Alternative monetary institutional policies of

H. P. Minsky and F. A. Hayek

The comparison of two alternative theories of inherent financial instability in a capitalistic economy

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Content

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1 Introduction

The initial idea for this thesis was born prior to and during the financial crisis of 2008. The first inspiration emerged from a special report of *The Economist* in 2006, which discussed how the emerging economic powers of Asia might not only reshape the international balance of economic might, but also the way that central banks would have to conduct monetary policy.

In this context, *The Economist* cited the chief economist of the Bank for International Settlements of that time, Mr. William White, in his prediction that the emergence of economies such as China, in particular, is tantamount to a positive supply shock of goods and services through the opening of additional markets, as well as technological innovation which drives down inflation rates and triggers a loose monetary policy through automatic inflation targeting and fear of deflation. This loose monetary policy might not be justified through a deflation that is not caused by a drop in demand but is instead the result of a positive supply shock. The answer to this kind of scenario is less likely to be found in a Keynesian monetary policy recipe than in an Austrian approach that takes account of the fact that this difference in the quality of deflation, combined with a loose monetary policy, will eventually result in an asset price bubble and the misallocation of resources. (Economist, 2006, pp. 27-28)

The next inspiration arrived in the form of an article in *The Wall Street Journal* from June 2007. The article revealed that the failure of the hedge fund Bear Stearns, which was highly invested in collateralised debt obligations (CDOs), might not be a singular case, but only "the tip of the iceberg". The remarkable feature of this article was that it dealt with the lethal combination of distorted asset valuation and the financing of these assets through increased leverage. The mispricing of risk thereby mainly referred to that of liquidity risk and the neglect of systemic risk through an inability to determine volatility of assets conclusively when they are relatively illiquid, as they are not frequently traded, and mathematical mark to model provides no conclusive answer either. What was envisioned, then, was a situation where a fire-sale might ensue that would result in a Fisher-style debt deflation of asset prices. This would fail to consolidate balance sheets, but instead would exacerbate the situation, since asset prices would fall more rapidly than firms would be able to decrease their leverage and thereby leave them with even higher debt ratios than before. (Lahart and Lucchetti, 2007, pp. 14-15)

As a further inspiration, another report in *The Economist* from 2009 dealt with the ways in which the financial crisis of 2008 might have an impact on economic theory. The two most important developments detected there are, first of all, the re-emerging prominence of liquidity and, with it, the re-emergence of concepts that take liquidity preference and the financial system as the core of their theory, such as in the case of Hyman P. Minsky. Secondly, the report casts doubt on "value at risk" (VAR) models, since critics like Myron Scholes are cited in their assessment that there often is no constancy in asset price volatility and that formerly uncorrelated asset prices suddenly become correlated in the situation of a crisis. (Economist, 2009, p. 71)

Therefore, what it all boils down to is the question of how the mispricing of assets results in economic crisis and that this mispricing of risk is first and foremost a mispricing of liquidity risk.

The final inspiration stems from a discussion between the Austrian school economist Thorsten Polleit and the Keynesian school economist Peter Bofinger, published in *Der Spiegel* in 2009. Whereas the Austrian economist emphasizes the danger of soaring asset prices and the neglect of this phenomenon by conventional monetary policy, which concentrates on prices of goods and services, the Keynesian economist emphasizes the importance of the central bank to provide liquidity as a lender of last resort to the banking system in the case of a crisis. The Austrian economist correspondingly refers to inflationary tendencies in asset prices, and the Keynesian economist refers to deflationary tendencies in the prices of goods and services. (Bofinger and Polleit, 2009, pp. 68-72)

The same dilemma about how monetary policy should be guided appears in the discussion between Polleit and Bofinger that was already mentioned in the special report of *The Economist* in 2006. Providing liquidity in accordance with a stable development of prices for goods and services might pose a dilemma when, at the same time, a surge in asset prices is neglected. This may sow the seeds of the crisis through an Austrian style misallocation of resources. The approach chosen in this thesis is therefore one where the post-Keynesian financial instability hypothesis of Hyman P. Minsky, which has liquidity preference as its core element, is compared to the Austrian business cycle theory of Friedrich A. Hayek, which, in contrast, has the misallocation of resources through distorted relative prices as its core element. From what can be learned from the financial crisis of 2008, it is assumed that only looking at these developments

from a post-Keynesian Minsky perspective might neglect the misallocation of resources and the causes thereof, whereas an exclusive Austrian perspective might neglect the importance that liquidity preference plays for the stability of the financial system, as well as for the central bank's role as a lender of last resort, in order to prevent a self-propelling downward spiral.

The reason the theories of Minsky and Hayek are chosen to be compared with one another lies with the fact that, as will be shown, Minsky provides a deeper understanding of how financial markets work and about the role that liquidity plays in this context, whereas Hayek provides a deeper understanding of how relative prices matter regarding the misallocation of resources. This understanding may in part also be provided by Ludwig von Mises, but, as will be shown in this thesis, the business cycle theory of Hayek is far more elaborate than that of Mises and surprisingly adaptable to an array of post-Keynesian concepts adopted by Minsky. Furthermore, it will be seen that the theories by both Minsky and Hayek regard the crisis to be an endogenous phenomenon of the capitalist economy and not the result of some external shock.

The approach chosen in this thesis is not of an empirical nature, but solely based on the comparison of the two alternative theoretical concepts, neither of which is of a formal mathematical nature. The comparison of arguments can therefore not exclusively remain within the realm of the two theories on which this thesis is focused, but has to go beyond that by also looking at where their respective arguments come from, in order to get an understanding about which concepts of their respective schools of thought retain a certain prominence and which of them are discarded or amended. This understanding is of importance in order to view the emergence and development of the two respective theories, not only as a necessary succession of ideas and concepts within a school of thought, but also as a critical view of the deficiencies in this school of thought and the resulting theories as concepts attempting to remedy these deficiencies. As will be seen, these perceived deficiencies and the attempt to rectify them may also serve as catenation points of the two theories, since pointing out these deficiencies is not only a matter of inter-school-of-thought debate, but also of intra-school-of-thought debate and criticism. The structure will first be guided by the intra-school-of-thought perspective, and the two theories will therefore be shown separately in their own right. Before the two respective theories can, however, be described to their full extent, it is important to lay the foundation by introducing the theoretical basis of the two theories from which they emerged. This is done by presenting the most important intra-school-of-thought

concepts on which these theories have been built. At the same time, references are being made to critiques emanating from within the school of thought, as well as from outside.

As will be seen, especially in the case of Hyman Minsky, the clear-cut categorization of its theoretic basis as post-Keynesian proves, however, to be impossible, since the basis consists not only of John Maynard Keynes, but also of Joseph Schumpeter and Irving Fisher, and, at some point, even the legacy of Henry Simons plays an important role for Minsky. The three major building blocks of the financial instability hypothesis are, however, to be seen firstly in Keynes's idea of a monetary economy, which provides the crucial concept of liquidity preference, secondly in Schumpeter's innovation, which also exerts itself on financial market innovation, and thirdly in the Fisher concept of debt deflation as a self-propelling deflationary mechanism. Other contributions that only play a role in very special institutional circumstances, like the 100 percent money doctrine by Henry Simons, or more technical aspects, like the macro sector aggregate accounting by Michal Kalecki, will be dealt with within the presentation of the Minsky theory, but not separately. Furthermore, as will be shown, the Minsky theory cannot be divorced from the institutional environment it is supposed to be applied to. Accordingly, capitalism may come in many forms, and the specific institutional characteristics matter, which is why the Minsky chapter also contains an account of the kind of institutional setting that has developed and has shaped the current form of capitalism. Finally, the remedies that the Minskyan theory provides for preventing and resolving a financial crisis, regarding the institutional architecture of monetary policy, as well as accompanying fiscal measures, will be shown.

On the other hand, the chapter on Hayek provides a more homogenous set of theoretical foundations, since it is exclusively Austrian school. It starts with Eugen Böhm-Bawerk and his contribution to Austrian theory of heterogeneous capital and roundaboutness of the production process, as well as the three reasons for the rate of interest. This is followed first by the concept of the natural rate of interest, contributed by Knut Wicksell, and then by Ludwig von Mises's use of the concepts of Böhm-Bawerk and Wicksell in establishing the first version of an Austrian business cycle theory. The marginalist contribution, as well as the imputation of prices by Carl Menger, will not be dealt with separately, but are instead subsumed under the chapter on Böhm-Bawerk, since the capital theory plays a far more prominent role in this thesis than the imputation of prices.

The presentation of Hayek's own business cycle theory will then be divided into the first version before its amendment, based on the critique of Nicolas Kaldor, which, in this thesis, is to be called Hayek's business cycle 1.0 and, after its amendment, is to be called Hayek's business cycle 2.0. Additionally, this thesis will discuss what kind of business cycle theoretical concept plays a role in modern Austrian macro today, before different and differing solutions will be introduced that are supposed to prevent a crisis from occurring, and which forces might help to resolve a crisis. In this regard, the position of Hayek and the consequences for the institutional architecture of monetary policy, as well as the role of fiscal measures that can be drawn from it, will be contrasted to other Austrian positions that are more in line with the business cycle theory of Mises.

Finally, the thesis culminates in the comparison that leads to the synthesis of the two theories of Minsky and Hayek. In the comparison, there will be a discussion of what crucial differences, but also what similarities, could be detected. The differences will then be discussed, regarding the question of whether they could serve as strengths, which make up for the other theory's weakness, and the similarities will be discussed, regarding their quality to serve as concatenating points in a synthesis. In order to make out these differences and similarities, the question of prices, the rate of interest, and the rational behaviour of both theories will be analysed. The discussion about prices will detail how prices are established and what role they play, regarding the allocation of resources. The interest rate discussion will consider whether it is only a monetary phenomenon or, also, in both theories, a real phenomenon that is definite and matters for the allocation of resources and the establishment of relative prices. The discussion will also analyse what kind of behaviour is assumed for the economic agents and in what way these assumptions differ from the rational expectations doctrine. Hence, it will analyse in what way there is room for behaviour under uncertainty in both theories. The first aspect of prices deals with the question of what kind of market form is assumed and, with it, whether the allocation of resources can be assumed to be efficient in a Pareto optimal sense at all in both theories. The second aspect of interest rates addresses the question of whether the inherent instability of the market economy could be resolved by setting the right interest rate that is in line with the concept of a natural or equilibrium rate of interest. The third aspect of rational behaviour then helps to understand how economic agents deal with uncertainty and whether this can lead towards an equilibrium position or rather distorts equilibrating tendencies.

The ultimate goal is the synthesis of two theories, which come from two very different ideological spectrums of economic thought. This requires cutting through the ideological rhetoric from both sides and bridging this ideological divide by showing where there is common ground, but also where a productive dialogue is hindered by unbridgeable theoretical differences or by ideology in the extremes of both schools of thought.

It is necessary to come up with a synthesis of both theories because both theories on their own appear to be incomplete. The Minsky theory predominantly deals with the stability of financial markets in connection with liquidity constraints, while the Hayek theory is mainly concerned with the misallocation of resources that is being induced by monetary causes, which distort relative prices. The following thesis shows that the particular explanatory advantages of the two theories, as well as their similarities, do not only make it worthwhile to compare them, but also provide the basis for a synthesis of the two theories.

2 The financial instability hypothesis of H. P. Minsky

According to Minsky, the financial instability hypothesis primarily rests on the shoulders of Keynes and is to be perceived as post-Keynesian, in contrast to any Keynesian neoclassical synthesis. Yet, at the same time, it does not singularly follow the ideas of Keynes. (Minsky, 1986a, pp. xiii-xiv, 104, 138). The other influences mentioned by Minsky that are of importance in developing the financial instability hypothesis are Keynes's "General Theory", Irving Fisher's debt deflation, and Henry Simons contributions to monetary policy (Minsky, 1986a, p. 172). Instability can therefore also be defined as an institutional architecture of monetary policy, which diverges from the 100 percent money doctrine of Henry Simons. According to Huerta de Soto, this doctrine is mostly in line with the Austrian school 100 percent money approach, with regard to the fact that banks have to provide a hundred percent reserve backing for demand deposits and that banks, in accordance with this doctrine, merely resemble warehouses for deposits, which prevents any kind of fiduciary media creation in the sense of a fractional reserve currency by credit money creation (Huerta de Soto, 2012[2011], pp. 731-732). Hence, not surprisingly, the financial instability hypothesis furthermore rests upon the Schumpeterian way of thinking about finance and money from the perspective of credit money creation (Minsky, 1992, p. 2). This link between financial instability and the institutional setting of money and finance becomes apparent when Minsky refers to Schumpeter's innovation, not only in the sense of real economy innovation, but also in the sense of financial market innovation. The institutional setting of the money economy, as Schumpeter saw it, is innovative, since it develops new ways of financing that then translate itself into real economy innovation (Minsky, 1988, p. 18). The financing of real economy innovation, however, creates a dynamic that leads to an "explosive business cycle" and not to a situation of stable growth (Minsky, 1988, p. 11). It thus leads to instability. The financing of innovation and the dynamic of the system, however, depend on credit money creation and therefore an endogenous money supply (Minsky, 1988, p. 10). The dynamism and also the instability of the economy is therefore established by an institutional architecture of a monetary system, which does not follow the 100 percent money doctrine in which investment necessarily equals prior saving, but one in which credit money creation closes the financing gap between planned saving and planned investment.

In order to follow the traits of thought that finally lead to the financial instability hypothesis of Hyman Minsky, it is first important to introduce the most significant

influences and the impact they had on the theory at hand. After this, the theory itself will be introduced in connection with the development of the institutional structure of capitalism, since, according to Minsky, the resilience, and also the fragility, of capitalism depends on its institutional setting (Minsky, 1991b, p. 10). The Minsky theory can therefore not be divorced from the institutional setting to which it is applied. Finally, there will be an analysis of what kind of institutional reform is envisioned from a Minskyan perspective in order to increase the system's stability.

2.1 Economic theory foundations by Keynes, Schumpeter and Fisher

In order to establish the foundation of the Minsky theory, it is important to first have a look at the three most important sources of influence from a perspective that is true to the one adopted by Minsky himself. The perspective chosen is therefore post-Keynesian, since Minsky sees himself and his theory as part of the post-Keynesian school of thought. The authors to be cited in this regard are therefore predominantly post-Keynesian authors, in order to shed light on the interpretation of the Minsky foundation from a post-Keynesian school of thought perspective. The analysis starts with Keynes and the importance that the post-Keynesian school of thought assigns to the role that money plays in exercising its influence on the real economy by its various functions and qualities. The core question that is being addressed at first is thereby whether money is something that is exogenously provided or whether it is something that is endogenously created and what consequences these two diverging characteristics may have for the phenomena of liquidity risk and liquidity preference. Secondly, it is being assessed how liquidity preference exerts its influence on the level of investment and, consequently, employment. The analysis of Joseph Schumpeter then deals with the interaction of financial innovation and real economy innovation and how the Schumpeter business cycle can be interpreted from a post-Keynesian perspective. The chapter on Irving Fisher finally deals with the self-propelling mechanism of debt deflation that is crucial for the understanding of the unhampered downfall of the economy in the Minsky theory if certain interventionist measures by the state do not take place.

2.1.1 Keynes's monetary economy

Money, according to Keynes, from a post-Keynesian perspective:

> "A monetary economy, we shall find, is essentially one in which changing views about the future are capable of influencing the quantity of employment and not merely its direction." (Keynes, 2011[1936], p. vii)

This statement from the preface of *The General Theory* conveys Keynes's crucial message that money plays its role in influencing the real economy to a great extent. Kregel points out that this is the central message taken up by post-Keynesian economists in their interpretation of Keynes:

> "Unlike other postwar interpretations, the post-Keynesian approach starts with a "monetary" theory of production. Keynes introduces this terminology to emphasize the fact that money was not a "veil," but a "real" factor determining production decisions in a modern economy." (Kregel, 1998, p. 111)

The difference in interpretation of what money is and what its functions in an economy are is decisive in how money is perceived in its effect on the economy. As mentioned by Keynes in chapter 17 of *The General Theory*, money is an asset like no other. Unlike in orthodoxy, money, according to this interpretation, is not primarily a medium of exchange from a barter economy that serves as a veil concealing the real value transactions by nominal figures. According to Davidson, Keynes follows a broader interpretation that entails two basic functions of money, which are "[...](1) money is the *means of contractual settlement* and (2) *money is a store of value*, i.e. a vehicle for moving purchasing power over time - a time machine. This time machine is known as liquidity" (Davidson, 2006, p. 141). Alternatively, as Wray puts it, "[...] Keynes [...] emphasized the holding of money as a safe asset in a world of uncertainty" (Wray, 1990, p. 11). The role of uncertainty will be further elaborated upon in the light of liquidity preference at a later point.

Furthermore, money, according to Wray, (1990, p. 6) is seen by Keynes as a unit of account, which could also be wheat or any other asset (Keynes, 2011[1936], p. 227), and as credit money in *A Treatise on Money* (Keynes, 1971[1930], p. 21), which is also emphasized by Davidson when it comes to the fulfilment of contracts (2006, p. 141):

> "A hoard of money increases individual security, whether that hoard is merely in terms of corn or in the terms to the right of another's reserves which is given by holding an IOU. [...] To summarize this position, money is a unit of account, created when property arises and an individual becomes a creditor or potential creditor " (Wray, 1990, p. 8).

Money, in this sense, predates markets but requires property rights (Wray, 1990, p. 9). The focus lies therefore, not on market exchanges of a barter economy, but instead on securing and possibly enhancing property positions by the usage of debt and credit. The credit money is therefore, according to Moore, not a commodity money or only a fiat money. It is not a commodity money in the sense of gold with an intrinsic value (Moore, 1988, p. 15) nor is it only a legal tender accepted by the government, as with fiat money. Instead, money, in a broader sense, is often just a promise on fiat money as an IOU (Moore, 1988, pp. 18-19).

However, the difficulty of a broader money definition that includes credit money is the fact that such a money is seen to be endogenous, which collides with Keynes's view in *The General Theory* that money is exogenous, since it is something that cannot be produced (Keynes, 2011[1936], p. 235). In other words, the supply curve for money is vertical and does not accommodate changes in the demand for money. However, credit money is, according to Moore, something that is produced by banks. As he renders, the orthodox proposition of deposits make loans to be invalid, and it is in fact the other way round, for example, loans creating deposits. Banks are, according to Moore, not the initiators of credit and do not wait for excess reserves to accumulate before giving out loans. Instead, by his judgement, they are passively accommodating whatever demand for money there might be. Hence, the supply curve for money is not vertical but horizontal (Moore, 1988, pp.45-46).

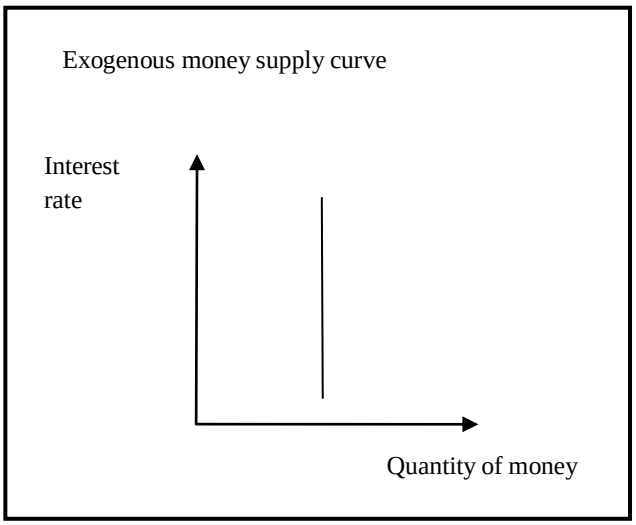

Figure 1: Exogenous money supply curve

Source: Own graph

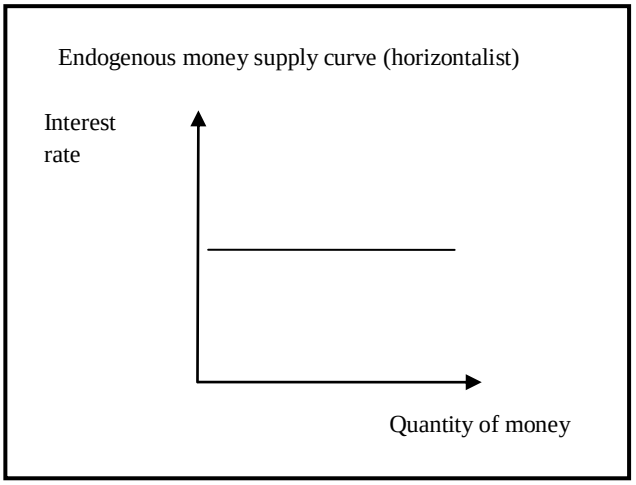

Figure 2: Endogenous money supply curve (horizontalist).

Source: Own figure.

According to this position, banks simply follow their credit customers' lead, as long as the spread between lending rate and borrowing rate is sufficient to provide a profit and, thereby, to satisfy the cost of risk for credit default risk, risk of contractually sticky interest rates (for contractually fixed interest rates on loans), and liquidity risk (Moore, 1988, p. 48).

Whereas the first two mentioned risks can be covered by a mark up, the liquidity risk is covered by holding cash or liquid assets, which do not earn as much as the usual credit business and therefore reduce the overall profitability, creating a trade-off between risk and profit. The liquidity reserves required by the bank thereby depend on the risk alertness regarding required liquidity and the reserves that the loans create within the bank itself.

As a monopoly bank will see no leakages of reserves from created loans, banks in a more competitive environment might face relatively high leakages of deposits moving to other banks. Furthermore, it is argued that the inter-bank money markets are so sophisticated that borrowing of reserves at will are not an obstacle under normal conditions and that, in the case of a breakdown of inter-bank lending, the central bank will take over the role of lender of last resort and will accommodate any demand for reserves (Moore, 1988, pp. 47-52). Moore proves this last point by using statistics of the Federal Reserve's behaviour in changes of the money base, or so-called high-powered money[1]. The conclusion of his assessment is that the central bank cannot reduce the level of credits as long as it has no direct control over the emission of credits and that it has to provide reserves to the banks, unless it is willing to risk the stability of the entire system. The only thing it can do is to decide upon the price, i.e. the interest rate at which reserves can be obtained (Moore, 1988, pp. 97-107).

This endogenous credit money, however, is a predicament when it comes to the question of whether it can be related to Keynes's perception of money, which says that money cannot be produced. Moore therefore uses an entire chapter to point out where traces and hints of an endogenous money can be found in Keynes's writings. In the end, the assumption is highly speculative because, if Keynes had lived the full extent of normal life expectancy, he surely would have come up with an endogenous money at some later point in his life (Moore, 1988, p. 204).

Other speculations are of a different kind, as Wray points out that Joan Robinson assumed that Keynes might not have used an endogenous money in order to avoid another point of assault from his critics, which might provide them with the excuse to disregard *The General Theory* because of an endogenous money approach and thereby frustrate the reception of more crucial points (Wray,1990, p. 123), such as, for example, the liquidity preference:

> "It would have been much simpler to start by assuming a constant rate of interest and a perfectly elastic supply of money. But then his whole case would have been dismissed as a misunderstanding of the orthodox position." (Robinson, 1971, p. 82)

[1] This expression of high-powered money is regarded to be similar to what is often called central bank reserves, which are in fact liabilities of the central bank towards business banks and also similar to the expression of outside money versus inside money as credit money created by banks.

Robinson continues, "He was obliged to accept the presumptions of his critics in order to explode them from within." (Robinson, 1971, p. 82) Robinson therefore supports Wray's position that Keynes used the exogenous money approach not because it was vital for making the case of liquidity preference as interpreted by Steele, but because he wanted to provide a level playing field for his critics that helped him to beat them at their own terms.

Moore gives a few hints that endogenous money actually plays a role in Keynes's work, although not explicitly. He indicates that, according to Keynes, the relation between *A Treatise on Money* and *The General Theory* should be seen as one in which *The General Theory* is not something that substitutes *A Treatise on Money*, but rather something that complements it (Moore, 1988, p. 178). In *A Treatise*, Moore particularly makes out some very strong hints towards an endogenous money in the form of a credit money creation of banks to accommodate business operation (Moore, 1988, p. 188). Similar claims are made by Moore for *The Tract on Monetary Reform*, in which Keynes describes how central banks are able to be and should be pragmatic enough to show some flexibility in covering issued notes with gold in a gold standard system (Moore, 1988, p. 183). The view by Moore might be debatable, since there are clear contradictions between the two books that Keynes himself mentions. For example, regarding the natural rate of interest, whereas, in *A Treatise*, there is one equilibrium, or natural rate in a Wicksellian sense, in *The General Theory*, there are many possible equilibria, or natural rates of interest (Keynes, 2011[1936], p. 242). This could be seen as proof that Keynes was still in the realm of classical interest rate determination of loanable funds when writing *A Treatise*. However, claiming an endogenous money for *A Treatise*, as Moore does, might contradict the loanable funds orthodoxy if it has to assume a constant and exogenous money, which ensures a specific equilibrium of saving and investment at a specific equilibrium rate of interest that is governed by the scarcity of loanable funds, i.e. money being saved.

It becomes obvious that there are two different interpretations regarding the potential misunderstanding of the orthodox position. According to Steele's understanding, without an exogenously fixed money supply, the whole point of a price for money, i.e. interest changing with the demand for money, is lost (Steele, 2001, p. 70). Wray points out that the same argument is made by some post-Keynesians as well (Wray, 1990, p. 156). With endogenous money, the liquidity preference is just not visible anymore, since it simply has no interest rate effect whatsoever when an increased demand for

money will be fully accommodated at the central bank's interest rate. Yet, the interpretation of Wray seems to be more about the misunderstanding of endogenous money as a heresy in the eyes of orthodoxy, potentially precipitating the refusal of *The General Theory* in the eyes of orthodoxy. This is an important difference because, unlike for Steele, according to Wray, the liquidity preference theory is even strengthened by the assumption of an endogenous money.

The picture painted by Moore remains inconclusive and speculative, since Wray points out that, even though endogenous money would, in his view, endorse the arguments Keynes establishes in *The General Theory*, it still is not an endogenous, but an exogenous, money used in *The General Theory* (Wray, 1990, p. 122). Steele shares this point, but, in Steele's version, the exogenous money is a precondition for the elaboration of the liquidity preference, and he uses the same citation by Joan Robinson, which Wray uses to make his claim about why Keynes used the exogenous money to defend *The General Theory* from undue criticism (Steele, 2001, p.70). The point of misunderstanding in rendering the liquidity preference as invalid in the face of an endogenous money is, according to Wray, to confuse liquidity preference with demand for money in the broader sense of credit money or IOU's (Wray, 1990, p. 186). The creation of credit money cannot satisfy liquidity preference. The point being made by Wray is that the additional creation of debt, i.e. credit money, cannot be fully elastic to demand, since the leverage ratio increases the cumulating risk of loans being issued:

> [The][...] "money supply curve is not horizontal at a given rate of interest because banks face uncertainty. Banks are concerned with the ratio of loans to safe assets such as government bonds plus reserves, and with the ratio of loans to equity. Should borrowers default on loans, liquidation permits banks to meet payment commitments temporarily, while equity allows banks to absorb loan losses." (Wray, 1990, p. 179)

This leads to a refusal of Moore's position that there is a relatively constant mark-up or spread that is primarily determined by the central bank's discount rate, combined with the relative market power of banks, at which banks are able to refinance and that it is the negligence of uncertainty that leads to the fallacy of a constant mark-up theorem (Wray, 1990, p. 179).

This dissent within post-Keynesian economics is known as the accommodationists/ horizontalists versus the structuralists debate. According to Lavoie, the

accommodationists/ horizontalists position is described as follows: "The supply of credit, for a given risk classification, is a horizontal line." (Lavoie, 2006, p. 25) However, his argument is that the debt to equity ratio is in itself an endogenous phenomenon that cannot be determined by "individual agents", and it therefore cannot be handled from a microeconomic perspective that is being extrapolated onto a macroeconomic level. According to Lavoie, there simply is no objective connection between levels of economic activity and debt to equity ratios (Lavoie, 2006, p. 25). According to the accommodationist/horizontalist view, there is no need for liquid assets, since overdraft facilities will always ensure the fulfilment of payment obligations. This, however, rests upon the assumption that these overdraft facilities will be available, which might not always be the case (Dow, 2006, p. 44). The counterargument against the accommodationist/horizontalist view is that the creation of credit money itself leads to such rising debt to equity ratios and thereby increases the perceived risk.

This goes right to the heart of Keynes's liquidity preference. According to Keynes, the motives to hold liquidity are:

a) "The income-motive":

   Covering the time gap between receipt of income and meeting payment commitments.

b) "The Business-motive":

   Covering the gap between cash inflow and cash outflow, created by turnover and incurred costs and expenses of erection and production.

c) "The Precautionary motive":

   Providing a buffer against unforeseen cash outflows (either for risk or opportunity reasons) or unforeseen gaps between cash inflows and cash outflows, such as, for example, for debt servicing.

d) "The Speculative-motive" (Keynes, 2011[1936], pp. 195-196):

   [...] "the object of securing profit from knowing better than the market what the future will bring forth." (Keynes, 2011[1936], p.170)

It is an inverse reaction of liquidity preference, in relation to changes of the interest rate, which are brought about by (expected) changes in prices of bonds and debt and their

inverse relation to the interest rate. This rests upon the assumption that, as soon as the opportunity cost of holding cash is lower than that for the holding of bonds, it is more favourable to hold cash rather than bonds because the holding of bonds incurs a loss, due to a reduction in value of the bonds and a respective increase of the interest rate (Keynes, 2011[1936], p.169). To be precise, the critical interest rate at which the holding of liquidity would be more favourable than the holding of bonds would be at the point when the expected decrease in value of the bond exceeds the obtained income from interest (Felderer and Homburg, 2005[1984], p. 123).

However, an additional predicament could be the requirement to turn the bond into cash because there is a need for cash before maturity of the bond. The estimation that would need to be made would be the likelihood of the occurrence of such an event and the likely future interest rate at that point in time, both of which are, according to Keynes, within the realm of uncertainty. (Keynes, 2011[1936], p. 169)

The two first above-mentioned motives for holding liquidity are subsumed by Keynes as the "transaction-motive", whose magnitude of liquidity preference is the same as the "precautionary-motive" in that it depends largely upon the aggregate income level (Keynes, 2011[1936], p. 196). However, the precautionary motive also serves the purpose of meeting unforeseen cash flow imbalances that might require going into debt. The inability to do so, because there is no market that provides loans, increases the magnitude of liquidity preference for precautionary reasons. In contrast, the existence of a ready market for loans carries the potential for a large magnitude of liquidity preference, induced by the speculative motive. (Keynes, 2011[1936], pp. 170-171)

Taking up the three above-stated factors of risk for a bank mentioned by Moore (i.e. credit default risk, risk of contractually sticky interest rates, and liquidity risk) in the light of Keynes's liquidity preference, the following categorization can be derived. First of all, there is a risk that cash flow imbalances will emerge because of probable credit defaults, or secondly, a combination of sticky interest rates on the cash inflow side of interest payments to the bank and interest rate changes on the bank's refinancing side, i.e. cash outflows of interest payments from the bank, the interest rate risk, causing varying cash outflows for interest payments, which both result in the risk of a bank to default on its own obligations. Thirdly, the bank might not be able to service unforeseen cash imbalances by using existing liquidity or going into debt, which constitutes the risk of becoming illiquid.

In line with Keynes aforementioned concept, the first two risks require holding liquidity in accordance with the speculative motive for covering changes in expected value development of financial assets, caused by probable changes in debt valuation and interest rate changes. The third risk requires the holding of liquidity in accordance with the precautionary motive for covering the default risk brought about by unforeseen cash flow imbalances and the threat of not being able to go into debt to cover these imbalances.

Yet, according to Wray, if liquidity preference is seen as the hoarding of cash, there really should be no need for banks to hold liquidity for meeting payment obligations, since the central bank usually acts as a lender of last resort should overdraft facilities in the interbank lending not be available (Wray, 1990, p. 164).

Hence, once the third risk of illiquidity is covered by the availability of liquidity at any time, the requirement to hold liquidity out of speculative reasons also breaks down, since liquidity may be accommodated by instant fiat money creation, regardless of whether it is required for speculative or precautionary reasons. In other words, if the central bank as a lender of last resort accepts financial assets as collateral for refinancing, the value of these assets is not governed by market valuation of debt and default risk but by the acceptability of the asset as collateral by the central bank. As will be shown at a later point in this thesis, the acceptability by the central bank may vary in absolute terms, as well as in relative terms. 'In absolute terms' means that certain assets might not serve as collateral at all, and 'in relative terms' means that the discount rate charged by the central bank may vary and prevent acceptability at par.

The point is that the relationship between the demand for liquidity to finance flows and the interest rate is more indirect because the creation of credit money leads to an expansion of the balance sheets of banks, and liquidity preference should be perceived as a preference of holding short-term assets versus long-term assets (Wray, 1990, p. 164). Short-term loans are created by banks to finance business endeavours, which, once their erection is completed, are issued as long-term bonds on the market. The initial creation of credit money has created corresponding deposits, or, as in Keynes's world investment, has created saving. In order for the deposit holders to exchange their deposits for long-term bonds, a premium has to be offered that compensates for the perceived risk of a longer-term commitment (Wray, 1990, p. 165). With a given liquidity preference, banks may expand their balance sheets, as long as their perceived

risk is not impaired by the impression that the level of leverage, i.e. the debt to equity ratio, is in any way diverging from conventions or conventional wisdom to which they are accustomed or become newly accustomed to as these conventions accommodate the new level of indebtedness (Wray, 1990, p. 166). The problem, however, arises as soon as these conventions are increasingly violated or are subject to changes, and current levels of leverage are not being perceived as within the range of conventional wisdom anymore. Banks and households would therefore require a higher interest rate premium for holding long-term bonds to compensate for the increased perception of risk. Alternatively, at a given liquidity preference, the central bank decides to increase interest rates for the banks' refinancing facilities and thereby fuels the expectation of falling financial asset prices and again banks and households holding long-term bonds would require an increase in the interest-rate premium to make up for the loss in asset value (Wray, 1990, p. 168). The consequence of both scenarios is that banks and households wish to exchange long-term bonds for more liquid short-term positions, since the interest rate premium on long-term debt is not sufficient anymore to cover the increased perceived risk. Liquidity preference is therefore reinterpreted as a premium required for the holding of long-term assets instead of short-term assets, which involves the necessity that usually short-term interest rates are below long-term interest rates (Wray, 1990, p. 164).

The increase of the interest rate premium for long-term assets is therefore induced by a violation of conventional wisdom, by a change of conventional wisdom that renders certain levels of leverage increasingly imprudent, or by a change in the central bank's interest rate policy. In any case, rising interest rates, short-term and long-term, are the consequence and thereby increase the interest rate risk for investment banks that underestimated the liquidity preference in their spread calculation and who now have to try to compensate the cash flow imbalances (Wray, 1990, p. 167). This increases the risk of default because all banks are trying to swap long-term assets for short-term assets and are attempting to shorten the balance sheets by reducing the burden of debt (Wray, 1990, pp. 163-164). Hence, banks will refrain from creating new credit money by issuing loans, since these again create deposits which would undermine their attempt to shorten the balance sheet.

In order to reconcile horizontalists with structuralists, Wray makes the point that the misunderstanding between the two is simply that the horizontalist money supply curve is to be understood as a point in time, and increasing risk margins can be represented by

upward shifting horizontal supply curves, whereas the structuralist money supply curve is upward sloping, due to the fact that it depicts a development over time (Wray, 2007a, p. 14).

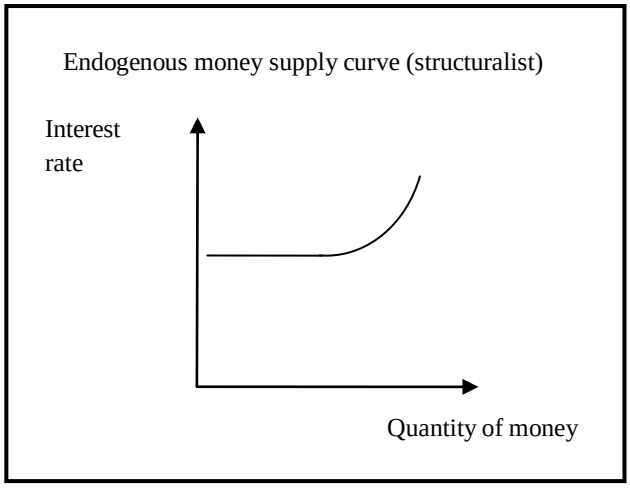

Figure 3: Endogenous money supply curve (structuralist).

Source: Own figure.

Nevertheless, as the risks increase with a rising ratio of debt to equity level that goes beyond conventional wisdom, the mark-up to cover the rising risk also has to increase at any risk category that might be governed by any convention, which in turn might be determined by any degree of optimistic or pessimistic expectation. The structuralist endogenous money supply curve is therefore only horizontal to a certain degree, after which it is upward sloping. In this regard, the endogenous money supply from a structuralist stance indeed validates the argument for a liquidity preference, without any necessity to resort to an exogenous money supply.

Liquidity preference as the crucial arbiter of investment

The liquidity preference hinges, as mentioned above, upon the assumption that there is a perceived risk and, furthermore, that this risk comes out of the realm of uncertainty. Fontana describes what that means from Keynes's perspective on the basis of *A Treatise on Probability*. The central relation in this regard can be seen in the degree of perceived likelihood between reason and effect. The reason then represents the evidence h for the conclusion a of a certain effect, resulting in an assumed likelihood p that there is such a relation of reason and effect $p = a/h$ (Fontana, 2006, p. 438; Keynes, 1973[1921], p. 145). Since it is an assumed probability and not a real objective probability, it is

subjective, but it is objective in the way that, given the same evidence and the same ability for logical deductions, two individuals would come to matching probabilities. New evidence, however, does not change the probabilities, but evokes a new set of assumed probabilities and does not increase any knowledge about objective real probabilities. (Fontana, 2006, p. 439)

According to this concept, assumed likelihoods ranging from $p = 1$(certainty) over $0 < p < 1\ with\ a\ high\ p$ (risk) and $0 < p < 1\ with\ a\ low\ p$ (relative uncertainty) towards $p\ non\ existent$ (complete uncertainty). The relative uncertainty is based on the fact that there is often a logical relation of reason and effect being assumed. However, the weight of the argument is weak because the information on evidence is little and relatively incomplete, and an increase of available evidence might even increase the perceived incompleteness of information as matters suddenly appear a lot more complex. (Fontana, 2006, p. 440; Keynes, 1973[1921], p. 145)

For complete uncertainty, no assumed likelihood can be established because the evidence is entirely inconclusive (Fontana, 2006, p. 442).

Certainty and risk probabilities of a higher magnitude, in this context, correspond with rational expectations of objective likelihoods, which is, however, according to Keynes, a situation that cannot possibly be achieved, since a society does not consist of atomistic entities with identical properties in which the knowledge about the probabilities of evidence and conclusion could be assigned to other entities because individual psychologically determined factors render this to be impossible. (Fontana, 2006, pp. 445-446)[2]

The uncertainty comes in two different qualities. The relative uncertainty comes into play when economic agents know that there will be payment obligations, and this requires liquidity, but the likelihoods of possible cash flow imbalances are relatively uncertain, due to possible but unforeseeable market fluctuation. The complete uncertainty arises when there is no conclusive evidence whatsoever about which direction the economy might go, and therefore, investment projects are put on hold. (Fontana, 2006, pp. 448-451)

[2] There seems to be, however, a logical flaw in Fontana's argument that certainty and risk probabilities of a higher magnitude correspond with rational expectations of objective likelihoods as that would imply that assumed probabilities and objective probabilities were identical, which would mean that the aforementioned possible divergence of assumed probabilities and objective probabilities were not to be the case with certainty and risk probabilities of a higher magnitude as for these cases complete information is assumed to be given.

The two degrees of uncertainty are of a different quality, since the first makes the risk assessment of known risks a tough choice because reason and effect relations are known but their corresponding probabilities are based on a very thin informational basis. The second degree of uncertainty makes it impossible to even establish any likelihoods of risk, since there is sheer disorientation because the known information does not provide any indication about probable developments.

The importance of these uncertainties lies within the fact that they are the cause for liquidity preference, depending on the magnitude of perceived uncertainty. As to the question of why this is of importance for the overall level of economic activity through investment, the next step is to analyze where Keynes sees the incentive to invest. This then leads to the concept of capital. The concept of the marginal efficiency of capital assumes that any investment generates a series of annuities that constitute the prospective yield of a project. This prospective yield has to be put in relation to the initial supply price of the capital goods required for this project. To do so, an internal rate of return method is used, which calculates a discount rate for the present value of yield and expenses for capital goods being equal (Keynes, 2011[1936], p. 739; Trautwein, 2010, p. 48). In other words, a discount rate is calculated when the capitalization of the investment is zero (Horngreen et. al., 2001[1997], p. 739).

> "The reader should note that the marginal efficiency of capital is here defined in terms of the *expectation* of yield and the *current* supply price of the capital-asset." (Keynes, 2011[1936]. p. 136)

This citation provides two important pieces of information. Firstly, the prospective yield is just an expected figure, and the relation between the prospective yield and the supply price of capital are determined by price. The conventional wisdom of financial controlling provides for the avoidance of disappointments regarding the expected yield the possibility to calculate a statistical expectation value, which works in such a way that different scenarios of yields are attached to likelihoods in accordance with a Gaussian distribution, where the highest and the lowest yields receive relatively small likelihoods, and the moderate yields receive the highest likelihoods. The expectancy value is the weighted average of these yields, weighted by their respective likelihoods. (Horngreen et. al., 2001[1997], p. 84)

These assigned likelihoods are, however, subjectively assigned and at best derived from historical figures, which do not necessarily have anything to say about future

developments and therefore cannot avoid the phenomenon of uncertainty. As Kregel puts it:

> "In place of the "statistics" that provide the expectations of the parameters of the distribution of the population of events, Keynes instead introduces convention, self-reference, reflexivity, and self-reinforcing processes, which may quickly jump from one conventional view to the other [...]. The processes that form the expectations need not be uncertain, they may be perfectly known and discoverable-indeed, that is what his theory of probability was meant to do. Yet, they do not produce predictable behavior [...]. [...]The generating function may be perfectly known, yet its realizations may not be statistically predictable." (Kregel, 1998, p. 118)

Hence, the application of demand elasticity and expectation values through statistics for the prediction of prospective yield is a fully comprehensible vehicle to form probabilities, but it is not fit to predict future events. It simply serves the practice that recent historic figures are being extrapolated into the future and thereby creating expectations based on conventions that might be subject to change and not objectively given probabilities.

Secondly, the essential characteristic of the prospective yield comprising of annuities is that these are not a marginal productivity of capital (Minsky, 1975, p. 96). In contrast to neoclassical investment demand functions, whose marginal rate of productivity reflects the physical scope of production in accordance with the governing technical input-output relations shown by the production function (Trautwein, 2010, p. 46.), the marginal efficiency of capital depends on value through prices (Keynes, 2011[1936], p. 138).

> "Now it is obvious that that the actual rate of current investment will be pushed to the point where there is no longer any class of capital-asset of which the marginal efficiency exceeds the current rate of interest." (Keynes, 2011[1936], p. 136)

Hence, any investment project whose marginal rate of efficiency is above or equal the market rate of interest will be undertaken. The following citation from Minsky conveys

exactly the same message, but from the capitalization perspective that is formulated by Keynes in an equal manner (Keynes, 2011[1936], 137).

> "The market price of a capital asset that is a substitute in production for an investment output must be equal to, or greater than, the supply price of the investment good if the investment good is to be produced." (Minsky, 1986a, p. 179)

The market price of capital hereby is nothing else but the capitalized value of the prospective yield, discounted by the ruling market rate of interest (Minsky, 1975, p. 97).

> "Whereas the productivity of a capital asset in conventional theory is technologically determined, the current scarcity yield of a capital asset depends upon the varying fortunes of industries, locations, and business conditions." (Minsky, 1975, p. 96)

Minsky also recognizes this crucial difference between marginal productivity and marginal efficiency and refers to another aspect brought forward by Keynes, which is that it is the scarcity of a capital asset that renders it valuable.

> "It is much preferable to speak of capital as having a yield over the course of its life in excess of its original cost, than as being *productive*. For the only reason why an asset offers a prospect of yielding during its life services having an aggregate value greater than its initial supply price is because it is kept *scarce*; and it is kept scarce because of competition of the rate of interest on money. If capital becomes less scarce, the excess yield will diminish [...]" (Keynes, 2011[1936], p. 213)

The scarcity of capital employed is therefore caused by the existence of the interest rate. An interest rate of zero would lead to the realization of investment projects with a marginal efficiency or respectively a capitalization of zero.

However, as mentioned before, money is a unit of account, and any other asset could also obtain such function. Hence, it has to be clarified what is the singular property that qualifies money to be an asset like no other, able to govern the extent to which investment projects are being realized.

> "The first characteristic [...] is the fact that money has, both in the long and in the short period, a zero, or at any rate a very small, elasticity of

> production so far as the power of private enterprise is concerned, as distinct from the monetary authority; - elasticity of production meaning [...] the response of the quantity of labour applied to producing it to a rise in the quantity of labour which a unit of it will command." (Keynes, 2011[1936], p. 230)
>
> "The second differentia of money is that it has an elasticity of substitution equal, or nearly equal to zero; which means that as the exchange value of money rises there is no tendency to substitute some other factor for it; [..] (Keynes, 2011[1936], p. 231)

The consequences of these two statements come to light when the own rate of interest approach is being applied. According to Keynes any asset can generate a total return consisting of its yield q, subtracted by its carrying costs c, and added by its liquidity premium l. The yield is a prospective yield, measured in the assets' own unit of account; the carrying costs are depreciations out of deterioration of the asset, such as, for example, wheat getting stale over time, which are also measured in the assets' own unit of account; and the liquidity premium, which is derived from the fact that the asset can serve as an insurance against the risk or inconvenience of being in short supply. (Keynes, 2011[1936], p. 226)

To simplify the argument, Keynes uses three different assets, with an exclusive assignment to each variable of the aforementioned formula. First, there is a capital asset that generates a yield q_1, while the other two variables are of minor importance and are therefore being neglected. Secondly, there is wheat, which only incurs a carrying cost c_2, and thirdly, there is money, whose only benefit is the liquidity premium l_3 because it does not produce any yield by itself, nor does it incur any carrying costs, at least as long as no inflation is assumed. Since these assets are denominated in their own unit of account, a money appreciation or depreciation factor a_1, for the capital asset, and a_2, for wheat, are necessary to denominate the variables in their expected future money price and thereby to make them comparable. The new return formula, denominated in money, for the capital asset is therefore $a_1 + q_1$, for wheat $a_2 - c_2$, and the liquidity premium remains l_3. Should any of the three mentioned assets generate a higher return than the others, demand will switch to that very asset, as long as there is an arbitrage effect. Hence, in equilibrium, all returns should be equal. (Keynes, 2011[1936], pp. 227-228)

What comes into play now, is the fact that money has a zero elasticity of production, as an exogenous thing issued by the central bank. Secondly, there is no elasticity of substitution either. In the face of a high liquidity preference, that would mean that $l_3 > a_1 + q_1;\ a_2 - c_2$. Since the elasticity for production of money is low, the high value of money does not lead to an increase of it, and since the elasticity of substitution is low, even if an increase of money production occurred, this would not drive down l_3 in relation to the other returns because the liquidity preference can only be satisfied with money.

> "Thus, not only is it impossible to turn more labour on to producing money when its labour-price rises, but money is a bottomless sink for purchasing power, when the demand for it increases, since there is no value for it at which demand is diverted - as in the case of other rent-factors - so as to slop over into demand for other things." (Keynes, 2011[1936], p. 231)

Hence, if an increase in the volume of money occurred, it would not drive down its own rate of interest. The alternative to fulfil the arbitrage effect is then that the appreciators a_1 and a_2 have to increase. (Keynes, 2011[1936], p. 228)

> "In other words, the present money-price of every commodity other than money tends to fall relatively to its expected future price. Hence, if q_1 and $-c_2$ continue to fall, a point comes at which it is not profitable to produce any of the commodities, unless the cost of production at some future date is expected to rise above the present cost by an amount which will cover the cost of carrying a stock of product now to the date of the prospective higher price." (Keynes, 2011[1936], p. 228)

In this context, the rate of return, or own-rate of interest, of any asset denominated in money is nothing but the differential between its spot price and its forward price (Keynes, 2011[1936], p. 222), and it changes as expectations about the future change (Kregel, 1985, p. 135).

According to Wray and Tymoigne, expectations have contrary effects on the own-rate of assets, depending on whether they are of an optimistic relative certainty or a pessimistic relative lack of confidence. The former expectations have an increasing effect on q and a lowering effect on l, due to an increased marginal efficiency of the

capital asset and a diminished liquidity preference, which makes the production of q-related assets more attractive. The latter kind of expectations, on the other hand, diminish q and enhance l, due to a decreased marginal efficiency of the capital asset and an increased liquidity preference. (Wray and Tymoigne, 2008, p. 6)

The q is, however, not the marginal efficiency of a capital asset, which would be $a + q$, because the marginal efficiency of capital, in the sense of Keynes, does not represent physical productivity, but rather physical productivity denominated in money terms, and hence evaluated by the price system.

The variable q instead measures the output of some asset in its own unit (Keynes, 2011[1936], p. 225). It is therefore a unit of physical productivity and not of productivity measured in money units. Hence, it is not the physical unit q, but the monetary unit a, that rises in correspondence with optimistic future expectations and that falls with pessimistic future expectations. Assuming diminishing marginal physical productivity with an increasing production of a capital asset, its q falls, and, to maintain production at a given set of expectations, the appreciator a has to increase in order to compensate for the diminishing q. In the case of growing uncertainty, the appreciator a has to increase even more, in order to compensate not only for the diminishing q, but also for the increasing liquidity premium l. Hence, there would have to be a rising gap between spot prices and expected future prices, which is something very unlikely to occur in a state of (pessimistic) uncertainty.

Kregel explains, "Marginal efficiency and liquidity preference reflect the views of the future or the state of general expectation." (Kregel, 1985, 135)

However, this is not the whole story, since, in a state of relative certainty, the necessity to hoard in order to make up for perceived risk would be unnecessary. Kregel denies that such a state could ever exist. He takes up two examples in making his case.

First, it is assumed that there is a market with a monopolistic competition, where competitive advantage rests with the fact that some companies possess a specific knowledge about the heterogenous quality of goods, which are traded, that provides them with an ability to set a monopolistic price to a certain extent. The monopolistic profit margin will diminish as more market participants gather the information that is necessary to assess the quality of a certain good. However, this involves a paradox because the incentive to inform oneself about the market conditions lies within the

monopolistic profit that can be gained from being a price setter. Once this profit is gone, there is no incentive to become informed. (Kregel, 1995, p. 214)

In a polypoly with full market transparency, the individual company is not a price setter, but a price taker, and, as such for every company, a horizontal demand curve is assumed (Mankiw and Taylor, 2008[2006], p. 326). In fact, there is then no incentive to be in the market at all under polypolistic competition:

> "The monopoly sets price where the marginal revenue equals marginal cost, while the competitive industry sets price where the supply curve (which is the sum of all individual firms' marginal cost curves) intersects the demand curve [...]. [...] If perfectly competitive firms were to produce where marginal costs equals price, then they would be producing part of their output past the point at which marginal revenue [to be understood as the first differential of the market demand curve] equals marginal cost." (Keen, 2011[2001], p. 91)

Hence, the market might even cease to exist, since companies, in their inability to further exercise market power by accumulating exclusive market knowledge, would voluntarily have to forfeit their ability to generate profits in order to stay in the market.

Another version could be that the marginal rate of efficiency cannot decrease to equilibrium with the rate of interest, since not as many investment projects are being financed as possible. The excess demand for credit does not drive up the interest rate because the banks will not accommodate the credit demand, even for higher rates, since, due to uncertainty, there would be a risk that this credit demand is not intended for prudent investment, but for reckless gambling, since this high a rate, in the eyes of a bank, can never be serviced by solid investment. (Kregel, 1995, 215)

The first case represents an uncertainty that leads to monopolistic competition and, by definition, to a gross product that is below that of a polypolistic market (Mankiw and Taylor, 2008[2006], pp. 416-417). The installation of a polypolistic market through achieving full transparency, however, abolishes the market activity because it leaves no profit incentive for entrepreneurs to become active at all. The second case represents uncertainty that could lead to an undersupply of financial resources because no market equilibrium can be established that would accommodate potential investment

endeavours at risk-adjusted interest rates, which in turn would constitute an equality of demanded credit and supplied credit.

According to Kregel, the problem with these approaches is that the cause for the inefficient allocation of resources is seen in New Keynesian market imperfections, creating either incomplete information or sticky prices like the interest rate that does not rise to equality with the marginal rate of efficiency through risk-adjusted spreads. The fallacy of conclusion, therefore, is that getting rid of these imperfections would lead to a state of efficient resource allocation and therefore to full employment. Still, this would not be the case, since the perfect market of a polypoly cannot provide any incentives, due to lacking profitability, and secondly, uncertainty cannot simply be assumed away:

> "It is not that information is incomplete, but that the information that the market requires simply does not exist, could not be discovered, even by hiring a firm of consultants, nor by waiting […]. Entrepreneurs have to form expectations about values of variables at future dates about which there is no currently existing "objective" information." (Kregel, 1995, p. 218)

The consequence is that there always is liquidity preference, no matter what attempt is made to make the markets more transparent. Furthermore, economic agents will refrain from gathering information as soon as this activity incurs a cost that exceeds the profit that can be obtained by this information, since there is then simply no incentive to continue the quest for information. Also, the incentive to become active as a market participant at all is missing as soon as every agent is fully informed, and the individual information obtained does not provide any monopolistic price incentive anymore. The result is that there always is underemployment:

> "Unemployment develops […] because people want the moon; - men cannot be employed when the object of desire (i.e. money) is something which cannot be produced and the demand for which cannot be readily choked off. (Keynes, 2011[1936], p. 235)

The next step is to show in what way this renders Say's law to be invalid, since, according to that law, the supply side determines the aggregate product of an economy as the supply induces its own demand (Felderer and Homburg, 2005[1984], p. 84). As Davidson puts it, the reason for unemployment is often seen by neoclassical synthesis

school, and equally by New Keynesians, as a coordination problem of markets, where full employment does not take place because entrepreneurs cannot be sure that their output meets a ready demand. That said, if this insecurity would be abolished, and the aggregate of entrepreneurs would hire the workforce to its full extent, then full employment would be secured, since the income of this fully employed workforce would result in an effective demand that absorbs the entire output resulting from a full employment situation. Again, this full employment situation would work thanks to a working market coordination, secured by market transparency, which would render Say's law valid. (Davidson, 2006, p. 145)

The fallacy of thought, according to Davidson, is that spending is not determined by actual income but by liquidity preference and therefore by how bold or shy the investment behaviour of entrepreneurs is, in consideration of future expectations. Davidson regards Say's law as invalid once saving is not directed towards producible assets, but rather towards the hoarding of liquidity, i.e. non-producible assets like money, in Keynes's sense. (Davidson, 2006, p. 146)

The denial of the aforementioned possibility of a substitution of money, in Keynes's sense, with any other asset therefore rests upon the assumption that liquidity can best be provided by the non-producible asset of money (in the sense of a physical production process), and the demand thereof has therefore no effect on employment, since the elasticity to produce them by inducing employment is next to zero (Davidson, 2006, p. 147).

Kregel's approach in depicting a market equilibrium on the market for credit by the establishment of an equilibrium rate of interest comes across like a loanable funds theory, although it is not determined by saving and investment, but by available finance and investment. In fact, there is a crucial difference, since, according to Keynes, the equality of saving and investment is not established, like in the neoclassical sense, by the interest rate (Felderer and Homburg, 2005[1984], p. 72-74).

> "Saving and investment are the determinates of the system, not the determinants. They are the twin results of the system's determinants, namely, the propensity to consume, the schedule of the marginal efficiency of capital and the rate of interest." (Keynes, 2011[1936], pp. 183-184)

As mentioned above, the decision to invest depends on the relation between the marginal rate of efficiency and the rate of interest, or, respectively, from a capitalization point of view, this decision depends on the relation of demand price for capital assets and supply price for capital assets. The propensity to consume, on the other hand, is a function of the level of income:

> "The fundamental psychological law, upon which we are entitled to depend [...] is that men are disposed [...] to increase their consumption as their income increases, but not by as much as the increase in their income." (Keynes, 2011[1936], p. 96)

An increase in income therefore induces an increase in consumption of less than unity. The remainder of that income is then used for saving, which turns saving into a residual of the propensity to consume (Keynes, 2011[1936], p. 97). The marginal propensity to consume, on the other hand, results in an income multiplier that is greater than unity, depending on the change in effective demand, for example investment (Keynes, 2011[1936], pp. 125-128)[3].

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[3] Mathematically the multiplier effect can be depicted as follows (Heertje and Wenzel, 1997[1970], 222):

c = marginal propensity to consume ($1-c$ = s = marginal propensity to save)

C_0 = autonomous consumption in period zero

Y = aggregated income

Y^* = aggregated equilibrium income

The calculation of the aggregated income in the simple version of a closed economy and without state activity:

$$Y = cY + C_0 + I_0$$

The supply and demand equilibrium aggregated income is derived through the isolation of Y:

$$Y^* = \frac{C_0 + I_0}{1-c}$$

The rate of increase of this function is given by its differential:

$$\frac{dY^*}{dI_0} = \frac{1}{1-c}, \frac{dY^*}{dC_0} = \frac{1}{1-c}$$

Hence, the increase rate of aggregated income is larger than one when $0 < c < 1$. This always holds true, since aggregated income is used either for consumption or saving, and therefore, $s + c = 1$.

According to Keynes, investment does not require prior saving, but in fact, it is the other way round, since it is impossible for the saver to obtain an asset that does not exist. It is, however, the creation of a capital asset, i.e. investment, that increases the aggregate income above unity, and it is the residual of that increased income that is not being used for consumption that buys these then already existing assets and thereby constitutes saving. The bank credit only provides the financing that is necessary to produce the capital asset, whereas the saving inevitably follows. (Keynes, 2011[1936], p. 82)

Hence, there is, according to this logic, no singular equilibrium or natural rate of interest:

> "With different natural rates of interest, each one corresponding to a unique level of income, an expansion of investment (demand for loanable funds) raises production, incomes and savings (supply of loanable funds); but shifts in demand cause shifts in supply, so there is no determinate theory of price (interest rate)." (Steele, 2001, p. 87)

Viewed by Wray from a loanable funds point of view, it is never only the saving that can provide loanable funds. The consumption expenditure can equally provide loanable funds, since it ends up in the banking system as well. It just happens to travel from one proprietor's bank account to another proprietor's bank account (Wray, 1990, p. 119).

> "The schedule of the marginal efficiency of capital may be said to govern the terms on which loanable funds are demanded for the purpose of new investment, whilst the rate of interest governs the terms on which funds are being currently supplied" (Keynes, 2011[1936], p. p. 165)

This again looks like classical loanable funds theory, but it is not. The interest rate is governed by liquidity preference, and liquidity preference diverts saving into hoarding of liquidity, which diminishes the readiness to provide credit, i.e. loanable funds. In this regard, Kregel refers to a point made by Keynes that the notion of bearishness, as described in *A Treatise on Money*, although it is not sufficient, it is nevertheless an important stepping stone (Kregel, 1992, p. 93).

> "Whilst liquidity-preference due to the speculative-motive corresponds to what in my Treatise on Money I called 'the state of bearishness', it is by no means the same thing. For 'bearishness' is there defined as the

> functional relationship, not between the rate of interest (or price of debts) and the quantity of money, but between the price of assets and debts, taken together, and the quantity of money. This treatment, however, involved a confusion between results due to a change in the rate of interest and those due to a change in the schedule of the marginal efficiency of capital [...]." (Keynes, 2011[1936], p. 173)

This refers to the point made in the *A Treatise on Money* that, in a state of 'bearishness', households would prefer to hold bank deposits instead of securities and therefore substitute relatively illiquid assets for liquid assets. In this regard, the generalization made is that securities can represent bonds or shares, i.e. debt or capital assets. Whether the prices of these securities have a tendency to fall depends not only on whether the households prefer holding liquid assets, but also on whether the banks have the same inclination in the way that they are not prepared to lengthen their balance sheets by providing more bank deposits on the liabilities' side of their balance sheet and to absorb the surplus of securities on the asset side of their balance sheet. (Keynes, 1971[1930], p. 128)

As described above, this is not the case when all economic agents, including banks, are in a run for liquidity.

The crucial point, according to Kregel, is that the demand price for a capital asset in *The General Theory* depends on the prospective yield, which is determined by the real productivity of the capital asset, and the expected effective demand, which determines the price level at which the produced goods can be sold and, thereby, whether the investment is profitable. On the other hand, liquidity preference leads to a change in the valuation of securities, which does not depend on any real productivity of the underlying asset that is being financed by these securities. However, a rise in liquidity preference precipitates a fall in the valuations of securities, which leads to a rise in the interest rate and decreases the demand price for capital assets as the discounting factor on the expected yields rises. This finally reduces investment activities (Kregel, 1992, p. 94) and leads through the multiplier process to a lower aggregate income.

Hence, the ability of a central bank to govern the interest rate, and, thereby, to set the pace for economic activity, is limited. As in the case of an insatiable thirst for liquidity, no amount of central bank reserves can quench this thirst and drive down the liquidity

yield, which works as a benchmark for any other own-rate of interest denominated into money. (Keynes, 2011[1936], p. 233)

Furthermore, even if the central bank should succeed in driving down the interest rate, this might not automatically induce additional investment if, at the same time, bleak expectations are driving down the marginal rate of efficiency to such an extent that it cannot be compensated by a reduction in the rate of interest (Keynes, 2011[1936], p. 164).

According to Keynes, an equilibrium below full employment is therefore not only feasible, but, in a laissez-faire economy, inevitable in the face of liquidity preference. The consequence, therefore, is that interest rates are usually not too low but too high. Even in a boom situation, interest rates should therefore be kept low in order to create a perpetual boom (Keynes, 2011[1936], p. 322). As mentioned above, in Keynes's view, the equality of investment and saving is automatically achieved by the multiplier effect and therefore exists at any rate of interest.

2.1.2 Schumpeter's innovation

> "Innovation is not only the most important immediate source of gains, but also indirectly produces, through the process it sets going, most of those situations from which windfall gains and losses arise and in which speculative operations acquire significant scope." (Schumpeter, 1939, p. 104)

According to Schumpeter, innovation acts as an immediate source for profit by creating the market form that also enables speculative movements. The market form that is being induced by innovation is that of monopolistic competition, which is not a situation of a perfectly competitive market, but the result of a deliberate differentiation of products or production processes that secures profit by gaining and defending a competitive edge, in comparison with the adversaries on the market. (Schumpeter, 1961[1939], p. 115)

It is important to notice that it is not the situation of a perfectly competitive polypolistic market, which drives the evolution in any economy's production process, but, on the contrary, it is the imperfection of monopolistic competition that is necessary for

entrepreneurs to have an incentive to differentiate themselves from their competitors. That incentive is profit.

However, as will be shown in the following section, profit, according to Schumpeter, is not only an incentive, but also a necessity to validate the innovation, since the financing of an innovation is nothing but an advance on future profits expected to be generated by the innovation.

For Schumpeter, there are two ways to finance. The first is the usage of internally generated funds by the entrepreneur himself, i.e. profits. Should that not be the case, it is the credit funds that are being generated by a bank. This credit money is newly generated money that has not existed before and which dilutes the existing amount of money. (Schumpeter, 1961[1939], p. 119)

Compared to a socialist planned economy, this constitutes a new production order that, though it does not substitute any old order, but rather competes with it as the old production orders simply lose in prevalence by reducing the purchasing power of their financial means through the dilution process called inflation (Schumpeter, 1961[1939], p. 120). This constitutes an accommodation of credit demand and therefore very much resembles an endogenous money approach (Schumpeter, 1961[1939], p. 121). Minsky explains, "In Schumpeter money emerges out of the credit system, it is always endogenous." (Minsky, 1988, p. 10)

Furthermore, Raines and Leathers state, "In that theory, entrepreneurial ventures are financed by credit money (capital) created by banks, and both inflation and deflation occur as normal phenomena in the several phases of the business cycle." (Raines and Leathers, 2008, p. 107)

The innovation process therefore requires the diversion of existing means of production towards other ends. This necessarily results in a drop of production of consumption goods if it is assumed that the diversion goes from the production of consumption goods towards the production of the innovative capital goods. (Schumpeter, 1961[1939], 142)

Innovation cuts off the old production function and replaces it with a new, more productive production function as the newly applied capital goods generate a more favourable input/ output relation (Schumpeter, 1961[1939], p. 95). In a first step, the innovation leads to a reduction of the production of consumption goods, but, as soon as the newly applied techniques become effective, the overall level of production, and,

therefore, also the level of production of consumption goods, is increased above former levels (Schumpeter, 1961[1939], p. 142). The implementation stage of the innovation therefore constitutes a state of inflation, whereas the succeeding stage of exertion of the innovation constitutes a state of deflation.

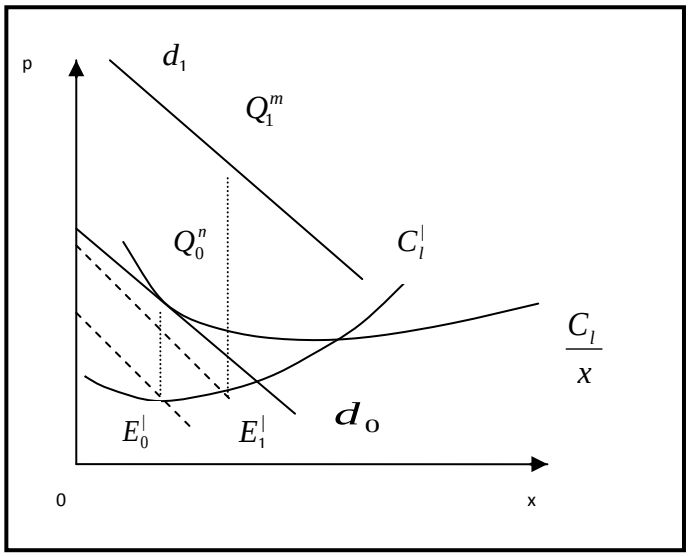

Figure 4: Price mechanism under monopolistic competition: A long term analysis.

Source: Herberg, 1994a[1985], p. 321.

The aggregate increase in production is, however, not the entire story. The innovations that prove to be successful supersede old practices or products in accordance with monopolistic competition (Schumpeter, 1961[1939], p. 143).

The increase of a competitive edge by, for example, a new product innovation moves the demand curve of the innovative company from d_0 to d_1 (or alternatively, drives down the cost curves for a company innovating to cut production costs). Therefore, it is possible for the innovative companies to increase prices and production from Q_0^m to Q_1^m. The result is that the innovators are gaining a monopolistic profit because they can sell for prices above the long average costs curve $\frac{C_l}{x}$. This expectation of rising profits will induce others to adopt the innovation as well, and the company`s individual demand curve will go back to where it used to be, unless it develops another innovation. For those companies who do not innovate or adopt the innovation, the individual demand curve could move below the long-term costs curve. This will ultimately push them out of the market, since they are no longer able to cover their costs. The companies that are able to establish themselves in the market will, in the long run, offer their goods and

services at Q_0^m, since this is the point of Cournot where marginal costs $C_l^{|}$ and marginal revenue $E^{|}$ are the same (Herberg, 1994a[1985], p. 315). At this point, two conditions are fulfilled. First, the price equals the average long-term costs, and production costs are therefore covered, and second, the marginal revenue equals the marginal cost, and production therefore is at its maximum profit of zero (Herberg, 1994a[1985], p. 320)[4]:

$$p = \frac{C_l}{x};\ \frac{dp}{dx} = \frac{d(C_l / x)}{dx}$$

The fact that the innovation leads to an increase in profitability induces an increase in future expectations (Schumpeter, 1961[1939], p. 150). This induces other entrepreneurs to either adopt the innovation or enlarge their existing companies by using old techniques (Schumpeter, 1961[1939], p.156). This may lead to overinvestment, since new investments into newly adopted techniques are excessively applied, or to malinvestment, since some innovations do not find a ready market, or the enlargements of existing capacities are based on overly optimistic expectations.

Unlike Irving Fisher, Schumpeter views the problem not as a monetary problem of overindebtedness induced by cheap credit money, but overindebtedness, in relation to the productivity of an investment. To initiate an investment on the basis of speculating

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[4] The following differentials prove the above relations mathematically (Herberg, 1994a[1985], pp. 275, 320; Herberg, 1994b[1985], p. 105):

a) $\frac{C_l}{x} = C_l * x^{-1},\ C_l^{|} = \frac{dC_l}{dx} = -C_l * x^{-2},\ C_l = -C_l^{|} * x^2$

b) $\frac{p}{x} = \frac{C_l / x}{x}$,

$$\frac{dp}{dx} = \frac{d(C_l / x)}{dx} = \frac{-C_l * x^{-2} * x - C_l * x^{-1}}{x^2} = \frac{-C_l * x^{-2}}{x} + \frac{C_l^{|} * x^2 * x^{-1}}{x^2} = \frac{C_l^{|}}{x} - \frac{C_l}{x^3},$$

$$C_l^{|} = x * \frac{dp}{dx} + \frac{p}{x}$$

c) $E^{|} = \frac{d(p * x)}{dx} = p * x^{-1} + p * x * (-x^{-2}) = \frac{p}{x} - \frac{p}{x} = \frac{p}{x} + x * \frac{dp}{dx}$, as

$$\frac{p}{x} = p * x^{-1},\ \frac{dp}{dx} = -\frac{p}{x^2} \text{ is } x * \frac{dp}{dx} = -\frac{p}{x^2} * x = -\frac{p}{x}$$

d) $E_0^{|} = C_l^{|} = x * \frac{dp}{dx} + \frac{p}{x}$

on an increase of revenue through an increase of demand does not serve as a prudent justification for an investment. According to Schumpeter, a productive investment is one that increases the productivity in a classical sense so that it improves the input/output relation and thereby reduces production costs. In contrast to this classical productivity approach, the profitability is a rate of monetary return, since it could also be a price increase of the produced goods, which validates the investment decision by increasing the generated revenue (Schumpeter, 1961[1939], p. 156).

The investment created by the innovation and adaptation of new techniques is, however, productive in the sense that "[...] it results in increases in productivity and lower costs of production. Those types of debt cannot result in 'overindebtedness'." (Raines and Leathers, 2008, p. 117)

There is therefore a difference between indebtedness for the purpose of innovation and the adaptation of innovation, on the one side, and speculation under the false presumption of overly optimistic expectations, on the other side, which is deemed to be unproductive.

The overinvestment and malinvestment are a speculation based on an overly optimistic future expectation, which may sometimes result in reckless behaviour (Raines and Leathers, 2008, p. 109). These futile attempts to benefit from the upswing state of prosperity are being liquidated as soon as price expectations are disappointed or interest rates rise, and the investment turns out to be unprofitable (Schumpeter, 1961[1939], p. 157). The turning point occurs when the innovative technique is effectively applied, and the additional demand for capital goods, as well as for labour, at the end of the erection stage, subsides, driving down the demand for consumption goods. Businesses that generate a cash flow sufficient enough to pay down their debt will do so, thereby liquidating credit money and reducing the money supply, causing deflation. The combination of an increase in the goods supplied and the reduction of the money supply leads to prices falling below their initial stage. (Raines and Leathers, 2008, p. 110 - 111)

However, in the same way that the expectations were overly optimistic during the upswing, the expectations will turn out to be overly dire during the recession, and thereby precipitate a depression in which not only futile investment will be liquidated, but also investment that would, under normal circumstances, prove to be profitable (Schumpeter, 1961[1939], p. 158). The whole process is one of depressed wages and

prices, as well as one of credit rationing, as bankers become more risk aware (Raines and Leathers, 2008, p. 111).

Like Keynes, Schumpeter believes it is not possible to assume the investment function to be stable, but rather, the investment function is subject to expectations. In the same way, a high yield on securities will not necessarily induce the public to hold them, since they could just be expecting an impending crash (Schumpeter, 1961[1939], p. 161).

Nevertheless, the eventual resurrection of the economy stems from the fact that, at some point, the demand curve's downward detraction will be slower than the fall in prices, which is, however, according to Schumpeter, no reason for the government to stand idly by and not to expedite the process of recovery (Schumpeter, 1961[1939], p. 165). However, according to Schumpeter, the state of equilibrium is not a state of underemployment (Schumpeter, 1961[1939], p. 162). In Schumpeter's business cycle, it is not the monetary world of credit money that causes the cycle, but rather, it is the innovation that changes the real productivity function and increases the overall abundance in an economy (Schumpeter, 1961[1939], p. 151). The role of credit money is therefore of subordinate importance in comparison to the real economy innovation in which "[...] the inflation and prosperity may appear to simply be results of an increase in the money supply. But the real source is the entrepreneurial visions of innovative products and processes which are endorsed by the bankers." (Raines and Leathers, 2008, p. 109)

The deflation process that follows once production has surpassed the money supply is nothing dangerous, as long as it remains within the limits of a recession. In fact, for Schumpeter, recession is the time of harvest (Schumpeter, 1961[1939], p. 152). It is a combination of real balance and real financial effect that picks up the economy again, since prices eventually tend to fall deeper than the demand curve’s shift downwards.

As seen by Leijonhufvud, it is the real balance effect (Pigou effect) that picks up consumption through an increase in real balances, or real wealth, since depressed prices increase purchasing power, and the real financial effect, which is brought about by the fact that nominally fixed claims gain increased purchasing power as well, and both result in higher consumption spending. According to Leijonhufvud, such a mechanism also exists in Keynes's world, even though there it is not so much of a real financial effect but rather of a real balance effect, the so-called Keynes effect, working, however, in an indirect way. Leijonhufvud states, "With the Keynes-effect the deflation induces

an increase of the real supply of money and this leads to a reduction in interest rate, which results in an increased level of investment (and consumption)." (Leijonhufvud, 1968, pp. 323-330)

The way the government can help, according to this logic, is therefore not to reflate prices at a general level, by providing additional refinancing facilities indiscriminately through the central bank, but to distinguish between those securities, which are backing productive investment and those, which are unproductive, i.e. endorsing speculation (Raines and Leathers, 2008, p. 121). Hence, the access to central bank discounting procedures for refinancing should only be provided for securities that are backing productive investment. Raines and Leathers explain, "Such limited policy would involve providing credit to firms that deserve it while denying it to those firms that have been rendered technically or commercially obsolete [...]."(Raines and Leathers, 2008, p. 122)

Even though, according to Schumpeter, the business cycle is not a monetary phenomenon, the exacerbation that turns a recession into a depression can be seen in the reckless behaviour of speculation that is endorsed by bankers who provide the credit money for such purposes. It is the banker's obligation to assess the creditworthiness of any business endeavour, and not delivering on this demonstrates the incompetence of the banking industry. This is especially true where bankers are confronted with relatively new and innovative projects, which also prove to be most tempting. This temptation is especially increased through the fact that a bank is not a neutral institution that makes decisions about the creditworthiness from an independent position. Rather, a bank is a profit-seeking institution, and therefore, it is open to speculative behaviour as well. This is a behaviour that becomes more reckless and less independent the more the bank can benefit from the profits of its business clients. (Schumpeter, 1961[1939], p. 126)

The process of creating credit money is thereby not the matter of a single bank, but of many banks stretching their balance sheets, and any requirements for holding reserves at the central bank can be easily circumvented by inventing new tools in banking and thereby using less high powered money for transactions (Schumpeter, 1961[1939], p. 126).

According to Minsky, this is precisely the reason why money also matters in Schumpeter's innovation. Minsky writes, "Innovation and entrepreneurship are not

restricted to process and product in Schumpeter. Innovation and entrepreneurship are characteristics of capitalist finance." (Minsky, 1988, p. 9)

Finance is involved from the start and drives relative prices (Minsky, 1988, p. 9). Banks are redirecting cash flows on a demand basis and not on a marginal productivity basis (Minsky, 1988, p. 9).

In conclusion, this means that resource allocation is not based on any real economic factors, but on monetary factors, and it is this factum that drives the economy from recession to depression, caused, according to Schumpeter, by speculative excesses. Nasica explains, "This implies that financial systems evolve not only in response to demands of business firms and individual investors but also as a result of the innovative activity of profit-seeking entrepreneurial financial firms." (Nasica, 2010, p. 107)

The consequence of this innovative activity of financial institutions can actually undermine any attempts from the monetary authority of the central bank to restrict reckless behaviour by increasing the interest rate. Nasica refers to Minsky's insight that an increase of the interest rate changes opportunity costs in such a way that the contrary of what was intended by the central bank is actually taking place. A rise in interest rates actually increases the profit opportunities of money holders in such a way that banks with excess reserves will be more willing to lend on the interbank overnight market. Other non-financial entities will refrain from holding deposits with low interest rates and instead lend to bond holding institutions, such as mutual funds. The consequences are twofold. Firstly, as the banks' ability to rely on interbank financing increases, they are able to provide an increased amount of loans. Secondly, since more financial institutions, such as mutual funds, are now investing in bonds, especially treasury bonds,[5] and taking these assets off the banks' balance sheets, the banks are able to make use of their increased lending capacities to accommodate new credit demand from companies, therefore taking their debt as assets onto their balance sheets instead. (Nasica, 2010, p. 108 - 109)

[5] The term treasury bond is being used in this thesis as a general term for treasury liabilities independent of their maturity.

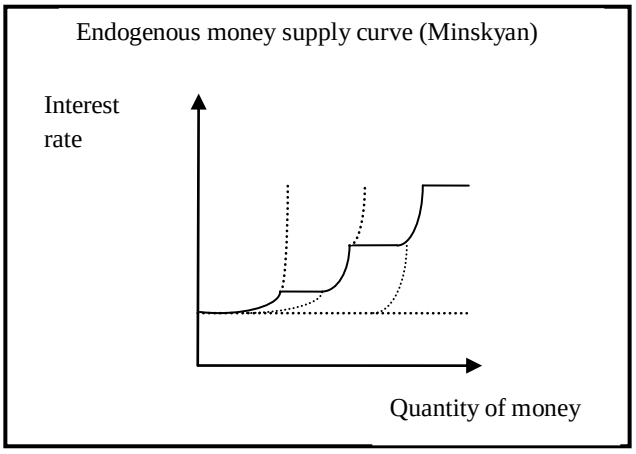


Figure 5: "Banking innovation and the money market rate."

Source: Nasica, 2010, p. 109.

As for the endogenous money approach, the consequence of this logic is that the money supply curve is not just horizontal, since every increase of the interest rate also involves a shift upwards. Financial innovation induces the velocity of circulation, as well as the money supply, to be fully elastic, and thereby, the horizontal money supply curve, in combination with the upwards shift due to increased opportunity costs for holding liquidity, not only undermines the central bank's restrictive monetary policy in increasing the interest rate, but also leads to the opposite effect. (Nasica, 2010, p. 109)

In combination with the structuralist endogenous money approach of either generating ever more credit money or increasing the velocity of circulation, it decreases the holding of liquidity (Nasica, 2010, p. 110). As balance sheets are lengthened and liquid assets are substituted with illiquid assets, the debt to equity ratio, as well as the liquidity reserves, deteriorate.

The money supply curve, in a Minsky sense, is therefore structuralist upward sloping after a certain degree of indebtedness and furthermore upward shifting.

> "Money, banking, and finance cannot be understood unless allowance is made for financial evolution and innovation: money, in truth, is an endogenously determined variable - the supply is responsive to demand and not something mechanically controlled by the Federal Reserve." (Minsky, 1986a, p. 226)

The success of the central bank's endeavour to tighten the money supply therefore depends very much on the demand for credit money from the business sector and the financial sector's willingness and ability to accommodate by issuing credit money and

using financial inventions to stretch liquidity. This depends again on expectations and their effect on the liquidity preference (Nasica, 2010, p. 110). In a situation of optimistic expectations, when liquidity preference is diminishing, such an endeavour by the central bank may not only be futile, but also could even be counterproductive.

According to Minsky, innovation is, however, not a one way street in the sense that product and process innovation induces financial innovation, since " [...] in a capitalist economy the drive to innovate is universal: bankers can also be entrepreneurs. New types of financing can trigger process and product innovation [...]" (Minsky, 1988, p. 18). Hence, it is also financial innovation that provides the financing for real economy innovation in the first place.

2.1.3 Fisher's debt deflation

Unlike Schumpeter, Fisher argues that the existence of an endogenous business cycle "is a myth" (Fisher, 1933, p. 338). Instead, the driving force of deviations from equilibrium can be seen in over-indebtedness and the following debt deflation, whereas all other so-called causes are mere symptoms (Fisher, 1933, p. 341; Raines and Leathers, 2008, p. 97).

> "In particular, as explanations of the so called business cycle, or cycles, when theses are really serious, I doubt the adequacy of over-production, under-consumption, over-capacity, price-dislocation, mal-adjustment between agricultural and industrial prices, over-confidence, over-investment, over-saving over-spending, and the discrepancy between saving and investment." (Fisher, 1933, p 340)

The consequence from this statement is that it is neither the level of production or consumption, nor any fluctuations in relative prices or a deviation of saving from investment that can be seen as causes for a depression.

Occurrences such as over-investment, over-speculation, and over-confidence only become toxic for the economy when they are supported by debt (Fisher, 1933, p. 341). The same is true when deflation occurs, since it is the debt-induced deflation that is harmful. Wray and Papadimitriou make the point that price level indices are "[...]

artificial constructs and reflect assumptions about weighting schemes, and indeed which prices to include." (Wray and Papadimitriou, 2003, p. 10)

The informative value of such indices is very much diminished by the fact that rises in product quality are often computed as a decrease in price; actual decreases in prices are often outpaced by improvements in factor productivity; and price indices usually deal with output prices and not with asset prices, which leaves a whole range of price fluctuations unaccounted for (Wray and Papadimitriou, 2003, pp. 11-12). The European HICP-index, for example, does not account for changes in prices of owner-occupied houses, whereas national CPI-indices like the one in Germany do (Eurostat, 2013). Asset prices might therefore drizzle through to consumer or output prices indirectly, as is the case for energy costs, for example, but they are not being accounted for directly. Hence, a registered deflation of output prices, which are more than absorbed by increases in factor productivity, does not pose a problem at all, whereas asset price deflations whose purchasing was endorsed by debt proves to be very problematic indeed (Wray and Papadimitriou, 2003, p. 11 - 12).

According to Fisher, the development that turns debt deflation into a severe contraction of economic activity comes in nine stages, which follow the overall perception that levels of debt are not sustainable at their current level and must therefore be diminished:

i. "*Debt liquidation* leads to *distress selling* [...]" (Fisher, 1933, p. 342). In other words, in order to re-establish solvency, debtors are forced to sell assets (Raines and Leathers, 2008, p. 98), i.e. to substitute illiquid assets for liquid assets.
ii. "*Contraction of deposit currency* [...]" (Fisher, 1933, p. 342). In accordance with endogenous money theory, the liquidation of debt reduces the amount of credit money, i.e. deposits, and therefore, the amount of money.
iii. "*A fall in the level of prices* [...]" (Fisher, 1933, p. 342). As in this situation, there is a general run for liquidity, and the price level of assets is being depressed. This causes another increase in the value of the currency (Fisher, 1933, p. 342).
iv. "*A still greater fall in the net worths of business,* precipitating bankruptcies [...]" (Fisher, 1933, p. 342). This is caused by the fact that the real debt value increases as debt is denominated in the currency as a nominal figure (Wray and Papadimitriou, 2003, p. 12). The decrease in the nominal value of assets with a constant nominal value of debt therefore results in the melting of the balance

sheet's equity. The fall in prices is, however, not restricted to asset prices, since the deterioration of the balance sheets will also bring investment activities to a halt and thereby decrease effective demand and depress sales prices. To compensate for decreased sales prices, there will be pressure on wages. This will further exacerbate the situation as it becomes ever more impossible to service the debt out of current cash flow for businesses, due to falling sales prices, and for households, due to falling wages (Wray and Papadimitriou, 2003, p. 12).

v. "*A like fall in profits* [...]" (Fisher, 1933, p. 342) is then the consequence of the melting of equity, due to bookkeeping losses caused by both asset devaluation and by a deterioration of revenue caused by depressed sales prices.

vi. "*A reduction in output, in trade and in employment* [...]" (Fisher, 1933, p. 342) is the result of the aforementioned development.

vii. "*Pessimism and loss of confidence* [...]" (Fisher, 1933, p. 342) is the psychological consequence thereof.

viii. "*Hoarding and slowing down still more the velocity of circulation*." (Fisher, 1933, p. 342) Consequently, the perceived insecurity precipitated by pessimism results in an increased liquidity preference.

ix. "*Complicated disturbances in the rate of interest*, [...] a fall in the nominal, or money rates and a rise in the real, or commodity, rates of interest." (Fisher, 1933, p. 342) The result is the tendency for the nominal interest rates to decrease while debts are paid off, but the real interest rates instead increase because of deflation (Raines and Leathers, 2008, p. 99).

The crucial point about debt deflation is that the overall run for liquidity includes not only businesses, but also the banking system. It is their thirst for liquidity that not only tightens the provision of loans, but also leads to a process of calling them in. (Raines and Leathers, 2008, p. 98)

This leaves debt holders no alternative but to sell their asset. The forced selling of asset then might not even relieve the debt holders from their burden, but might actually increase it if the decrease in asset valuation through this concerted effort of selling them outpaces the cash generated in sales.

> "Then, *the very effort of individuals to lessen their burden of debts increases it, because of the mass effect of the stampede to liquidate in swelling each dollar owed*." (Fisher, 1933, p. 344)

In accordance with Fisher and Schumpeter, the reason that leads to over-indebtedness in the first place can be seen first and foremost in "[...] psychology of great optimism and enthusiasm and, usually, the opportunity to invest is such a result of new inventions, discoveries, or business methods." (Raines and Leathers, 2008, p. 100)

> "It [over-indebtedness] may be started by many causes, of which the most common appears to be new opportunities to invest at a big prospective profit, as compared with ordinary profits and interest, such as through new inventions, new industries, development of new resources, opening of new lands or new markets. Easy money is the great cause of over-borrowing. [...] Inventions and technological improvements created wonderful investment opportunities, and so caused big debts." (Fisher, 1933, p. 348)

As with Schumpeter, the reason for over-indebtedness lies within new business opportunities, driven by innovation. However, as mentioned before, unlike Schumpeter, it is not Fisher's concern to assess the consequences of debt by analysing the quality of the investment it has financed, distinguishing between the financing of increases in productivity and increases in speculation.

Similarly, according to Minsky, it is not Fisher's concern to analyse the options concerning how to actually service debt obligations (Minsky, 1982a, p. 383). First of all, Minsky identifies that the debt obligations in question are to be seen in "[...] the amount due to account of principal as well as interest." (Minsky, 1982a, p. 382)

> "If debt structures generate a distribution in time of sums that need to be paid, it is the asset structures that generate a distribution in time of the sums coming to the unit." (Minsky, 1982a, p. 382)

Hence, the question of what the debt has been used for is of importance because it is the asset that is being purchased by debt that has to generate cash inflows sufficient to cover for cash outflows for payments on instalments as well as interest.

> "Before the prospects of a debt deflation occurring in any situation can be assessed it is necessary to "model" both the payment commitments on debt structures and the source of funds by which the commitments can be fulfilled." (Minsky, 1982a, p. 382)

As long as the assets are 'productive' enough to cover these commitments, a decrease in their price value is not an immediate problem. Therefore, it is important to know whether an asset can be rendered 'productive' or not.

The cash flow from day to day operations is, however, not the only means of generating cash. The other two ways are borrowing and selling the asset (Minsky, 1982a, p. 382). The latter is the only one that Fisher really seems to be concerned with, but the situation is a lot more complex, as Minsky points out:

> "The margins of safety that Keynes referred to are either an excess of cash receipts over cash payment commitments, the excess of the value of assets over liabilities, and holding of cash and other liquid assets." (Minsky, 1982a, p. 382-383)

The consequence of a rise in the interest rate for diminishing the margin of safety is that, first of all, it increases the payment commitments on interest payments, and secondly, it decreases the asset value as the discounting of prospective yields increases (Minsky, 1982a, p. 383).

> "The demand for cash depends upon the structure of payment commitments embodied in the liability structure relative to the cash flow from operations and the existence of financial markets which facilitate refinancing." (Minsky, 1982a, p. 383)

The degree to which a business has to compensate for an increase in the rate of interest by substituting illiquid assets for liquid assets therefore depends upon the ability of the asset to generate cash flows, i.e. its 'productivity', and the ability of the business to approach financial market institutions for refinancing.

The likelihood for debt holders to meet their payment obligations decreases when they are unable to generate enough cash by selling their assets, since there is not a ready market for such assets anymore, and therefore, the decrease in price is too severe to cover the commitments, or alternatively, the output price's decrease outweighs the reduction in money wages paid (Minsky, 1982a, p. 384). For Minsky, the innovation is

not just a driving force for over-indebtedness as a result of new business opportunities, but also includes the innovation of the banking sector by providing innovative finance.

> "The broader the range of financing alternatives the greater the demand for existing assets and the greater the financing available for investment." (Minsky, 1982a, p. 385)

It is therefore more feasible and cheaper to obtain a credit either for purchasing existing assets for speculative reasons, or for genuine improvement through investment into new capital goods, which drives up demand for capital assets. The increased availability of finance therefore increases the asset price value. This again increases the margin of safety and enables asset holders to increase their level of debt again, which results in a self-enhancing spiral of asset price appreciation and increasing debt commitments. (Minsky, 1982a, p. 385)

This spiral of becoming more indebted is, according to Minsky, particularly true for short-term debt, in relation to cash flows, since demand for short-term debt is accommodated faster than for long-term debt. The result is that new short-term debt, in particular, has to be refinanced in a revolving process, making the liability structure ever more susceptible to changes in interest rates and the tightening of credit money. (Minsky, 1982a, p. 386)

An increase of the interest rate thereby increases the supply price of capital goods as the financing becomes more costly but, on the other hand, decreases the demand price for capital assets as the discounting of prospective yields is increased (Minsky, 1982a, p. 386). In looking for a way out of the predicament called debt deflation, there are two options. According to Fisher, "[..] the ways out are either via laissez faire (bankruptcy) or scientific medication (reflation) [...]" (Fisher, 1933, p. 349). The bankruptcies will simply 'cleanse' the economy of some over-indebted participants. The remaining participants with hoarded cash and new access to finance will be able to purchase assets at very low prices, i.e. making use of the real balance effect. (Raines and Leathers, 2008, p. 100)

The following commodity own-rate of interest increase in money terms, which again triggers the arbitrage effect in favour of these assets, is very much a sign of their spot

price depreciation in relation to their future price, which remains relatively constant and above the spot price, since, according to Kregel, the interest rate should be seen, in accordance with Keynes and Fisher, as nothing but an arbitrage system of own-rates of interest (Kregel, 1999, p. 272).

> "It is clear that the arbitrage may occur via adjustment of either the spot or forward prices, i.e. the rate of appreciation or depreciation of one standard in terms of the other, or in terms of the rate of interest in each standard, or in all three." (Kregel, 1999, p. 273)

Hence, a decline in the spot price, combined with an increase of the commodity own-rate of interest, in money terms, means that the forward price must be relatively stable. In this logic, however, the real balance effect can only become effective once the cost of carry, combined with the current spot price, is lower than the future price. Otherwise, further hoarding and waiting would be more appropriate. In other words, future expectations have to be sufficiently positive to assume future prices to be relatively 'healthy'. The option of state intervention by reflating spot prices can take two forms, according to Minsky. The central bank can increase the reserves of the banks by buying securities, which results in a fall of interest rates and supports the quantity of bank deposits generated through credit money. The effect is twofold, since it first stops the contraction of the money supply, and secondly, it props up asset prices. This is, however, not sufficient because it does not address any imminent fall in profits. In a second step, it is therefore up to the government to provide a fiscal stimulus that is sufficient to sustain profits. (Minsky, 1982a, p. 388)

The first step is therefore to counter the asset price deflation, while the second step takes account of the fact that it is the cash flow generated by assets that services the debt commitments.

2.1.4 Conclusive remarks on the theoretical foundations

It is shown that the way in which Keynes, Schumpeter, and Fisher serve as a basis for the Minsky theory is developed from a distinctly post-Keynesian perspective. This assessment can be derived from the emphasis that is put on certain features of the respective theories. In the interpretation of Keynes, the emphasis of the Minsky disciples, Jan Kregel and Randall Wray, lies on the phenomenon of a monetary economy with liquidity preference as the result of unavoidable uncertainty and as the crucial arbiter for economic activity, which then also is the main reason for cyclical fluctuations, as well as unemployment. It is furthermore established that the phenomenon of liquidity preference does not require the assumption of an exogenous money supply, but it is also valid under the assumption of an endogenous money supply, which is also in line with the perspective chosen by Minsky. The view on Schumpeter is then mainly governed by the interaction of financial innovation and productivity enhancing real economy innovation, and the dual qualities thereof, since, on the one hand, financial innovation may trigger real economy innovation, but, on the other hand, real economy innovation may trigger further financial innovation that ultimately does not translate itself into productivity increasing real economy innovation anymore. Instead it might turn increasingly into speculative activity. The importance of the Fisher contribution can be seen in the phenomenon of debt deflation as a process that may serve as a self-propelling downward spiral as fire-sales deteriorate balance sheets further through plumbing asset prices and the resulting inability to decrease levels of indebtedness.

The risk of illiquidity is thereby governed by a combination of all three foundations. Keynes's liquidity preference decides whether debtors will be able to refinance their investment through the availability of credit money, the real economy innovation of Schumpeter determines whether the investments undertaken have the productivity potential to generate sufficient and sustainable cash flows in order to serve current debt payment obligations, and the debt deflation phenomenon of Fisher decides through asset price valuation whether debt can be settled by liquidating the assets.

Furthermore, it is being established that the microeconomic market assumption cannot be one of a polypolistic competition, but must instead be one where monopolistic competition, and therefore monopolistic price setting, as well as the generation of profits, have an important role to play.

2.2 The model of the financial instability hypothesis by H. P. Minsky

The model of the financial instability hypothesis is described in the following chapter as a model where investment and profits are at the centre of attention. It will be shown that profit can only be generated if prior investment takes place, and investment requires financing externally, through the issuance of securities, but also internally, through the generation of profits.

After this, there will be a description of the Minskyan business cycle itself, and, in particular, the role that risk perception and relative market tranquillity play in deteriorating the economy's financial structure. It will be shown that the formation of expectations under uncertainty exists at the very core of this risk assessment, which is something that is already known from the chapter on Keynes. It is therefore again the pricing of assets and the changes in perceived liquidity risk that lie at the heart of the balance sheet deterioration.

The way that profits are generated and assets are accounted, as well as the availability of finance, can not be divorced from the institutional setting of financial markets. It is therefore also of importance to describe where the global apex of financing is located, since this defines the rules that apply, and the institutional framework that matters, for the development of the global financial system. In particular, there will be mentioning of the important role that the Wall Street paradigm of capitalism plays with regards to its leading position towards deregulation, prior to the financial crisis of 2008. It then must be established what general impact this deregulation of financing had on a global scale and also what innovative potential opened up for the evolution of new forms of financing, such as in shadow banking. It will then be addressed how this change in the institutional setting of modern capitalism has created a different kind of business model in the finance industry, which might require a novel approach by central banks and bank regulators in the light of the Minskyan theory.

2.2.1 Profits and investment

Profits according to Kalecki

The systematic, which Minsky adopted from Kalecki, is explicitly based on a market of monopolistic competition. Hence, a market is assumed where market power is exercised, and it is therefore, by definition, an imperfect market that enables monopolistic price setting (Kalecki, 1943, p. 9).

The relation between profits and investment is of a circular nature in the Minsky case. The first relation is, as described in the above chapter on Keynes, that profit expectations determine the level of investment. The second relation is that the level of investment determines the generated profit.

> "The simple equation "profits equals investment" is the fundamental relation for a macroeconomics that aims to determine the behaviour through time of a capitalist economy with a sophisticated, complex financial structure." (Minsky, 1986a, p. 144)

This equation is based on the Kalecki view that, in a very simplified economy, the wage bill equals the demand for consumer goods, if it is assumed that labour does not save but spend its entirety of wages on consumer goods, while the profit gainers do not spend any of their profit on consumer goods. Furthermore, it is assumed that the total demand consists of the demand for consumer goods and the demand for investment goods. The profit must therefore be the residual of the total demand after the deduction of demand for consumer goods, which is then the demand for investment goods. (Minsky, 1986a, pp. 144 - 146)

$BTDf = balance\ of\ trade$ deficit

$C = consumption$

$Df = government\ deficit$

$G = government$

$I = investment$

$M = import$

$N = employment$

$P = price$

$Q = quantity$

$T_r = transfer\ payments$

$T_W = taxes\ on\ wages$

$T_\pi = taxes\ on\ profits$

$W = wages$

$X = export$

$\pi = profit$

$\dot{\pi} = profits\ after\ taxes$

$\dot{W} = wages\ after\ taxes$

$P_C Q_C = W_C N_C$

$\pi_C = P_C Q_C - W_C N_C = 0$

Including the wage bill for investment goods' production:

$P_C Q_C = W_C N_C + W_I N_I$

$\pi_C = P_C Q_C - W_C N_C = W_I N_I$

$I = P_I Q_I = W_I N_I + \pi_I$

$W_I N_I = \pi_C$

$I = \pi_C + \pi_I = \pi$

Adding a government to this equation means that profit after taxes equals investment plus government deficits (Minsky, 1986a, p. 148).

$Df = \overline{W_G N_G} + \pi_G + T_r - T_W\left(W_C N_C + W_I N_I + \overline{W_G N_G}\right) - T_\pi(\pi)$

$P_C Q_C = W_C N_C + W_I N_I + Df - \pi_G + T_\pi(\pi)$

$\pi_C = P_C Q_C - W_C N_C = W_I N_I + Df - \pi_G + T_\pi(\pi)$

$\pi_I = I - W_I N_I$

$$\pi = \pi_C + \pi_I + \pi_G = I + Df + T_\pi(\pi)$$

$$\dot{\pi} = \pi - T_\pi(\pi) = I + Df$$

Furthermore, to open the economy to foreign trade implies that a balance-of-trade surplus adds to generated profits, whereas a deficit works as a deduction from profits (Minsky, 1986a, p. 150).

$$BTDf = P_M Q_M - P_X Q_X = P_M Q_M - W_X N_X - \pi_X; P_X Q_X = W_X N_X - \pi_X$$

$$P_C Q_C = W_C N_C + W_I N_I + Df - \pi_G + T_\pi(\pi) - \pi_X - BTDf$$

$$\pi_C = P_C Q_C - W_C N_C = W_I N_I + Df - \pi_G + T_\pi(\pi) - \pi_X - BTDf$$

$$\pi = \pi_C + \pi_I + \pi_G + \pi_X = I + Df + T_\pi(\pi) - BTDf$$

$$\dot{\pi} = \pi - T_\pi(\pi) = I + Df - BTDf$$

To allow for a scenario in which workers are saving and profit receivers are spending on consumption goods means that, as in the case of including a government and opening the economy to foreign trade, the total demand is altered. The worker's saving diminishes total demand, whereas the profit receiver's spending increases it and, hence, also the generated profit. (Minsky, 1986a, p. 151)

$$P_C Q_C = W_C N_C + W_I N_I + \overline{W_G N_G} + T_r - T_W + c\dot{\pi} - s\dot{W}; T_r = 0$$

$$\pi_C = P_C Q_C - W_C N_C = W_I N_I + \overline{W_G N_G} - T_W + c\dot{\pi} - s\dot{W}$$

$$\pi = \pi_C + \pi_I + \pi_G = \overline{W_G N_G} - T_W + c\dot{\pi} - s\dot{W} + I + \pi_G$$

$$Df = \overline{W_G N_G} + \pi_G + T_r - T_W - T_\pi(\pi)$$

$$\pi = I + Df + T_\pi(\pi) + c\dot{\pi} - s\dot{W}$$

Furthermore, the Kalecki equation not only determines the overall profits in an economy, but also the price level (Minsky, 1986a, p. 146).

$$P_C Q_C = W_C N_C + W_I N_I$$

$$P_C = \frac{W_C N_C}{Q_C}\left(1 + \frac{W_I N_I}{W_C N_C}\right)$$

$A_C = \frac{Q_C}{N_C}$ (average productivity of labour in consumer goods)

$$P_C = \frac{W_C}{A_C}\left(1 + \frac{W_I N_I}{W_C N_C}\right)$$

$$W_C = W_I$$

$$P_C = \frac{W_C}{A_C}\left(1 + \frac{N_I}{N_C}\right)$$

> "The price level equation makes explicit that in the simplest formal case the proximate determinants of how our economy works are the subsystems that determine (1) money wages, (2) the average productivity of labor, and (3) the ratio of investment employment to consumption employment." (Minsky, 1986a, p. 147)

By taking account of more aspects, like, for example, a government, the influence of factors on the price level also increases. As can be seen below, the government deficit and its corresponding spending on government wages and transfer payments increases the price level of consumer goods, whereas taxes on wages decrease their price level. However, this is only true to the extent to which these taxes do not alter the supply price of labour. The taxation of wages can increase the nominal wages by the same amount. Hence, the deflationary effect of non-profit taxes might be counteracted by a change in relative prices by increasing the nominal wages. (Minsky, 1986a, p. 149)

$$P_C = \frac{W_C N_C}{Q_C}\left(1 + \frac{W_I N_I}{W_C N_C} + \frac{Df - \pi_G}{W_C N_C} + \frac{T_\pi(\pi)}{W_C N_C}\right)$$

$$P_C = \frac{W_C N_C}{Q_C}\left(1 + \frac{W_I N_I}{W_C N_C} + \frac{W_G N_G}{W_G N_G} + \frac{T_r}{W_C N_C} - \frac{T_W}{W_C N_C}\right)$$

The prices, according to this Kalecki view, therefore always enable companies to generate a profit in a capitalist economy, and should that not be the case, it can even be rendered dysfunctional. This resembles not only the condition, in accordance with Keynes, that investment without profit (expectations) is impossible, but also that, in the very simplified model of a closed economy without a government, profit without investment is not feasible either.

The ability of businesses to generate profits is, however, dependent on their market power and, therefore, their ability to act as price setter in a market of monopolistic competition. (Minsky, 1986a, p. 158)

These generated profits are in essence cash flow sources that validate cash flow commitments stemming from incurred debt:

"Kalecki's gross profits after taxes are the realized cash flows that enable firms that use debt to finance control over capital assets to satisfy their payment commitments." (Minsky, 1982b, p. 27) Minsky states, "[...] the cash flow available to meet payment commitments on debts will arise from the total operations of the firm." (Minsky, 1982b, p. 19)

Investment and finance

Minsky also differentiates between different stages of a company's ability to generate cash flows and thereby validate different sets of costs incurred within the production process:

"TDC = Technologically determined costs, given prices and wages of inputs

OV = Technologically determined costs and overhead

DT = OV + funds needed to validate debts

CA = DT + funds needed to validate prices paid for capital assets

Revenues > CA fully validate past investment and financing decisions

CA > revenues > DT debts can be validated but the full price paid for capital assets cannot." (Minsky, 1986a, p. 159)

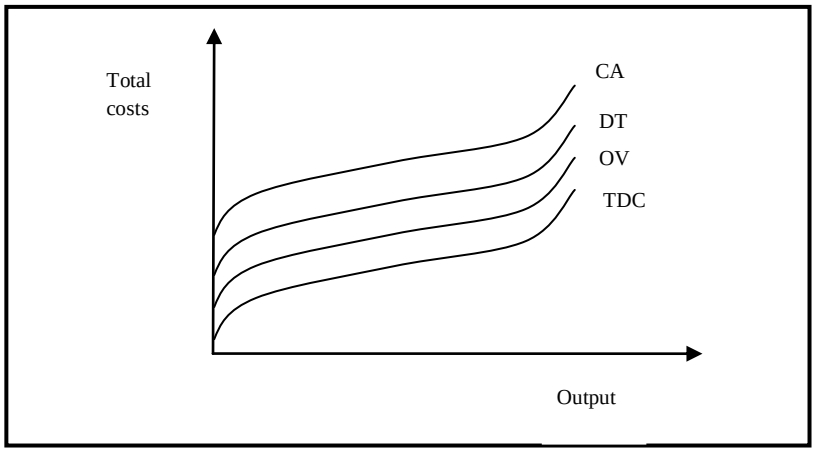


Figure 6: "Total Costs Allowing for Composition of Costs."

Source: Minsky, 1986a, p. 159.

In this regard, it is also interesting to see how close this concept actually is to the reality of internal business accounting and controlling. The most appropriate way of assessing a company's value in modern business controlling is not through profits, since they are often a matter of interpretation, due to certain freedoms provided by accounting standards. According to IAS standards, the options to evaluate assets in accordance with mark to market procedures are far more lenient than in the case of German HGB accounting, where mark to market for an asset's appreciation is limited by its original purchasing or production price (Thommen and Achleitner, 2009[1991], pp. 449, 494). Furthermore, according to Wray, many financial products become more and more unintelligible to be valued due to their increasing complexity, which results in mark to market valuation often turning into market to myth valuation (Wray, 2008, p. 14).

Hence, the most appropriate way to assess the value of an asset or a company is through cash flows, since these reflect the actual earning power of a company. A method commonly used by internationally operating investment banks is the Discounted-Cash Flow (DSF), which is based on the calculation of free cash flows. The gross cash flow serves as the basis and can be calculated indirectly by adding the depreciation of assets to the operating profit after taxes. Then, the increases in assets and net working capital are added, and decreases are deducted for arriving at the operative free cash flow. Finally, the non-operative cash flow is added, in order to get to the free cash flow (Thommen and Achleitner, 2009[1991], p. 725).

Even the succession of cash flows in this calculation is in accordance with Minsky and actually contains them all. The cash flow requirement, by adding the depreciation of capital to the operative profit, resembles OV, the cash flow needed to also cover the alteration in the net working capital by, for example, using working capital for servicing debt, resembles DT, and the cash flow necessary to account for the purchasing of assets corresponds with CA. Any cash flow that exceeds the aforementioned requirements is free for engaging in new financial commitments, such as interest payments, principal payments or dividends (Thommen and Achleitner, 2009[1991], p. 725).

> "Cash to meet these payment commitments is obtained either as: (1) income due to production [...], (2) the fulfillment by some other agent of contractual commitments; (3) the result of borrowing or selling assets, or, trivially (4) initial cash on hand." (Minsky, 1991a, p. 160)

Apart from receiving cash by conventional business operations, cash might also be generated by holding financial assets, which constitute contractual commitments from another party or by portfolio alterations. Minsky states, "Portfolio payments occur when assets, real or financial, are traded." (Minsky, 1964, p. 330)

In accordance with the aforementioned analysis, the realisation of investment requires two preconditions. Firstly, there has to be an expectation of future revenue that renders the investment profitable in the eyes of the entrepreneur, and secondly, the entrepreneur has to have the finances available in order to realise the investment.

The profitability reflects the demand price for an investment and is determined by "[...] capitalizing the expected cash flows and liquidity return from a project." (Minsky, 1986a, p. 183)

> "In a capitalist economy assets are priced. The prices reflect the relation between the cash flows or quasi rents, that capital assets are expected to earn as they are used in production and the payment commitments that have to be agreed upon in order to finance ownership." (Minsky, 1982c[1980], p. 73)
>
> "The demand prices for investment, however, do not determine the pace of investment. The existence of a market price for a capital asset and a demand price for comparable investments does not necessarily imply that there is an effective demand for investment; an effective demand for investment takes financing." (Minsky, 1986a, p. 183)

The funds available for financing are either internal or external, and, whereas the internal funds are constituted by cash flows, the external funds are either the holding of debt or the issuance of equity (Minsky, 1986a, p. 183). The ability to access external funds is, however, highly dependent on the probability to service the financial commitments:

> "Borrowing and lending take place on the basis of margins of safety. The fundamental margin of safety is the excess of the expected quasi-rents from operating capital asset over the cash flow commitments by financial contracts." (Minsky, 1982c[1980], p. 74)

The profitability and, therefore, the resulting price valuation, or demand price, for an asset depends on the generated cash flows and their capitalisation in accordance with interest rate commitments, in the case of debt, or, in the case of equity commitments, to pay dividends that reflect the opportunity costs of an alternative investment.

In modern business controlling, the capitalisation rate is often reflected by the usage of a Weighted Average Cost of Capital (WACC):

$$r_{equity} = \ opportunity\ costs\ rate\ (including\ a\ systemic\ risk\ markup)$$

$$r_{debt} = interest\ rate\ on\ debt$$

$$t = marginal\ tax\ rate$$

$$WACC = \ r_{equity} * \frac{equity}{capital} + \ r_{debt} * (1 - t) * \frac{debt}{capital}$$

Hence, the capitalisation rate is a composition of interest rate commitments on debt (deducted by their lowering tax effect) and of the opportunity cost rate of dividends from an alternative investment with the same systemic risk (Thommen and Achleitner, 2009[1991], pp. 725 - 726).

The systemic risk is taken account of by assessing the correlation β between the profitability of a certain equity and the market portfolio, which is the relative deviation in profitability of a certain financial asset, in relation to the deviations in profitability of the other financial assets of the same market portfolio. It therefore determines the volatility of a certain financial asset in relation to the volatility of the market portfolio. In other words, it expresses the extent to which the profitability of an asset is influenced by the business cycle (Wöhe, 1996, p. 916):

$$r_{equity} = \ r_{debt} + \ (r_{portfolio} - \ r_{debt}) * \ \beta$$

The cost that is incurred by an increase of the WACC limits the ability of a company to access finance, since it reduces the margin of safety and therefore the probability to service its financial commitments.

Minsky states, "The techniques available for financing positions in capital assets affect asset prices." (Minsky, 1982c[1980], p. 73)

Hence, the ability to finance either through internal cash flow, the holding of debt, or the issuance of equity determines asset prices by turning potential demand into effective demand.

2.2.2 The business cycle

Borrower's risk and lender's risk

The Minsky business cycle theory is "[...] an investment theory of the cycle and a financial theory of investment." (Wray, 2011a, p. 3) The first part of Minsky's business cycle theory is based on Keynes because "[...] investment is unstable and tends to be the driver of the cycle (through its multiplier impact)." (Wray, 2011a, p. 3) The investment itself is financed by internal and external funds (Wray, 2011a, p. 3). As is shown above, the internal funds stem from cash flows, mostly generated by operational business activities, whereas the external funds are borrowed funds. The crucial point is that, with successful business operations coming to fruition, the willingness to borrow and to lend additional funds becomes more relaxed, since profit expectations look rosy enough to justify such extra activities. However, the more leveraged these operations become, the higher the risk exposure is, in the case of generated cash flows falling short of expectations. (Wray, 2011a, p. 3)

The risk takers, in this case, are precisely the borrower and the lender. The basis of Minsky's theory therefore has to be seen in the borrower's and lender's risk, in combination with a model of demand prices for capital assets and the supply prices thereof (Wray and Tymoigne, 2008, p. 7).

The supply price of a capital asset is determined, as mentioned above, by its technical input determinants, combined with market prices for input, resulting in production costs, as well as the overhead costs and profit that can be covered by price setting in a monopolistic competition. The demand price for a capital asset is, however, determined by the profit expectations and their corresponding cash flows, which serve to calculate either a marginal efficiency of capital or, alternatively, the capitalized value of the expected cash flows at the current market's interest rate.

It is the capitalized value that represents the demand price of a capital asset; "[it] is the demand price of the investment, and investment will be carried to the point where [the

capitalized value] becomes equal to the supply price of the investment [...]." (Minsky, 1975, p. 99)

Furthermore, Minsky refers to Keynes's assumption that the economic process is driven by market behaviour under uncertainty and that this is the cause for financial and output instability. He furthermore emphasizes that there are two sets of prices at work, namely the demand price of capital assets and the supply price of current capital asset output, which are determined by different forces in the economy and are thereby susceptible to fluctuations. (Minsky, 1982d[1977], pp. 60-61)

De Antoni explains, "Belonging to both categories, investment has the function of aligning the two prices. By doing so, however, it attracts uncertainty, passing it on to the rest of the economy." (De Antoni, 2006, 157)

The uncertainty lies in the fact that the supply price of current output covers current technically-determined costs and reflects the ability to exercise market power in establishing a price setting that provides a current profit and a demand price that is not based on current but on expected future profits:

> "Uncertainty is largely a matter of dealing today with a future that by its very nature is highly conjectural. In a world with uncertainty, units make do with and react to the often surprising fruits of past decisions as they ripen." (Minsky, 1986a, p. 185)

According to Minsky, this is portayed by Keynes's borrower's risk and the lender's risk (Minsky, 1986a, p. 186):

> "The first is the [...] borrower's risk and arises out of the doubts in his own mind as to the probability of his actually earning the prospective yield for which he hopes. [...] But where a system of borrowing and lending exists [...] a second type of risk is relevant which we may call the lender's risk. This may be due either to moral hazard, i.e. voluntary default or other means of escape, possibly lawful, from the fulfilment of the obligation, or to the possible insufficiency of the margin of security, i.e. involuntary default due to the disappointment of expectation." (Keynes, 2011[1936], p. 144)

Both risks are therefore determined by a likely disappointment of expectations, either by too optimistic profit expectations by the entrepreneur, or by too optimistic expectations of the lender in regard to the borrower's estimated solvency or integrity.

The determination of investment for a representative company works, according to Minsky, as follows:

> " P_k depends upon what Keynes called the state of long-term expectations which leads to current views about future profits, the financing conditions that are available for positions in capital assets, and the supply the money, defined as the default-free assets that yield only liquidity." (Minsky, 1982c[1980], p. 79)

P_k is the the demand price for capital assets and P_I is the supply price of investment goods.

> "The "position" of P_I depends upon short-run profit expectations of the producers of investment goods. The supply curve of investment output states the minimum price at which particular outputs of investment goods would be produced given current money wages, the carrying costs of investment goods as they are produced, and the cost of purchased inputs." (Minsky, 1982c[1980], p. 80)

Q represents the company's ability to finance investments internally. It is therefore the cash flow that it generates through its business operations, divided by the supply price of the capital asset:

> "This income minus gross payments on debts and dividends yields the gross internal finance. The price multiplied by the quantity of investment goods that can be internally financed yields a rectangular hyperbole [...] which can be so financed." (Minsky, 1982c[1980], p. 80)

R_L represents the lender's risk that is to be added to P_I and the borrower's risk R_B that is to be subtracted from P_k. The less an investment project can be financed by the internal funds Q, the more the company has to go into debt (Minsky, 1986a, p. 190-191).

As described before, the increased indebtedness requires increased margins of safety by the lenders, which are reflected by an increase of P_I, due to an increase of the lender's risk R_L, which again is reflected by an increasing rate of interest at which credit is

provided, and which thereby increases the supply price at which a capital asset can be purchased.

However, not only the lender's risk increases, but the borrower's risk R_B also rises with increasing indebtedness:

> "A buyer of capital assets that are expected to yield a given flow of profits can increase his margin of safety to offset an increased exposure to failure to fulfil debt contracts by lowering his demand price for capital assets to reflect an increased dependence on debt financing. Borrower's risk shows up in a declining demand price for capital assets. It is not reflected in any financing charges; it mirrors the view that increased exposure to default will be worthwhile only if there is a compensating potential gain." (Minsky, 1986a, p. 190)

As far as $P_k > P_I$ is the case, it is worthwhile for entrepreneurs to invest as the capital value of the capital asset's future cash flows exceeds its supply price. For this endeavour, external finance becomes necessary from the point at which Q goes below P_I, since from there on, the internal financing capabilities do not meet the financial requirements of the corresponding degree of investment anymore because the internal ability to finance investment diminishes with the accumulated amount of investment.

With the inclusion of external finance and its successive increase, the obligations for the entrepreneur to meet interest and principle payments become ever higher. These increased debt commitments, which are due to rising leverage, pose an increased level of risk that payment commitments cannot be met in the case that the anticipated cash flows are not achieved. This requires a higher margin of safety to compensate, which can be met by a diminished demand price for capital assets. As the borrower's risk rises due to increased leverage, the value of the purchased capital asset decreases, since the rising risk premium, or margin of safety, to be added to the market rate of interest reduces the capitalized value of cash flows, which in turn diminishes the demand price for further capital assets. (Minsky, 1986a, p. 190)

On the other hand, the perceived lender's risk also increases with increased leverage as the margins of safety represented in the borrower's balance sheet by financial assets that are fed by internal cash flows become less sufficient and might even deteriorate due to

increased internal financing endeavours and/or increased payment commitments for external finance. These external finance commitments can either occur through increased interest and principle payments or through increased dividend payments for attracting fresh equity through emitting shares. (Minsky, 1986a, p. 191)

The increase of the lender's risk raises the supply price of the capital assets as the default risk rises, with the increasing degree of total investment diminishing the margin of safety on the borrower's side, which induces the lender to compensate for this perceived increase in risk by raising the rate of interest charged to the borrower.

The actual degree of investment reaches its optimum when the demand price and the supply price are both adjusted by the borrower's risk and marginal lender's risk to form an equilibrium:

$$(P_K - R_B) = (P_I + R_L)$$

The actual point where this will be depends on the risk perception of the economic agents and, ultimately, on their future expectations. The investment level that can only be nourished by internal finance therefore lies at I_i, and any investment that goes beyond this point will have to be financed externally. A relatively steep increase of perceived risk per unit of additional indebtedness will therefore lead to a relatively low degree of investment at I_0, whereas a relatively shallow increase of perceived risk per additional unit of indebtedness will yield a relatively high degree of investment at I_1.

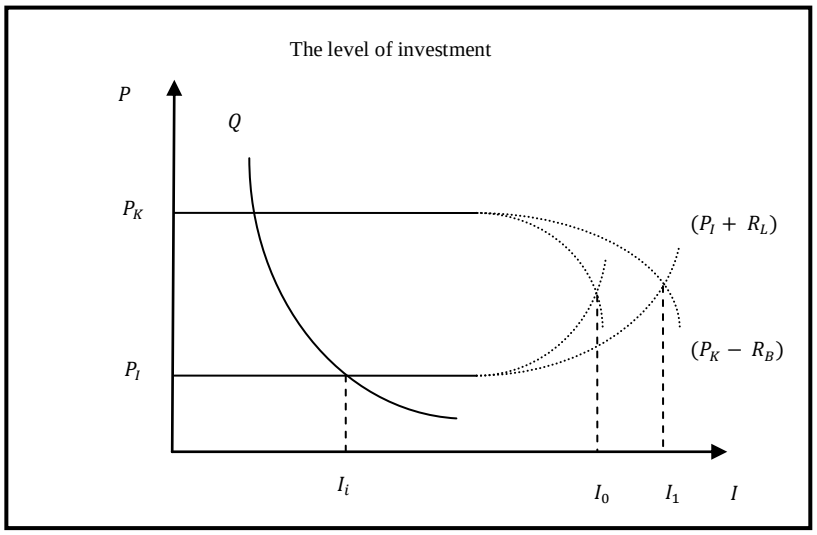


Figure 7: Level of investment: Changes in expectations.

Source: Own figure on the basis of Minsky, 1986a, p. 191.

In the same way as the risk perception works on the borrower's side, it also works on the lender's side as a risk adjustment of interest rates. An increase in the overall level of market interest rates, including both long-term and short-term rates, decreases the demand price for investment, since the increase of the long-term rate reduces the capitalization value of the anticipated cash flows, whereas the short-term rate increases the supply price of capital assets, since it poses a rise in finance costs for the producers. (De Antoni, 2006, 157)

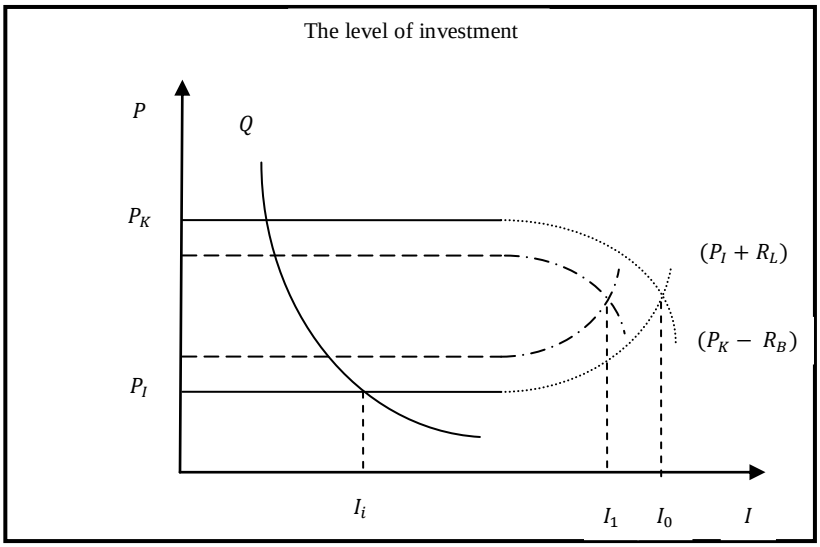


Figure 8: Level of investment: Interest rate changes.

Source: Own figure on the basis of De Antoni, 2006, 159.

This reduces the incentive to invest and, in the extreme, might even lead to an inversion of demand and supply price of a capital asset where the supply price exceeds the demand price (Minsky, 1986a, p. 195). This extreme situation may also resemble that of a dysfunctional capital economy in which anticipated cash flows are largely being disappointed so that future expectations are revised, to the effect that the supply price of a capital asset exceeds its demand price at any level, as its capitalization value falls short of its cost induced supply price (Minsky, 1982e[1978], p. 110).

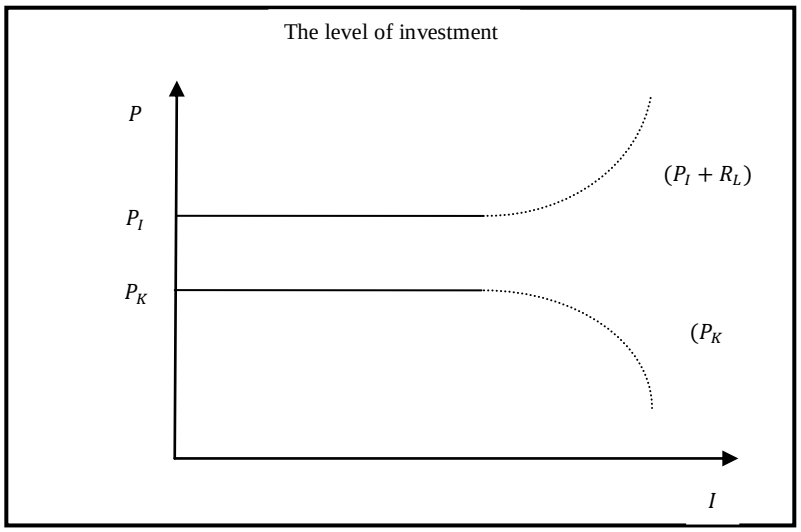


Figure 9: The level of investment: Extremely pessimistic expectations.

Source: Own figure on the basis of Minsky, 1982e[1978], p. 110.

When it comes to debt commitments and the ways to service them through cash flows, Minsky distinguishes between three categories of cash flows, which are income, balance sheet, and portfolio cash flows. The first category of income cash flows is generated through everyday business activities and their generation of revenue and the occurrence of cost related payments. The second category of balance sheet cash flows are due to interest generating financial assets or to interest and principle payment causing liabilities. The third category of portfolio cash flows stems from "[...] decisions to acquire or to sell assets or to put new liabilities into circulation." (Minsky, 1986a, p. 200)

This systematic of generating liquidity through cash flows again resembles the systematic mentioned earlier in the chapter on the theoretical foundations of the Minsky theory. The risk of illiquidity might therefore be countered by internally generated cash flows, through the 'productivity' of the investment, which, in this case, might be constituted either by assets in the form of capital goods or by assets in the form of financial assets. Alternatively, illiquidity might be countered either by obtaining additional external finance through the emission of securities or through the liquidation of assets.

Stability breeds instability

The bait that attracts investment is the demand price of a capital asset, which surmounts its production costs, represented by its supply price. The purchasing of such an asset poses a capital gain. (Minsky, 1986a, p. 214)

As mentioned above, this is not only true for capital assets, but for financial assets as well:

> "In a capitalist economy, two sets of profit-maximizing institutions exist: One owns capital assets and makes profits by producing and selling goods and services, the other owns financial assets and makes profits by producing and selling debts [...]." (Minsky, 1982b, p.19)

The possibility to generate a capital gain is therefore not limited to the conventional entrepreneur who produces goods and services, but open to any financial market institution that uses financial assets as collateral for loans (Wray, 2008, p. 2).

The measurement of the objective validity of the perceived risk is achieved by dividing the capital invested into three different categories:

i. Hedge units
ii. Speculative units
iii. Ponzi Units

> "Hedge financing units are those which can fulfill all of their contractual payment obligations by their cash flows: the greater the weight of equity financing in the liability structure, the greater the likelihood that the unit is a hedge financing unit. Speculative finance units are units that can meet their payment commitments on "income account" on their liabilities, even as they cannot repay the principle out of income cash flows. [...] For Ponzi units, the cash flows from operations are not sufficient to fulfill either the repayment of principle or the interest due on outstanding debts by their cash flows from operations." (Minsky, 1992a, p. 7)

The only units that are therefore able to meet their entire debt commitments are the hedge units. The speculative units are able to meet their interest payment commitments but not their principal payment commitments, which means that their positions have to

be refinanced continuously. The Ponzi units are able to meet neither the interest nor the principle payments commitments and therefore have to finance both with increasing indebtedness.

The capitalization value for hedge units is therefore positive at any interest rate, whereas for speculative units, this may only be the case for low interest rates and even more so for Ponzi units (Minsky, 1982b, p. 22). The hedge units can therefore only default on their obligations when the actual cash flows fall short of the anticipated cash flow (Minsky, 1982b, p. 23).

> "The robustness or fragility of the financial system depends upon the size and strength of the margins of safety and the likelihood that initial disturbances are amplified. Hedge, speculative, and Ponzi units alike are vulnerable to economic developments that reduce the cash flows from assets." (Minsky, 1986a, p. 209)

However, according to Minsky, the business cycle develops that way so that the hedge units turn more and more into speculative units, while these turn more and more into Ponzi units, and thereby, the entire economy becomes ever more susceptible to instability. It is the capital gain that can be generated through the gap between the demand price for a capital asset and its supply price that triggers this development (Minsky, 1986a, p. 210). Assuming that the short-term interest rate is usually lower than the long-term interest rate, it is a viable option to finance the purchasing of assets short-term with the intention of selling them off again before long, since, with a lower interest rate, a speculative unit may actually generate a positive capitalization value.

Furthermore, assuming that banks will accommodate this surging demand for credit, in accordance with the endogenous money hypothesis, the effective demand for those assets will increase their demand price even further (Minsky, 1986a, p. 212). This increases the capital gain gap and hence attracts not only more speculative units, but Ponzi units as well. The extent to which this gap-widening process between the supply and the demand price becomes self-enhancing depends on whether the increases in asset demand prices "[...] are fed back into the financial system as security for debts." (Minsky, 1964, p. 333)

Increased mark to market valuation of the asset then serves as collateral on the balance sheets for new loans, financing the purchasing of the same asset type and enhancing the asset's market valuation even further.

> "Ponzi-equivalent finance characterizes the financing of much of investment in process. An investment project yields no revenues until the project is finished." (Minsky, 1982b, p. 23)

An investment project has no value until it is finished and ready to generate the anticipated cash flows. A half erected investment project is unable to generate any revenue at all, which makes it especially susceptible to changes in interest rates and in particular the longer the gestation period of that project is. Hence, the longer the gestation period of a project, the more likely it is to be a Ponzi financed unit:

> "Thus interest rate changes have a greater impact upon investment in projects with a significant time to completion and a long expected useful life than upon short-term investment." (Minsky, 1986a, p. 216)

However, as long as the optimistic expectations prevail, an increase in the market rate of interest is rather unlikely, since liquidity risk, and therefore liquidity preference, as well as risk spreads, are underrated:

> "A period of tranquility (in which the financial system is robust and there are no relevant shocks, so that profits are systematically greater than debt commitments) increases the confidence of firms and financial intermediaries, thus reducing both the value placed upon liquidity and the borrowers' and lenders' risks." (De Antoni, 2006, p. 163)

Since the confidence is shared by the banking system, the increasing demand for finance is accommodated by creating credit money and inventing instruments in the form of new securities. This endogenous increase in money and liquidity stretching by using liquid assets then increases the demand price for assets, in comparison to current output prices. (Minsky, 1986a, p. 212) Hence, the first prices that will be on the rise are asset prices and not prices for goods and services.

This also leads to the conclusion that there are two steps of inflation and that the second step comes with a time-lag. The first one results in rising prices of assets, where the nominal wages lag behind as real wages initially remain unaffected. The second step is

driven by increasing nominal wages in a second round, induced by exercised trade union power as real wages are increased, which then results in a further increase of prices. Ultimately, this may even lead to "[...] an open inflation in which rising prices induce rising wages, which leads to further rising prices." (Minsky, 1986a, p. 259)

> "Hence [...] marked and sustained increases in the demand of consumer goods financed by incomes that do not result in consumption-goods output will break through the inflation barrier, thus leading to the type of inflation that is associated with increases in money wages." (Minsky, 1986a, p. 259)

The first round of price inflation is therefore driven by demand prices for assets, whereas the second round is driven by cost induced rises in output prices due to increases in nominal wages. The second round, however, only occurs when higher nominal wages can be negotiated, and the consumer-goods output is unable to immediately follow suit with increased demand.

However, neither the increase in investment of capital assets, nor the inflation that ensues, are unlimited. In accordance with a structuralist endogenous money supply, which is only fully elastic to a certain degree and then loses its elasticity with increasing leverage, an increasing risk margin has to be added, resulting in an increase of the market interest rate (Wray, 1990, pp. 163-167). The question of whether the central bank tries to tighten the money supply or not is therefore of secondary importance. It is the increase in leverage that leads to rising market interest rates, and the turning point of the business cycle is therefore entirely endogenous (Minsky, 1982b, p. 32-33). The susceptibility to instability increases even more as the interest rate rises, and this on its own shifts finance further from hedge into speculative and into Ponzi units.

The liquid assets that are created in the process of financial innovation only remain liquid as long as there is a ready market for them because, as soon as the balance sheet lengthening becomes intolerable and position making is required by turning these assets into narrow money,[6] a fire-sale ensues, which results in a debt deflation. The willingness of companies to accept rising wages is also limited by their market power, in terms of how far they are able to mark up these wage rises onto their prices (Minsky, 1986a, p. 267). The increasing demand for capital goods results in increased

[6] Narrow money is broadly defined as M0 and M1which then includes next to notes and coins also money equivalents like demand deposits (Financial Times, 2014).

employment and in increased demand of consumption-goods and, with a time-lag, an increase in consumption-goods output, which thereby also leads to an increased employment in the production of consumption goods, which in turn increases the profits of the consumption goods' producers. (Minsky, 1986a, p. 268)

> "Thus, an initial increase in investment-goods employment and wages leads to rising employment, wages, and prices in consumption goods. This process, however, is limited by financial-market reactions to increased financial layering and the emergence of fragile financial structures conducive to crisis and cyclical downturns." (Minsky, 1986a, p. 268)

In accordance with the Kalecki equation adopted by Minsky, the increasing nominal wages serve as an additional nominal validation of investment projects, as long as they are added as a mark-up to the output prices and do not diminish the entrepreneurs' profits. The downturn, and therefore also the deflation, are precipitated by the rising level of market interest rates caused by increased liquidity preference through increased financial fragility, and this is even due to occur with an accommodative central bank (Minsky, 1986a, p. 269). Hence, the downturn diminishes the companies' ability to service their debt further and thereby forces them to obtain narrow money elsewhere. The first option is "forced borrowing" (Minsky, 1964, p. 331). This means increasing the weight of the speculative and the Ponzi units in financing even further by greater indebtedness, which is unlikely when everyone is trying to shorten the balance sheets. The inability to realize forced borrowing therefore results in forced selling of assets to make position at a grand scale. A financial panic develops, and the fire sale ensues. (Minsky, 1964, p. 331)

It has to be reiterated that the inflation becomes more severe the less companies are able to satisfy the increased demand for consumer goods. This is a vital insight by Minsky, and yet, he does not establish the connection to the limits of financing further investment. This connection will, however, be of major importance later on, when dealing with the Austrian business cycle theory of Hayek. It will be shown that the inability to satisfy the demand for consumer goods and the limits of financing are actually very much connected.

2.2.3 Characteristics of modern capitalism according to Minsky

The Wall Street economy

> "Looking at the economy from a Wall Street board room, we see a paper world - a world of commitments to pay cash today and in the future. These cash flows are a legacy of past contracts in which money today was exchanged for money in the future. In addition, we see deals being made in which commitments to pay cash in the future are exchanged for cash today. The viability of this paper world rests upon the cash flows [...]." (Minsky, 1982d[1977], p. 63)

> "The theoretical argument of the financial instability hypothesis starts from the characterization of the economy as a capitalist economy with expensive capital assets and a complex, sophisticated financial system." (Minsky, 1992a, p. 2)

Minsky describes the Wall Street economy as an economy in which finance is the prime arbiter of everything. It is a world of cash commitments and their validation through cash flows. A widespread fear over the inability to validate the papers issued in this world, either internally, through cash flows generated by enterprise operations, or externally, by obtained new debt to refinance positions, has dire consequences for the entire fabric of the economy. The acceptability of liability structures depends on profit expectations, which serve to validate the incurred debt:

> "The instability that such an economy exhibits follows from the subjective nature of expectations about the future course of investment, as well as the subjective determination by bankers and their business clients of the appropriate liability structure for the financing of positions in different types of capital assets." (Minsky, 1982d[1977], p. 65)

Another characteristic of this kind of economy is the growing complexity of its exchange structure, which is gaining complexity in two dimensions. Firstly, the validation of cash commitments is not just a matter between businesses and banks, but also includes a variety of parties in a modern society. Any analysis of a modern economy must therefore also include instruments of financing households' consumption, state indebtedness, and internationally active entities' debt structures. (Minsky, 1992a, pp. 4-5)

Secondly, since the Wall Street economy is not a static structure, but rather an evolving one that is subject to Schumpeterian innovation, the instruments put to use for financing are becoming ever more complex and sophisticated:

> "Banks seek profits by financing activity and bankers. Like all entrepreneurs in a capitalist economy, bankers are aware that innovation assures profits. Thus, bankers (using the term generically for all intermediaries in finance), whether they be brokers or dealers, are merchants of debt who strive to innovate in the assets they acquire and the liabilities they market." (Minsky, 1992a, p. 6)

The growing complexity of finance, with Wall Street as a role model, is based on New York evolving into the unrivalled champion of international financial centres directly after the second world war, and on the US dollar as the currency that became the world's reserve currency in the wake of the Bretton-Woods agreement (Cassis, 2007[2006], p. 297; Minsky, 1995, p. 3). In his assessment, Cassis sees New York as the world's financial hub. Even though New York might not be the number one by standards of international financial transactions, where London is the most important player, or in portfolio management, where other US locations like Boston or San Francisco are also prominent, the leading role of New York lies in its market capitalization, which, prior to the financial crisis of 2008, was at least more than five times larger than that of any other stock exchange. Furthermore, international finance was dominated by US investment banks, such as Goldman Sachs, Merrill Lynch, and Morgan Stanley, whose role in global mergers and acquisitions was markedly dominant. (Cassis, 2007[2006], p. 373)

The apex of the international financial system is therefore the US, and New York in particular. The role that the US dollar plays as an international reserve currency will be repeatedly dealt with in this thesis during the analysis of how the financial crisis of 2008 was managed and what this might imply for institutional monetary reform. The role of financial market deregulation emanating from the US, and the way it was used by US financial institutions on a global scale, will be dealt with in the following section. Thereafter, it will be discussed how the regulatory framework spurred a process of financial innovation.

Globalisation and deregulation

The globalisation of financial markets, which has been successively enforced on national levels mainly from the 1980s onwards, is characterised by lifting restrictions on the movement of capital (Cassis, 2007[2006], p. 349). The deregulation of the 1970s in the US also included a reform of the abolishment of regulatory price setting, such as minimum commissions on transactions (Cassis, 2007[2006], p. 351). Later, it went on with the end of Glass Steagall, lifting the segregation of commercial banks and investment banks and allowing the adoption of broker functions by commercial banks (Cassis, 2007[2006], p. 351; Wray, 2007b, p. 4). The aim of deregulation was to enhance the competitiveness of the financial markets, which ultimately resulted in a massive increase of international capital flows. The capital invested in foreign markets increased globally by tenfold from 1980 to 2000 and doubled between 1995 and the year 2000, while the share of foreign assets to global GDP went from 25 percent in 1980 to 92 percent in 2000 (Cassis, 2007[2006], p. 348).

The importance of the regulatory framework for the way that incentives and business models are created plays an important role for Minsky and his followers. An example of such a case of regulatory arbitrage is presented by Minsky and Wray in the circumvention of Regulation Q, which was a regulatory price setting restriction for interest rates on deposits, and which provided, in combination with usury laws, a maximum for interest rates to be paid on deposits and interest rates charged on loans (Wray, 2008, p. 9). The incentive for financial innovation was created when the US central bank adopted a high interest rate policy in order to curb inflation (Minsky, 1994, p. 12; Wray, 2008, p. 9). The result was the withdrawal of deposits from savings and commercial banks, which were subject to Regulation Q and the provision of higher interest rates on the financial markets, through institutional novelties of what has become known as shadow banking (Wray, 2008, p. 9). In pushing up the target interest rate above the Regulation Q level, the Federal Reserve created a severe credit rationing at commercial banks, since deposits were withdrawn in order to seek higher earnings with commercial papers from shadow banks (Wray, 2007b, p. 12). Hence, the savings and loans' and commercial banks' old business model was no longer viable, which usually saw a deposit rate of about 3 percent and a loan rate of about 6 percent. This new situation, however, meant that the savings and loans, for example, would be stuck with long-term home loans, earning less interest than the interest to be paid in order to attract deposits, resulting in losses that would deteriorate the equity base of these

institutions. The solution to this problem was the abolishment of Glass Steagall in order to allow commercial banks, as well as savings and loans, to adopt other instruments that would enable them to generate profits by providing them the means to compete with bond issuing investment banks and commercial paper issuing shadow banks (Wray, 2007b, pp. 6-7). The Glass Steagall act's segmentation of the banking system into investment banks and commercial banks formerly ensured that investment banks would have the monopoly in issuing securities, whereas commercial banks, on the other hand, would have the monopoly in obtaining deposits. However, under the regime of a very high interest rate target, the advantage was with the investment and shadow banks, so, with the innovation of securities that had demand-deposit-like attributes, they could outbid the regulated commercial banks (Kregel, 2010a, p. 3). Hence, the newly developed securities provided a competitive edge because spreads at which financial market entities like shadow banks can operate are far lower because they are not obliged to hold minimum reserves and are not subject to equity ratio requirements, and neither are they burdened with high administrative costs resulting from a vast due diligence apparatus of relationship banking (Wray, 2007b, p. 8). However, this also means that provisions made to absorb liquidity and solvency risk might be insufficient in comparison to regulated institutions (Minsky, 1986b, p. 25). The usage of financial market instruments is therefore not exclusively in the hands of the traditional banking system anymore, but increasingly in the hands of new institutions, i.e. shadow banks that issue securities with a quasi-demand deposit character (Wray, 2007b, p. 8).

One answer, therefore, was for commercial banks, savings, and loans to move generated loans off their balance sheets by selling them on and thus earning fees for originating the loans, as well as assessing the clients' solvency (Wray, 2007b, p. 7). By shortening their balance sheets, commercial banks, as well as saving and loans, could also decrease their reserve requirements with the Federal Reserve and thereby reduce their costs of holding idle reserves (Wray, 2009, p. 7). Hence, another step was to regard these banks as equal to investment banks in order to provide them with a level playing field and thereby to also exempt them from Regulation Q (Kregel, 2010a, p. 3).

However, this proved to be a great disadvantage to commercial banks that were still regulated by Regulation Q, and it proved to be an incentive to also move towards investment banking in order to circumvent Regulation Q, as well as reserve holding requirements by issuing instruments that were not subject to regulation. This would often be done indirectly by issuing negotiable commercial papers of demand deposits'

quality through subsidiary shadow banks, which would also be active in tapping dollar funds on the Eurodollar market. As a result, commercial banks were able to compete against traditional investment banks in refinancing themselves on the money market (Isenberg, 2006, p. 372). Another answer to the problem was to allow an increase in the riskiness of the asset portfolio by allowing commercial banks, as well as saving and loans, to engage in property development on their own account and by allowing them to take on non-investment grade bonds on their balance sheets with higher premiums to be earned (Minsky, 1994, p. 12).

The first answer in ensuring a level playing field can therefore be regarded as the start of a huge movement towards securitization and as a reaction on regulatory arbitrage resulting in financial innovation, which, combined with a more relaxed risk oversight by making the correct pricing of the riskiness of assets an obligation of the individual bank, potentially increased the riskiness in the banking industry on a global scale, considering the increased international exposure of financial institutions, should systemic risk be underestimated.

Innovation and deregulation

The process of innovation, which turned out to be ever more influential at the end of the 20th century, is the withdrawal of deposits from conventional business banks and their reallocation towards the direct purchasing of securities such as commercial papers, bonds, or shares (Cassis, 2007[2006], p. 354). This is also reflected by the fact that the share of financial assets held by traditional banks decreased in the US from 50 percent in the 1950s to 25 percent in the 1990s (Wray, 2007b, p. 7).

> "This [securitization] provides a great deal of profit space for innovative suppliers with lower costs. Bank participation in securitization is part of the drive, forced by costs, to supplement fund income with fee income. The development of the money market funds, the continued growth of mutual and pension funds, and the emergence of the vast institutional holdings by offshore entities provide a market for the instruments created by securitization." (Minsky, 2008, p. 3)

The main innovation drive is therefore visible in the development of securitization, for which Minsky detects the following main players and their corresponding interactions (Minsky, 2008, pp. 4-5):

i. The debtor:
   Entity in whose name the paper is issued and which constitutes the source for cash flows.

ii. The paper creator:
   Issuer of paper and provider of econometric risk management. Risk management is devised through the usage of insurance; for example, by credit default swaps or portfolio risk management by mixing liabilities of different risk classes and yield levels.

iii. The trustee:
   Keeps the underlying collateral paper of the security, collects the cash from the servicing organisation, and forwards it to the securities' owner (funders). Often has the right to sell the collateral, i.e. the underlying asset, in case the performance of the security should deviate from the predicted development beyond what was deemed to be tolerable and to use the proceeds to reimburse the securities' owners (funders).

iv. Servicing organisation:
   Often the issuing bank, which also collects the cash flow from the debtor and passes it on to the trustee.

v. The rating service:
   Successive assessment of the securities' risk class and therefore of its likely performance.

vi. The maker of a secondary market:
   Investment bank that underwrites the security as a dealer thereof.

vii. The funders:
   "[...] households, pension funds, banks with poor
   paper-creating facilities, foreign institutions, etc."(Minsky, 2008, p. 5)

The question that can be derived from this securitization process is: Whose risk is it in the end? According to the above process overview of the players and their interactions, it can be assumed that the default risk can be ascribed to the funders. However, this is not entirely true because the banks who originated the papers often guaranteed buybacks

in case the securities' performance goes below a certain threshold, which enhanced the argument for the rating agencies that the securities could be deemed to be investment grade quality for insurers and pension funds (Wray, 2009, p. 7). Furthermore, the securities are often insured against default. However, if the CDS's quality, which is supposed to serve as an insurance, is questionable, since they are just a derivative of the bond itself, and, if it is a junk bond, then the CDS is just a derivative of junk. An estimate quoted claims that, from 2004 onward, 40 percent of all debt consisted of junk bonds with relatively high default risk and, therefore, risk compensating high yields (Wray, 2008, p. 26). The risk therefore also lies in an overall default of the insurers, due to the sheer amount of insured junk bonds, which then has repercussions on whoever bears the final risk. This can be either the funder or the paper creator (Wray, 2007b, p. 22).

However, the fact that the originator of the security is under the impression of not bearing a risk, due to the fact that an insurance will cover, leads to excessive risk taking. As could be seen in the financial crisis of 2008, mortgage brokers did not care much about the solvency of their clients or their ability to meet their cash flow commitments. Three indicators tell exactly this story. First of all, the share of subprime mortgages that were being securitized rose from about 50 percent in 2001 to about 80 percent in 2006. Secondly, the share of mortgages that required no or only little documentation to provide proof about the solvency situation rose from 28.5 percent in 2001 to 50.8 percent in 2006. Thirdly, the debt-payments-to-income ratio increased from 39.7 percent in 2001 to 42.4 percent in 2006 (Wray, 2007b, pp. 30-31). Obviously, the mortgages that were sold became ever riskier as mortgages with a high default risk became increasingly securitized, and the solvency standards were more and more neglected. The pinnacle of the whole development can be seen in the development of variable interest rate mortgages, with "teaser rates" in the first three years, and an automatic interest rate reset thereafter (Wray, 2007b, p. 9). This was something that could only be viable from a cash flow commitment point of view for a person with insufficient solvency from the start, with either new refinancing options at falling interest rates or increasing house prices (Wray, 2008, p. 29).

The process of deregulation and the innovation of new instruments would not only add new players, as has been shown in the above overview of securitization. It also changes the roles of already existing market players:

> "Thrifts and other regulated financial institutions would earn fee income for loan origination, for assessing risk, and for servicing the mortgages. Wall Street would place the collateralized debt obligations (CDOs), slicing and dicing to suit the needs of investors." (Wray, 2007b, p. 7)

The ability to circumvent reserve holdings with the Federal Reserve through securitization also led to a vast increase in leverage. For example, hedge funds would use asset-backed securities as collateral, on the basis of which loanable funds would be collected, which would be used for the purchasing of these securities. The securities to be purchased served as collateral for the funds to be collected, operating with leverage to equity factors between 20 or 30, whereas banks could operate with a leverage factor of 8 (Wray, 2008, p. 18). On average, the leverage factor went up to 15 (Wray, 2009, p. 9).

The final consequence for liberalizing the financial market and providing a level playing field was then, of course, the abolishment of Glass Steagall:

> "The Glass Steagall act that had separated commercial and investment banking was repealed in 1999, allowing commercial banks to engage in a wider range of practices so that they could better compete with their relatively unregulated Wall Street competitors." (Wray, 2007b, p. 4)

Money Manager Capitalism

Economic agents that became significantly more important were institutional investors, such as pension funds, insurance companies, and investment companies, combined with an accompanying increase of innovative negotiable securities (Cassis, 2007[2006], p. 355). It is therefore predominantly managed money that drives up asset prices. According to a study quoted by Wray, "[...] the increase of Chinese consumption of oil over the past five years totalled 920 million barrels, while index speculators increased their holdings of oil contracts by 848 million barrels during the same period." (Wray, 2009, p. 15)

This comparison of quantities suggests that pension funds are able to 'move markets' due to their sheer size and thereby create speculation bubbles, resulting in price rises that are far more powerful than any increase in real production demand for certain commodities, such as oil. The driving force behind this is for pension funds to diversify

their portfolio, and it is deregulation that allows them to do so (Wray, 2011b, p. 8). The principle of this modern kind of financial market paradigm is different from the old banking paradigm of banking relations in which the banker actively assesses the creditworthiness of his customer. The principle of the new paradigm is instead to detect the 'mispricing of risk':

> "Instead of a spread between borrowing and lending rates determined by the bank's ability to assess credit risk and thus ensure the liquidity of its liabilities, riskless arbitrage requires just the opposite process. Here, it is the pooling, diversification, and structuring of the special purpose entity's assets that reduces risk [...]." (Kregel, 2010b, p. 4)

The risk assessment is, however, based on quantitative models, providing data about the historic correlation between market volatility and the individual asset volatility, expressed as the systemic risk of β (Wray, 2008, p. 18).

> "The new system required accurate appraisals of values of the underlying assets and accurate evaluation of the risks of the securities. However, the apparent success of the "originate and distribute" approach encouraged erosion of margins of safety, ever-riskier practice, collusion, and misrepresentation in the belief (or at least hope) that nothing could go wrong." (Wray, 2008, p. 22)

However, what has not changed is the fact that "[...] like any other asset, securities derive their value from the size and certainty of supporting cash flows." (Minsky, 1986b, p. 26)

The problem, however, seems to be that the financial crisis is the result of this principle not being adhered to:

> "Today's crisis is rooted in what he [Minsky] called "money manager capitalism," the current stage of capitalism dominated by highly leveraged funds seeking maximum returns in an environment that systematically under-prices risk." (Wray, 2009, p. 2)

The economic agents involved have not only changed in their prominence, as can be seen, for example, by the number of hedge funds, which increased from 200 in 1990 to an estimated number of 800 in 2003, with their funds rising from 60 billion US dollars

to more than 750 billion US dollars (Cassis, 2007[2006], p. 357). What has also increased is their global interconnectedness. Minsky already foresaw in 1986 that the prolonged trade deficit of the US, and, consequently, the accumulation of US reserves on foreign soil, would provide a ready market internationally for the newly developed securities from the US (Minsky, 1986b, p. 26).

> "Packaged securities were appealing for global investors trying to achieve the desired proportion of dollar-denominated assets." (Wray, 2009, p. 6)

> "[Securitization] was part and parcel of the globalization of finance, as securitization creates financial paper that is freed from national boundaries. German investors with no direct access to America's homeowners could buy a piece of the action in U.S. real estate markets." (Wray, 2007b, p. 7)

It is therefore the underestimation of systemic risk that caused the global severity of the crisis once the overall mispricing of risk became apparent and the defaults became inevitable. This was based on historically established correlations, which can, however, not allow for the fundamental uncertainty, since no meaningful probabilities can be established for such future correlations. Furthermore, it took place in combination with an unprecedented interconnectedness of global financial markets and through innovative financial instruments, flourishing in a deregulated financial market environment.

2.3 Minskyan policy recommendations for the resolution of the crisis

2.3.1 Big government prevents volatility

> "Big government rigs the economic game so that profits are sustained; by sustaining profits, government deficits can prevent the burden of business debt from increasing during a recession." (Minsky, 1986a, p. 148)

As described before, the Kalecki profit equation, which involves the government through deficit spending, represents another factor that props up business profits through increased total demand. The big government, as Minsky sees it, serves as an automatic stabilizer precisely because it provides society with the fiscal safety net of the social state. A crisis-induced reduction of cash flows in the private sector is thereby met by increases in cash flows from the state's deficit spending, making up for a good part of the shortfall in private sector cash flows and thereby helping to sustain profits. (Minsky, 1986a, p. 166)

An argument that can be brought forward against such a stabilizing effect is that the deficit spending does not help to overcome the crisis, but rather, it is at best a futile attempt, since the increased demand for finance by the state leads to a crowding-out effect of private sector investment, since the state and the private sector are now competing for limited resources of finance and thereby driving up the market interest rate. This argument can be made independently, either from a neoclassical or a neoclassical-synthesis perspective. In the former case, the crowding-out is driven by the quantitative theory of money in which the increase in demand for investment drives up the interest rate directly as I + G exceeds S and is brought back into equilibrium by an increase of the interest rate at the capital market. This results in a diminishing amount of private investment because it is inhibited by increased cost of financing and an increased amount of saving, attracted by increased gains in saving, both of which are induced by the increased rate of interest and lead to a complete crowding-out. (Felderer and Homburg, 2005[1984], p. 163)

In the latter case, an increase of the interest rate is brought about in two ways: firstly, by a portfolio shift that occurs as the increased demand for liquidity, which is due to a rise in transactions, leads to a sell-off of securities and thereby increases the market interest rate as a reciprocal value of security prices; and secondly, by an increase in commodity

prices, due to increased demand, which decreases the real amount of money and therefore further increases the demand for liquidity. Both of these increase the interest rate to such an extent that it leads to a crowding-out of private investment to the same degree as deficit spending (Felderer and Homburg, 2005[1984], p. 163). Another argument often brought forward is that, due to a budget constraint, households would reduce their consumption spending in expectation of future tax increases (Seccareccia, 2011, p. 64). This argument is in accordance with the Ricardian equivalence hypothesis, which assumes that the deficits of today will have to be eventually repaid and thereby constitute future tax increases, which leads to a crowding-out of consumption through deficit spending (Gabler, 2005, p. 2557).

The crowding-out argument of deficit spending, however, only holds true as long as the investment is interest elastic. As soon as this is not the case, any interest rate increase is of no importance to investment activity, and instead of leading to a crowding-out, deficit spending actually precipitates a crowding-in (Felderer and Homburg, 2005[1984], p. 171). Seccareccia also brings precisely this argument forward in rejecting the crowding-out logic in the case of a severe crisis, since, due to depressed future expectations, only a negative real interest rate would have any positive effect on investment activity. The investment is therefore inelastic with regards to the interest rate within any normal positive range of the real interest rate (Seccareccia, 2011, p. 69). However, in the face of a crisis, falling prices are likely and thereby result in positive real interest rates at a regime with a nominal interest rate at the lower zero bound (Kregel, 2009, p. 654).

Tcherneva even goes a step further, arguing that the crowding-out effect of deficit spending is nothing but a myth in the first place. She argues from a Chartalist/ Modern Monetary Theory position, in which money is introduced by the state, and taxes are not for financing state expenditure, but rather for creating demand for the state currency that enables the state's subjects to meet their tax payment requirements (Tcherneva, 2009, p. 223).

> "If we carry this analysis to its logical end, it means that tax revenues are irrelevant for the purposes of financing government deficit spending for a government that pays in its own liabilities, no matter whether this deficit is associated with the central bank’s deflation-fighting tactics or with general federal government operations." (Tcherneva, 2011, p. 422)

Additionally, Tcherneva takes up Michael Woodward's argument that treasury bonds, as well as the currency, are both liabilities of the state because they are both being issued by state entities; the only difference is that a currency is interest free, whereas a treasury bond is interest bearing, or involves the promise to the holder to receive more interest-free state liabilities (Tcherneva, 2009, p. 215).

> "As the modern money approach explains, reserves and Treasury securities are both liabilities of a sovereign government, denominated in the domestic currency, and there is no limit to which those two agents can issue one or the other." (Tcherneva, 2011, p. 424)

According to Tcherneva, this includes that there is no budgetary constraint and therefore no Ricardian equivalence hypothesis at work, unless it is artificially imposed (Tcherneva, 2009, p. 212). The artificial imposition of a separation of these two governmental entities, however, bears some consequences and is an almost impossible task, according to Modern Monetary Theory:

> "[...] the central bank's desire to set and hit overnight interest rate targets means that it cannot be independent of the treasury - in the sense that any undesired impact of fiscal operations on banking reserves must be immediately and completely offset by central bank operations. All else equal, treasury spending leads to a credit to banking reserves while tax payments lead to a debit, thus, treasury deficits lead to net credits." (Wray, 2007b, p. 11)

The reserve effect of fiscal policy has to be understood from a high-powered money perspective that includes all non-interest bearing government liabilities issued by the central bank and the treasury alike and therefore also includes treasury cheques (Tcherneva, 2009, p. 223).

> "Whether it is financing the Treasury TARP [Troubled Asset Relief] program or the Recovery Act, the Fed creates these reserves at the stroke of a pen (or keyboard) on behalf of the Treasury when purchasing toxic assets, financing unemployment insurance, providing aid to states, or supplying contracts to private companies." (Tcherneva, 2011, p. 419)

The issuance of bonds from the treasury simply causes an increase of supply at the securities' market and, because the market interest rate is of a reciprocal value to the

security prices, the central bank has no other choice but to buy any treasury bonds that are not being readily absorbed by the public at a price that reflects a market interest rate that is in accordance with the central bank's interest rate target:

> "[...] modern central banks are charged with maintaining the price of short-term bonds, i.e., the interest rate, which means they will buy and sell government debt on demand to keep their interest rate target." (Tcherneva, 2009, p. 215)

Therefore, this logic works in both directions. While the deficit spending increases reserves in the hand of the banking sector, the taxation has the opposite effect in drawing reserves from the banking system. In either case, the central bank will have to react to these measures by compensating for their effect on reserves in the banking sector (Tcherneva, 2009, p. 224). Both cases result in an amendment to portfolio structures, since liquidity in excess of the transaction, precaution, and speculative motive will flow into the holding of securities, whereas the liquidity that is short of the transaction, precaution, and speculative motive will precipitate sales of securities in order to satisfy all three motives of holding liquidity.

> "In such a regime, private agents do not make the decision whether to finance government spending or not, rather they will determine the amount of bonds they will hold in their portfolios based on their liquidity preference." (Tcherneva, 2009, p. 215)

The validity of this proposal can be seen in the contradictory example of the European Central Bank (ECB). Tcherneva points out that this is exactly such a regime where the two governmental entities of treasury, as the fiscal authority, and central bank, as the monetary authority, are separated in such a way that the ECB, as a supranational body, is not authorized to finance any national fiscal expenditure (Tcherneva, 2011, p. 425). However, in contrast to this stands the policy that was actually adopted by the ECB in the year 2012. In a speech held at the Hyman P. Minsky conference in Berlin in 2012, the chief economist of the ECB, Peter Praet, gave the following account on how the ECB attempts to solve the growing disparity in financing costs in different euro member countries, since, in some nations, pessimistic evaluations of risk and sovereign bonds result in differing yields and thereby compromise the ECB's interest target rate:

> "To mitigate the dynamics of such self-sustaining fragmentation, the ECB decided to adopt Outright Monetary Transactions (OMTs). OMTs provide for interventions in government bond markets, with no ex ante limits, for countries that are subject to effective conditionality of a programme under the European Stability Mechanism (ESM). The aim of OMTs is to directly address excessive risk premia in government bond markets that reflect in particular unwarranted perceptions of redenomination risk and are a key source of impairment in monetary policy transmission." (Praet, 2012, p. 6)

Hence, the unwillingness of the public to hold certain types of sovereign debt in their portfolio requires the central bank to buy up the amount of undesired debt, in order to prevent the public's portfolio decisions from compromising the central bank's target rate. The conditionality of an ESM participation thereby serves as the proverbial fiscal 'stick' to the monetary 'carrot' provided by the ECB. The 'carrot' is only provided when the 'stick' of fiscal discipline is abided by the otherwise stubborn 'donkey', which is thereby driven into the direction of increasing its competitiveness through reforms in fiscal and market governance.

The principle of this argument, however, results in the proposition that the government is not financed by the private sector, but that the amount of debt held by the public depends on their portfolio decisions, which again depends on their liquidity preference. The residual amount of sovereign debt is simply absorbed by the central bank in accordance with its monetary policy target (Tcherneva, 2009, p. 224). The sovereign debt in the hands of the public is thereby an almost arbitrary amount that depends on the portfolio decisions of the public and the central bank's target rate and not on the government's decision regarding the extent of debt it wishes to build up. The issuance of sovereign debt therefore has no reserve draining effect, since it corresponds with the reserve injection through the deficit spending. Whereas the banking sector is therefore fully vested with additional reserves through deficit spending, the decision to absorb the resulting treasury bonds is of an entirely voluntary nature. Any excess reserves held by the banking system might even drive down the interest rate, since portfolio decisions might deem it wiser to additionally opt for other securities, rather than just treasury bonds, in which case the central bank might offer bonds from its portfolio on the open market in order to depress overall security prices and keep the interest rate from falling beyond the central bank's target.

> "The operations of the Treasury and the central bank are therefore necessarily interdependent since in the presence of a fiscal deficit (surplus) either the Treasury or the central bank must sell (buy) bonds or otherwise drain (add) reserve balances in order to avoid the overnight target falling (rising) to the rate paid for reserve balances (penalty rate for borrowing reserve balances)." (Fullwiler, 2008, p. 13)

However, according to Fullwiler, reserves are held for only two purposes, which are, first of all, payment settlements among banks and, secondly, central bank reserve requirements (Fullwiler, 2008, p. 2). The motive of liquidity preference, in conjunction with the rate of interest, does not apply to reserve holdings in the same way, since the public wishes to substitute liquid non interest-bearing assets for illiquid interest bearing assets (Fullwiler, 2008, p. 22). Instead, according to Fullwiler, the mechanism is of a more indirect and endogenous nature. The central bank does not and cannot attempt to change the amount of reserves or any other money aggregate in circulation through reserve requirements. Instead, reserve requirements help them to achieve their target rate of interest (Fullwiler, 2008, p. 14). Hence, central banks can set the interest rate, but not the aggregate supply of money. For the medium period, which lasts between two weeks to one month, they may resort to definitive open market operations, such as the Federal Reserve, by purchasing or selling securities, or the ECB, by providing reserves on a repo basis against eligible securities. Furthermore, both central banks have facilities to provide overnight liquidity. The Federal Reserve provides reserves at a penalty rate above the overnight target rate and absorbs excess reserves at a rate underneath the overnight target rate. (Fullwiler, 2008, p. 16)

In the same manner, the ECB provides standing facilities, which are the marginal lending facility that represents the ceiling for the overnight market interest rate and the deposit facility that represents the floor of the overnight market interest rate (ECB, 2013).

The maximum oscillation of the overnight market rate around the target rate is thereby given by the spread of floor and ceiling in the overnight facilities (Fullwiler, 2008, p. 17). In practice, the oscillation of the overnight market rate is, according to Bindseil, however, being tamed by the central banks in fine-tuning their market operations through calculating the probabilities of reserve requirement shocks and taking them into consideration so that, at the end of the day, the likelihood for banks to make use of

either floor or ceiling facility is equal (Bindseil, 2014, pp. 54-55). The reserve requirements simply help achieve this task, since banks are forced to keep reserves, which, in the case of them miscalculating the daily reserve requirements for payment settlements, puts less strain on the interbank lending market, which also means that central banks have to intervene less frequently (Fullwiler, 2008, p. 15-16). For reserve requirements to work as a liquidity buffer, however, implies that the reserve requirements should be met only on average over a certain time period, as the Federal Reserve does it, in order to provide the necessary breathing space (Bindseil, 2014, pp. 136-138). Still, the requirement to hold reserve balances does not impede the banks' ability to create credit money. It only makes it less profitable when, due to the process of credit created deposits, longer balance sheets also require the holding of increased reserves, which have to be obtained either from the central bank or on the interbank lending market at a cost. (Fullwiler, 2008, p. 5)

It has to be reiterated that any operation to accommodate the demand for reserves by the banking system, as well as any fiscal operation by the government, changes the central bank's balance sheet (Fullwiler, 2008, p. 28).

The business banks' increased demand for reserves is therefore met by lengthening the central bank's balance sheet through increasing the bank reserves on the liability side and, correspondingly, increasing the claims on domestic banks or increasing the claims on domestic government by taking on private sector assets or treasury bonds through repo or outright purchases of eligible papers in open market operations. According to the above stated logic, the government's spending increases the bank reserve balances with the central bank, but these increased reserve balances are neutralised when the government finances its spending through the emission of treasury bonds. However, should the private sector not be willing to purchase this increased amount of treasury bonds, but rather prefer to hold some other assets, it is the central bank that accommodates the portfolio decisions of the public by taking the treasury bonds onto its balance sheet and instead selling the kind of assets that the public wishes to hold. In either case, the deficit spending will be interest rate neutral, since the additional amount of treasury bonds does not dilute the overall market valuation of securities because the expansion of treasury bonds equals the expansion in reserves.

The same might also work the other way round. When economic agents prefer treasury bonds instead of private sector securities, the central bank may simply engage in asset

swaps, which accommodate the portfolio decisions of the private sector and which can be deemed to be part of the central bank's role in acting as a lender of last resort (Bindseil, 2014, p. 241).

Hence, these assets sold by the central bank are not forced onto the market participants, but readily purchased, since the market participants would, under normal circumstances, prefer market interest bearing assets to low-interest bearing reserve balances.[7] According to this understanding, fiscal measures of deficit spending therefore do not have a crowding-out effect.

Assets	Liabilities and Capital
Claims on Domestic Government	Currency in Circulation
Claims on Domestic Banks	Bank Reserve Balances
Net Foreign Reserves	Government Deposits
Other Assets	Central Bank Bills
	Central Bank Capital or Equity

Figure 10: "Typical Central Bank Balance Sheet."

Source: Fullwiler, 2008, p. 47.

In accordance with Keynesian logic, Seccareccia states that monetary policy without fiscal measures is never successful in the situation of an interest inelastic investment demand function (Seccareccia, 2011, p. 69). It is also in line with this logic that, according to Tcherneva, monetary policy cannot be successful in the case of a liquidity trap either, unless the monetary policy includes what Bernanke calls "fiscal components of monetary policy", which are, according to Tcherneva, indeed fiscal policy measures but certainly not conventional monetary policy measures at all (Tcherneva, 2011. p. 413, p. 415, p. 416).

[7] In a situation of a crisis, central banks might, however, not only choose to accommodate any reserve quantities being asked for by business banks, but business banks might also choose to hold reserves in excess as a kind of insurance against the potential dry up of the interbank lending market and the threat of being unable to meet payment obligations in central bank reserves. However, this would mean that there is a very high probability that the only central bank facility that business banks will use, at the end of the day, is the floor facility, which means that the overnight interbank interest rate will be close to the floor facility rate. This kind of policy has been adopted by the ECB since 2008. (Bindseil, 2014, pp. 59-61)
In such an abnormal situation, the business banks will actually choose to hold reserve balances in excess and abstain from using these reserves by taking on public or private sector securities.

> "When the central bank buys these assets, monetary policy will have a "fiscal component" [...]. It essentially provides something of value—default-risk-free assets (reserves)—in exchange for something the market has deemed worthless (mortgage-backed securities and collateralized debt obligations [...]). Again, even though Bernanke calls such purchases "fiscal components" of monetary policy, operationally, legally, and in practice purchasing toxic assets from banks and other financial institutions such as Bear Stearns, AIG, Citi, or other institutions are, in fact, purely fiscal operations. They require an act of Congress to pass a budget [...]." (Tcherneva, 2011. p. 417)

In this sense, Tcherneva defies the notion that there should even be a difference between the government purchasing a commodity for the public benefit or a financial asset to prop up a certain financial asset's value (Tcherneva, 2011. p. 429).

> "In all cases, government spending is financed through a reserve injection in the nongovernment banking sector. Every type of government spending creates a crowding-in effect, and every type of federal tax collection destroys reserves, reduces the wealth of the nongovernment sector, and creates a crowding-out effect. To argue that purchases of toxic assets require the direct injection of reserves but that the construction of bridges does not, is not only a theoretical blunder but also a failure to grasp a fundamental aspect of policy, namely, that the monetary authority in a sovereign currency nation cannot choose what expenditures of the government it will finance." (Tcherneva, 2011. p. 429)

The difference between the financing of financial assets that have gone bad and projects of the 'real' economy lies, according to Kregel, in the sustainability of the recovery. The crucial question is whether, apart from artificially propping up some financial asset prices through bailouts, underlying profits can be sustained as sustainable profit generating opportunities are achieved (Kregel, 2009). However, according to Wray, in the acuteness of the crisis, there is no alternative to bailouts, since the risk of a fully fledged fire-sale, with all its troublesome consequences of a Fisher style debt deflation, are not regarded to be a viable option (Wray, 2008, pp. 31-32). The problem of using bailouts only without profitability enhancing real economy measures in a situation of an

inelastic investment demand function, or, alternatively, a liquidity trap, is that monetary measures, such as zero interest rate targets, are a futile non-event, simply because there is no business for banks to be made as long as there are no eligible, i.e. solvent, customers asking for credit (Kregel, 2009, p. 656). This situation cannot be improved by exclusively using bailouts, no matter whether it is administered fiscally by the treasury or monetarily by the central bank. The only real remedy is therefore to find a business model for the economy that operates on sustainable cash flows and a banking industry that is able to generate profits with a model that is based on hedge finance and is therefore not prone to failure due to financial instability right from the start.

The answer to it lies in the concept of a big government that provides a huge fiscal stimulus for public works that are deemed to be necessary, useful, or at least advantageous for society (Wray, 2011c, p. 5).

> "In Minsky's view, growth promoted by government consumption and public infrastructure investment would actually improve private sector balance sheets—hence would be financially stabilizing. Still, it would also promote higher markups (relieved to the extent that public infrastructure investment increased potential output)." (Wray, 2011c, p. 5)

The promotion of higher mark-ups is, however, the kernel of inflation:

> "In our economy the causal chain that leads to inflation starts with rising investment or government spending, which leads to increases in markups; an increase in the money supply or in money velocity usually is associated with the rise in investment or government spending." (Minsky, 1986a, p. 256)

This is the first step of the inflation process, and, as described earlier, it has the potential to turn into an open inflation as soon as the wages follow suit with the prices, which are due to trade union negotiation power. Alternatively, with an increasing size of employment by governmental entities and a corresponding price-index-linked rise in wages and/or price-index-linked minimum wage, the second step towards open inflation becomes an almost inevitable automatism (Minsky, 1986a, p. 259). As mentioned above by Wray, the relief is the corresponding increase in output and the extent to which it corresponds with the increase of credit money or the degree of liquidity stretching, i.e.

the increase in money velocity. The way to contain inflation therefore depends on the projects the government decides to spend its money on, and that means that it should provide productive output that serves as a basis for the sustainable generation of cash flows:

> "Economies in which government is big because of transfer payments and military expenditure are susceptible to uncontained inflation." (Minsky, 1986a, p. 270)

Hence, according to Minsky, the inflation process is a direct result of misguided policy in a big government economic system in the face of a crisis, whereas the potential of the private sector to bring about a severe inflation on its own is regarded to be rather limited:

> "The inability to externally finance an ever increasing share of private investment in total output makes inflations in a capitalist economy with a small government self-limiting. Inflations in such an economy depend upon the impact of innovations in finance upon asset prices and investment and whether speculation infects businessmen and bankers." (Minsky, 1986a, p. 270)

Furthermore, according to Minsky, the phenomenon of inflation should not be taken light heartedly either:

> "When Big Government increases faster than the output of the economy inflation is induced: inflation induces inefficiency in investment decisions and is a cruel tax. Thus, Big Government is a curse when it leads to inflation." (Minsky, 1986a, p. 283)

The solution therefore lies in the usage of governmental financial means for productive purposes and not in the creation of unconditional entitlements, as through transfer payments for welfare:

> "Unlike most progressive Keynesians, Minsky was not a strong supporter of welfare, at least for those who can work. Instead, he always pushed for employment programs as a preferred antipoverty strategy." (Wray, 2011c, p. 5)

The employment program that Minsky had in mind takes the Roosevelt New Deal program as a blueprint (Minsky, 1986a, p. 310; Minsky, 1964). As in the New Deal era, such state financed employment can improve the functioning of public works, such as schools and nature reserves, or it can even be used to erect such public amenities in the first place (Papadimitriou and Minsky, 1994, p. 25). The idea behind this scheme is to provide a fully elastic supply of jobs, which accept anyone who is willing to participate in this program, and it would also provide additional vocational education (Wray, 2011a, p. 11). Such a scheme would prove not to be as inflationary as welfare induced by transfer payments, since "[...] it could be used to increase aggregate supply even as it increased demand." (Wray, 2011c, p. 5)

It would thus be able to provide full employment without inflationary pressures (Wray, 2011c, p. 5). Even though these public works might inhibit inflation due to a corresponding increase in aggregate demand and supply, the automatism of rising wages indexed to price increases still poses an inflationary threat.

The whole scheme therefore has to provide a last resort of employment in the sense that the wages paid are significantly less attractive than those paid by the private sector, but, still at least at subsistence level, which, in fact, works as minimum wage (Kaboub, 2007, p. 14). The program therefore absorbs redundant labour force in episodes of crisis and decreases their employment in episodes of a thriving economy, since private demand for labour induces its participants to shift their employment from last resort towards more attractive offers from private employers. The loss in aggregate demand in an episode of a crisis will not be fully compensated by the employer of the last resort program, and will therefore not be constructed to achieve a turnaround of the economy, but it will have a stabilizing effect and be less inflationary than current welfare schemes. (Minsky, 1986a, p. 313)

According to Minsky, the emphasis of big government fiscal spending should therefore not be on creating entitlements, but should instead rest on the creation of public capital through government investment in infrastructure and the fruits of employers of last resort programs. According to Kaboub's research, the New Deal programs never really achieved a fully elastic supply of jobs, but it proved that the creation of an employer of

a last resort program would be feasible and that such jobs could be created without posing a competitive threat to the private sector economy[8] (Kaboub, 2007, p. 4).

Another point to be stressed is that Minsky's position on the validation of debt actually contradicts some of the Chartalist/ Modern Monetary Theory approach depicted above, in the sense that, according to Minsky, the finance of the government is not exempt from the principle of cash flows validating cash payment commitments:

> "Just as private business debts have to be validated by profits, as bank liabilities by receipts from assets, as a foreign debt by an export surplus, so government debt has to be validated by an excess of tax receipts over current expenditures. These validating cash flows need not be forthcoming at every moment of time; it is sufficient that reasonable circumstances exist in which a positive cash flow is generated." (Minsky, 1986a, p. 302)

> "The reason for an in principle balanced budget is that government needs an implicit surplus if its debt is to be valuable and a swing of the government budget from deficit to surplus is an especially powerful anti-inflationary device." (Minsky, 1986a, p. 304)

According to Minsky, the tax receipts therefore not only carry the function of absorbing reserves, but also of validating incurred cash payment commitments through the issuance of treasury bonds. The anti-inflationary effect of drying up reserves thereby lies not in the realm of inhibiting financing by making it more difficult for banks to create credit money, but of inhibiting financing by making it less profitable due to rising costs for the banks to meet their reserve requirements with the central bank and for their payment obligations. Even though the state might only issue promises for providing more state IOUs by the issuance of treasury bonds, the acceptance of such practices by bond holders, without providing an underlying cash flow validation by the tax system, might not go on indefinitely. This is probably not of importance for an international reserve currency, such as the US dollar, but certainly for any other currency that is not regarded as an international reserve currency. The difference is that major commodities,

[8] The latter is, however, not easily accomplished. The German Ein-Euro-Job Program, which provides an extra hourly payment of between 1 and 1.5 Euros for unemployed welfare recipients to take up an employment in an employer of last resort program of the German government, received repeated criticism by the German Federal Court of Auditors, as well as from the Chamber of Crafts, claiming that these employment programs often do stand in competition with goods and services provided by the private sector (Zeit, 2011).

such as oil, are being denominated in US dollars, and therefore, this in itself secures demand for US dollar currency and US dollar denominated financial assets. Furthermore, as mentioned earlier, the prolonged US trade deficit, due to the high valuation of the US dollar, has raised the US dollar reserves in foreign countries, and their holders are seeking investment opportunities in US securities, including US treasury bonds.

A breach of confidence regarding the trustworthiness of the state's promise to provide more state IOUs, which become increasingly worthless due to rising inflation, would lead, however, to a portfolio shift in the private sector economy, since it will shift from state IOU, such as currency or treasury bonds, towards real assets, in its attempt of hedging against inflation:

> "In the case of inflation expectations [...] the price of tangible assets may increase at more rapid rate than the increase in the money supply; there is a run from money." (Minsky, 1986a, 181)

The central bank would then have to absorb an increasing amount of treasury bonds in order to meet its interest rate target, resulting in more reserves being provided to the economy and thereby increasing the business bank's demand for private sector assets instead, at least as far as, under normal circumstances, business banks prefer to hold interest bearing assets instead of low or non-interest bearing reserve balances. As long as this increased demand for private sector assets can be accommodated by the central bank through asset swaps, no increase in private sector lending should occur through increased reserves, but only a portfolio shift takes place. However, this will no longer be true once the central bank cannot provide the kind of private sector assets that the economic agents wish to hold, and they therefore create new financial assets through private sector lending, and the increase in reserves is not neutralised anymore. It has to be kept in mind that there is an opportunity cost in holding reserve balances because these might as well be put to use in purchasing interest-earning assets. The opportunity costs in holding reserve balances even increase when asset prices rise more rapidly than reserve balances, and an increase in demand for private sector financial assets, such as bonds, will make the financing conditions for private sector assets more favourable as the interest rate, i.e. the financing cost, decreases and the capital value of the asset increases.

According to Fullwiler, there is actually only one case where he sees the possibility that the expansion of the central bank's balance sheet would precipitate a net increase in private financial assets. This is the case in which the central bank is forced to bid up the value of treasury bonds in a situation of a fiscal deficit. This may create a wealth effect regarding the valuation of public debt in the form of treasury bonds and a capital gains effect of private sector assets, which may result in a net increase of private sector financial assets (Fullwiler, 2008, p. 31).

This also provides the understanding of why Tcherneva speaks in the above quotation of a crowding-in of private sector investment when expansionary monetary policy is combined with expansionary fiscal policy. That said, it also confirms that there are limits for the monetization of fiscal deficits because, in a situation of increasing inflation, a further accommodation of the fiscal deficit through the central bank would result in more inflationary pressure through a run on private sector assets, which will be financed by increased credit money creation. The option in this case could be for the central bank to curb inflation by increasing its interest rate target, but, as described in the chapter on Schumpeter, this might lead only to further liquidity stretching through increased money velocity as long as the fundamental profit expectations are not revised, and hence, inflation would continue. The only option to reverse this process would then be to raise taxes in order to absorb reserves and, in effect, to validate the cash outflow commitments of the state by increased cash inflow trough taxation. The increased taxation, according to the Kalecki profit equation, then decreases profits of entrepreneurs and thereby undermines the validation of their cash flow expectations and the resulting capital values of their investment projects.

Thus, the monetization of increasing state budget deficits cannot be continued indefinitely, when it is assumed that the state's liabilities are also subject to market valuations based on fundamental cash flow validation of payment commitments.[9]

Keeping the Kalecki profit equation in mind, the only other two options to validate profit expectations, apart from the state going into fiscal deficit, are that the private

[9] Another option to service the increased payment commitments, due to an increasing budget deficit, would be for the state to provide a stable investment demand that actually covers for its own expenses, since its projects generate cash flows that validate their very existence, hence providing a surplus of the operational budget requirements of these public amenities, while still running an increased overall deficit, due to uncovered capital expenditure (Seccareccia, 2011, p. 75). This would, however, only partly assuage the concern of monetized state deficits, as mentioned above.

sector increases its investment or consumption by going into debt or by generating a trade surplus.

The overall income of an open economy is generated as follows (Felderer and Homburg, 2005[1984], p. 193):

$$Y = C + I + G + X$$

Whereas the overall income of an open economy is used for the following purposes (Felderer and Homburg, 2005[1984], p. 193):

$$Y = C + S + T_W + T_\pi; T = T_W + T_\pi$$

$$Y = C + S + T$$

Hence, the economy's overall saving finances the following elements (Felderer and Homburg, 2005[1984], p. 193):

$$S = I + (X - M) + (G - T)$$

$$S = I + (X - M) - (T - G)$$

$$(S - I) = (X - M) - (T - G)$$

Or, as Parenteau describes it:

"Private sector balance = Current account balance - Government financial balance" (Parenteau, 2005, p. 55)

> "Deficit spending will tend to produce income in excess of expenditures in another sector, or net nominal saving. Financial claims issued by the deficit spending sector will end up being held by the net nominal sector. The financial balance equation simply requires the net nominal savings of all macro sectors to sum to zero, since [...] for each borrower there must be a lender." (Parenteau, 2005, p. 54)

Therefore, the only ways to turn the government deficit into a surplus is by running a current account surplus, combined with a private sector deficit, a relatively small current account deficit, combined with a relatively large private sector deficit, or a relatively large current account surplus, combined with a relatively small private sector surplus:

$$(T - G) = (X - M) - (S - I)$$

In the same way, for the private sector to run a surplus means for the government to run a relatively small fiscal surplus, combined with a relatively large current account surplus, a fiscal deficit, combined with a current account surplus, or a relatively large fiscal deficit combined with a relatively small current account deficit:

$$(S - I) = (X - M) - (T - G)$$

The aggregated financing relations in an open economy are therefore as follows:

$$S + T + M = I + G + X$$

The private sector saving, taxes, and imports finance the corresponding part of investment, fiscal measures, and exports. Should an economy show an investment activity that turns its former private saving surplus position into a private saving deficit position, there are two ways to finance these activities. The first one is in the case of an exogenously fixed and constant amount of money through finance provided by the state sector and/or the foreign sector. In the second case of an endogenous fully elastic money supply, the solution lies within the additional creation of credit money.

In the exogenous money case, the additional investment, is, however, unable to increase income through the multiplier effect, since, to finance investment, either government expenditure or exports have to be curbed, both of which reduces the income through the multiplier effect, to the same extent as the increase of investment would increase the income through the multiplier. The investment financed by credit money creation, however, creates additional income in all sectors in accordance with the multiplier and equates overall financing and spending, since surplus sectors should receive income in excess of spending, and deficit sectors should receive income short of spending.

Therefore, in both cases of endogenous and exogenous money, the state would move into a surplus position, and/or the foreign sector would move into a deficit position, but only in case of an endogenous money supply would this induce the economy to grow. In order to re-establish the private saving surplus situation, and thereby avoid the deterioration of the private sector's saving position (caused by additional income being mainly absorbed by the other two macro sectors), the state sector would have to move back into a deficit position, and/or the foreign sector would have to move back into a surplus position.

Assuming a case in which an economy abstains from financing the surplus position of an increasing private sector by running a fiscal deficit or a current account surplus, the reason could be the following. The wish for a balanced fiscal budget could be caused by fears that an increasing gap between fiscal cash inflows and cash outflows deteriorates the treasury's position vis-à-vis the holders of its treasury bonds and their portfolio decisions. The wish for a balanced current account could stem from the fact that an increasing reliance on mercantilist style current account surpluses might trigger a trade war, resulting in widespread currency devaluation attempts or reversals of free trade agreements. The former restriction comes into play when the foreign trade situation increasingly deteriorates in such a way that the current account deficit increases continuously, and the reestablishment of a private saving surplus position hinges on an increasing state deficit. The latter restriction comes into play, for example, when the reestablishment of the private sector's saving position is countered by the political will to run an increasing state surplus (or to reduce the state deficit further), which would require an increasing current account surplus in order to re-establish the private saving surplus position.

Hence, should the requirement of a balanced fiscal budget and a balanced current account be a viable constraint in financing an economy's activities, the aggregated financing relation is again $S = I$ because, in the case of an exogenous money, the only possible sources of finance through the other two macro sectors would be blocked off. In the case of an endogenous money, the increasing deterioration of private sector balance sheets could not be reversed in the face of a deteriorating current account, unless the state would be allowed to go into a fiscal deficit position, or, alternatively, an increasing current account surplus would be allowed for in the attempt of reducing the fiscal deficit or even creating a fiscal surplus.

Minsky analysed the importance of this constraint, with regard to the working of the accelerator effect and the provision of extra finance.

Hence, the accelerator-multiplier model is depicted by Minsky as follows (Minsky, 1982f[1957a], p. 232):

$Y_t = income\ in\ period\ t$

$C_t = consumption\ in\ period\ t$

$I_t = investment\ in\ period\ t$

$\alpha = marginal\ propensity\ to\ consume$

$\beta = accelerator\ coefficient$

$Y_t = C_t + I_t$

$C_t = \alpha Y_{t-1}$

$I_t = \beta(Y_{t-1} - Y_{t-2})$

$Y_t = (\alpha + \beta)Y_{t-1} - \beta Y_{t-2}$

The accelerator principle is based on the assumption that increases in income also trigger increases in investment. These changes in income level induced investment are only possible in combination with a production function that is subject to capacity limitations in such a way that increases in income would require increases in production capacity, as, for example, in the total amount of capital. Any increase in production is therefore only feasible when a prior enlargement of capacities occurred. The enlargement of capacities might therefore refer to only one production factor as, for example, capital, whereas the other production factor of labour might be available in abundance. The two can, however, not be substituted for each other. (Wohltmann, 1996, p. 140)

The level of investment activity therefore depends not only on the rate of interest, but also on the current level of income, as well and as on the level of income in the following periods, and therefore provides an instrument to depict repercussions of the business cycle on investment activities (Wohltmann, 1996, p. 141).

According to Minsky, the question of whether the aggregate production capacity of existing capital is fully employed is of secondary importance:

> "Investment is undertaken to alleviate a shortage of particular types of capital as made manifest by profits earned and anticipated" (Minsky, 1986a, p. 179)
>
> "The productivity and scarcity of capital services result in current and expected future cash flows to owners of capital. The accelerator basically is an assertion that if an output greater than current output is to be produced, an increment to the capital stock of *a particular size* can be

> expected to yield satisfactory or adequate cash flows." (Minsky, 1982h[1972], p. 207)

The question of whether an increase in income or in expected income actually triggers a rising investment at a given rate of interest therefore depends not so much on the scarcity of the aggregate level of capital employed, but on the scarcity of certain types of capital assets for certain investment projects that are expected to yield project-specific amounts of project-validating cash flows. The limited substitution of production factors therefore applies not only to the inability to swap labour for capital in the face of specific investment projects, resulting in a certain composition of aggregate capital intensity, but it also applies to the usage of specific technological practices, due to the inability to substitute one type of capital asset for another.

The accelerator therefore depends on expected income variations in time and their anticipated effects on effective demand-driven cash flows. The question then is in which boundaries the accelerator is able to change the amount of investment, depending on different financing scenarios.

To begin with the most basic usage of financial means would be for liquidity to be used for the transaction motive only. Hence, for any income level Y, a minimum amount of money M_T is required to fulfil the transaction purpose. Furthermore, there is a maximum velocity of money circulation V_m that is still able to sustain the transaction mechanism. (Minsky, 1982f[1957a], p. 235)

$$M_T * V_m = Y$$

If M_T is the entire quantity of money M ($M_T + M_L = M$), then no money will be held in portfolios. If the entire quantity of money is greater than M_T, then the actual velocity V is smaller than V_m, and the excess liquidity can be held as liquid asset M_L, as part of portfolios (Minsky, 1982f[1957a], p. 235).

> "Abstracting from changes in the quantity of money, with $M_L > 0$, the interest rate is determined by the demand curve for investment, ex ante saving, and the terms upon which holders of liquidity are willing to substitute earning assets for money. Similarly, if $M_L = 0$, then the interest rate is determined by the demand for investment, the supply of saving, and the terms upon which individuals are willing to hold cash as an asset." (Minsky, 1982f[1957a], p. 235)

The supply of saving serves as a source of finance that can be utilized either for investment purposes or for increasing the portfolios' liquidity positions, which implies a partial transformation of saving into hoarding. The sources of investment finance can therefore be the amount of saving and the liquidity positions in portfolios. (Minsky, 1982f[1957a], p. 235)

The interest rate therefore depends upon the liquidity preference, i.e. the amount of liquid assets, in portfolios, in combination with the available abundance of finance through the amount of saving, to quench the thirst for liquidity. Any finance resulting from the amount of saving in excess of wished-for liquidity leads to the purchasing of securities, and any deficit in finance for the satisfaction of the wished-for liquidity results in the sales of securities, in order to satisfy the wished-for amount of liquidity. The portfolio transformations therefore change the market rate of interest as the purchasing of securities drives down the interest rate and the sales of securities increases the market rate of interest. In the absence of liquid assets $M_L = 0$ at a certain rate of interest, the financing is, however, limited by S, so, in such a case, the financing limitation is $S = I$.

> "Whereas *ex ante* saving and decreases in the liquidity of households can be used for either debt or equity financing of investment, increases in the quantity of money can be used only for the debt financing of investment." (Minsky, 1982f[1957a], p. 236)

The increased financing with debt, i.e. credit money, however, deteriorates the balance sheets of banks and companies by increasing debt to equity ratios and decreasing liquidity (Minsky, 1982f[1957a], p. 236). As also described earlier, the willingness to accept deteriorating balance sheets by increases in debt-to-equity ratio and decreasing liquidity is not limitless:

> "The value of the accelerator coefficient therefore depends upon two variables, the market rate of interest and the structure of the balance sheets of firms. Changes in these variables can dampen what otherwise would be an explosive movement of income." (Minsky, 1982f[1957a], p. 236).

The ex ante saving is defined as follows within the accelerator systematic:

$$Y_{t-1} - C_t = (1 - \alpha)Y_{t-1}$$

From the above assumptions, it is therefore necessary that, for $Y_t \geq Y_{t-1}$, the relation between ex ante investment and ex ante saving is $I_t = \beta(Y_{t-1} - Y_{t-2}) \geq (1-\alpha)Y_{t-1}$. (Minsky, 1982f[1957a], p. 236)

> "With a monetary system in which neither the velocity of circulation nor the quantity of money changes, if *ex ante* saving has to be rationed among investors, and the market in which this rationing takes place is the money market. The excess of demand over supply results in a rise in the interest rates, which will continue until realized investment is equal to *ex ante* saving. [...] A necessary condition for the functioning of an accelerator process during an expansion is that the source of finance of investment in addition to ex ante saving should exist." (Minsky, 1982f[1957a], p. 236)

Hence, the only way that the accelerator can work under the regime of a fixed money supply is by increasing the velocity of money circulation (Minsky, 1982f[1957a], p. 237).

The case that has been assumed so far in this thesis and is in accordance with Minsky's money supply assessment is, however, a fully elastic credit money supply with changing velocity. In such a case, "[...] no matter what the difference between ex ante investment and ex ante saving, the difference can be financed." (Minsky, 1982f[1957a], p. 242)

The increase in velocity provides the accelerator with additional thrust, since, with increasing velocity, the necessity to increase the financing of investment with debt decreases. Therefore, the deterioration of balance sheets is slowed down if the financing gap is not exclusively covered by credit money creation because the debt-to-equity ratio does not rise as fast with an increase in money velocity. (Minsky, 1982f[1957a], p. 250)

The real threat for leveraged investment is not so much the balance sheet deterioration itself, but the change in liquidity preference that it triggers, since this suddenly increases the financing gap even further and makes the deterioration of the balance sheets more apparent, and a further covering up of the financing gap through credit money creation becomes impossible because the increased liquidity preference leads to an overall shortening of balance sheets. Even though Minsky cannot make out an endogenous mechanism for increasing liquidity preference in the case of a boom in his paper from

1957, the endogenous turnaround is, however, well analysed in his later work, since it was already described that the increase in leverage leads to rising risk perceptions. This in turn leads to increased risk-adjusted market interest rates, and the turning point of the business cycle therefore is entirely endogenous (Minsky, 1982b, p. 32-33). It is the deterioration of the balance sheets that makes position-making a necessity and triggers the shift of illiquid assets towards liquid assets and further towards narrow money. This is a process which ultimately results in debt deflation through fire-sales.

The downturn would also result in an accelerator movement of a negative kind as income falls from period to period:

> "With a fall in income, the excess of ex ante saving over induced investment will be utilized to reduce bank debt. Also, the failure of some firms which have relied heavily upon debt financing will result in the substitution of equity for debt in balance sheets." (Minsky, 1982f[1957a], p. 250)

Hence, during the downturn, there will be an attempt to reverse the deterioration of the balance sheets by shortening them through the abatement of indebtedness. Should the private sector, however, increase its liquidity preference, and therefore abstain from taking on more private sector financial assets, the central bank would also increasingly have to purchase private sector securities in order to meet its interest rate target and to prop up asset prices.

The consequence for big government to prevent volatility and to solve the crisis through deficit spending therefore depends, in a Minskyan system, firstly on the existence of an endogenous money, secondly on whether the government is able to monetize its fiscal deficit to an increasing extent, and thirdly on whether it has the political will to channel these fiscal expenditures into projects that do not cause inflationary pressures.

The first two conditions are necessary to provide the creation of credit money for finance above ex ante saving (of all macro sectors) and for the accelerator-multiplier effect to work at all, as well as to avoid any crowding-out effect. The first condition thereby provides the extra means of finance through the creation of credit money, and the second condition monetizes any government and private debt, should an increasing amount of treasury bonds or private sector bonds no longer find a ready market and the central bank therefore has to take them on in order to make up for shifts in liquidity

preference induced portfolio structure reversals. The first condition therefore accommodates an increase in demand for credit money at a given level of liquidity preference and thereby keeps the interest rate at a constant level, whereas the second condition accommodates for shifts in portfolio and, in particular, liquidity preference and thereby keeps the interest rate at a constant level as well.

The third condition avoids inflation-induced market distortions and inefficiencies. The ability to abate inflationary pressure induced by fiscal measures is, however, interlinked with the central bank's ability to take on government debt, since this in turn might provoke inflationary pressure as the private sector might become less and less inclined to hold treasury bonds in its portfolio, and, since the central bank provides ever more reserves, inflation may be exacerbated through increased net private sector financial assets, which in turn potentially deteriorates private sector balance sheets through increased leverage. Furthermore, portfolio holders might choose to hedge against inflation by purchasing real assets, which would also exacerbate inflationary tendencies as even more leveraged effective demand follows.

From a neoclassical perspective on state activity, the crowding-out problem may not be an immediate problem with an endogenous money because any financing gap can be solved by credit money creation, and neither does inflation result in any crowding-out through increased liquidity preference for transaction purposes when the central bank is able to accommodate any resulting private sector portfolio shifts to keep the interest rate within target range.

The more fundamental problem appears when the endogenous turning point is reached through the deterioration of balance sheets and the shifts in portfolios, resulting from an increased liquidity preference, which is induced by a perceived increase in liquidity risk due to the apparent fragility of the financial structure, force the central bank to validate public and private debt in its role of a lender of last resort.[10] The fundamental question is therefore not about whether government deficit spending leads to a crowding-out of private sector investment or a crowding-in through increased net private sector financial assets. It is instead much more about validating the status quo of the existing production, or capital structure, through big government intervention and the attempt to

[10] According to Perry Mehrling, the central bank then turns more into a "dealer of last resort" as it takes on all the financial assets that no private dealer would be willing to accept (at least not at this combination of prices and quantities) due to the risk exposure involved, since private sector demand for these assets dried up (Mehrling, 2011, p. 132).

build the recovery on that very structure. As was seen in this chapter, Minsky obviously assumes a production function where capital is heterogeneous and follows a certain arrangement of complementarity, and yet, this does not make him realise the possible consequence that it might be the existing capital structure that lies at the heart of the financial fragility. One way for Minsky to counter inefficiencies of state intervention is for the state to provide stability through ensuring that it is not so much engaged in handing out unproductive welfare, but in providing public goods like infrastructure, which increases the economy's productivity and counters inflation through increased real income. As will be seen later on, it is the Austrian school which combines these two aspects of a capital structure that is governed by heterogeneous, as well as complementary, capital, with the aim of creating a real income that provides resources sufficient for intended consumption and investment purposes and therefore does not result in inflation.

2.3.2 Financial regulation provides sound financing

> "In a Big Government capitalist economy with an activist central bank, debt deflations and deep depressions can be contained. Furthermore, central bank administrative actions and legislation can attempt to control and guide the evolution of the financial structure in order to constrain cyclical instability" (Minsky, 1986a, p. 314)

The role of the central bank is therefore not restricted to that of a lender of last resort but also implies the provision of guidance and control of a supervisory body. This is of particular importance because the "originate and distribute" business model of securitization deteriorates the underwriting standards, while originating banks are under the misperception that they no longer have a 'skin in the game':

> "If a bank believes it can offload questionable assets before values are doubted, its incentive to do proper underwriting is reduced." (Wray, 2010a, p. 8)

According to Minsky, optimistic future expectations change the quality of banks' balance sheets in such a way that its compositions reflect an increasing rate of speculative and Ponzi financing (Minsky, 1986a, p. 319). This tendency is exacerbated through securitization, as the principle of caution in the process of underwriting gets

lost. Wray illustrates this process by using several figures of the development of the subprime crisis in the US. According to his assessment, the share of securitized subprime mortgages of all securitized mortgages went up from 8.6 percent in 2001 to 20.1 percent in 2006, and the share of subprime mortgages that were securitized went up from 50.4 percent in 2001 to 80.5 percent in 2006. From this information alone it cannot be derived that underwriting standards deteriorated, but he also found out that the share of subprime loans that required no documentation to prove the underlying solvency of the applicant increased from 28.5 percent in 2001 to 50.8 percent in 2006. At the same time, the debt-payment-obligations-to-income ratio increased from 39.7 percent to 42.4 percent. (Wray, 2007b, pp. 30-31)

Therefore, the goal for the central bank should be to set the standards that ensure proper due diligence in underwriting:

> "The central bank affects how business is financed by its power to define assets it will protect and by selecting the assets it will use to furnish reserves to the banking system." (Minsky, 1986a, p. 323)

The central bank can therefore discriminate between assets it assesses to be in accordance with hedge financing and those which reflect speculative and Ponzi financing. According to Minsky, the central bank's role of a lender of last resort and its ability to be active in open market operations means that it actively cofinances by accepting securities as collateral or by buying them in exchange for reserves on the open market (Minsky, 1986a, p. 324). As described before, the on-taking of treasury debt by the central bank actually constitutes the financing of treasury debt. In the same way the on-taking of securities from the private sector also constitutes the financing of these assets:

> "The access of banks to central bank cofinancing should be through business assets that reflect hedge financing." (Minsky, 1986a, p. 324)

However, this principle seems to be unfeasible in the urgency of an acute crisis, since such a situation is not the time to "[...] teach markets a lesson by allowing a generalized debt deflation to "simplify" the system [...]" (Wray, 2008, p. 32). Hence, bailouts are inevitable, but "[...] they validate bad behavior and can encourage worse." (Wray, 2008, p. 32)

The creation of this moral hazard problem is not neglected by Minsky, but he describes it as a tough choice between the creation of moral hazard by validating 'toxic' assets and the danger of a severe recession:

> "The longer the Federal Reserve delays its intervention, the larger the decline in income and employment following the crisis. On the other hand, the quicker the intervention, the sharper the subsequent rise in prices and the more fragile the financial structure with which the next expansion begins. Whenever the Federal Reserve steps in and refinances some positions, it is protecting organizations that engaged in a particular type of financing, and is expected to do so again." (Minsky, 1986a, p. 327)

The way Minsky proposes to counter a further expansion into the realm of increasing speculative and Ponzi finance is to deliberately use uncertainty. One way to achieve this would be to actually allow for a severe downturn to take place. However, for Minsky, this is out of the question, due to normative considerations of economic policy to avoid such incidents from happening in the first place. The other option for the central bank is to create uncertainty regarding the functioning of financial markets, such as, for example, for the banks' ability to use the interbank market for refinancing. (Minsky, 1982i[1969], p. 187)

One way to increase this uncertainty is for the central bank to raise the banks' reserve requirements (Minsky, 1986a, p. 327). This increases the risk of banks to fulfil their reserve requirements at comparatively cheap interbank rates and enhances their potential reliance on comparatively expensive central bank overnight lending rates.

> "Thus disrupting financial markets may be a necessary tool of monetary policy." (Minsky, 1982i[1969], p. 187)

The only other way to avoid the weed of moral hazard spewing its seeds even further is for the legislative body to ban certain practices and for the central bank to accept certain assets, only with an interest rate mark-up or a disagio (Minsky, 1986a, pp. 326-327; Wray, 2010a, p. 16). The supervisory function of a central bank has to be, on the other hand, of a proactive nature, if it shall be able to assess and to prevent the likely repercussions of certain financial practices.

According to Minsky, a precondition is when the central bank is involved with the banking industry in a business relation, as well as through a supervisory and examination relation, that allows it to assess innovative developments and their likely repercussions on the market stability (Minsky, 1992b, p. 10). The business relation of the central bank with the banking industry thereby serves as the key to oversight through the central bank, since it is able to influence the portfolio composition of the banking industry through the securities it accepts as collateral for central bank reserves (Minsky, 1986a, p. 323). Even though the central bank might have to provide liquidity in the form of reserves in a fully elastic manner in its role of a lender of last resort, it should, like any other bank, have the right to gain access to its debtors' balance sheets in order to assess the creditworthiness of their debtors and the collateral they provide (Wray, 2010a, p. 15).

The importance of the central bank to act as a lender of last resort, providing fully elastic liquidity against collateral in concert with a fiscal authority that validates the underlying cash flow expectations of these assets, becomes ever more relevant the higher the complexity of the financial system. The rising complexity leads to an increased interconnectedness of financial entities, in such a way that the layering of finances advances as debt is originated and distributed in the form of securities, which serve as assets that are again funded by the issuance of commercial papers, which end up as assets on another balance sheet, and so on. (Minsky, 1992b, ch. III pp. 3-4)

The necessity of regulation becomes ever more evident as the moral hazard problem increases with increased protection of the banking industry. The fact that there is a deposit insurance actually precipitates the necessity for the state to establish a regulatory framework that averts the banking industry from excessive risk taking. The point is that, with a deposit insurance in place, there is no real control from depositors anymore because, without such an insurance, depositors would penalize excessive risk taking of their financial institution by withdrawing their deposit. (Minsky, 1986b, p. 15)

In the same way, it is argued that the de facto protection of the shadow banking sector also justifies the extension of the regulatory framework towards these institutions:

> "The swing toward markets and away from regulated banking greatly increased risk, while at the same time it necessarily extended government assurance to the unregulated institutions for the simple reason that the

> government cannot allow a financial crisis to threaten the economy." (Wray, 2008, p. 37)

The de facto insurance of the shadow banking sector also entailed that, during the crisis in 2008, the central bank facilities were opened to all financial institutions, whether regulated or not (Wray, 2010a, p. 9). Also, a variety of assets, including doubtful mortgage backed securities, were accepted as collateral by the central bank (Wray, 2008, p. 30).

> "Opening the discount window to provide an elastic supply of reserve funding, to a broad spectrum of financial institutions, would ensure that banks could finance positions in as many assets as they desired, at the target funds rate. If the Fed had lent reserves without limit when the crisis hit, it is probable that the liquidity crisis could have been resolved more quickly." (Wray, 2010b, p. 1)

This assessment of Wray therefore implies that solving the liquidity crisis is mandatory, whereas resolving the moral hazard problem is of secondary importance. Hence, Wray also distinguishes between two requirements, which are namely that of a "Keynesian", signified by underemployment, and that of a "Smithian", signified by the misallocation of resources (Wray, 2010a, p. 12).

> "Solving the Smithian problem requires direct oversight of bank activity, mostly on the asset side of their balance sheet. Financial activities that further the capital development of the economy need to be encouraged; those that cause it to be “ill done” need to be discouraged." (Wray, 2010a, p. 15)

However, since the bailout and fiscal stimulus come first to solve the "Keynesian" problem, and regulation follows, the misallocation problem can only be solved for investment to come, and it is at the discretion of the central bank and the legislative body to decide which financial activities are permissible and which assets qualify to what extent as collateral and can be thereby validated. Apart from using facilities for discriminating certain securities at the discretion of the central bank, and, in accordance with formerly formulated targets regarding the capital development of an economy, the type and size of entities that are active on the financial markets play an important role, too.

According to Minsky, the emphasis in the reform of financial markets lies on the provision of smaller banking entities that particularly target the needs of middle class customers and businesses. Furthermore, a level playing field has to be provided by ensuring that all financial institutions are subject to equal equity-to-assets ratio regulations and by abolishing market entry barriers for financial institutions in general. (Minsky, 1986a, pp. 319-321)

The aim of such regulation is to strengthen small financial institutions that are able to provide a whole variety of financial services to medium and small size businesses, as well as to the middle and lower income classes in general. The proposed institutional entity that should be provided, with the assistance of the state if necessary, is the Community Development Bank (Minsky, et al., 1993). The variety of financial services, which such an institute should provide to the community, ranges from the provision of a payment service to deposit holding, credits for households, working capital credits for companies, investment banking and the resulting issuance of securities, and the management of asset holding of private households and companies (Minsky, et al., 1993, pp. 10-11). The state assistance may be through a creation of a central bank for community banks that acts as a supervisory body, as well as a provider of reserves, a mediating body towards other financial market entities, and a provider of half of the required equity (Minsky, et al., 1993, p. 16).

The proposals of Minsky and of his follower Kregel do not actually call for a resurrection of the Glass Steagall act. In fact, Minsky did not perceive the deregulation by abolishing Glass Steagall as the primary problem, but rather, he percieved the development of mutual and pension funds as the major players in financial markets. The abolishment of Glass Steagall simply has the effect that there is a further trend towards larger financial market entities, without any guarantee of improving market efficiency through the provision of a larger array of financing products in the wake of increased market competition. (Minsky, 1995, pp. 12, 25)

Hence, it merely works the other way round, since the deregulation by abolishing Glass Steagall and Regulation Q can be seen more as the inevitable result of these regulations, either being circumvented or ridiculed by financial innovation. As stated above, it was the development of shadow banking, i.e. the emergence of mutual funds with the issuance of deposit-like commercial papers outside the regulatory regime, that circumvented Glass Steagall and ridiculed Regulation Q, as mutual funds concatenated

the services of commercial and investment banking. Thus, instead of protecting the regulated entities from overly intensive competition for deposits, the development of financial innovation through regulatory arbitrage actually drained their deposits.

> "Recognizing this evolution of the activities of banks suggests that a return to a Glass-Steagall separation of commercial banking and investment finance with the former engaged in short-term commercial lending and the latter in capital market financing would be extremely difficult, if not impossible, since the former activities are now carried out with capital market instruments and activities." (Kregel, 2010b, p. 16)

What can be learned from this is that, according to Kregel, mutual funds, such as hedge funds, have to be regulated in the same manner as banks, with, for example, corresponding equity requirements. The difference between traditional banks being active in liquidity arbitrage by providing long-term credit at a mark up, financed by short-term deposits, and mutual funds being active in risk arbitrage by pooling financial assets and issuing commercial papers, lies in the difference of profit incentives, but regulation should be able to cover for both. (Kregel, 2010b, p. 18)

The profit incentive of mutual funds lies in the assessment of mispricing of risk and portfolio pooling of assets that reduces the individual portfolio risk through diversification (Kregel, 2010b, pp. 5, 8). The creation of liquidity is therefore different from that of credit money created by traditional banks, which actually provides the same liquidity as central bank reserves, but, in contrast to this:

> "[...] in a securitized lending structure, liquidity is created on the balance sheet of a separate institution (technically a trust or a special purpose entity or vehicle) that, by the magic of diversification and aggregation, “arbitrages” higher risk assets into lower risk assets and, as a result, lower liquidity assets into higher liquidity assets." (Kregel, 2010b, p. 8)

In traditional banking, the liquidity risk is therefore countered by great numbers of statistical average and standard deviation, regarding the likely withdrawal risk of short-term deposits and the therefore tolerable exposure in long-term loans. The liquidity created by mutual funds is instead market liquidity, which relies entirely on the existence of a ready market for the financial assets, i.e. the securities held in the

portfolio. However, it is key to this market liquidity that the risk perception attached to the portfolio of assets is negligible.

The individual risk that is reduced by pooling different kinds of assets does, however, not disappear, according to Kregel. Instead, it is just transformed:

> "This redistribution of risk has been facilitated by a misrepresentation of risks that takes two forms. First it is represented as a transformation of individual or idiosyncratic “alpha risk” into systemic or market “beta risk” through diversification and aggregation of the loans. Second, it presumed to allow the transformation of long-term, higher risk assets into short-term, lower risk assets." (Kregel, 2010b, p. 5)

In other words, the individual diversification of risk reduces the individual volatility of a portfolio but increases the dependence of this volatility in regard to the systemic market volatility.

> "Because of uncertainty, the prices of assets whose cash flows are assured will rise or fall relative to the prices of assets whose cash receipts depend on the future performance of the economy. This change in relative prices is the substance of Keynes's theory of liquidity preference." (Minsky, 1986b, p. 6)

The degree of liquidity that the commercial papers can provide, which are derived from a financial asset portfolio where the individual risk was reduced through diversification, therefore depends highly on the expectations regarding the future performance of the economy, since, in contrast to secure assets such as treasury bonds, the underlying cash flows of these securities are not assured, but depend upon the actual performance of the economy. As mentioned before, the liquidity preference therefore is indeed the premium that is required to hold long-term assets instead of short-term assets, and the less liquid an asset is perceived to be, the higher the required premium to hedge against the risk of holding it will be.

The solution to counter this systemic risk is therefore to ensure decent underwriting that prevents speculative and Ponzi financing schemes. In this regard, Wray proposes stricter rules for the provision of credit to households when it comes to home financing, such as, for example, by requiring a certain degree of income and prohibiting variable mortgage rates, especially teaser rates. In this context, more transparency is also called

for, so potential debtors have a chance to understand what they are getting into, by providing an overview that shows all implied costs and conditions on one page. (Wray, 2007b, p. 50)

Furthermore, Kregel emphasizes that the efficient provision of finance does not depend on very large banks, especially not with a vibrant financial market that is based on securities, but on the overall size of the financial market itself. The recipe therefore is to break up big financial entities in order to avoid the existence of too-big-to-fail structures that have the potential to blackmail the state and to allow the entry of a variety of smaller financial entities instead, including mutual funds such as hedge funds, but under the umbrella of a comprehensive regulatory regime that leaves no exchanges unobserved and no security creation outside approved standards. (Kregel, 2010b, pp. 18-19)

The only problem with this array of regulation and institutional creation is, however, that, in order to work properly in preventing financial instability from occurring, it has to be fully proactive in providing structures and regulations that avoid the emergence of speculative and Ponzi financing schemes. Regulation can only be provided by legislation, and legislation in any democracy is a lengthy and often tedious process of compromise and lobby interference. Keeping the innovative nature of financial capitalism in mind, it is hard to see how this can ensure that regulation will, in the future, not act with hindsight or that it will act at all, even when hindsight is available, because the legislation is paralysed by some interparty power struggle or under the impression that it has to forsake certain regulation for the sake of gaining competitiveness as part of an internationally operating financial market.

The supervising body would then have to be able to amend regulation at its own discretion, within the afore-set boundaries of the legislative body. The difficulty lies in setting these boundaries in a manner in which the supervising body is able to act effectively, but without undermining the democratic accountability of the legislative body. Even if full democratic accountability is assured, it can be argued from a liberalistic point of view that this is not a sufficient justification to overrule resource allocation decisions made by private market participants. Still, as described in this chapter and before, this is exactly what big government does; it validates certain investment decisions and prohibits others. Therefore, the question is what framework

can be provided that avoids interference with private sector resource allocation decisions at the discretion of the government.

For example, Kregel argues that one mistake of Glass Steagall was that it did not clearly distinguish between deposit-taking and deposit-making financial entities, but instead between commercial banks and investment banks, and that only the former provides a clear distinction of functions, whereas the latter was about the distinction between providing short-term finance of working capital through commercial banking and long-term finance of asset accumulation through investment banking (Kregel, 2010b, p. 6).

The distinction in function between deposit-taking entities and deposit-making entities lies in the fact that the former collects deposits in order to provide a payment service, i.e. the transaction accounts, whereas the latter creates credit money deposits for financing (Kregel, 2010b, p. 6).

Therefore, the crucial difference is that one entity solely serves the transaction motive, whereas the other solely serves finance requirements. In order to separate the one from the other and to provide stability, Kregel deems it necessary that the deposit-taking entity is not allowed to provide finance to the deposit-making entity and that the deposit-taking entity has to abstain from proprietory trading (Kregel, 2010b, p. 3). However, Kregel concedes that this separation is difficult to maintain, since financial assets are widely traded among financial market entities (Kregel, 2010b, p. 3).

Hence, financial assets that are the outcome of risk arbitrage might still end up with deposit-taking entities as underlying assets for the transaction deposits, and therefore, these assets' underestimated systemic risk would also end up in the deposit-taking entities' balance sheets. The problem that remains herewith is that the deposit-making entities would still be able to create credit money as an advance, in the Schumpeterian sense, on an investment project that may turn out to be a successful business venture, which translates into investment validating cash flows and therefore proves to be hedge finance, or it might turn out to be either a doubtful speculative venture that could go either way or even an outright futile Ponzi scheme. Whereas the first alternative represents a viable allocation of resources, the second case represents a doubtful allocation of resources, and the third case represents a complete misallocation of resources. In the latter two cases, the economy would increasingly occupy itself with futile non-events that lead towards increasing instability, and, since underlying cash flows will not be realised, disappointed expectations lead to a reversal of assets' capital

values and increased liquidity preference. Once these speculative and Ponzi assets increasingly end up as assets of the deposit-taking entities, they would also endanger the integrity of the payment system.

The solution to this conundrum is the 100 percent money approach. In the post-Keynesian construction of such a system, this means that the government provides the payment service, i.e. a government entity that fulfils the transaction motive by furnishing transaction accounts (Kregel, 2010a, p. 6). This can be achieved by using a postal savings system like those used in Japan or Italy, where the underlying assets are only safe, and fully liquid assets such as narrow money and treasury bonds (Wray, 2011c, p. 8).

The entire financing (short and long term) would then be provided by privately run investment banks, and, in order to avoid, the successive trend towards ever riskier business ventures through credit money creation, these investment banks could be restricted to only use collected deposits (Kregel, 2010a, p. 6).

Both measures would then render deposit insurance, as well as the lender of last resort function of the central bank, to be superfluous, since finance would be limited by private saving, i.e. ex ante $S = I$ (Kregel, 2010a, p. 6).

The problem, however, is that the categorization of an investment as speculative, or even Ponzi, may also be a matter of the gestation time that is allowed for the project. Thus, whether an investment ultimately is hedge, speculative, or Ponzi may only be decided with hindsight after a period of time:

> "The financial arrangements of an investment project conform quite closely to the characteristics we have identified with Ponzi finance. Over the construction period, committed payments exceed revenues from the project. Furthermore, at the end of a period, lump sums are paid by the purchaser that presumably cover payments made by the builder during construction." (Minsky, 1982b, p. 32)

Any business venture that does not reach its stage of complete fruition almost immediately might be categorized as a speculative or a Ponzi scheme and would not be able to continue when additional finance to validate these schemes is not available, if savings are not being committed to the lengthy time period that is required for the completion of the project. The downside is that such an economy might be of a

relatively static nature, since there is no room to provide advances in the form of credit money in order to embark on a Schumpeterian innovation adventure, with the potential of dramatically changing the production function, and thereby changing the path of economic development.

The question of whether a business venture is actually hedge, speculative, or Ponzi scheme therefore dramatically depends on whether underlying cash flows that validate these projects are being created. In a world with finance through the creation of credit money, the underlying cash flows can, however, not be distinguished from those that have solely been generated by prudent resource allocation of a sustainable investment and those that have been generated by overly optimistic and excessively risky investment adventures. As long as the underlying cash flows of an asset provide the means to pay principle and interest, it is a hedge financed project, even though these underlying cash flows are already being driven by increasingly Ponzi behaviour, which still feeds on an increasing amount of credit money creation.

Whether some venture is prudent hedge finance because its productivity increases are able to support its payment obligations, or is a speculative, or even a Ponzi, scheme, can be a matter of time. The question therefore is how long the gestation period of a project is, as well as whether finance is available for as long as it takes to harvest the productivity increase, and finally, whether there is any productivity increase to be expected from it at all.

According to Carlotta Perez, the last question can be answered by looking at the different characteristics of either a new technology driven investment bubble, or an easy money driven investment bubble:

> "The two defining characteristics of these major technology bubbles are: (a) their concentration on the new technologies –especially the new infrastructural networks– and (b) their decoupling from the real economy. The latter is typical of all bubbles; the former –in terms of a strong bias in investment– is what distinguishes a major technology bubble from an ordinary excess liquidity one. (Perez, 2009, p. 8)

As a rule of thumb derived from empirical data research of the new technology dot.com bubble followed by the easy credit mortgage crisis in the US, Perez claims that the ratio

of initial public offerings (IPOs)[11] that were issued by enterprises that were part of the new technology innovation was at between 40 and 60 percent of all IPOs during the phase of the technology innovation driven investment boom, whereas, during the succeeding phase of an easy credit driven investment frenzy, this ratio dropped to around 20 percent and was largely replaced by IPOs from the financial sector (Perez, 2009, p. 18). Furthermore, even though profit increases in the financial sector were higher in both kinds of bubbles compared to profits generated in the real economy, profit increases in the financial sector literally outpaced those of the real economy during the easy credit driven boom (Perez, 2009, p. 26).

Another way to look at the question of whether we are in a phase in which investment is still hedge, since it creates underlying future cash flows, or speculative and Ponzi, since it fails to do so, would be to measure the connection between asset growth and real GDP growth (Tonveronachi, 2012, p. 6).

$IAG = internal\ asset\ growth$

$ICG = internal\ capital\ growth$

$RG = GDP\ growth\ rate$

$POR = payout\ rate$

$ROA = return\ on\ assets$

$L = leverage$

A situation where aggregated $ICG = IAG > RG$ constitutes a situation where investment increases the number of speculative and Ponzi schemes, whereas, in a situation where aggregated $ICG = IAG < RG$, the lack of finance availability constrains growth (Tonveronachi, 2012, p. 6).

The potential internal growth of a financial market entity is $ICG = (1 - POR) * ROA * L$ (Tonveronachi, 2012, p. 5).

Hence, the two options to restrict excessive internal growth of assets are, firstly, the regulation of equity-to-asset ratios, which would reduce the ability to leverage, and, secondly, to set a mandatory payout rate on profits, which would be increased when deemed necessary by the supervising authority (Minsky, 1986a, pp. 320-321). It will be

[11] IPO is defined as a company's first public offering of shares (Scott, 2000, p. 271).

seen later on in the chapter on Hayek that this approach of encouraging, or even forcing, payouts of profits resulting from increases in asset market valuation, is deemed to be rather detrimental because it has the potential to drain the equity substance.

The crucial point that has to be made here is that, in a situation where the aggregated internal asset growth does not translate itself into a corresponding GDP growth rate, obviously the multiplier process is broken, since investment reflected by an increase of assets does not induce the economy to grow above par anymore. The assets that are being invested in will simply cease to generate an underlying cash flow that would validate their current value displayed on the balance sheets. This means that the marginal propensity to save cannot ensure an ex-post identity of saving and investment in the private sector anymore. Instead, the growing mismatch has to either be covered by an increased ex-ante saving of the other macro sectors, such as through a government surplus, as well as through increasing imports relative to exports, or by an increasing reliance on the creation of credit money. Yet, assuming the level of ex-ante budget plans of all other macro sectors to be steady, the increasing asset growth on the balance sheets is increasingly financed by the creation of credit money. Finally, since every debtor has a lender, this credit money creation also increases the budget imbalances between the three macro sectors ex-post. Thus, the lack of income creation, resulting in an increasing deficit position of the private sector, forces the other macro sectors into a surplus saving position, i.e. an increased saving position.

An increasing creation of credit money will then also be the only option for creating the underlying cash flows for the validation of the assets on the balance sheets, since these cash flows are decreasingly being generated through goods and services of the real economy. This is true unless, of course, it is assumed that the underlying investment projects, which are inducing the asset growth, have such a long gestation period that their transformation into increased GDP growth comes with a considerable time-lag.

This means that the financial sector plays a vital role in both kinds of bubbles. In fact, financial innovation provides the ground on which technological innovation treads (Perez, 2009, p. 17). The process then successively decouples from reality and is driven by increasingly optimistic expectations, which lead to an over-investment in the new technology (Perez, 2009, p. 14).

> "Technological trajectories of individual products and of whole systems indicate a logic of improvement that is an essential part of the paradigm

> and serves to guide progress in each area. But with Deployment comes a fundamental shift of focus. Rather than looking at the potential of technologies, the focus switches to the opportunities defined by markets and by growth possibilities." (Perez, 2010, p. 11)

Hence, this over-investment does not restrict itself to the markets, which are likely to be the immediate beneficiaries, but extends itself towards expectations regarding an amendment of the overall growth-path of an economy and the resulting profit opportunities thereof.

> "The extraordinary bounty induces the financial world to engage in all sorts of innovations to mobilise it: some good, some doubtful, some even fraudulent and illegal. Thus finance soon completely decouples from the new economy and adopts a casino like behaviour. [...] Nevertheless, the consequences of these particular bubbles that occur at mid-surge driven by a radically new set of technologies are not all negative. By the time the collapse happens, the new industries and infrastructures will have been fully installed in the territory and the new paradigm will have become the new common sense for innovation and competitiveness." (Perez, 2012, p. 6)

The financial innovation that provided the ground for the technological innovation to deploy itself into the midst of the economy then starts fuelling an over-investment of a different kind, which is not connected to innovative productivity increases anymore, but, with easy credit available, it turns increasingly into a Minskyan financial instability situation (Perez, 2012, p. 6).

Perez argues, "Finance has done its job and overstayed its welcome at the helm of investment; [...]" (Perez, 2009, p. 28). The difficulty, however, is that, at this point, a laissez-faire economy might produce financial instability, instead of technological innovation. However, with regulation that is too restrictive, no technological innovation might ensue in the future either, since there is no financial ground on which it can tread (Perez, 2009, p. 30).

In a world of credit money creation, the attempt to simply let the supervisory body decide upon the discrimination of financial products and practices within a certain framework provided by the legislative, which aims to avoid speculative and Ponzi

finance, might serve the purpose of stabilizing the economy, but, in the same manner as with the 100 percent money approach, it also carries the potential to kill off any innovative dynamic in the real economy. Reintroducing this dynamic would require the state to actively choose investment projects that it deems to be worthwhile in pursuing the greater good of 'king and country'. This implies, though, that it is then more the state and less the free market that is actively involved in the allocation of resources. Such a proposal may of course run into difficulties, since the state might not possess the knowledge necessary to assess which investment may prove to be a viable productivity increasing innovation, and it might also lack the integrity not to choose projects from which only a few of its cronies may benefit.

2.4 Assumptions regarding prices, rate of interest, and rational behaviour

In this account of the most important aspects regarding prices, rate of interest, and rational behaviour in the Minskyan theory, the point to start with is really the rational behaviour, since the other two aspects of interest rate and price very much depend on it.

As described above, the economic agents are at best able to form probabilities that are of a subjective nature, which means they may think they are relatively certain about something, but their subjectively perceived sense of certainty might not necessarily have any correlation with the objective probabilities. In fact, the normal state is that of uncertainty, where cause and effect relations are known, but there is no informational basis that allows any calculation of probabilities that an event is likely to occur, or where there is even a complete unawareness about possible future events. The first kind of uncertainty is like "[..] function [..] smother'd in surmise [...]" (Shakespeare, 2009[1606], p. 9). It is similar to Macbeth, whose imaginations about possible future events are sending him into wild speculations about being king one day, as prophesied by the three witches, and yet, he is unable to calculate the likelihood of such an event, and this inhibits his ability to act on his own accord. Whereas the second kind of complete uncertainty is more like Hamlet's "[...] undiscovered country, from whose bourn No traveller returns,- puzzles the will,[...]" (Shakespeare, 1897[1603], p. 51). In this case, the future of our certain demise paralyzes us with fear, due to the complete unknown of the world that awaits us thereafter. As described before, it is this fear of the unknown that lets us keep our options open by fleeing into liquidity, just like Hamlet, who keeps his options open by putting on a strange and seemingly uncommitted

behaviour so as not to fall for false prophecies emanating from the world thereafter through his father's ghost. The higher the fear about uncertainty, the higher the value that this state of being uncommitted or liquid possesses.

> "Uncertainty deals with that class of events for which the outcome of actions cannot be known with the same precision as the average outcome at a roulette table, or even a mortality table, is known." (Minsky, 1986a, p. 185)

As mentioned before, liquidity can be obtained by narrow money, as well as through short-term assets. However, the market liquidity of an asset, i.e. whether it is short-term in the sense that it can be sold at short notice without a loss, depends on whether a ready market for these assets exists. In the very optimistic phase before the mortgage crisis, CDOs also had an almost liquidity-like status, since there was a ready market for these securities, which, however, dramatically changed as the mortgage crisis ensued.

Furthermore, in such a situation, credit money creation also comes to a halt, since financial market entities, and economic agents in general, want to consolidate their balance sheets by shortening them. Therefore, liquidity cannot be easily produced or substituted, which is why the own-rate of interest of liquidity is at the helm of investment, as soon as there is no investment project left that would provide a greater, or at least the same, own-rate of interest, combined with the money appreciation factor, like liquidity, or, to put it in plain English: The incentive to hold additional long-term assets would have to be so high that it is unrealistic in terms of its expected ability to create the required amount of cash flows. This is why Wray calls the liquidity preference the premium necessary for holding long-term, instead of short-term, assets (Wray, 1990, p. 164).

One exception to this may occur:

> "In the case of inflation expectations [...] the price of tangible assets may increase at more rapid rate than the increase in the money supply; there is a run from money." (Minsky, 1986a, p. 181)

Hence, in this case, the own-rate of interest, combined with the money appreciation factor of the capital asset, actually does exceed the own-rate of interest of money, which is why, in such a case, the hedging against inflation by taking tangible assets, such as commodities like oil or gold, into the portfolio, instead of money, would be worthwhile.

Furthermore, it is important to note that this state of expectations, which also governs the degree of perceived uncertainty, may vary in long-term and in short-term, and that short-term ex-ante expectations, which are disappointed by ex-post facts, may or may not alter long-term expectations. Additionally, disappointment in long-term expectations may or may not alter short-term expectations. Expectations may also be altered by completely non-economic events. (Kregel, 1976, p. 214)

Hence, it is not the disappointment of ex-ante expectations through ex-post facts that cause underemployment, but the very existence of uncertainty (Kregel, 1976, pp. 213-214). Furthermore, changing expectations do not only alter the liquidity preference and the marginal efficiency of capital, but the marginal propensity to consume as well (Kregel, 1976, pp. 218-219).

> "Since in the neoclassical model, a decision not to consume today is a decision to consume tomorrow, firms can go ahead and invest even as sales fall today. In the real world, a decision to not consume today does not represent a decision to consume tomorrow - or ever." (Papadimitriou and Wray, 1999, p. 6)
>
> "While the conventional life-cycle consumption theory models the household as an atomistic agent and seeks an explanation from a familiar cast of macroeconomic variables, such as wealth, taxes, and interest rates, our [post-Keynesian] theory conceives of the household as a fundamentally social agent guided by norms of behavior." (Cynamon and Fazzari, 2011, p. 1)

Both of the statements quoted above convey the message that consumption in the Minskyan world is not a matter of inter-temporal optimization of utility, but of psychological factors, such as optimistic future expectations, translated into certain social conventions. Even though, as described before, the cash flow balance also has to hold for a government budget in the long run, this does not automatically imply that this also validates the Ricardian inter-temporal hypothesis when consumer decisions are independent from inter-temporal utility considerations.

Furthermore, it was shown that changes in the liquidity preference lead to changes in the portfolio of economic agents. These changes in portfolio in turn change the overall interest rate level in an economy consisting of all the different interest rates of different

securities. The central bank can only decree a certain interest rate level if it is prepared to make up for these portfolio decisions in the private sector by applying open market operations. Furthermore, it was established that the natural, or equilibrium, interest rate is indeterminate because there are many possible combinations of equilibrium interest rates and equilibrium incomes. It was, however, also shown that this does not hold true when there is an exogenously fixed money supply combined with a constant money velocity. Instead, there exists a certain interest rate at which ex-ante $S = I$ holds true as a financing limitation at the point where no narrow money is being held as liquid assets in portfolios, i.e. where the rate of interest governed by liquidity preference provides a premium large enough for every economic agent to hold only capital assets in the portfolio. In other words, the internal rate of interest generated by the capital asset has to be so high that it compensates for the perceived risk of holding it and thereby is at least equal to the required liquidity risk premium or the liquidity own-rate of interest. However, as mentioned above, this is unlikely to be the case, since there is always uncertainty, and therefore always liquidity preference, which can only be satisfied by money. The liquidity preference, and therefore the required premium, changes with the degree of uncertainty regarding the future expectations.

Hence, in a situation where no credit money creation or money velocity changes exist, saving limits investment in combination with liquidity preference, which is why underemployment is the norm, since saving is partially transformed into hoarding, and therefore not entirely into capital assets, i.e. investment.

The portfolio decisions that are being made depend on the liquidity preference and, as shown before, the accelerator effect, according to Minsky, only works when the expansion of investment is being met by additional means of finance. Thus, without credit money creation and a constant money velocity, there is only one possible combination of interest rate and income for each degree of liquidity preference.

It is furthermore established that, even with the creation of credit money in combination with changes in money velocity, the process of increasing indebtedness cannot continue indefinitely, due to the progressing deterioration of balance sheets. The increasing indebtedness of one sector of the economy involves indebtedness to all other macro sectors, which are the government sector, the private sector, and the foreign sector. Hence, the state can finance itself by private sector saving and current account deficits, and the private sector can finance itself by government deficits and, equally, by current

account deficits. However, neither the state nor the private sector can increase their deficits indefinitely, and current account deficits may result in a devaluation of the currency.

What was also shown is that, at some point, the additional investment, driven by credit money creation, does not translate itself into a corresponding GDP growth anymore, which means that, at that point, the multiplier process has broken down because investment does not increase income above unity anymore and is instead producing an increasing finance gap, since private sector saving is increasingly lagging behind and has to be covered by an ever increasing amount of credit money creation.

These increasing imbalances between macro sector savings and a weakening multiplier process are therefore covered by credit money creation, which will at some point be unable to continue due to widespread balance sheet deterioration. It is therefore debatable whether, in this kind of economic system, there really is a multitude of equilibria, or natural interest rates, in combination with a multitude of income levels, or whether the equilibrium, or natural interest rate, just cannot be easily detected due to credit money creation, but its fundamental existence and its continued violation precipitates the downturn.

This is at least what Barbera's and Weise's work may suggest (Barbera and Weise, 2010). Instead of using a Taylor rule[12] for setting the Federal Reserve's interest rate target with a constant natural interest rate of 2, they propose a Minsky-Wicksellian-modified-Taylor rule with a fluctuating and actively calculated Wicksellian natural or neutral rate of interest. They therefore calculate this Wickselian neutral rate of interest by using yields of five-year forward Treasury Inflation Protected Securities (TIPS), since these are supposedly independent from short-term central bank policy influence (Barbera and Weise, 2010).[13] A Taylor rule that is only modified by this Wicksellian

[12] The Taylor rule was introduced in 1993 by John B. Taylor and serves as a simple calculus to determine the interest rate to be set by the central bank, depending on the rate of inflation and the actual real economy output gap in relation to the target rate of GDP growth (Taylor, 1993, p. 202). Since then, it has become a standard tool in monetary economics, and the overnight target rate may be calculated by also including the natural rate, or equilibrium real interest rate, added by the actual inflation rate, which is then added by a weighted inflation rate target gap, and finally, added by a weighted output target gap (Belke and Klose, 2011, p. 149).

[13] The calculation of five year forward Treasury Inflation Protected Securities (TIPS) is achieved by "[...] subtracting the five-year TIPS yield from the ten-year TIPS yield." (Barbera and Weise, 2010, p. 141)
Hence, it is achieved by calcualting the five-year forward yield by using the difference in yields of TIPS with a maturity of ten years and TIPS with a maturity of five years (Barbera and Weise, 2010, p. 141). In order to make up for risk, an average risk spread is added, which consists of the average difference in yield between risk free treasury bonds and BAA credit risk classified corporate bonds. Finally, in order to arrive at a present, instead of a forward, yield, an average term premium is deducted, constituting the term

natural rate then provides a relatively strict stance on interest rate targets, with little degree for the easing of interest rate targets, since it follows the current market perceptions regarding profit expectations, but without considering the corresponding changes in risk spreads that these market fluctuations bring about (Barbera and Weise, 2010, p. 143).

Hence, the Minskyan part is the inclusion of these varying risk premiums, which is done by the risk spread for long-term private industry bonds of the lowest investment grade (BAA credit rating) in comparison to TIPS of a similar time period. The monetary policy makes up for the perceived risk fluctuations in taking account of the risk premium in order to get the real risk market rate. (Barbera and Weise, 2010, p. 145)

Hence, when the markets are very optimistic and the risk premium proves to be low, the interest rate target should be relatively high, as advised by the increasing Wicksellian neutral rate, whereas, when the markets turn, and the Wicksellian neutral rate drops, but the risk spreads surge, the monetary policy should ease the interest rate target further to make up for the Minskyan risk premium factor (Barbera and Weise, 2010, pp. 146-147).

The crucial point that Barbera and Weise are making here is that the central bank should not only question market rational expectations in the case of a downturn by providing quantitative easing that is ad hoc and beyond the recommendations of their Taylor rule, but they should also let suspicion rule, regarding market efficiency during the upturn, and consequently tighten the monetary policy far earlier. According to Barbera and Weise, it is not the inflation of consumer goods' prices that provide us any guidance in this respect, but the far harder detectable surge in asset prices fuelled by credit money creation. (Barbera and Weise, 2010, pp. 148-149)

An increase in perceived uncertainty therefore also increases the margin of safety that finance would require, which flows into a long-term asset, and this in turn decreases the capitalized value of an asset. Furthermore, it was shown that, according to this understanding of Keynes, there is always some degree of liquidity preference, which is essentially why underemployment is the norm.

On ther other hand, a reduction in the demand price for a capital asset, which is the capitalized asset value, reduces its potential capital gain, which is the difference between the capital asset demand price and the capital asset supply price. This in turn

spread of the overnight inter-bank market rate, compared to a 10-year rate. This assumes, of course, a normal yield curve that is upward sloping. (Barbera and Weise, 2010, pp. 141, 152)

reduces investment activity as the investment projects in question turn out to be less profitable. Hence, relative prices do matter when it comes to changes in capital gains through varying capital asset demand and supply prices, but they do not have an allocation function in the sense of a Pareto-optimal allocation of resources. Instead, these fluctuations in relative prices are more a matter of changes in liquidity preference through uncertainty and of market power.

> "Where monopoly power exists and when financing and investment are undertaken, present prices are not parameters for decisions." (Minsky, 1986a, p. 108)

Firstly, by introducing finance, there is no immediate budget constraint, but instead, effective demand is constrained by available finance, which may vary. Secondly, the decision to implement an investment does not depend on the present prices of final goods, but on the expected prices that these goods are hoped to fetch in the future and the expected corresponding future demand thereof. These expectations may or may not come true (Minsky, 1986a, pp. 108-109). Thirdly, monopoly power implies that the enterprises act as price setters and not as price takers, as in a polypoly. Hence, prices are not necessarily a consequence of scarcity but of market power.

The allocation of resources is therefore more driven by available finance, expectations regarding future prices, as well as expected future demand, and the individual market power in setting prices (Papadimitriou and Wray, 1999, pp. 7-8).

> "The price system of a capitalist economy must carry the carrot that induce the production of the physical resources needed for future production. To do this it is necessary that the present validate the past, for unless the past is being validated and the future is expected to validate present investment and financing decisions, none but pathological optimists will invest. [...] In other words, the price system must generate cash flows (profits, quasi-rents), which simultaneously free resources for investment, lead to high enough prices for capital assets so that investment is induced, and validate business debts. For a capitalist system to function well, *prices must carry profits*." (Minsky, 1986a, p. 142)

The allocation of resources is therefore validated by hindsight in such a manner that the generated cash flows are able to validate the investment by covering the payment obligations thereof and provide an additional profit that serves as an incentive to continue.

The connection between a lack in rational behaviour, rate of interest, and prices can be summed up as finding liquidity preference at its core. The uncertainty which inhibits rational behaviour, in the sense of acting under complete foresight, is not a relative uncertainty, like in the Macbeth example, in which a coup d'État is a possible event, and there is therefore a knowledge about causation and effect. Rather, what is lacking is the objective probability that can be ascribed to the event taking place. Instead, the inevitability of liquidity preference lies in the fundamental uncertainty, like in the Hamlet example of the complete unknown of the life thereafter, where the missing knowledge about possible events cannot lead to any assumptions about causation and effect or to the ascribing of any probabilities whatsoever, and the only remedy is to keep the options open until more information is available. This is in order not to fall into the trap of possibly false prophecies, just like the way Hamlet counters the fear that the story told by his father's ghost might not be a divine revelation, but evil-spirited false testimony. His behaviour is seemingly irrational and uncommitted but, under fundamental uncertainty, it is in fact the only rational option. Under normal circumstances, there can be no elimination of fundamental uncertainty, which is why an underemployment of resources is seen to be the norm.

Yet, as will be seen in the chapter on Hayek, there seems to be a flaw in this logic when it comes to situations of boom and bust, since, at the pinnacle of the boom, this normal situation does not seem to apply if the boom situation is also a situation where there is a full employment, or at least a near full employment, of resources, which means that the relative market tranquillity, as it is described by Minsky, must be a situation where at least the subjectively perceived fundamental uncertainty seems to be almost absent, or at least negligible. Translating this into the terms of market risk, it is then not the individual alpha risk of an investment project in which causation and effect are known, and subjectively perceived probabilities are assigned, as well as optimised by portfolio pooling, but it is the systemic beta risk that is neglected or underestimated by economic agents and that lies at the core of fundamental uncertainty regarding the stability of the system in its entirety. It was established in this chapter on Minsky that the stability of the system is put in danger by investment that increasingly does not translate itself into

real economy growth anymore, and this is what constitutes an increase of systemic risk. This remains undetected by economic agents for some time, since it is covered up by further credit money creation until financial fragility cannot be overlooked anymore and finally results in a surge of liquidity preference and, with it, in position-making, fire-sales, and the shortening of balance sheets.

The financial fragility, as it is called by Minsky, may be then just a symptom of a much deeper cause, which has at its heart a production structure that is not sustainable anymore. This is the core of the Austrian school business cycle theory with which the following chapter on Hayek deals. The other logical flaw, which is criticised by the Austrian school, or at least by some of its economists, is the fact that the real balance effect plays no role with Keynes in remedying the situation through reductions in prices precipitated by liquidity preference and therefore resulting in the new establishing of market clearing prices.

Therefore, it remains to be seen in the next part of this thesis what assessment the Austrian school provides regarding the real economy consequences of liquidity preference and the potential remedy of a real balance effect. It was already mentioned that this is not part of the world of Keynes, but what instead could provide such a market clearing mechanism would be the Keynes effect, where the reduction in price level increases the real amount of money and depresses the interest rate. This, however, is of course countered by liquidity preference, which has an opposite effect on the interest rate. The interest rate, on the other hand, then changes the capitalization value of investment projects, and therefore the demand price of capital goods, in relation to the supply price of capital goods. Price setting itself is, however, not necessarily governed by scarcity but primarily through market power and the way in which the availability of credit changes effective demand. The availability of credit again depends on changes in liquidity preference.

3 The business cycle theory of F. A. Hayek

Before starting with Hayek's business cycle itself, the first three subchapters will lay the foundation in the history of economic thought on which Hayek built his theory. Then, the business cycle theory of Hayek will be looked upon not just as some static theory, but also as something that developed over time thanks to criticism and influences from the post-Keynesian school towards a modern Austrian business cycle theory. As will be seen, this modern Austrian business cycle theory is not an homogeneous theory, but very much something that is debated within the modern Austrian school of thought, and in order to remain true to Hayek's point of view, a distinction has to be made regarding the modern Austrian business cycle theory that is more to be seen in the tradition of Mises and that which is true to the ideas of Hayek.

3.1 Economic theory foundations by Böhm-Bawerk, Wicksell, and von Mises

The following three subchapters on Böhm-Bawerk, Wicksell, and von Mises all follow the same basic structure. Every subchapter starts with what the respective theorist has to say on price formation, then addresses what is to be said on the rate of interest, and finally, deals with the formation of capital. The emphasis will, however, diverge regarding the importance of contribution of the three theorists, which is why the Böhm-Bawerk chapter emphasises the formation of capital as a process of roundaboutness, and the pricing process and interest rate phenomenon are used to elucidate the capital formation process. Regarding Wicksell, the emphasis lies on the natural rate of interest, and the pricing process is seen more in the context of the cumulative process, and both of which result in the appearance of a certain capital structure. Finally, the subchapter on Mises puts its emphasis on the occurrence of unsustainable malinvestment, and the pricing and interest rate are merely used to elucidate the misleading signals, resulting in an unsustainable capital structure. The Mises approach then also represents the point of departure for Hayek's own business cycle theory, which, as is still to be shown, can, however, not be divorced from Austrian capital theory and the way it defines the rate of interest, which then can only be described if we fall back on Böhm-Bawerk and Wicksell.

3.1.1 Böhm-Bawerk's capital theory

Unlike Minsky's post-Keynesian, bottom-up price formation process, in which costs and profit spreads are added up in order to come up with a sales price, the Austrian way of price formation is top-down, starting at the point of demand of the consumer, and all prices of intermediate products and original production factors are derived from this final consumer demand:

> "The valuation which consumers subjectively put upon iron products forms the first link. This helps, next, to determine the figures of the valuation—the money price at which consumers can take part in the demand for iron products. These prices, then, determine [...] the resultant price of iron products in the market for such products. This resultant price, again, indicates to the producers the (exchange) valuation which they in turn may attach to the productive material iron, and thus the figure at which they may enter the market as buyers of iron." (Böhm-Bawerk, 1930[1894, 1891], p. 226)

According to Böhm-Bawerk, the price formation takes place in the manner of marginal pairs, where the upper threshold of a market price is determined by "the last buyer", whose subjective valuation of the good in question is right underneath that of "the first excluded seller", and the lower threshold is determined by "the last seller", whose subjective valuation is right above that of "first excluded buyer". (Böhm-Bawerk, 1930[1894, 1891], p. 208)

Böhm-Bawerk states, "The value of a good is determined by the amount of its Marginal Utility." (Böhm-Bawerk, 1930[1894, 1891], p. 149)

This marginal utility is determined in an ordinal fashion, regarding the hierarchy of wants and the cardinal availability of a good to satisfy these wants (Böhm-Bawerk, 1930[1894, 1891], p. 150).

However, the subjective value of a commercially produced good is zero, since it is not produced for the immediate satisfaction of any wants of its producer, but for the intention of exchange (Böhm-Bawerk, 1930[1894, 1891], p. 220). Hence, the costs flown into the production are to be regarded as sunk costs because the product cannot

satisfy any personal wants of the producer, so he will be ready to sell the entirety of the goods at whatever price they might be able to fetch on the market under current circumstances of supply and demand, without considering whether this price actually covers the costs incurred (Böhm-Bawerk, 1930[1894, 1891], p. 221). The question of whether a good's price exceeds its production costs determines whether the production of a certain good is perceived as remunerative or not (Böhm-Bawerk, 1930[1894, 1891], p. 226). Hence, the profit induces an increasing production of the respective good, which in turn increases the demand for necessary intermediate products and original production factors, which drives up their prices as well, so, in the end, the identity of prices and costs is re-established (Böhm-Bawerk, 1930[1894, 1891], p. 234).

Market frictions and preference alterations explain the case in which such an identity between prices and costs does not prevail. The allegory that Böhm-Bawerk finds for market friction is a flowing river whose flowing speed does not only depend on the sheer amount of water, but also on the physical geometry through which the water flows:

> "If we compare the means of production to a stream, we might say that the stream is not, as it should be, of equal breadth at all stages of its course: from some disturbing cause or other there may be dams at certain particular points, and leakages at others; and these cause an unsymmetrical divergence of price compared with the prices obtained at stages before and after, or, as it is usually conceived and expressed, a divergence of the price of a product (or intermediate product) from its costs." (Böhm-Bawerk, 1930[1894, 1891], p. 233)

These frictions could therefore be interpreted as entry and exit barriers of markets or a general inertia of the reallocation of resources and assets due to their specific design in the light of executed production plans. Or, in the words of Ludwig Lachmann:

> "Factor substitution is a concomitant of plan revision [...]. And substitutibility essentially indicates the ease with which a factor can be turned into an element of a [new] plan." (Lachmann, 1978[1956], p. 57)

Furthermore, the identity of prices and costs might not prevail, due to a change in preferences while the production process is underway, and this is important because:

> "It is this second disturbing cause which gives rise to Interest." (Böhm-Bawerk, 1930[1894, 1891], p. 234)

The way that Böhm-Bawerk describes the imputation of prices induced by subjective valuations is done in the spirit of Carl Menger, but the later formation of aggregates, such as capital, is not (Hennings, 2012[1989], p. 182). While the formation of prices is induced by scarcity of supplied goods in connection with the subjective valuation thereof, the rate of interest must also be seen in connection to economic evaluation. As Klaus Hennings interprets Böhm-Bawerk's approach, the rate of interest is to be regarded as a real phenomenon. However, the explanation of the rate of interest cannot solely rest on the productivity of capital because the accumulation of capital itself depends on the valuation of the future services it will provide. (Hennings, 1997, p. 115)

The three determinants in Böhm-Bawerk's theory of interest are firstly, "DIFFERENCES IN WANT AND PROVISION FOR WANT", secondly, the "UNDERESTIMATE OF THE FUTURE", and thirdly, "THE TECHNICAL SUPERIORITY OF PRESENT GOODS" (Böhm-Bawerk, 1930[1894, 1891], pp. 249, 253, 260).

> "THE first great cause of difference in value between present and future goods consists in the different circumstances of want and provision (Bedarf und Deckung) in present and future. [...]If a person is badly in want of certain goods, or of goods in general, while he has reason to hope that, at a future period, he will be better off, he will always value a given quantity of immediately available goods at a higher figure than the same quantity of future goods." (Böhm-Bawerk, 1930[1894, 1891], p. 249)

The first explanation refers to an inter-temporal scarcity of real income, since it deals with differing means available over time to meet constant wants (Hennings, 1997, p. 118).

The second reason given by Böhm-Bawerk is regarded as what is nowadays referred to in Austrian economics as Pure Time Preference (Hennings, 1997, p. 120). Its praxeological foundation shall be more closely explained in the subchapter on Mises.

According to Böhm-Bawerk, this kind of under-valuation of the future is, however, due to three different causes. The first cause for this phenomenon lies in a deficit of

imagination regarding the possible future wants one will have. The second cause hinges on the assumption of weakness in willpower, that leads us to consume today and to neglect the future opportunity costs of this consumption altogether. The third cause lies in the perception that life is short and therefore today is valued higher than some uncertain future that might not be experienced anymore. (Böhm-Bawerk, 1930[1894, 1891], pp. 254-255)

Hennings interprets the first reason not just as a deficit of imagination of future wants, but also as a deficit of information regarding the usefulness of presently available goods for the satisfaction of possible future wants (Hennings, 1997, p. 119). Hence, the first and the third cause for the under-evaluation provided by Böhm-Bawerk hinge very much on a lack of information and therefore on uncertainty. These two causes do not, however, provide a very strong argument for a positive rate of interest. For the first cause, the evaluation of a future want or the capability to satisfy this future want with a presently available good, might also have been exaggerated in hindsight. For the third cause, it is not clear at all that, because life is perceived to be perishable, people do not make provisions for the future. (Hennings, 1997, p. 119) One could even claim that provisions for the future are made exactly because the future is uncertain.

Hence, the remaining strong argument for a positive rate of interest, induced by the under-evaluation of the future, is the irrational lack of willpower, which ignores known facts in favour of the immediate satisfaction of somebody's desires (Hennings, 1997, p. 119).

> "We systematically underestimate future wants, and the goods which are to satisfy them. [...]We find it most frankly expressed in children and savages. With them the slightest enjoyment, if only it can be seized at the moment, outweighs the greatest and most lasting advantage." (Böhm-Bawerk, 1930[1894, 1891], p. 253)

At the beginning of the chapter for the second reason for a rate of interest, Böhm-Bawerk therefore sees this phenomenon grounded in childish and uncivilized behaviour.

The third reason for a rate of interest is somewhat set apart from the first two reasons, since the third reason actually reintroduces the productivity back into the argument for a rate of interest (Lachmann, 1978[1956], p. 73). This is, however, somewhat inconsistent with the original claim to divorce the explanation of an interest rate from any physical

productivity. For instance, Hennings does not really take the third reason into consideration when dealing with the rate of interest explanation of Böhm-Bawerk, but introduces it later in the chapter on capital theory (Hennings, 1997, p. 128). The reason for this can be seen in the fact that the third reason merely provides a counterbalancing pole that restricts the consumption today and allows capital accumulation for the final goods production of tomorrow (Böhm-Bawerk, 1930[1894, 1891], p. 276). Hence, the "centre of gravity", as Böhm-Bawerk calls it, is achieved by the interplay between the potentially cumulatively working first two psychological reasons for the rate of interest and the third productivity induced reason for a rate of interest. The centre of gravity then determines the extent of capital accumulation.

The superiority of present over future goods is rooted in the assumption that the sooner one puts resources into productive use, the greater the physical proceeds at the end of the production process will be (Böhm-Bawerk, 1930[1894, 1891], p. 262). This argument is then transferred from the increase of a physical amount of production towards the value of that production in such a way that there is a stringent correlation between higher physical output and corresponding higher value of that output (Böhm-Bawerk, 1930[1894, 1891], p. 277). The physical increase of production by employing resources as early as possible includes the assumption that the longer the employment of these resources is, the more productive this employment will be (Wicksell, 1977[1934], p. 170). This is based on the assumption that the lengthening of the time of the production process by what Böhm-Bawerk calls increased "roundaboutness", always leads to enhanced productivity because otherwise, such an employment of resources would not take place, and this is merely an "experience of practical life" (Böhm-Bawerk, 1930[1894, 1891], pp. 19-20).

However, Wicksell contests the point that it is the physical output that ensures this centre of gravity, arguing instead that it is the profitability of the lengthening of the production process that limits the extension of roundaboutness, which is ultimately also conceded to by Böhm-Bawerk (Wicksell, 1977[1934], p. 170). Hence, according to Wicksell, there cannot be a simple correlation between physical output increase and the increase of value. This can also be seen in Böhm-Bawerk's criticism of what he claims to be a naive stance on productivity that confounds physical with value productivity (Böhm-Bawerk, 1890[1880], p. 112). The question of whether there actually is a stringent correlation between the two depends on whether the products are still deemed to be as useful as before and whether the relation between the demand for these

products and their availability is constant, meaning that their scarcity has not changed (Böhm-Bawerk, 1890[1880], p. 135). Accordingly, Hennings does not see the physical productivity as a driving force for Böhm-Bawerk's third reason for a positive rate of interest, but instead the valued output of the production process.

It is, however, important to mention at this stage that the only reason for a positive rate of interest is the second reason, which is also known as Pure Time Preference Theory, since, for the first reason, the intertemporal scarcity can also be such that the actual income is perceived more abundant than the expected future income, and, for the third reason, the market valuated physical productivity gains may not reflect an increase in market value but a decrease.

Hence, also according to Wicksell, the second reason is the only one that is applicable when it comes to explaining a strictly positive rate of interest as a generally applicable phenomenon (Wicksell, 1970[1954], pp. 108-112).

The accumulation of capital is a process of roundaboutness, which is both time consuming and productivity enhancing (Böhm-Bawerk, 1930[1894, 1891], p. 82). The formation of capital can therefore be seen as a means to an end, driven by the choices made with regard to the roundaboutness of a production process (Hennings, 1997, p. 130). Capital therefore is not some kind of homogenous mass, but purpose specific investment (Hennings, 1997, p. 133). This does not mean that all capital is completely specific in such a way that it cannot be employed for another purpose than originally imagined, but any such reassignment of capital involves costs and time (Hennings, 1997, p. 130). According to Lachmann, capital therefore is specific in correspondence to a specific production plan, and within such a plan, capital goods cannot serve as substitutes for one another (Lachmann, 1978[1956], pp. 56-57). It is only when existing plans are abolished and new production plans are established that capital goods can be reassigned to new purposes, which, in light of their original design, are merely "second-best uses" (Lachmann, 1978[1956], p. 3).

Accordingly, because capital is not some homogenous mass but rather consists of heterogenous capital goods, a concept that aggregates these heterogenous assets into a physically existing stock of capital is rejected by Böhm-Bawerk (Hennings, 1997, pp. 133-134). In order to measure the amount of capital accumulation, Böhm-Bawerk instead uses the extent of roundaboutness measured in time (Hennings, 1997, p. 134). However, Böhm-Bawerk detects the problem that production is a continual process that

incorporates intermediate products whose date of production reaches far into the past, such as iron ore that has been mined centuries ago and is still in use as being recycled over and over again (Böhm-Bawerk, 1930[1894, 1891], p. 88). Hence, Böhm-Bawerk comes up with the concept of the average period of production, "[...] which elapses [...] between the expenditure of the original productive powers, labour and uses of land [...] and the turning out of the finished consumption goods" (Böhm-Bawerk, 1930[1894, 1891], p. 88). This concept would be used to calculate at what ratio the original production factor of a certain remoteness in time was actually invested in the end product (Böhm-Bawerk, 1930[1894, 1891], p. 89).

However, the difficulty is that, in order to weigh the amount of original production factors invested in the final product on a physical basis, one would have to abstain from including the two different original production factors, labour and land, simultaneously. This would only work when being weighted by factor prices, since they are physically incomparable. The consequence would then not be a period of production, but a Wicksellian period of investment concept. The consequence would be that, instead of determining a technical or physical period of production, a price value induced period of investment is determined. (Hennings, 1997, p. 137)

Alternatively, capital may of course be measured in value. This implies that from the means to an ends nature of Böhm-Bawerk's capital, the valuation must be future oriented, guided by the expected value of the final consumer goods, deducted by their costs incurred in accordance with the principle of price imputation, and discounted by the factor that takes account of time preference, ergo the rate of interest (Hennings, 1997, p. 132). Accordingly, the value of capital is subject to changes with changes in final goods prices. Not only that, but the calculation of a capital value under the aforementioned conditions may also render the assumption of increases of productivity in value through increasing roundaboutness invalid. When the distribution of original factor investment values is of such a nature that, for a long production process, which produces a higher amount of physical output, the input values at the beginning of the investment period are relatively higher than those of a shorter process, which produces a smaller amount of physical output, and yet, the shorter production process generates a higher capital value due to the differing input distribution in combination with the discounting factor. (Hennings, 1997, pp. 138-139)

The way to avoid the criticism that hinges on the factor of time and to rescue the concept of productivity enhancement through roundaboutness is to follow Lachmann's advice to take time out of the equation (Lachmann, 1978[1956], p. 83).

> "Progress through capital accumulation [...] means, firstly, an increase in the number of processing stages and, secondly, a change in the composition of the raw material flow as well as of the capital combinations at each stage, reflecting specialization as new stages are being added to the existing structure." (Lachmann, 1978[1956], p. 83)

It is therefore not about measuring the time, but the number of stages for which length in time is not as important as the specialisation effects accompanying the increased number of production stages.

> "It seems to us that Boehm-Bawerk, in making time the measure of capital, was led to confuse a process with the dimension in which, *in very special circumstances*, it may take place. Time by itself is not productive, nor is human action necessarily more productive because it takes longer." (Lachmann, 1978[1956], p. 84)

As to what exactly constitutes capital, Böhm-Bawerk introduces the categories of capital in a wider sense and capital in a narrower sense, as well as the distinction between Social Capital and Private Capital. First of all, to distinguish capital in the narrower sense from capital in a wider sense means that capital in a narrower sense includes all intermediate products that were generated by a process of roundaboutness and are being employed in a process of roundaboutness, or rather, transformed into final consumer goods. In contrast to this category stands capital in a wider sense, which is durable and rent earning and not part of the production process itself. (Böhm-Bawerk, 1930[1894, 1891], p. 38)

The emphasis in defining capital therefore lies on the fact that it serves a function in the production process, and this is also true for the distinction between Social Capital and Private Capital. Böhm-Bawerk explains, "Social Capital embraces only the means of production; Private Capital embraces also certain consumption goods." (Böhm-Bawerk, 1930[1894, 1891], p. 63)

Hence, what is precisely included as Social Capital are facilities that improve the productivity of land, such as fences, buildings that serve as factories, company offices,

or infrastructure (excluding schools and courts), machinery, farm animals, raw materials, consumption goods held in company warehouses, and money. Hence, consumption goods that are not in the hands of the consumers are also regarded as part of Social Capital that serves production purposes. (Böhm-Bawerk, 1930[1894, 1891], pp. 65-66)

Evidently, the Social Capital also serves as a source of subsistence to bridge the gap between initiating the process of roundabout production and harvesting its fruits (Böhm-Bawerk, 1930[1894, 1891], p. 58). Thus, for the formation of capital, provisions have to be made that ensure the timely supply of the production process with resources necessary to maintain the production process according to planned procedures:

> "Capital only comes into existence when man actually enters upon the profitable roundabout journey that the means of subsistence have made possible; when he builds machines, tools, railways, factories, raises raw materials, and so on. However abundant the means of subsistence were, if the workers were to consume them in living from hand to mouth, the community would evidently never accumulate capital at all." (Böhm-Bawerk, 1930[1894, 1891], p. 58)

In order to make provision a part of this, subsistence fund must be sacrificed for the formation of capital. The saving of subsistence fund is, however, not sufficient for the formation of capital, since the capital assets must also be produced. (Böhm-Bawerk, 1930[1894, 1891], p. 101)

Therefore, the consumption of subsistence fund is restricted by the capital that has been formed in the past and needs maintenance today, as well as through the capital that will be newly produced (Böhm-Bawerk, 1930[1894, 1891], p. 104).

> "Command over a sum of present consumption goods provides us with the means of subsistence during the current economic period. This leaves the means of production, which we may have at our disposal during this period (Labour, Uses of Land, Capital), free for the technically more productive service of the future, and gives us the more abundant product attainable by them in longer methods of production. On the other hand, command over a sum of future consumption goods leaves, of course, the present unprovided for, and, consequently, leaves us under the necessity

> of directing the means of production that are at our command in the present, wholly or partially, to the service of the present. But this involves curtailment of the production process, and, as consequence, a diminished product." (Böhm-Bawerk, 1930[1894, 1891], p. 271)

Hence, a choice must be made between lengthening the production process through capital formation, which is productivity enhancing in the future, and shortening the production process to serve the immediate needs of the present. The point at which the actual trade-off between the two is made is determined by the economic point of gravity between the first two reasons for a rate of interest (inter-temporal scarcity of real income and the under-evaluation of the future), on the one side, and the third reason for a rate of interest (the superiority of present goods), on the other side. As was made clear above, the third reason for a rate of interest cannot, however, be based on a physical productivity, but must be based on a productivity of price value. The accumulation of capital can therefore not be divorced from the pricing process, nor can it be divorced from the first two reasons for a rate of interest, which are not governed by productivity but by time preference.

3.1.2 Wicksell's natural rate of interest and the cumulative process

The crucial point in Wicksell's understanding of the workings of the price level is essentially the rebuttal of the quantity theory stance that the price level depends directly on the quantity of money. Instead, the connection is of a more indirect nature, working its way through the market rate of interest (Wicksell, 1962[1936], p. xxviii). Hence, according to this logic, the focus must shift from a quantity of money, changing the price level towards the market interest rate exerting its influence on prices (Arnon, 2011, pp. 345-346).

The criticism against the quantity theory is not so much aimed against the real balance effect, which induces market participants to decrease their demand and increase their supply of goods in the face of rising prices in order to re-establish their cash balances that they deem to be sufficient in realising their expenditures, but against the unrealistic assumptions underlying this mechanism. The points being brought forward against this logic are that transactions are not being made through balances, which are individually held, but that transactions are deposit-based accounting procedures, often effected

through credit money creation or near money instruments, and that furthermore, the velocity of money is, in reality, not of a constant nature. (Arnon, 2011, pp. 348-349)

Whether the quantity theory remains valid therefore very much depends on the question of what kind of monetary system is at hand. Wicksell distinguishes basically three different kinds of banking systems, which are the pure cash economy, the simple credit economy, and the organised credit economy (Wicksell, 1962[1936], p. vi). Whereas the pure cash economy only allows transactions with money in the narrow sense, the simple credit version allows credits that will have to be serviced by narrow money, and the last version of an organised credit economy allows for a fully fledged credit money creation economy, where debts can be serviced with credit money, which means by bank deposits that are generated by credit money creation. The consequence then is that the quantitative theory that holds true for the pure cash economy also eventually holds true for the simple credit economy but holds no truth for the organized credit economy. (Arnon, 2011, p. 351)

The consequence for an organized credit economy is that, in the face of rising prices, no attempts by market participants have to be made to re-establish their cash balances by curtailing their demand expenditure or increasing their supply generated gains, as long as the perceived gap in cash balances can be filled by credit money creation. The effect of curtailing demand and increasing supply would of course be a demise of the price level until the wishes for cash balances are met again. In the absence of this process, no demise of the price level would come to effect.

Nevertheless, if the price level has an effect on credit money creation or on money supply in the broader sense, it also works the other way round. Namely, the credit money creation not only prevents the prices from falling again but also induces them to rise. It is this connection between interest rate and price that Arnon sees at the heart of the innovative monetary theory of Wicksell (Arnon, 2011, p. 351). The way that a rise in prices is induced by monetary expansion requires, however, still another concept, which is the pivotal driving force. In order to induce credit money creation, it has to be worthwhile for investors to ask for additional credit for investment purposes. Wicksell first of all mentions the point where this desire is absent, and the currently obtained credits exercise no effect on the price level:

> "THERE is a certain rate of interest on loans which is neutral in respect to commodity prices, and tends neither to raise nor to lower them. This is

> necessarily the same as the rate of interest which would be determined by supply and demand if no use were made of money and all lending were effected in the form of real capital goods. It comes to much the same thing to describe it as the current value of the *natural rate of interest on capital*." (Wicksell, 1962[1936], p. 102)

This natural rate of interest thereby provides us with a situation that is identical to that of a barter economy whose exchanges are fully "in kind" (Wicksell, 1962[1936], p. 103). Hence, money in such a situation would be the famous veil that only hides the real economy transactions from sight but does not alter them. This natural rate of interest carries, however, also another property, which is that it represents the equality of capital demanded and capital supplied, or in other words, it constitutes the equality of investment and saving (Wicksell, 1962[1936], p. 103).

The actual amount that can be paid for interest payments is limited by the other costs incurred and the price the final good may fetch on the market. The logic behind this is again the imputation of prices to such an effect that it brings about equality of costs and final goods prices, only allowing a profit that is the reimbursement for the creative entrepreneurial activity or specific circumstances, such as a company secrets or patents that allow for monopolistic price setting, but only to a certain degree. (Wicksell, 1962[1936], pp. 103-104)

Any interest rate for a loan that is set below that natural rate of interest by the bank therefore provides the entrepreneur with an additional profit because the interest payments have now been reduced. In effect, this induces entrepreneurs to enlarge their businesses or to enter the market as newcomers. The consequence is that this leads to an increased overall demand for resources and commodities, which raises the price level. (Wicksell, 1962[1936], p. 106)

The likelihood for a case in which both the natural rate of interest and the market rate of interest actually coincide in order to ensure money functioning neutrally as a veil, is, however, perceived by Wicksell to be rather small. According to his assessment, the natural rate of interest fluctuates continually, whereas the market interest rate for loans is set in discontinuous steps. (Wicksell, 1962[1936], p. 106)

The consequence then is that, even if the banks get it right in the beginning and set their interest rates for loans equal to the natural rate of interest, there is no guarantee that this

equilibrium will prevail, since the natural rate of interest may diverge from the market rate over time and set either an increasing investment with rising prices, or a decreasing investment with falling prices, in motion (Wicksell, 1962[1936], p. 107).

> "The money rate of interest depends in the first instance on the excess or scarcity of money. How then does it come about that it is eventually determined by the excess or scarcity of real capital?" (Wicksell, 1962[1936], p. 108)

The interesting aspect of the above question is the insight that the money rate of interest depends on either the abundance or the lack of money, and only to a second degree on the abundance or lack of capital. To put the question differently, it must be asked what conditions have to be assumed so that the real balance effect resumes its function and makes the real capital situation felt and thereby brings the money rate of interest in line with fundamentals.

For a simple credit economy, the answer lies in the fact that, due to the rising prices resulting from increased investment, thanks to a money market interest rate that is below the natural rate of interest, market participants are eventually forced to consolidate their cash balances by decreasing their cash loaned out and thereby curtailing the supply of money, which restores the equilibrium of the natural rate of interest and the money rate of interest. (Wicksell, 1962[1936], p. 110)

In the case of an organized credit economy, this will, however, not be the case, since the pressure to consolidate cash balances will be missing as the money supply becomes fully elastic in bridging any perceived gap in cash balances:

> "At the same time it is clear that in an elastic monetary system [...] a fairly constant difference between the two rates of interest could be maintained for a long time, and the effect on prices might be considerable. [...]The banks have merely to enter a figure in the borrower's account to represent a credit granted or a deposit created. When a cheque is then drawn and subsequently presented to the banks, they credit the account of the owner of the cheque with a deposit of the appropriate amount (or reduce his debit by that amount). The "supply of money" is thus furnished by the demand itself." (Wicksell, 1962[1936], p. 110)

The only real limit Wicksell perceives are legal regulations which prohibit the extension of the banks' balance sheets beyond a certain percentage to be covered by reserves, i.e. outside money like gold (Wicksell, 1962[1936], p. 115).[14]

The considerable effect on prices resulting thereof is what Wicksell called a cumulative process. This is assuming an evenly spread increase of the price level, where the entrepreneur has to pay higher prices for his input factors but, at the same instance, obtains increased prices for his products as well, which then leaves him no better nor worse off than before the rise of the price level. With a rise in price level created by a permanent decrease in the money interest rate, the situation is somewhat similar, since the decreased interest payment induces the entrepreneurs to increase their demand for input factors, which leads to higher prices of input factors, and hence, increased income of input factor suppliers and an increased demand for final consumer products. This in turn increases the price level for consumer products, which is, however, nothing that was anticipated by the entrepreneurs but enables them to reap the full additional profit of the money rate of interest decrease, which is higher than expected, since initially, the competition among the entrepreneurs forced them to pay higher prices for the input factors. This experience then induces them to increase their production again, which in turn leads again to a higher price level and so on and so forth. Should the money rate of interest return to its former higher level, there will be no downward effect on the price level because the entrepreneurs will simply refrain from expanding their business further, but will not shrink it either. (Wicksell, 1962[1936], p. 96)

This cumulative effect hinges on the assumption that the only interest rate that can bring the economy back into equilibrium is the money rate of interest. The reason is that the natural rate of interest remains undeterred by an enlargement of investment. This is so because initially, the increasing investment increases labour wages and rents for very durable capital goods, which drives up their profitability. In the following process, short-term capital assets of working capital are more and more transformed into durable capital assets, which in turn drives up the profitability of the short-term working capital

[14] The similarities of Wicksell's insight with today's post-Keynesian theory on fully elastic money supply are simply striking because the business banks in the Wicksellian world are also able to accommodate any demand for money by simple credit money creation. The connection that is, however, still missing to today's Modern Monetary Theory (MMT) is the fact that the central bank may act alike by simply crediting business banks with its reserves, i.e. today's outside money, by a stroke on its key board. As already mentioned in the chapter on Minsky, the minimum reserve requirements cannot control the amount of credit money created when the supply of central bank reserves is fully elastic. Hence, the cumulative effect cannot be stopped by minimum reserve requirements because reserves increase in lockstep with the cumulative process.

assets. Hence, whilst the natural rate of interest of durable capital assets is driven down, the more their abundance is increased, the more the natural rate of interest of the short-term assets is increased as they become ever more scarce. In netting each other out, the respective natural rates of durable capital assets and short-term capital assets are keeping the overall natural rate of interest constant. (Goodspeed, 2012, p. 28)

Hence, it is the banking system as the sole arbiter that has to resolve the differences between the natural rate of interest and the money rate of interest (Grossekettler, 2012[1989], p. 204).

In the case of a Wicksellian investment glut, the structure of capital transforms itself from short-term working capital assets towards increasingly long-term capital assets. However, in the sense of a Böhm-Bahwerk subsistence fund, this would also imply that an increasing amount of the intermediate products that make up the subsistence fund are being transformed into durable capital assets of a very long-term and specific nature, and therefore, the cumulative process is not just a nominal but also a real phenomenon.

The resources necessary for this transformation from short-term to long-term assets are taken at the expense of consumer goods (Wicksell, 1962[1936], p. 155). In fact, this constitutes "forced saving" (Goodspeed, 2012, p. 22).

In accordance with the concept of productivity increases through the lengthening of the production process, according to Wicksell, this has a positive effect on the abundance of consumer goods after the new methods of production have been implemented:

> "At the end [...] the available quantity of consumption goods has increased correspondingly, the consumers will receive some reward for their abstinence." (Wicksell, 1962[1936], p. 156)

3.1.3 Von Mises's malinvestment

As with Böhm-Bawerk, the pricing of intermediate products and original factors of production works through imputation that runs from the market valuation of final consumer goods downwards through the different stages of production and their corresponding intermediate products (Mises, 1998[1949], p. 330). However, the price formation process itself does not happen passively but rather as the result of the entrepreneurial action of profit seeking. This entrepreneurial action is always speculative in nature because it is based on the anticipated foresight of future prices, and accordingly, entrepreneurs are looking for opportunities of profit through the correct appraisal of prices and arbitrage (Mises, 1998[1949], p. 325).

Accordingly, the process of price formation therefore requires the entrepreneur to inform himself in advance about the likely profit opportunities and to actively look for and digest all available information, whether quantitative or qualitative, to exactly that end (Salerno, 2010, pp. 186-187).

All prices are, however, prices of the past, and present prices are the understanding that past prices will not change within the proximate future (Mises, 1998[1949], p. 327). Mises states, "However, all that is asserted with regard to future prices is merely an outcome of the understanding of future events." (Mises, 1998[1949], p. 327)

The coordinating function of the price formation process for entrepreneurs to allocate their resources in accordance with perceived profit opportunities is, however, not restricted to the correctness of the entrepreneurs' forecasts, but likewise, functions in the frustrations thereof. The frustration of profit expectations leads to a necessary revision of plans, and these plan revisions can only be effectively executed under a regime of flexible prices. (Salerno, 2010, pp. 189-190)

From this kind of perspective, the phenomenon of liquidity preference is also just a phenomenon of transient plan revision. The forecast of future prices of final goods lying below the present prices of their input factors leads entrepreneurs to abstain from further production and instead to opt for cash hoarding. This in turn drives down the market prices of input factors to the point where they are so far below the future final goods prices that production is regarded to be profitable again. It is then the inflexibility of

input factor suppliers to accept the new realities and therefore lower prices, which results in non-employment of resources. (Salerno, 2010, pp. 190-193)

The unwillingness of relatively unspecific resources, such as labour, to accept the new prices, i.e. wages, results in looking for alternative employment where higher reimbursements can be still obtained (Salerno, 2010, p. 194).

The prices of final consumer products are determined in part by the subjective values attached to these products by the consumers. The degree to which a single consumer can influence the resulting price depends on the market size (Mises, 1998[1949], p. 328).

As mentioned above, the entrepreneurs on the other side base their production decisions on historic prices and their anticipation of changes, which may, however, not always be validated by actual developments.

The competition between entrepreneurs for scarce input recourses takes place on their demand side, and the competition for the adequate satisfaction of consumer needs takes place on their supply side. It is this link that constitutes the imputation of prices (Mises, 1998[1949], p. 335).

> "The competition among the entrepreneurs is ultimately a competition among the various possibilities open to men to remove their uneasiness as far as possible by the acquisition of consumers' goods. The decisions of the consumers to buy one commodity and to postpone buying another determine the prices of factors of production required for manufacturing these commodities. The competition between the entrepreneurs reflects the prices of consumers' goods in the formation of the prices of the factors of production." (Mises, 1998[1949], p. 335)

The satisfaction of consumer needs, or, as Mises puts it, the removal of uneasiness, does not assume the competition that is widely understood as perfect competition of homogenous goods, but of different goods and services that are most suitable for the purpose. However, Mises also does not accept the term of monopolistic competition, since, to his understanding, a monopoly is defined by the entrepreneur's ability to restrict production, not because the capacities could be used for some alternative production in a more profitable way, but because he has a monopoly on a specific resource that hinders potential competitors to enter the market as well (Mises, 1998[1949], pp. 357-358). Hence, it is impossible for potential competitors to provide a

substitute, or even a near substitute, without the specific resource that is monopolized. However, a price that is set in the competition among substitutes or near substitutes therefore cannot be of a monopolistic nature because the curtailment of the production of one entrepreneur would lead to the expansion of production of another entrepreneur.

Next to budget constraints of the available income of households, the question of whether the subjective valuation of consumer goods actually turns into demand very much depends on their time preference, either to consume today or to make provisions for tomorrow. The kind of time preference that Mises has in mind is the Pure Time Preference, which, in the categories of Böhm-Bawerk, is the second reason for a positive rate of interest, which is the under-evaluation of the future as it values present satisfaction higher than future satisfaction. Hence, it undervalues the future:

> "Time preference is a categorial requisite of human action. No mode of action can be thought of in which satisfaction within a nearer period of the future is not – other things being equal – preferred to that in a later period. The very act of gratifying a desire implies that gratification at the present instant is preferred to that at a later instant. He who consumes a nonperishable good instead of postponing consumption for an indefinite later moment thereby reveals a higher valuation of present satisfaction as compared with later satisfaction. If he were not to prefer satisfaction in a nearer period of the future to that in a remoter period, he would never consume and so satisfy wants." (Mises, 1998[1949], p. 481)

The reasoning behind this argument appears to be, however, tautological, since it basically says that, because it is so, it must be so, and because, if it would not be that way, it would not be that way. Hence, it does not provide any further explanation to why it is so. On the contrary, Mises denies any reasons that might stem from the realm of psychology and argues that this kind of reasoning only provides validations for certain motives of actions but not a general explanation of the phenomenon that renders it true under all circumstances (Mises, 1998[1949], p. 485). This kind of reasoning by Mises can only be understood if it is put into the context of the principal method of Mises's reasoning, which is called "praxeology".

> "The teachings of praxeology and economics are valid for every human action without regard to its underlying motives, causes, and goals.[...] Praxeology deals with the ways and means chosen for the attainment of

> such ultimate ends. Its object is means, not ends. [...] It takes the ultimate ends chosen by acting man as data, it is entirely neutral with regard to them, and it refrains from passing any value judgments. The only standard which it applies is whether or not the means chosen are fit for the attainment of the ends aimed at." (Mises, [1949] 1998, p. 21)

The laws of praxeology therefore apply to every human action, and every human action is motivated by the ends it hopes to achieve, or as George Selgin explains:

> "Praxeology represents an attempt to escape the nihilistic implications of both historicism and empiricism. It affirms the operation of inviolable laws within the realm of human action. It purports to establish the universal validity of these laws by deducing them from the allegedly incontestable truth that people act purposefully, the "axiom of action." (Selgin, 1988a, p. 21)

Praxeological reasoning therefore does not depend on any special circumstances that render economic laws invalid due to historically ever changing circumstances, as in historicism, nor can they be falsified by empirical data, since they represent an a priori inner truth of the human mind, and they can therefore only be refuted by the detection of logical flaws within their "chain of reasoning" (Selgin, 1988a, p. 21).

The concept of an a priori inner truth is actually adopted from the Kantian synthetic a priori truth (Selgin, 1988a, p. 21). This Kantian synthetic a priori truth is, in its most narrow sense, however, referred to in mathematics as the only real self-evident truth (Scruton, 2004[2001], pp. 47-48). This is then also the reason why, in a Mises inspired textbook on economics, the students are told that the laws of economics have the same properties as mathematical laws, which is why empirical falsification would be as futile as in the case of mathematics:

> "It wouldn’t make sense to go out and “test” the laws of economics, just as it doesn’t make sense to use a ruler to go out and “test” the various proofs that you might learn in a geometry class." (Murphy, 2010, p. 5)

The proposition that there is such a thing as Pure Time Preference is then to be seen as such an incontestable a priori truth, even though others might want to call it a tautology by contesting that economic laws have the same properties as mathematical laws. If it is to to be regarded as an a priori truth at all, it should only be seen as such in a

metaphysical sense through reasoning, which is not to be regarded as a self-evident truth, like mathematics, and is therefore not beyond contestation (Scruton, 2004[2001], pp. 47-48).

The result of this Pure Time Preference is then what Mises calls originary interest:

> "Originary interest is the ratio of the value assigned to wantsatisfaction in the immediate future and the value assigned to wantsatisfaction in remoter periods of the future. It manifests itself in the market economy in the discount of future goods as against present goods." (Mises, 1998[1949], p. 523)

The originary interest is therefore not determined by the supply and demand of capital, but on the contrary, the supply and demand of capital is the result of Pure Time Preference as to how much is preferred to be consumed today versus how much to be consumed in the future (Mises, 1998[1949], p. 524). Mises explains, "It [originary interest] is the ratio in the mutual valuation of present goods as against future goods." (Mises, 1998[1949], p. 524)

The rate of interest paid on loans therefore does not determine the rate of interest either; it is only adjusted to the originary rate of interest in order to reflect the Pure Time Preference onto the capital market (Mises, 1998[1949], p. 524).

Mises's concept of originary interest is not exclusively based on the underevaluation of the future, since an element of inter-temporal scarcity can also be detected in there. Mises argues that the originary rate of interest can never be zero (and therefore most certainly cannot be below zero either) because there is no state of affairs imaginable where a further lengthening of the production process does not bring about further productivity increases. This proposition is based on the assumption that inter-temporal scarcity will always prevail in such a manner that full satisfaction of needs can never be achieved and that there always is the trade-off between present consumption and future consumption. This means that the wish to increase consumption in the future by lengthening the production process involves curtailment of consumption today, or the wish to increase consumption today involves the shortening of the production process today and thereby the necessary curtailment of future consumption. This inter-temporal scarcity can only be resolved if a fairy-tale-like state of plenty could be reached that

makes any economizing unnecessary, and no trade-off between future and present consumption would remain. (Mises, 1998[1949], p. 525)

This view neglects, however, the possibility that the inter-temporal scarcity could be of such a nature that present real income is of a relative abundance compared to that expected for the future and that therefore the trade-off for shifting resources from consumption today to consumption tomorrow is more favourable than the other way round. This in itself would already constitute the possibility of a zero, or even a negative, rate of interest should this kind of reversed inter-temporal scarcity compensate, or even overcompensate, the Pure Time Preference (whose existence is based on praxeology, which some might even consider to be tautological). If we combine such a state of inter-temporal scarcity, which sees the present as better off than the future, with a physical productivity that actually is declining, a state might be reached where the inter-temporal scarcity, in combination with the physical productivity, results in a natural rate of interest at a zero, or even a negative, magnitude. Later on, it will be shown how Hayek deals with this kind of problem in a far more sophisticated manner than Mises, without resorting to the obscurities of praxeology or Pure Time Preference Theory.

In contrast to Wicksell, for Mises to achieve a neutral rate of interest does not presuppose stability of money value as a necessary condition of neutrality. Instead, the importance lies within the necessity that newly created money would have to increase prices of all goods, services, intermediate products, and original factors simultaneously and to the same degree (Mises, 1998[1949], p. 538). Alternatively, the corresponding decline of the rate of interest for money loans could be compensated by a price premium on top of the interest rate that immediately takes account of the rising prices and thereby compensates for the rise in the amount of money (Mises, 1998[1949], p. 539).

According to Mises, both possibilities are unrealistic because the economy is in constant change, and the originary rate of interest is under constant fluctuation, and only a tendency towards an equilibrium position is in progress, but that does not mean that an equilibrium position will ever be reached at all (Mises, 1998[1949], p. 539).

In both cases, the point of entry for money is already a crucial matter because neutrality presupposes that the entry of new money would have to be evenly spread so that all cash balances are increased by the same increment and at the same time. Otherwise, those who get their grip on newly created money first might be the first to exercise

increased demand due to their widened budget constraints. Hence, all prices will not rise simultaneously but successively, which also includes that a price premium on top of the interest rate would not affect all market participants alike, but most severely those whose budget constraints have not been widened, but their debt payment obligations have increased.

In this regard, another important point according to Mises is that such a price premium that comes on top of the rate of interest for money loans also develops successively with the succession of price increases that market participants become aware of more and more (Mises, 1998[1949], p. 541). However, it is impossible for the market participants to apprehend beforehand who exactly is able to take advantage of the newly introduced money and, even less, which commodity prices will be the first affected and to what extent (Mises, 1998[1949], p. 540).

The originary rate of interest, when reflected duly in the loan market by a corresponding rate of interest for money loans, ensures through the signal delivered via the market rate of interest to the entrepreneurs that their production plans are in accordance with the Pure Time Preference of the consumers. This means that the entrepreneurs will produce as many consumer items and invest as much capital for the production of future consumer items as wished for by the public, which is thereby expressed in the originary rate of interest. (Mises, 1998[1949], p. 550)

For an increase of the money supply, Mises assumes that this money supply flows entirely into the loans' market and thereby depresses the rate of interest for money loans (Mises, 1998[1949], p. 548). Hence, as an increasing amount of money drives down the rate of interest for money loans, it delivers the wrong signal to the entrepreneurs about the public's valuation regarding the presently wished for amount of consumer goods in relation to the amount of consumer goods wished for in future (Mises, 1998[1949], p. 550).

The consequence of the false signal is that entrepreneurs will make use of these additional loans and increase their investment activities because they have become more profitable (Mises, 1978[1928], p. 104). The first effect that this enhanced activity has is a rise in prices of input factors and a rise in wages. The rise in wages in turn works itself through to a rise in consumer goods' prices, since consumption will rise thanks to risen wages. These increased consumer prices actually validate the increased investments, since otherwise, with only input factor prices and wages on the rise and no transmission

towards consumer product prices, the perception of entrepreneurs would be that their products do not meet a ready market. However, as such is the case, they are prepared to continue their efforts. Risen consumer demand will, however, not only be fuelled by increased wages but also by increased entrepreneurial profits. (Mises, 1998[1949], pp. 550-551)

The resulting increase in investment then requires additional capital to be channelled into investment, but such additional capital is not provided by saving, or at least not by voluntary saving (Mises, 1998[1949], p. 553). It must be kept in mind at this junction that the time preference has not been altered, and therefore, voluntary saving has not been changed either.

At this point, Mises concedes that even though voluntary saving has not been increased, forced saving might indeed have increased (Mises, 1998[1949], p. 553). Forced saving thus appears when the rising prices of consumer goods cannot be met by rising wages anymore, since these are left behind, and so, these consumers have to curtail their consumption, or those entrepreneurs who profit from the rise in prices of the final goods will use some of these additional proceeds for corporate saving. According to Mises, the crucial point is that the consumption is actually not curtailed because entrepreneurs have the intention to enlarge their production capacities (Mises, 1998[1949], p. 553). To this end, they are competing for the scarce input resources and labour, which cannot both be increased at an instant and which results in rising input factor prices and rising wages (Mises, 1978[1928], p. 112).

In conceding to the fact that there might be forced saving of those who do not gain from the wage rises, Mises also assumes that the forced saving and the rise in consumption demand by those who benefit from rising wages net each other out. According to Mises, what is left is the fact that the entrepreneur's have gone on the path of lengthening the production process, which has increased the amount of waiting (Mises, 1998[1949], p. 553). It is this increased amount of waiting that renders the available subsistence fund to be insufficient for the maintenance of the lengthened production process (Mises, 1978[1928], p. 112). Hence, entrepreneurs are willing to pay ever-higher prices when competing for these scarce resources, thereby driving up prices for input factors and wages to ever higher levels. This can only continue as long as corresponding finance is provided by an ever-increasing money supply, which in turn increases the final

consumer goods prices again, which validates the profitability of the investments. (Mises, 1998[1949], p. 554)

However, the fact that the new money has never been evenly spread among holders of cash balances, which is also not in accordance with the relative sizes of their cash balances, leaves some who are close to the point of entry of the new money to gain from the increase of money and those farthest away from the point of entry of the additional money to lose out:

> "Mises thus conceived inflation as a time-spanning process in which an increase in the stock of money invariably results in a sequential adjustment of prices, which necessarily alters relative prices and brings about a reallocation of productive resources and a redistribution of real income and wealth. The specific temporal sequence in which prices are adjusted, and thus the identity of those market participants experiencing gains or losses, is not deducible from economic theory. Rather, it depends concretely on the specific point at which the new money is injected into the economy and on the marginal utility schedules of those who receive and spend the new money." (Salerno, 2010, pp. 202-203)

The change in relative prices comes about through the competition for resources, financed by additional credit creation. These resources are eventually reallocated from consumer goods production towards the production of intermediate goods of production stages farthest away from final goods production (Mises, 1998[1949], pp. 554-555).

Finally, the consumer goods production might be hampered, and the prices of final consumer products might rise even more sharply as this situation meets with ever-rising wages and profits, resulting in increased consumer demand. This brings about a situation in which the originary rate of interest is being brought to a higher level as the difference between present and future prices increases, as increases in consumer goods prices are exceeding the price increases of intermediate products, and as these roundabout production methods come increasingly on-stream at the expense of the consumer products. All of this takes place at a time when the completion of these roundabout methods may promise to increase the consumer goods production of the future, but in the present, they instead increase the scarcity of consumer products. Even though there is a rising price premium on top of the interest rate charged on loans, and the increasing demand for loans leads to increasing rates of interest for money loans, the

rates charged by the banks, including the price premium, will be lagging behind the originary rate of interest. (Mises, 1998[1949], p. 555)

Hence, the only way to keep up this process is an increasing amount of money that ensures the continual financing of the outbidding of the necessary resources for the lengthened production process, leading to ever higher inflation and distortion of relative prices (Mises, 1998[1949], p. 556).

The inflation itself can be what brings the process to a halt, which lets the whole monetary exchange system collapse and brings back a state of exchange in kind:

> "The inflation can continue only so long as the conviction persists that it will one day cease. Once people are persuaded that the inflation will not stop, they turn from the use of this money. They flee then to “real values,” foreign money, the precious metals, and barter." (Mises, 1978[1928], p. 114)

Alternatively, it can be the banks that realise in time where this is heading and finally curtail the credit money creation. This second option then leads to a collapse of the boom as well, but instead of a breakdown of the payment system, it is brought about by the fact that entrepreneurs lack the finance to continue bidding for resources required in order to maintain their initiated investment projects, which then results in fire-sales in order to obtain the necessary finance to service debt obligations. This in turn frustrates the prospects for profit immensely and leads to an explosion of risk-adjusted interest rates charged for money loans. In the end, the consequences are bankruptcies and massive layoffs. (Mises, 1998[1949], pp. 559-590)

The wealth effects of the distortion of relative prices are then, however, not being rectified, since those who benefit at the earliest opportunity from the additionally created money at least have the opportunity to also accumulate the highest quantity of tangible assets while the boom lasts.

Accordingly, the fact that inflation favours the debtors, at the expense of the creditors, therefore is only of a secondary importance regarding the distortions in wealth and income distribution, since this imbalance is compensated to a large extent by the price premium put on top the rate of interest charged for money loans (Salerno, 2010, p. 205).

According to Mises, what is important to note is that it is not overinvestment that is taking place but malinvestment. The reason for this distinction is that there is no new accumulation of capital taking place, except for the forced saving that took place. However, according to Mises' assumption, at no point in time is there a situation where forced saving and voluntary saving exceed additional consumption. Capital is therefore merely realigned to other uses, which prove to be unsustainable. (Mises, 1998[1949], p. 556)

In accordance with Wicksell, Mises also sees a reallocation of short-term working capital towards the formation of long-term fixed capital in the lengthening of the production process. This development also represents the changing specificity of capital during the boom phase, since, while Mises refers to the short-term working capital as relatively unspecific regarding its potential uses, he refers to the long-term fixed capital assets as relatively specific regarding their potential uses. (Mises, 1998[1949], p. 557)

Therefore, it becomes increasingly difficult to assign these capital assets to other uses as they become more specific (Mises, 1998[1949], p. 501). Furthermore, with an increasing ratio of such assets, it becomes difficult to rectify the malinvestment for the economy as a whole.

Hence, the boom induced by the creation of new money leads to unsustainable malinvestment that in turn affects the distribution of wealth and income by a distortion of relative prices.

According to Mises, the newly created money is an exogenous money that is ultimately issued by the central bank, which, as an outright state monopoly for issuing fiduciary media,[15] has no fear of bankruptcy and serves as a lender of last resort to the business banks so that these will not have to fear bankruptcy when issuing additional credit (Mises, 1978[1928], p. 125). This moral hazard problem is then combined with an 'inflationist ideology' that ensures that the state monopoly of the central bank acts accordingly by driving down interest rates and flooding the market with new fiduciary media (Mises, 1978[1928], p. 121).

In the following section, it will be discovered what connection, but also what differences, can be established between the Hayekian business cycle and the Mises's

[15] Currency that is issued in excess of reserves and is therefore not covered by "money proper", which means ultimate outside money such as, for example, gold reserves (Mises, 1998[1949], p. 430).

malinvestment and between the Wicksellian natural rate of interest and the capital theory of Böhm-Bawerk.

3.2 The business cycle theory by F.A. Hayek in the passage of time

The business cycle theory developed by Hayek is based on the business cycle theory developed by Mises, as described in the preceding subchapter (Garrison, 2001, p. 10). Mises came up with the business cycle in *The Theory of Money and Credit* and *Monetary Stabilization and Cyclical Policy* well before the first version of Hayek's business cycle was published in his treatise *Monetary Theory and the Trade Cycle* in German in 1929 and later translated into English in 1933, as well as in his publication of *Prices and Production*, first published in German and in English in 1931. It is in Huerta de Soto's opinion, however, strange that Hayek never really quoted Mises's work on the business cycle extensively by neglecting *Monetary Stabilization and Cyclical Policy* and that this leads him to surmise that Hayek might have intended to deceive the scientific world as to who really developed the business cycle idea into a detailed theory (Huerta de Soto, 2012[2011], p. 372). An alternative interpretation would be, however, that there are in fact crucial differences between the business cycle developed by Mises and the one developed by Hayek, regarding assumptions and depth of analysis, and that these differences lead to diverging interpretations as to what triggers the business cycle and as to how it plays itself out.[16]

This latter interpretation has to grasp that the Hayekian business cycle is a theory that does not remain inflexibly bound to Mises's business cycle but rather is developed over time. Also, thanks to the critique and influence from other academics, which adds an increasing amount of complexity to the theory, and that, in the end, it carries a minor resemblance with its point of departure and exists in its own right. As will be shown, the version that it is laid out in the first two publications by Hayek that are mentioned can only serve as Hayek's business cycle version 1.0, whereas the one laid out in *Profits, Interest and Investment* in the year 1939 shows a Hayekian business cycle 2.0 that is far more elaborated and contains mechanisms distinct from those described in Hayek's first version.

[16] Furthermore the assessment of Huerta de Soto also seems to be a bit unjust, as Mises is one of the most frequently cited authors in Hayek's *Monetary Theory and the Trade Cycle*.

Finally, this chapter on Hayek's business cycle will deal with modern Austrian macro and its incorporation of the business cycle. As can be seen in the work of Huerta de Soto, as well as in the work of Garrison, this is not an exclusively Hayekian event. Garrison incorporates into his Austrian macro concept ideas from Mises and Hayek, but also from Rothbard, and the same is true for Huerta de Soto (Garrison, 1978, p. 3; Huerta de Soto, 2012[2011]). Hence, in order to find out in what way the Hayekian business cycle plays a role in the perception of actual crises, it is vital to see what parts and bits from the Hayekian business cycle can be found again in modern Austrian macro and to what extent the authors differ in their emphasis, or even outright neglect, of certain aspects.

3.2.1 Hayek's business cycle theory 1.0

The fundamental assumption that differs between Hayek and Mises is that, in *Monetary Theory and the Trade Cycle*, Hayek assumes an endogenous money and even criticises Mises for his exogenous money approach (Hagemann and Trautwein, 1998, p. 302). Accordingly, the crucial point of a business cycle as an endogenous phenomenon lies in the fact that it can recur without any intentional interest rate rigging from the banking sector (Hayek, 1933[1929], pp.146-147). Furthermore, this also excludes an intentional decrease of interest rate by any state entity, such as a central bank (Hagemann and Trautwein, 1998, p. 302).

> "By disregarding those divergences between the natural and money rate of interest which arise automatically in the course of economic development, and by emphasizing those caused by an artificial lowering of the money rate, the Monetary Theory of the Trade Cycle deprives itself of one of its strongest arguments; namely, the fact that the process which it describes must always recur under the existing credit organization, and that it thus represents a tendency inherent in the economic system, and is in the fullest sense of the word an *endogenous* theory."(Hayek, 1933[1929], pp.146-147)

Instead, the divergence between the natural, or equilibrium, rate of interest and the market rate of interest for money loans may even occur due to shifts of the natural rate itself at a constant rate of interest for loans (Hagemann and Trautwein, 1998, p. 302).

> "The situation in which the money rate of interest is below the natural rate need not, by any means, originate in a *deliberate lowering* of the rate of interest by the banks. The same effect can be obviously produced by an improvement in the expectations of profit or by a diminution in the rate of saving, which may drive the 'natural rate' (at which the demand for and the supply of savings are equal) above its previous level; while the banks refrain from raising their rate of interest to a proportionate extent, but continue to lend at the previous rate, and thus enable a greater demand for loans to be satisfied than would be possible by the exclusive use of the available supply of savings." (Hayek, 1933[1929], p.147)

Hence, in such a situation, the banks would accommodate any demand for credit money at a constant market rate of interest. However, this assumption is abolished again in *Prices and Production*, in which only a lowering of the market rate of interest is assumed, guided mainly by the intention to simplify matters by excluding the possibility of technical innovation that increases the natural rate of interest (Hagemann and Trautwein, 1998, p. 302).

Also, unlike in *Monetary Theory and the Trade Cycle*, in *Prices and Production* there is no trace left from at least considering the possibility that a credit money creation economy might enter an enhanced growth path in a Schumpeterian way so that the crisis could be the price to be paid for technical innovation (Hagemann and Trautwein, 1998, p. 308). Klausinger detects this notion in an even stronger form in the original German version, which has been toned down towards rejecting it in the translated version of *Monetary Theory and the Trade Cycle* (Klausinger, 2012a, p. 24).

> "So long as we make use of bank credit as a means of furthering economic development we shall have to put up with the resulting trade cycles. They are, in a sense, the price we pay for a speed of development exceeding that which people would voluntarily make possible through their savings, and which therefore has to be extorted from them. And even if it is a mistake — as the recurrence of crises would demonstrate — to suppose that we can, in this way, overcome all obstacles standing in the way of progress, it is at least conceivable that the non-economic factors of progress, such as technical and commercial knowledge, are

> thereby benefited in a way which we should be reluctant to forgo." (Hayek, 1933[1929], pp.189-190)

This shows that in Hayek's perception in 1933, there is still a trade-off between technical innovation and the economic and social upheaval that has to be paid through the recurring crises (Hagemann and Trautwein, 1998, p. 308). However, it also shows that the condemnation of the trade-off is not of an absolute manner, but of a relative manner, since no alternative for overcoming the obstacles for progress are mentioned either, which is why there is a justified reluctance to stabilize the system, to such a degree that a Schumpeterian innovation and the resulting crisis are abandoned altogether. This condemnation changes in quality, though, and becomes almost absolute and remains that way, as Hayek states at a lecture held in 1970 and published in 1978:

> "There is of course, no doubt that temporarily the production of capital goods can be increased by what is called "forced saving"-that is, credit expansion can be used to direct a greater part of the current services of resources to the production of capital goods. At the end of such a period the physical quantity of capital goods existing will be greater than it would otherwise have been. [...] But I am not so sure that such a forced growth of the stock of industrial equipment always makes a country richer, that is, that the value of its capital stock will afterwards be greater-or by its assistance all-round productivity be increased more than would otherwise have been the case." (Hayek, 1996[1978], p. 105)

Hence, Hayek does not deny entirely that investments initiated by credit money creation cannot have a productivity enhancing effect at all, but in his opinion, it is doubtful that the same productivity gains could not have been met without a crisis.

Accordingly, this does not mean that Hayek does not condemn the Schumpeterian business cycle and, in parallel, all under-consumption business cycles altogether (Hayek, 1933[1929], pp. 96-97). The point of condemnation is seen in their inability to grasp the real workings behind the non-neutrality of money in the business cycle and the effect it has on the resulting capital structure.

As laid out in the chapter on Schumpeter, the crisis is merely harvest time, when deflation is induced by the increased productivity of the newly adopted innovative

techniques, and a persistence of the crisis which turns into a depression merely is an overreaction to which normally profitable companies also fall victim.

An almost similar account can be given of the under-consumption theories, as depicted by Hayek in *The "Paradox" of Saving*. According to these theories, everything is fine as long as the investment goes on. The wage bill increases, and the consumption possibilities of the investors are diminished, which means there is no change in expenditure for consumption goods. The problem arises when the newly produced consumption goods enter the market, and there is not enough cash on hand for the consumers to purchase all these additional goods resulting from the increased production capacities (Hayek, 1939a[1931], p. 206). The problem here is seen in the resulting deflation, which, in the view of the under-consumption theorists, eradicates profits and discourages further production (Hayek, 1939a[1931], pp. 209-210). In the eyes of Hayek, the crucial mistake behind this reasoning lies in the neglect of stages of production. The increasing investment leads to more capitalistic methods, or a lengthening of the production process, and rising annual expenditures for intermediate products as the production process is lengthened. This lengthening of the production process means that the final products go through a lengthened maturing process, which has to be maintained by saving (Hayek, 1939a[1931], pp. 226-227). The fall in prices is nothing to be afraid of, but rather, it is the natural result of increased productivity, induced by the lengthening of the production process (Hayek, 1939a[1931], p. 245). Any attempt to increase the purchasing power of the consumers by handing them additional means of payment in order to stabilize prices would set the signal to increase production to such a degree that is unsustainable under current savings, since their amount would be insufficient to maintain the resulting lengthened capital structure. In the end, the profitability will indeed not be enhanced by such a measure due to the imputation of prices. Also, the prices of the intermediate products and original factors of production will eventually rise. Hence, part of the capital structure, and thereby its corresponding saving, is squandered on futile investments. (Hayek, 1939a[1931], p. 246)

Thus, if the disturbance does not arise from increased productivity, from where does it arise? Therefore, it has to be distinguished what separates sustainable and unsustainable growth or growth that triggers the business cycle.

Sustainable Growth

According to Hayek, the only way sustainable growth can be achieved is voluntary saving, which enables the economy to intensify the usage of capital and thereby to lengthen the production process in the sense of Böhm-Bawerk. The increased saving thereby decreases the market rate of interest for loans, which attracts investment into production stages more remote from the final consumption products, and as in the Böhm-Bawerk principle of productivity enhancement, through a lengthening of the production process this leads to an increased final output, which in turn in a situation of full employment increases real wages and consumption (Klausinger, 2013, p. 58).

The attraction towards more remote stages of production is induced by the interest rate mechanism, and in accordance with the principle of discount rates, the capital value of investment projects with a longer gestation period is increased (Huerta de Soto, 2012[2011], p. 326; Goodspeed, 2012, p. 75.).

Any investment that is induced beyond the provision of saving is, however, not sustainable, and hence, money loses its neutrality. Money can only be regarded as neutral as long as the money rate of interest coincides with the natural, or equilibrium, rate of interest (Hayek, 1976[1931], p. 23). This concept is explicitly based on Wicksell's concept of a natural rate of interest (Hayek, 1976[1931], p. 22). Although the concept differs to a certain extent, since the definition of a natural rate of interest in the Wicksellian sense supposes price stability, whereas Hayek differs in his assessment and assumes that an expanding economy is subject to a decreasing price level, should the natural rate of interest work in such a way that it provides the equality of saving and investment. On the other hand, a rate of interest that provides price stability in an expanding economy that sees a continual increase of produced final goods would be one where investment would in fact exceed saving. (Hayek, 1933[1929], p. 114)

Therefore, the great disadvantage of Wicksell's theory is its fixation on price stability. This is something that is partly overcome by Mises and his understanding of the importance of changes in relative prices, even though they are being dealt with by Mises as a kind of byproduct to changes of the general price level (Hayek, 1933[1929], p.114-117).

Hayek makes the important point that a money economy is distinct from a barter economy in such a way that the non-neutrality of money makes itself felt, not primarily

through changes in the general price level, but in changes of relative prices (Hayek, 1933[1929], p.116). Whereas Mises is still very much hooked on the definition of a natural rate of interest that is something stemming directly from the real economics of a barter economy, Hayek perceives the natural rate as something that works as a simulation of a barter economy, while in fact, there is no such thing as a barter economy (Klausinger, 2012a, p. 17). The natural rate in Hayek's sense therefore represents the relative prices of the goods that would exist in a barter economy, and accordingly, it is a far less concrete concept but rather something that is "imaginary" and elusive to the point where every commodity might have its own natural rate, and therefore, a single common natural rate of interest cannot be determined (Klausinger, 2012a, p. 18).

> "All existing theories of interest [...] restrict themselves to the explanation of that imaginary rate of interest which would result from such an immediate confronting of supply and demand. The fact that the rate of interest which these theories explain is one never found in practice does not mean that they are of no importance, or even that any explanation of the actual rates can afford to ignore them. On the contrary, an adequate explanation of that 'natural rate' is the indispensable starting point for any realization of the conditions necessary to the achievement of equilibrium, and for an understanding of the effects which every rate of interest actually in force exerts on the economic system." (Hayek, 1933[1929], p. 201)

According to Hayek, the elusiveness of the concept and its fictitious nature do not reduce its importance for the explanation of the business cycle. However, the elusiveness of the concept triggered the criticism from Sraffa about the impossible notion to conflate the natural rate of interest with a single equilibrium rate of interest (Sraffa, 1932, p. 49). Hayek heals this in *The Pure Theory of Capital* at a much later stage. The exact way he does this will be discussed at a later point[17] (on the pages 259-267; 275), when the concept of the rate of interest and its development over time is assessed in greater detail.

In order to explain the working of the relative prices, Hayek invents the allegory of the price fan whose ribs represent the different stages of production, and the space between the ribs represents the price or profit margin. An increase of consumer spending leads to

[17] See pp. 262-270; 278.

an increase of the profit margin, starting at the stages closest to the consumer goods production. An increase in demand for original production factors leads to a shrinking of the profit margins due to increased costs starting at the stages most remote from the final consumer goods production. (Hayek, 1976[1931], p. 79)

In an equilibrium situation, the profit margins of the stages of production are identical to the market rate of interest (Hayek, 1976[1931], p. 74). In a situation where the time preference of the population is changed in such a manner that their saving increases and their consumption decreases, two simultaneous effects can be detected. First of all, the lack of consumption drives down profits at the stages closest to the consumption goods production, relative to those most remote from the final goods production. Thereby, the demand for originary production factors and intermediate products in the stages most remote from the production of consumer goods will increase, since investment is reallocated from the stages of production closest to the consumer products production to those most remote from the consumer products production (Hayek, 1976[1931], pp. 75-76). Furthermore, new stages of production even more remote from the final goods production will be implemented, since a lengthening of the production process has become more profitable through the decreasing profit rates (Hayek, 1976[1931], p. 77). The logic behind this reasoning is again the fact that, in an equilibrium situation, the decreased profit margins are identical to the market rate of interest, so that, through the logic of discounting, the capital values of investment projects with a longer gestation period increase, which precipitates the lengthening of the production process and adds additional production stages to the whole process.

This shows that the absolute price level is not what determines the structure of production but rather the relative prices between the different stages of production (Klausinger, 2013, p. 62).

The ability to reallocate resources from the stages closest to the final goods production towards stages most remote from the final goods production depends on the question of whether these resources are specific or non-specific. The non-specific resources can easily be reallocated, and the result is an increasing price due to the increased demand for the limited number of resources. In the case of specific resources, the consequence will usually be that the specific resources in the stages closest to the final goods production will lose some of their value as some of the required complementary non-

specific resources have been reallocated towards more remote stages of production. (Hayek, 1976[1931], pp. 77-78)

Accordingly, resources are specific when they can be used only for a certain stage of production, are not easily substituted, and are complementary in their combination with other specific or non-specific resources. Furthermore, it is assumed that capital goods of a more durable nature are usually specific, whereas raw materials and labour are non-specific. (Klausinger, 2013, p. 62)

In this context, Klausinger critises that the smoothness of transition towards a longer and more capital intensive production process very much depends on the underlying assumption regarding the question of what resources are specific or non-specific. Assuming resources to be generally specific would render any transformation troublesome because it would leave resources idle, since a re-designation would be impossible. (Klausinger, 2013, pp. 64-65)

If one assumed, for example, that labour is specific due to vocational training, a re-designation would not work smoothly, and any transformation of the production process would inevitably result in unemployment.

A transformation process without any structurally transient unemployment would only be feasible if full labour mobility is given (Garrison, 1996a, pp. 118-119).

According to Lachmann, the question of whether resources are complementary or substitutes is not solely a matter of design but also of designation of function. Before resources are designated a certain function within a specific production process, they are substitutes, and they only become complementary in nature due to their designated function in a production plan. (Lachmann, 1978[1956], p. 56)

The transformation of the capital structure by turning it into a more capital intensive structure always requires the regrouping of the entire capital structure (Lachmann, 1978[1956], p. 58). As already laid out in the chapter on Böhm-Bawerk, this transformation is not without friction or the necessity to assign second-best uses to certain resources.

> "Every given structure of production, i.e. every given allocation of goods as between different branches and stages of production, requires a certain definite relationship between the prices of the finished products and

> those of the means of production. In a state of equilibrium, the difference necessarily existing between these two sets of prices must correspond to the rate of interest, and at this rate, just as much must be saved from current consumption and made available for investment as is necessary for the maintenance of that structure of production." (Hayek, 1933[1929], pp. 212-213)

In the end, the changes of relative prices ensure that the equilibrium position is reached, where saving equals investment, and the profit margins coincide with the market rate of interest. The sustainability of the transformation is thereby determined by the equality of the (imaginary) natural rate of interest and the market rate of interest ensuring the equality of investment and saving. This ensures that the investment activity is in line with the time preference of the population, which determines their voluntary saving.

The reallocation of resources depends thereby not only on the degree of their specific nature, but also on the flexibility of prices, especially of wages, which ensures that falling wages in one production stage and rising wages in another production stage induce the movement of labour, or resources in general, among stages of production (Klausinger, 2013, p. 58). However, this alone does not guarantee that all resources will be fully employed in the new situation, since it also depends on the ability to reassign them to new uses.

In *Prices and Production*, Hayek developed the Hayekian triangle as a concept to illustrate the stages of production and the way of transformation of the original factors as they go through the stages over time. Garrison explains, "The triangle [...] is a heuristic device that gives analytical legs to a theory of the business cycle [...]." (Garrison, 2001, p. 10)

The time of roundaboutness is thereby measured in average time of production, and it is assumed that the adding of additional stages to the production process lengthens it, whereas the elimination of production stages shortens it, in average production time (Hayek, 1976[1931], p. 36). It is important to note that Garrison defines the Hayekian triangle as a heuristic, which means that it is more a creature of common sense than of science and is therefore merely a pedagogical instrument that shows an assumed correlation.[18] Nevertheless, to Garrison, it proves to be a useful instrument because it

[18] Furthermore the concept of an average period of production in time was abandoned by Hayek later on in the *The Pure Theory of Capital* once and for all; See p. 265.

actually acknowledges time as an important factor for the business cycle, which is neglected by concepts that see consumption and investment as two separate aggregates (Garrison, 1996b, p. 10). Hence, in contrast to consumption and investment as two separate aggregates, they have to be perceived as interdependent in the way that there exists a trade-off between the two, whose budget constraint in the form of a production possibility frontier (PPF) may be altered through the passage of time, depending on the degree of investment backed by voluntary saving, which enlarges the production capacity over time and drives the PPF outwards (Garrison, 2001, pp. 41-43).

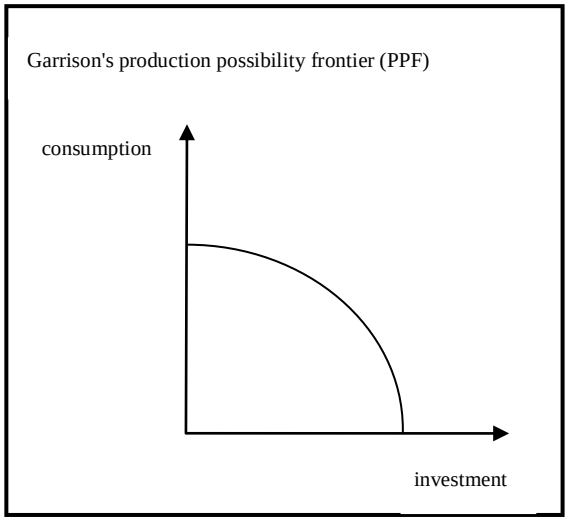


Figure 11: Garrison's PPF.

Source: Garrison, 2001, p. 43.

As already mentioned in the chapter on Böhm-Bawerk, the concept of an average production time runs into difficulties, which is why Lachmann advises to take time out of the equation when it comes to finding a correlation between roundaboutness and productivity and instead to restrict roundaboutness to the number of production stages, independent of time. An alternative would be, as in modern Austrian macro, to go back to a concept of an aggregate production time, which, according to Hayek's description in *The Pure Theory of Capital*, also runs into difficulties (Garrison, 1978, pp. 6, 37). Still, this subject will be dealt with more thoroughly at a later stage of this work[19].

[19] See pp. 262-270.

Unsustainable growth

The factor that renders the transformation process unsustainable is the non-neutrality of money, which means a monetary disturbance that destroys the equality of investment and saving. The disturbance thereby always stems from newly generated money or credit money creation, which either increases the demand for originary factors of production, when channelled into investment, or the demand for consumption, when channelled into consumer credits (Hayek, 1976[1931], p. 81). The second case is mentioned but neglected by Hayek's analysis and will be dealt with at later stage[20] as a subject of modern Austrian macro.

The starting point is that additional credit money is provided for investment projects of entrepreneurs. As a necessity for entrepreneurs to make it worthwhile for them to demand this additional credit money, it is required that the market rate of interest for these loans is below the equilibrium rate or natural rate of interest. The entrepreneurs will use this credit money accordingly to purchase factors of production, and, since an initial situation of full employment of resources is assumed, they will bid the resources away from other uses, which leads to a reallocation of resources. (Hayek, 1976 [1931], p. 82)

As already mentioned above, the regrouping of the capital structure entails a regrouping of the entire capital structure. The newly created credit money bids away original (non-specific) factors of production from stages closest to the final consumer goods production towards stages most remote. The consequence is that this also entails a substitution of intermediate products for original factors of production, since stages that used to produce the necessary intermediate products themselves now tend to outsource the production and therefore to buy them from other entrepreneurs now producing these very intermediate products with greater capital intensity. (Hayek, 1976[1931], p. 83)

As already shown, in the case of sustainable growth, the market rate of interest that is below the equilibrium rate also makes it worthwhile to invest in new production stages that are more remote from the final consumer goods production. Unlike in the case of sustainable growth, the newly induced investment is not covered by a corresponding increase in saving, and therefore, it is not covered by a decreasing consumption either (Hayek, 1976[1931], p. 84). The result of the lengthening of the production process will be, however, that production in the stages closest to the final consumer goods decreases,

[20] See p. 223.

since resources have been allocated into production stages of a more remote nature. This in turn will increase the scarcity of final consumer products and will precipitate a rise in their prices. (Hayek, 1976[1931], p. 84)

The rise in prices of the consumer products then diminishes real wages, and as the starting point is one of full employment, the workforce will not tolerate this. They will negotiate pay rises, especially since, in the light of rising prices, entrepreneurs are generating increased nominal profits (Hayek, 1976[1931], p. 85).

Instead of a diminished demand for consumer products, a nominal increase is the result, which can, however, not be met by increased production, since the average gestation period of the economy's production process has been lengthened. The price increase due to the scarcity of consumer products is thereby compounded by the increase in nominal wages. This in turn means that the price margin in production stages closest to the consumer goods production increases and makes them more profitable. This results in a tendency to reallocate the production factors back into the stages closest to the consumer products and precipitate a shortened and less capitalistic production process. (Hayek, 1976[1931], pp. 86-87)

> "As soon as the cessation of credit inflation puts a stop to the rise in the prices of investment goods, the difference between these and the prices of consumption goods will increase again, not only to its previous level but beyond, since, in the course of inflation, the structure of production has been so shifted that in comparison with the division of the social income between expenditure and saving the supply of consumption goods will be relatively less, and that of production goods relatively greater, than before the inflation began." (Hayek, 1933[1929], pp. 217-218)

Hence, the only way to perpetuate the lengthening of the production process would be to not only accommodate the demand for credit money indefinitely, but also to do so at a successively increasing rate (Huerta de Soto, 2012[2011], p. 401).

> "The rate at which this rate of increase must increase would be dependent upon the time lag between the first expenditure of the additional money on the factors of production and the re-expenditure of

> the income so created on consumers' goods." (Hayek, 1967[1931], p. 150)

Therefore, the increase in credit money creation has to constantly catch up with the rising consumer goods' prices and re-establish the reduced price margin that precipitated the lengthening of the production process.

In the absence of further credit money creation, the increased scarcity of consumer goods as a result of the lengthening of the production process might even lead to a transient shortening of the production process that exceeds the shortening necessary to re-establish an equilibrium situation (Hayek, 1976[1931], p. 88).

However, this entire reasoning depends on the proposition that the newly induced investment, which leads to a lengthening of the production process and to more capital intensive ways of production, does not reach its stage of fruition. If it were to reach this stage, it would ultimately result in an increased productivity of production.

This in turn depends on two assumptions. Firstly, the transformation process does not have an effect on the income distribution, which would increase the voluntary saving to such a degree that it would be able to maintain the investment plans to their full extent. Secondly, there will be no productivity gains from the additional investment unless the process has reached its full gestation, which would increase the production of consumer goods and drive down prices. (Hagemann and Trautwein, 1998, p. 307)

A Kaldorian saving fuction would contradict the first assumption (Hagemann and Trautwein, 1998, p. 307). In such a case, the voluntary rate of saving would show a progressive correlation with an increasing amount of income (Kaldor, 1980b[1940], p. 181). Hence, voluntary saving would increase if the total amount of income increases and if the income distribution is changed in such a manner that higher incomes would gain higher increases than lower incomes. The chapter on Mises mentions that the forced saving in the case of Mises might actually have exactly that property of a redistribution of income from wage earners to capitalists. Accordingly, this income redistribution would already suffice to infer an increase in voluntary saving, since income is channelled from income classes that are averse to saving towards income classes that are prone to saving (Klausinger, 2012a, p. 22). As already mentioned in the chapter on Mises, this effect was regarded as insufficient in its magnitude, and Hayek also denied it for the same reasoning (Klausinger, 2012a, p. 23).

The second assumption holds true as long as technical innovation is neglected, as by Hayek. The investments therefore cannot be of an innovative nature such that it would be able to increase productivity to such an extent that it generates increases in output that would counteract the scarcity effect normally resulting from the reallocation of resources from near production stages of consumer goods to remote stages of production in such a manner that a scarcity of consumer products will not ensue, and therefore, an increase in the overall abundance of consumer products might even reduce its price level. Hence, technical innovation in a Schumpeterian sense, which has the potential to lift the economy's production function onto a different level and send the economy on a different growth path, is not part of the Hayekian world.

This, however, not only neglects the possibility of innovation, but the option of second-best uses, as mentioned by Lachmann, are also not taken into consideration because even though there might be a restructuring of capital, should a crisis be the result, the capital goods that were constructed are not entirely idle and futile, even though they are specific in regard to the production plans, which are based on a lengthened production process. The new shortening of the production process might render a reassignment of function within the new capital structure necessary, and this is where the assignment to second-best uses comes into play. Consequently, this would mean that the prices of these capital goods might have to be reduced in order to re-establish their profitability in light of their new assignment (Hagemann and Trautwein, 1998, p. 307). The depreciation might be necessary, since the second-best use might prove to be less productive than the original use the capital good was designed for.

The incident of the "Great Eastern" steamship is a historic example of technical innovation in a Schumpeterian sense, combined with a second-best use. The steamship was re-assigned from the purpose of transporting goods and people to the Americas and Australia to the laying of the first transatlantic telegraph cable. As its originally assigned use did not prove to be commercially viable, it had to be put to auction and was finally used for the second-best use of an innovative infrastructure project, which enhanced the communication abilities between Europe and the US considerably. In this regard, it is questionable whether the second-best use was actually less productive than the original use, considering the wide implications the transatlantic telegraph cable has had for reducing communication costs and increasing communication speed. (Gordon, 2002)

Hayek basically amalgamates the two above-mentioned assumptions into the single proposition that the lengthening of the production process can only be brought to its full gestation when supported by voluntary saving but not by forced saving (Klausinger, 2013, p. 58).

The only way that forced saving could theoretically provide the basis of a new equilibrium would be if the additional investment would drive down the natural rate of interest to the level of the market rate of interest for loans. According to Hayek, it is a mistake in reasoning to assume that the added capital is actually provided for from a pool of increased free capital. In the absence of increased saving, this additional free capital may stem only from forced saving. The forced saving, on the other hand, may only stem from the investments already existing and from extraditing the forced saving through an increased price level or even progressively increasing price level from the consumers through generating turnover. (Hayek, 1933[1929], p. 221)

The turnover generated by investments must therefore be large enough to cover for its costs, its depreciation, and the interest payments (Hayek, 1933[1929], pp. 221-222).

Should this not be the case for some of the investments, or should some investments not be able to generate enough turnover to maintain them by covering for their depreciation and by fulfilling the interest payments, those investment projects would be on the demise, unless they are able to obtain financing outside the turnover process for their maintenance, such as by additional credit (Hayek, 1933[1929], p. 222-223). In such a case, the newly added investment comes at the expense of some other already existing capital stock, which cannot be maintained sufficiently anymore, and its activity is therefore diminished (Hayek, 1933[1929], pp. 221, 225).

Hayek's reasoning almost corresponds with that given by Wicksell regarding the inability to drive down the natural rate of interest by increasing investment activity. The chapter on Wicksell pointed out that, in the Wicksellian case, the expansion of investment activity first drives down the amount of short-term working capital, since this is transformed into long-term durable capital goods, and this is what keeps the natural rate of interest at one and the same level. As with the expansion of durable capital goods, their natural rate of interest decreases, but at the same time, the increased scarcity of working capital in turn increases its natural rate of interest by the same degree.

The only way that some of the newly added investment projects can be brought to their stage of fruition is to inject credit money at a progressively increasing rate that is always ahead of the time-lag with which the newly created money trickles down towards consumption demand and in turn increases the consumer prices. According to this logic, the driving down of the natural rate of interest can be only of a transient nature because, as soon as the credit money creation stops, the process comes to a halt. (Hayek, 1933[1929], p. 223)

The reason why already fully completed projects will also be wiped out is the ensuing fight over credit money in order to complete still uncompleted investment projects (Hayek, 1933[1929], p. 224). This will drive up the market rate of interest for loans to higher levels than would have been the case without the disturbing force of credit money creation, i.e. the imbalance of the natural rate of interest and the market rate of interest as the inducing force of this process (Hayek, 1939b[1937], p. 80). The reason is that it is not simply the supply of loanable funds that is insufficient, but the increased demand for them that is induced by the new capital structure, which renders them insufficient (Hayek, 1939b[1937], pp. 81-82). This effect will be more pronounced the more capital is needed for the completion of new investments in comparison to already existing capital, or in other words, the longer the process of credit money creation has been lasting (Hayek, 1933[1929], p. 224).

The crisis in Hayek's first version is therefore brought about by an increase of the market rate of interest for loans. This is, however, a bit of a contradiction with regard to the above-mentioned assumption from the *Monetary Theory and the Trade Cycle* where an endogenous fully elastic money supply is assumed, which for some unspecified reason, is succeeded by a tightening of the credit money creation by the business banks in the face of increasing inflation (Hayek, 1933[1929], p. 223).

As for *Prices and Production*, the logical consistency provided for the upper turning point is more comprehensible, since the endogenous nature of the money supply is being dampened. It is assumed that the banks are not in the position to increase the credit money creation indefinitely, and even if they could do so, at some point inflation would render it necessary to stop the inflation process by a state authority such as the central bank (Hayek, 1976[1931], p. 86).

However, a central bank can restrict the lending practices of the business banks in a more indirect manner. To illustrate this relation, Hayek refers to an upside-down

pyramid where the central bank reserve provides the base on which the banking system is built. The credit money creation thereby creates an amount of credit money that is several times larger than the base provided by central bank reserves. During the boom phase, the upside-down pyramid thus widens through the additional creation of credit money. The central bank can only counteract effectively by reducing the reserve base, and this is unlikely to happen as long as the severity of the situation does not put it under sufficient pressure to act accordingly. (Hayek, 1976[1931], pp. 109-110)

The exogenous force of a central bank would thereby restrict the extent of credit money creation, although belatedly, but this means that no fully elastic money supply is being assumed either.

This indirect influence of the central bank is the result of a fractional reserve banking system. Since the individual business bank is not forced to hold a 100% reserves on its liabilities, it is unable to distinguish whether an increase of its liabilities, such as, for example, in demand deposits, is due to an increase in saving or overall credit money creation (Klausinger, 2013, p. 59).

As is mentioned in the chapter on Wicksell, the only constraint a central bank can put in place is the legal restriction of holding a minimum reserve ratio on liabilities, which would restrict the abilities of banks to increase their credit money creation indefinitely. However, Hayek also points out that the public pressure will induce the central bank to provide the business banks with extra reserves, as deemed necessary for the economy's development (Hayek, 1976[1931], p. 110). These extra reserves are, however, not backed by an increase in voluntary saving.

As Hayek sees it, the forced saving consists of two successive allocation effects. The first effect is in action as long as credit money creation is still intact, and the forced saving is in favour of entrepreneurs by inflation that is driving up their profit margins at the expense of the consumers. The second effect comes into action when the credit money creation comes to a halt, and the redistribution of resources happens among entrepreneurs, which means among investment projects competing for limited resources.

In the end, it is the second effect that wipes out investment projects and leads to decreasing asset prices, especially of those projects that could not be completed (Hayek, 1933[1929], p. 225).

There are three alternatives in which the second effect can be avoided. The first alternative would be that the voluntary saving follows suit, when the forced saving only represents an, however, unlikely anticipation of the future voluntary saving (Klausinger, 2012a, p. 23). This means there would have to be knowledge in advance about changes in time preference. Alternatively, as shown above in the case of the Kaldorian saving function, voluntary saving follows suit because of changes in distribution of income.

Secondly, it would be thinkable that the starting point is not one of full resource employment but of idle resources that would be re-activated by the credit money creation and thereby provide resources beyond the actual saving that can increase the creation of real income and thereby provide additional saving (Klausinger, 2012a, p. 22). Thus, increased employment of these existing resources would have the same property as the Keynesian multiplier that ensures the ex-post identity of saving and investment at any market rate of interest. This logic would at least hold true as long as growth stays within the realm of formerly idle resources. (Goodspeed, 2012, p. 137)

Thirdly, the last alternative would be that the transformation process of restructuring the economy towards a more capitalistic configuration has already generated enough additional resources to maintain and complete the existing investments. This last alternative therefore represents the case of a Schumpeterian technological innovation that has the potential to change the growth path of the economy entirely. This is something that Hayek neglects and that can be seen as a growth impulse that would not inevitably lead to a crisis (Hagemann and Trautwein, 1998, p. 302).

As was mentioned above, the budget constraint for the trade-off between consumption and investment may be changed through the passage of time, and the question arises as to what extent the three aforementioned alternative reasons, which would avoid a crisis, adhere to that principle.

The first alternative is in line with the concept that saving can meet increased investment only through time if voluntary saving follows suit by changing in magnitude. As mentioned above, Mises and Hayek denied this, seeing it as very unlikely to happen or, if it did happen, as being of an insufficient magnitude.

The second reason takes account of income increases over time, which bring saving and investment back in line without wiping out any capital stock but only redistributing idle stocks to other uses. However, this is not the point of departure Hayek takes in either

the *Monetary Theory and the Trade Cycle* or in *Prices and Production*, and therefore, a more detailed analysis has to wait until the next chapter on Hayek's business cycle 2.0, where such a case of idle resources will be examined in more detail.

The third alternative that might at least avoid a crisis of the Hayekian, but not necessarily of the Schumpeterian kind, is the case of technological innovation. As is to be shown, this last alternative is in fact the only of the three that does not depend on time.

> "The Austrian theory, as most other models except Schumpeter's, ignores the effects of innovation and technical progress. It views economic progress primarily as taking place along the lines of ever greater division of labour and specialization of capital equipment, of ever higher degrees of complexity of factor combinations. But technical progress may cancel some of these effects by making some specialized skills and other specific characteristics redundant." (Lachmann, 1978[1956], p. 126)

The point Lachmann makes is that increasing productivity does not solely depend on more roundaboutness. On the contrary, true technological innovation might even render some stages of production to be useless.

To put it with the words of Wicksell:

> "This is not to say, of course, that all technical advances must necessarily lead to the lengthening of the production processes which were usual before. But in so far as they do not lead to this lengthening, they do not make necessary an increase in the existing capital [...]. Capital can even be freed in this process." (Wicksell, 1970[1954], p. 116)

Thus, this kind of technological innovation does not require additional capital. To the contrary, it increases the free capital available for other uses as certain stages of production become obsolete. Time therefore plays no role for this third alternative to avoid a crisis, since the technological innovation almost instantly changes the growth path of the economy by providing an increased amount of resources, ready to expand and maintain new investment.

Thereby, the budget constraint of Garrison's production possibility frontier can be lifted at an instant without any amount of waiting (Garrison, 2001, p. 59).

According to Hayek, this kind of innovation, which frees capital for the usage of new investments, is, however, more the exception than the usual case (Hayek, 2009a[1941], p. 320). However, in my view, this assessment is based on a false perception of the nature of innovations. Hayek shows that innovative processes are only adopted when the costs of the new process are lower than the costs of the old process (Hayek, 2009a[1941], p. 312). Furthermore, Hayek shows that only those processes whose operating costs are greater than the operating costs of the old process, and hence the capital costs of the new process are lower than the capital costs of the old process, are able to free capital for the usage in additional investment projects, "[...] as the old equipment wears out and is replaced by equipment requiring investment of a smaller amount of input [...]" (Hayek, 2009a[1941], p. 315). In contrast to these capital freeing innovative processes, Hayek sees those innovative processes whose operating costs are lower than or equal to those of the old process and whose capital costs are also lower than those of the old process. This kind of innovation requires additional capital from other sectors of the economy in case the old equipment is substituted by new innovative equipment. (Hayek, 2009a[1941], pp. 316-318)

The innovative process in the second case is relatively more capital intensive than in the first case because its variable costs are relatively smaller compared to its fixed costs, while the first case is relatively less capital intensive because its variable costs are relatively higher than its fixed costs. The assessment of Hayek is based on the assumption that the first case is far less likely than the second case.

In reality, however, innovation always contains both scenarios simultaneously. Taking up again the example of the first transatlantic telegraph cable, it is obvious that the investment of the provider of the telegraph service is more capital intensive than the investment of the user of that service. The provider has to invest in a vast steamship and a massive cable, whereas the user only has to invest in a telegraph ticker. Furthermore, assuming that both the service provider and the user formerly provided a postal service with a fleet of steamships, the capital saving of the user of the innovative service is greater than that of the service provider, who finally needs one remaining ship to lay the cabling and probably to maintain it. Once the cable is in the sea, the operating cost of the service is far lower than that of running a steamship line. For the user of that service, on the other hand, the operating costs may exceed those of transporting a bulk of messages by steamship, since every message sent via telegraph is costly, and the

possibility for the economies of scale that a steamship provides for transporting a vast number of messages and thereby reducing the costs per unit dramatically, is not given.

Hence, the service provider of the innovative process is of the second capital binding type, which requires additional capital from other sectors, whereas the user of the innovative process is of the first type, which is the capital freeing type. The consequence is also that the more users there are, or the higher the dissemination rate of the innovation, the higher the capital that is freed for new investments is. At this point, it has to be reiterated that the capital is still specific and that this is not about the reassignment of existing capital goods but about the capital that is being freed in the process of amortisation.

Many other examples can be added to the above-mentioned example of the transatlantic telegraph cable. What springs to mind are combinations of technological and financial innovations. Innovative capital equipment, like assembly robots, are often not purchased by their users but instead leased[21]. Innovative distribution and service industry concepts are often disseminated in the form of franchising contracts, such as, for example, franchise restaurants[22]. The purpose behind this is substituting variable, or operating, costs for fixed, or capital, costs on the side of the users of such innovative processes. This increases the variable, or operational, costs of the user but, at the same time, reduces their fixed, or capital, costs dramatically. For the provider of the innovation, on the other hand, a potential reduction in capital costs must be far lower, but the operating costs are reduced significantly and can be reduced even further by the outsourcing of certain services. A franchise provider will thus not run the restaurants himself and therefore also not employ the staff and will probably not even be directly involved in providing the restaurant's furniture but only the overall concept and design.

[21] One example is the erection of a new assembly line by Ford in Germany with KUKA assembly robots where half of the equipment was leased in order to tighten the ties with its innovative production technology providers and to free financial resources for the innovation in future car models (KUKA, 2014).

[22] One example is that of Subway restaurants where the franchise company provides a whole concept ranging from the design of the store, including the mediation with the leasing service for the equipment, towards training and operation manuals (Subway, 2014, p. 4).

3.2.2 Hayek's business cycle theory 2.0

As mentioned in the preceding chapter on the first version of Hayek's business cycle, the case in which the starting point is not one of full employment has not been subject to an analysis. With the second version of the business cycle, Hayek attempts to bridge that gap and to put his theory on a broader basis by making it applicable to a more general set of circumstances (Klausinger, 2012b, p. 16). As noted by Kaldor, this new version exhibits a new kind of mechanism that is quite distinct from the one laid out in Hayek's first version of the business cycle, which brings about the endogenous turning point of the cycle (Kaldor, 1980a[1942], p. 151). According to Kaldor, unlike in the previous version, Hayek now attempts to explain the upper turning point, not by a lengthening of the production process, which is induced by a market rate of interest for loans, that is below the profit margin and thereby below the natural rate of interest, but by the ultimate shortening of the production process, which is induced by the very same discrepancy and which thereby turns Hayek's theory upside down (Kaldor, 1980a[1942], p. 152). In contrast to Kaldor's claim, Klausinger points out that this assessment is unjust, since the new version has to be interpreted merely as a complementary approach, which in no way aims to contradict but to enrich the earlier version (Klausinger, 2012b, p. 17). The answer to the question of which of the two assessments carries a higher validity and in what aspect has to wait until this new version has been introduced and the criticism thereof has been explained to a greater detail. Furthermore, it has to wait until there has been an assessment of to what extent the two versions of Hayek's business cycle theory play a role in modern Austrian macro and whether they are actually being perceived as complementary.[23]

The new mechanism introduced in *Profits, Interest and Investment* in the year 1939 is the "Ricardo effect", and Klausinger also perceives this to be a new mechanism applied to the explanation of the business cycle (Klausinger, 2012b, p. 16).

This approach covers the assumptions of a situation of unemployment of resources and labour, a rigidity of nominal wages, as well as a restricted mobility of labour, specific capital goods, and a market rate of interest that is kept constant (Hayek, 1939c, p. 5).

In this second version, Hayek analyses circumstances that not only cover the newly introduced situation of unemployment and market rigidities, but also the re-introduced

[23] For an answer see p. 224.

assumption of an endogenous money, which was already assumed to be possible in the *Monetary Theory and the Trade Cycle* but was not consequently adhered to, since in the first version the crisis is triggered by a tightening of the credit money creation. The credit money supply in the second version is, however, assumed to be fully elastic, and unlike in the first version, the upper turning point therefore cannot be induced by an increased rate of interest (Klausinger, 2012b, p. 17).

As described in the preceding chapter on the first version of Hayek's business cycle, Hayek first claims to provide an endogenous business cycle theory but is not able to follow through in his reasoning, since in the end, what triggers the crisis is the tightening of credit money creation and not the first allocation effect of forced saving, which allocates resources from consumption towards investment. Instead, it is the second allocation effect that is activated as soon as the credit money creation stops and wipes out existing capital in favour of newly created capital. The turning point in Hayek's first version is therefore insufficient to be regarded as endogenous when it really is brought about by an exogenous credit tightening, as in *Prices and Production*, or an unspecific, and therefore not convincingly endogenous, reason for a credit tightening as in the *Monetary Theory and the Trade Cycle*.

> "Monetary expansion induces an expansion of production and sets the economy on a traverse to an equilibrium with a higher output. Since forced saving, in itself, has no strictly negative implications for productivity, the turning point of the cycle requires additional arguments by which time is given another role to play, namely the role of the 'natural frustrator' of the traverse. The non-neutrality of money must be shown to lead to an 'unsustainable misdirection of production'. At this connection Hayek began to adapt Ricardo to his Böhm-Bawerkian framework." (Hagemann and Trautwein, 1998, p. 303)

One major intention behind the introduction of the "Ricardo effect" in the second version of Hayek's business cycle theory is therefore to provide a truly endogenous reason for the crisis that stems from the mechanism of the business cycle itself and is independent of any external central bank policies to curb inflation.

Additionally, it also provides a business cycle theory that is valid in a situation of unemployment and does not solely hinge on a situation of full employment to precipitate the downturn (Klausinger, 2012b, p. 17).

McCormick sees another reason in a reaction to Kaldor's criticism of Hayek's first version of the business cycle. According to this notion, the introduction of the Ricardo effect is merely an incorporation of a critique published by Kaldor in his article *Capital Intensity and the Trade Cycle* in 1939. According to McCormick, Kaldor claimed that Hayek received a copy in advance and that Hayek asked Kaldor to postpone publication until he would be able to contribute a reply, which is how the Ricardo effect was born. (McCormick, 1992, p. 114)

The core of the critique on Hayek's first version of the business cycle was the question of whether the capital intensity described by Hayek would indeed fluctuate in the way it is described by Hayek's first version of the business cycle. Kaldor actually comes to the conclusion that the fluctuation of capital intensity is in fact the other way round, as Hayek predicted, which means that the boom phase does not correspond with an increased capital intensity but with a decreased capital intensity (McCormick, 1992, p. 113).

The reasoning behind this conclusion is that whether the capital intensity increases or decreases depends on the elasticity of the supply of loanable funds and the demand for loanable funds. In order to illustrate this, Kaldor comes up with two different extreme cases. For the first case, it is assumed that all markets are fully competitive markets with the capital market as the only market of imperfect competition, and for the second case, the capital market is the only fully competitive market, and all other markets are of an imperfect competition.

For the first case, it is assumed that, in accordance with a horizontal marginal efficiency function in markets of perfect competition, the demand function for credits is assumed to be horizontal or fully elastic, whereas the capital supply curve shows a positive slope, in accordance with a market of imperfect competition. The second case, on the other hand, shows a horizontal capital supply curve, in accordance with a fully elastic supply schedule of a fully competitive capital market, whereas the demand function shows a negative slope, in accordance with the marginal efficiency function of a market with imperfect competition. Kaldor shows that, in the first case, a rise in real wages will increase the capital intensity and reduce the scale of investment and vice versa for a fall in the real wages, whereas a rise in the rate of interest (or an increased risk margin) will only decrease the scale of investment, but not its intensity and vice versa with a reduction in the rate of interest (or a decreased risk margin). The mechanism behind this

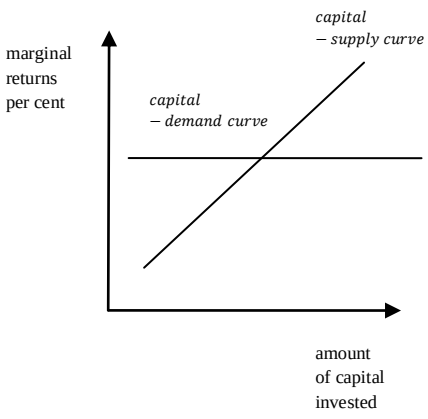
is that a profit maximum is given when real wages and marginal productivity of labour are equal and that, when real wages drop, this must result in an increased employment of labour until real wages and marginal productivity of labour are identical again. (Kaldor, 1980c[1939], pp. 128-129)

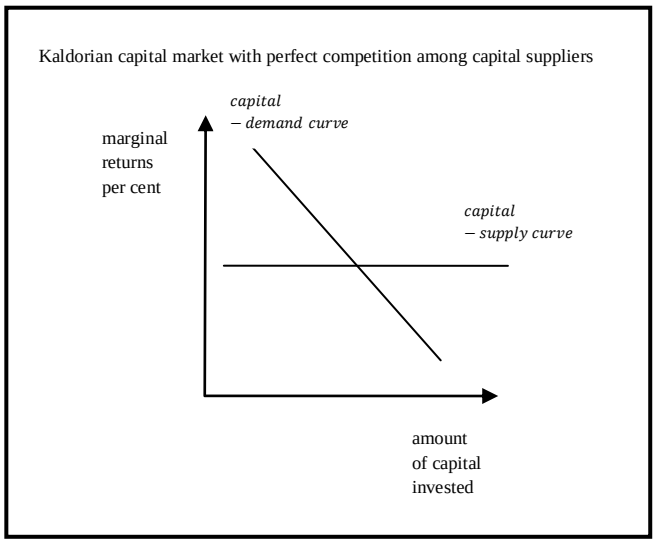
For the second case, a rise in real wages only decreases the scale of investment and vice versa for a decrease, whereas a rise in the rate of interest (or an increased risk margin) results in a decreased capital intensity, combined with a reduced scale of investment, and vice versa for a fall in the rate of interest (or a decreased risk margin). A decrease in real wages will increase the scale of investment at a constant ratio of capital and labour employed until the marginal productivity of labour again matches the real wages. (Kaldor, 1980c[1939], pp. 129-130)

Hence, a variation in the real wages only changes the capital intensity when an imperfect capital market is assumed, and the supply curve for capital has a positive slope. In contrast, a variation in the market rate of interest only changes the capital intensity when an imperfection in the markets for goods is assumed, and the slope for the demand function of capital is negative.

In reality, Kaldor assumes that both the capital market and the market for goods are of an imperfect competition, and therefore, variations in real wages and the rate of interest simultaneously alter the scale of investment and the capital intensity. Whether the variation of the real wages or the market rate of interest dominates the variation in capital intensity depends, however, on the relative elasticity of the capital supply and demand curve. (Kaldor, 1980c[1939], pp. 131-132)

Kaldorian capital market with perfect competition among capital demanders





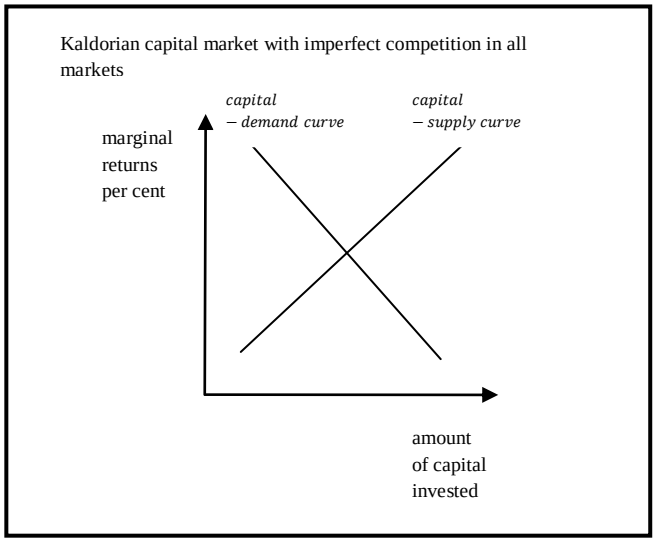


Figure12: Kaldorian capital market.

Source: Own figure based on Kaldor, 1980c[1939], pp. 126-129.

The underlying microeconomic concept of the above-mentioned mechanism is, however, somewhat blurred and never clarified by Kaldor. A horizontal marginal efficiency function, sometimes depicted by him as marginal revenue function, and with it, the long-term market supply curve, is indeed horizontal for a market of perfect competition (Mankiw and Taylor, 2008[2006], pp. 326-341). However, this does not say why the company's corresponding demand curve for capital with a good's market of perfect competition should also be horizontal. This is only logical when it is assumed that the production function is linear-limitational, since only then would there be a horizontal marginal revenue function combined with a horizontal marginal cost function (Herberg, 1994a[1985], pp. 158, 183). Only a linear-limitational production function would therefore ensure that the market demand function for the production factor of capital is fully elastic in the same way as the market's long-term supply function

because any increase in production of the individual company always results in a constant marginal efficiency or marginal profit.[24]

However, the notion of a linear-limitational production function is contradicted by the fact that the ratio between capital and labour is variable and that the mechanism of adjustment to bring real wages and marginal productivity of labour to equality resembles that of a neoclassical model, with constant marginal costs regarding wages but with a neoclassical production function, and therefore a substitutional function that allows the marginal productivity to adjust to whatever new level of real wages by increasing or decreasing the employment of labour (Felderer and Homburg, 2005[1984], p. 61).

The conclusion drawn from this mechanism is that, in the situation of a boom, prices of consumer goods are rising, and they are rising faster than nominal wages, which leads to a fall in real wages. Furthermore, it is assumed that the market rates of interest are kept relatively stable. Accordingly, the result is not an increase of capital intensity during the boom but a decrease of capital intensity. It is then exactly the other way round for the downturn, since falling prices lead to increased real wages, and a rise in capital intensity ensues. The role of the interest rate is more or less neglected because there are two opposing factors working during the business cycle. The market rate of interest might rise during the boom phase due to an upward sloping supply curve of capital, but this effect might be compensated by an increased optimism, which drives down the risk margins added onto the interest rate. Hence, while an increase in the market rate of interest would lead to a decreasing capital intensity, the fall in risk margins would have the opposite effect. (Kaldor, 1980c[1939], pp. 133-135)

Thus, Hayek adopts this notion and incorporates it into his theory by calling it the "Ricardo effect", which is based on the "[...] Ricardian proposition that a rise in wages

[24] With a linear-limitational production function, the individual company's long-term supply quantity can then, however, not be determined by any intersection of marginal cost and marginal revenue function but by the intersection of average costs and marginal revenue function, i.e. at the company's break-even point if identical production functions are assumed for all companies. This must be so in a situation of perfect competition, since any increase in aggregate demand would shift all the individual marginal revenue functions upward and precipitate an immediate increase in profitability that would instantly attract new market participants with identical production functions, which would, in the same moment, shift the marginal revenue function back into its original position. Yet, any company would always love to expand production, since any increase in production would always increase profits because there are after all constant marginal profits. This is a logical flaw of the perfect competition doctrine, in combination with a linear-limitational production function that could only be resolved if it is assumed that the individual marginal revenue functions break off to zero as soon as at least one company attempts to increase the production amount beyond its break-even point, and thereby, the market value of the goods collapses entirely.

will encourage capitalist to substitute machinery for labour and vice versa." (Hayek, 1939c, p. 8)

The above-mentioned problem in Kaldor's approach with immingling a linear-limitational with a neoclassical production function is being solved by Hayek by using a different kind of mechanism, which introduces an accelerator mechanism working with two distinct variables. The first variable takes account of the overall magnitude of consumer demand and is called the "multiplicand", whereas the second variable takes account of the structure of production and is called the "multiplier". (Hayek, 1939c, p. 19)

Hayek is well aware of the fact that the amount of labour employed may only be extended to a certain degree without an amendment of the structure of production. At first, production may be increased by introducing double shifts or triple shifts or by resurrecting old machinery, but eventually, the structure of production itself will be amended, as new investments and replacement investments take account of the new relative prices for labour and capital, and the production structure is driven towards a less capital intensive structure in the face of decreasing real wages. (Hayek, 1939c, p. 14)

As already mentioned in the chapter on Böhm-Bawerk, in the logic of Lachmann this means that a new structure of production is defined, which requires a new set of complementary resources. The substitutability of resources is only given in the transformation from one structure of production to another. Hence, we are always dealing with a linear-limitational production function or, more precisely, with succeeding linear-limitational production functions whose specific nature depends on the planned structure of production.

The mechanism which amends the structure of production is the "multiplier", which decides on "[...] the ratio at which [...] final demand [the "multiplicand"] is transformed into demand for capital goods." (Hayek, 1939c, p. 19)

Whether or not the demand for capital goods in the consumer goods industry drops depends therefore not only on the "multiplier" but also on the "multiplicand". As long as a rise of the "multiplicand", i.e. final demand, compensates for a fall of the "multiplier", no decrease in demand for capital goods will occur. (Hayek, 1939c, p. 20)

What changes the "multiplier" in the course of the boom phase is the imputation of prices trickling through the stages of production from those closest to consumer goods towards those most remote from consumer goods, with a declining and later even reversed magnitude. Since demand for consumer goods is on the rise, real wages are correspondingly falling at the stages closest to the consumer goods production. This means that these stages will start adopting a less capital-intensive production structure even though their total demand for capital goods might even rise due to a rising "multiplicand" that still outpaces a dropping "multiplier". (Hayek, 1939c, p. 20)

The equipment demanded will be, however, of such a nature that it is produced by stages that are closer to the final goods production than before the transformation process began. This means that the prices of these now preferred stages of production, and thereby their profit margins, will increase, and they also will transform their production structure towards less capital intensive production, since the drop in real wages will make this structure more favourable. The consequence is that they then also will abstain from purchasing intermediate goods from the most remote stages of production. Hence, the more remote a stage of production is, the less the effect of demand trickling down from the stages of production closest to the consumer goods will be. On the contrary, for the most remote stages of production, this process will result in falling profit margins, since the demand for their intermediate products, which are only used in a capital-intensive production structure, breaks off. It is important to note that the starting point is one of unemployment of resources and that therefore there will not be an immediate rise in prices, but as the stages closest to the production of consumer goods successively reach a state of full employment, their prices are also on the rise. (Hayek, 1939c, pp. 24-25)

Eventually, a point is reached where the fall of the "multiplier" is greater than the increase of the "multiplicand", and at this point, the aggregate demand for capital goods drops, and the accelerator turns into a decelerator (Hayek, 1939c, p. 33). It is the constantly low market rate of interest that initially allows for an increased production and investment activity, since rising consumer goods prices result in an increased profit margin that exceeds the market rate of interest. Hence, this process would be checked, if the market interest rate for loans would also rise accordingly with the rise in prices (Hayek, 1939c, pp. 27, 33). This process may continue as long as investment is higher than the saving, which is generated out of the newly created income, since this would

lead to ever increasing consumer goods prices compared to costs incurred (Hayek, 1939c, p. 34).

Furthermore, the increase in employment in the stages closest to the production of consumer goods is limited by the specificity of labour because it is assumed that labour cannot be reallocated from those stages that are affected by unemployment towards those stages experiencing a threshold which impedes continued growth due to full employment. Apart from labour being specific, the assumption that nominal wages are sticky also prevents any price signal for the reallocation of labour from stages with unemployment towards stages with full employment, and additionally, this also prevents real wages in stages with full employment from rising through an increase in nominal wages.

The effect of a fall in aggregate demand for capital goods then leads to a drop in income at these remote stages of production and thereby to a falling demand for consumer goods, which, in the end, drives up real wages again as prices are slumping (Hayek, 1939c, p. 35). The turning point at the end of the depression will then be reached when the rise in real wages precipitates a transformation towards a capital-intensive production structure, which ultimately results in an increase of aggregate demand for capital goods (Hayek, 1939c, p. 37). The variable of the "multiplier" therefore decreases during the boom phase and increases during the downturn.

Furthermore, as the "multiplier" changes, there is a proportional correlation with the lengthening and shortening of the production process, since a high "multiplier" corresponds with a long production process and a low "multiplier" with a short production process. Hayek also assumes that the gestation time of an investment corresponds inversely with the increased periodical increment that this investment is able to contribute to the consumer goods production, which means that for an investment project with a gestation period of ten years, every year contributes an increment to the production of consumption goods that increases by 1/10, which is depicted as variable Q, until, after ten years, the amount of consumer goods generated by this investment is equal the total investment. As there is a proportional correlation between the length of the investment period and the "multiplier", Q represents not only the inverse relation of the investment period but also of the "multiplier". (Hayek, 1939c, p. 50)

Hence, the difference between the investment sum during the gestation period and the contribution to consumer goods production is the net-investment of the project. Net-investment by definition is thereby only investment, which increases income beyond the amount of current consumer products production. Thus, the only way to provide an identity of saving and investment in such a case is the curtailment of consumption and thereby a provision of net-saving, which equals net-investment. Should the marginal propensity to consume be higher than Q, investment cannot be equal saving, as the additional consumer goods forthcoming cannot meet the increased demand for them. The inevitable result is a rise in prices and in profit margins of the consumer goods industry. (Hayek, 1939c, pp. 54-55)

Initially, as the boom phase starts, the "multiplier" is still very high and, in combination with a rising "multiplicand", generates investments whose annual increment to further consumer goods production is increasingly lagging behind the increased demand for consumer goods, which again increases the prices thereof and increases investment demand through the increased "multiplicand" even further. The cumulative process entered upon is thus one of ever-increasing profit margins in the consumer goods industry, and it can only be stopped through a fall of the "multiplier", but not through a fall in profit margins due to ceasing investment opportunities. Profit margins are finally brought to a fall through the decreased "multiplier" and not vice versa. (Hayek, 1939c, p. 56)

The striking thing about this version of Hayek's business cycle is that the level of employment in which the upper turning point is reached is not some objective fact, but merely a matter of how the changes in the "multiplicand" and in the "multiplier" frustrate the production plans. This then also means that the turning point might be reached even when there are still idle resources.

Starting at the end of the depression phase with a very high "multiplier" means that, with a very low Q, the investments induced by the transformation process towards a high capital intensity will show a high ratio of net-investment and, correspondingly, a very low incremental provision of consumer goods, which will not suffice to meet the increased demand for them. Hence, as Q will be much lower than the marginal propensity to consume, net-investments will not be covered by net-savings. Consequently, consumer prices, and therefore profit margins, in the consumer industry will rise more strongly. In particular through a high "multiplier" an increase in the

"multiplicand" will increase the investment even further. The instability of the process will be thus far greater than with a high Q and a low propensity to consume. Hence, the turning point where the accelerator turns into a decelerator is being reached far earlier and at a lower rate of employment. (Hayek, 1939c, pp. 57-59)

The way to prevent such an early turning point would be to prevent the "multiplier" from rising too far during the downturn, so when aggregate demand for capital goods picks up again, it does so with a relatively high Q. The way to achieve that is to reduce the increase in real wages during the downturn. This may be achieved either by a fall in nominal wages or by propping up consumer goods prices through fiscal measures. However, the problem with such measures is that, if applied too early, the necessary restructuring of the production would be impeded, and if applied for too long when the boom picks up again, it exacerbates the increasing price level. (Hayek, 1939c, p. 63)

The crucial point that prevents full employment is, however, the current distribution of labour among the different stages of production. The shortening of the production process would not generate unemployment in the stages furthest from the consumer products if labour and other resources, such as capital goods, could move easily from the most remote stages to the nearest stages of consumer goods production and thereby provide the necessary resources to increase consumer goods production to the required level. (Hayek, 1939c, p. 60)

The logical flaw detected by Klausinger in this construction is, however, that the original notion of imputation of prices from Hayek's first version of the business cycle is not compatible with the notion of falling profit margins in the stages most remote from the production of consumer goods. According to Klausinger, in Hayek's former logic, a rise in consumer goods prices would result in a rise of all profit margins even though of a decreasing degree the more remote the production stages are from the consumer goods production, but nevertheless there would be an increasing activity in all stages of production. Hence, there would be no reason for a fall in aggregate investment. (Klausinger, 2012b, p. 19)

In the same manner, Kaldor points out that the shrinking profitability of the remote stages of production is not a drop in absolute profitability, but only in relative profitability, as profits are increasing all the time at all stages. Furthermore, once the threshold to increase production further is reached in the stages closer to final goods production, the rise in their product prices should induce intermediate products from

more remote stages to be more favourable again, and also, the demand for their intermediate products should rise again and increase their profit margins as well (Kaldor, 1980a[1942], p. 171). Hence, it can also be logically derived from the law of imputation of prices that profit margins should be equal among stages of production.

Furthermore, it is then questionable whether there is any substitution of capital for labour, due to increased real wages, or labour for capital, due to decreased real wages, at all. As mentioned by Blaug, the "[...] equimarginal rule states that that the optimal combination of labour and capital is one where the ratio of the marginal physical products of any factors is equal to the ratio of their marginal factor costs for the same period of time." (Blaug, 1968[1962], p. 546)

As Blaug furthermore points out, none of the factor costs, such as the nominal wages, nor the rental or interest charges on capital goods, have changed according to Hayek's assumptions, but only final goods prices have changed. The equimarginal law depicted by Blaug actually refers to a homothetic production function, where the marginal rate of substitution is constant at a given set of factor prices but changing production activity (Klausinger, 2012b, p. 19).

Through the above discussion on the shape of the production function, it was made clear that the whole concept of capital specificity and the complementarity requires the production function to be of a linear-limitational nature.

How can such a Leontief linear-limitational production function be translated into a neoclassical framework where substitution is allowed for? The solution is that the technical input combination coincides with the slope of the isocost line, or in other words, the price ratio of inputs equals the marginal substitution rate and does so at a constant marginal rate of substitution, independently of the level of production activity. Changes in the ratio of input prices would thereby alter the technical combination of inputs in accordance with the then changed marginal rate of substitution. (Rasmussen, 2013, pp. 215-216)

Translated into a neoclassical framework, it is then a production function, which is homothetic.

Consequently, this approach reflects the one chosen by Lachmann to perceive the resources in an economy to be of a complementary nature, based on a specific structure of production and substitutional only when a restructuring is taking place. Hence, as

already mentioned above, the production structure should be seen in the form of a Leontief linear-limitational production structure with succeeding linear-limitational production functions, depending on the restructuring of the production process.

However, as the prices for the production factors capital and labour do not change, no substitution of capital against labour can take place, which means that there would be no Ricardo effect either (Klausinger, 2012b, p. 19).

In addition, Kaldor provides the following reasoning why the Ricardo effect does not work. According to him, the first flaw in Hayek's reasoning lies in assuming a constant market rate of interest, which represents a fully elastic supply of capital. This, as already described above in the Kaldorian version of an alteration of capital intensity, means that changes in real wages will only alter the scale of investment, but not its intensity (Kaldor, 1980a[1942], p. 161). Hence, it is not feasible to imagine an alteration in capital intensity from changes in the level of real wages, unless it is assumed that the capital market supply function is not fully elastic but upward sloping.

More crucially, Kaldor points out that, in this context, the fall in capital intensity is brought about by an increasing scale of investment, which is induced by the rise in profit margins (Kaldor, 1980a[1942], p. 169). Hence, the precondition for a fall in capital intensity is an increasing scale of investment, which is a contradiction in terms because:

> "[...] the reduction in capital intensity will make the rise in investment expenditure less than it would have been if capital intensity had remained constant. But it cannot eliminate it altogether because capital intensity would not have fallen if investment expenditure had not risen." (Kaldor, 1980a[1942], p. 170)

In other words, it is not possible for declining capital intensity to cancel the increase in investment entirely, since it is the increase in investment that precipitates the decline in capital intensity and that would not be operative without the increase in investment (Blaug, 1968[1962], p. 547).

In such a situation, the Ricardo effect would be inoperative, since a fall in real wages could not decrease the capital intensity any further because the decline of investment does not result in an increasing "multiplicand", i.e. final demand, anymore, as employment in the capital goods industry breaks off and results in a decrease in demand

for final goods. However, without an increasing "multiplicand", there is no further use for a decreasing "multiplier" to transform the production structure into a less capital intensive structure by decreasing the amount of capital goods added for every increased amount of the "multiplicand".

According to Blaug, what is required for the Ricardo effect to work is that the marginal borrowing cost, i.e. the growth of the market rate of interest plus risk margin, does not depend on the growth rate of investment but on the total amount of capital invested. Otherwise, with a drop in real wages combined with an investment growth rate of zero, no change in the marginal borrowing cost would occur. (Blaug, 1968[1962], p. 547)

As Kaldor showed above, without this change in marginal borrowing costs, a decline in real wages would not result in a decline of capital intensity. Yet, in the case of marginal borrowing costs that depend on the total amount of capital invested, a growth in the absolute amount of capital invested could induce rising marginal borrowing costs, and the absolute amount of capital invested would still be an increasing figure, even while the growth rate of investment declines. In such a case, decreasing real wages would result in a decreasing capital intensity.

Considering the above-mentioned point brought forward by Kaldor and Blaug, it is therefore impossible to perceive the increase of the market rate of interest (including the risk margin) as a result of an increased growth rate of investment but only as a result of the absolute amount of capital invested.

Blaug therefore manages to lay down the conditions with circumstances of credit rationing under which the Ricardo effect can still be rescued, since the increasing level of the market rate of interest would have to be perceived as depending on an increased level of aggregate capital invested. The logic behind this is that the increasing amount of capital, increasingly financed by leverage, induces a rise in the riskiness due to higher levels of indebtedness. (Blaug, 1968[1962], p. 547)

> "To rescue the Ricardo Effect, we have to interpret the upward-sloping supply curve of credit to firms under capital rationing as a relationship between the marginal borrowing cost and the total capital stock of the firm [...]." (Blaug, 1968[1962], p. 547)

This is exactly the kind of Ricardo effect that Hayek comes up with in 1969 (Hayek, 2012[1969], p. 328). This is therefore after the publication of Blaug's attempt to rescue

the Ricardo effect, which was not inspired by Austrian economics but, ironically, by the post-Keynesian economist Kalecki,[25] who in turn influenced Minsky a great deal, as was already shown in the chapter on Minsky.

It is therefore no coincidence that Klausinger makes out a certain alikeness between the new Ricardo effect and the credit rationing in the world of Minsky (Klausinger, 2012b, p. 21).

In fact, what Hayek comes up with is a credit supply curve that looks like the post-Keynesian endogenous credit money supply curve of a structuralist fashion: At first, a fully elastic supply of credit is assumed, which becomes ever more inelastic after a certain point as the ratio of indebtedness compared to equity increases and, with it, the perceived risk (Hayek, 2012[1969], p. 328).

3.2.3 Modern Austrian macro and the business cycle

In order to write about the phenomenon of modern Austrian macro, it has to be reiterated that there is no homogenous theoretical body that can be depicted as a single theory of modern Austrian macro. It merely consists of many different strands that cannot all be dealt with in this thesis, which can only consider what importance they carry for the Hayekian business cycle theory as one of the two core topics of this thesis.

The most concise and formalised version of a modern Austrian macro certainly stems from Roger Garrison, who first came up with a formalised and graphical approach in 1978 with the publication *Austrian Macroeconomics*, which already emancipated itself from the standard Keynesian macro and which reached its pinnacle in 2001 with the publication of *Time and Money* in which Austrian macro is not only contrasted with Keynesian macro, but also with Monetarist macro. However, even though it is highly important and probably most concise, the Garrison version of Austrian macro is not the only version worth mentioning. Another less graphical, but very extensive, approach in

[25] In this regard, Kalecki depicts a curve that is first horizontal but then upward sloping for the rate of interest, depending on the velocity of money (Kalecki, 1943, pp. 32-33). The higher the velocity of money, the higher the "convenience of holding cash" at a given amount of money is. The upward sloping curve of Kalecki thereby provides justification for an increased liquidity preference in a situation of liquidity stretching through increased money velocity. Translated into an endogenous money framework, this means that it is the increased indebtedness through credit money creation that precipitates the increased liquidity preference to counter increased liquidity risk. The money velocity curve used by Minsky is actually only a modification of the Kalecki curve (Minsky, 1982g[1957b], p. 1972).

its attempt to also cover the history and nature of money and banking comes from Jésus Huerta de Soto in his publication of *Money, Bank Credit and Economic Cycles*. Additionally, when it comes to the nature of banking and money, it is also worth mentioning the work of George Selgin and his free-banking approach, which differs substantially from the hundred percent gold backed money approach of Murray Rothbard in the tradition of Mises. The concept of banking itself will, however, be discussed at a later point, when it comes to the question of what remedies Hayek and the Austrian school can provide for avoiding crises and their instability. At this point, the look at the Selgin approach should therefore be restricted to the question of in what way liquidity preference is defined in the Austrian school.

Furthermore, differing ways that forced saving and the Ricardo effect play a role in modern Austrian macro will be examined. These aspects are of importance when it later comes to a comparison of concepts with the Minskyan approach, where liquidity preference plays a key role and where the Hayekian Ricardo effect might find its resemblance in the post-Keynesian structuralist endogenous money approach. Furthermore, it is important to note that the way forced saving is defined also plays a key role when it comes to the adaptability of this concept to the Kaleckian definition of profits.

The crucial starting point of any Austrian macro is, however, the Böhm-Bawerk concept of the heterogeneous nature of capital. Assuming an economy that consists of homogenous capital goods would mean that any adjustment process would work without any kind of friction, but it is the heterogeneous nature of capital that is essentially the nature of any specific structure of production (Batemarco, 1994, p. 218). However, whereas capital is heterogeneous in nature, labour is seen to be non-specific (Garrison, 2001, p. 65). Rigidities in the labour market therefore do not stem from any specific nature of labour but only from legal regulation and the formation of union power (Huerta de Soto, 2012[2011], p. 417). This causes the inertia of labour and wages, resulting in additional unemployment (Batemarco, 1994, p. 218). Hence, as already mentioned in the preceding chapters on Hayek, unemployment may stem from the inability to allocate resources in accordance with the time preferences of the consumers, due to misled investment that is not sustainable but nevertheless rigid to be reassigned, and additional rigidities in the labour market compound the difficulties in restructuring the production process.

By introducing a combination of a production possibility frontier (PPF), the Hayekian triangle, and the capital market, Garrison achieves the tool to depict the relation between stages of production and the resulting production potential.

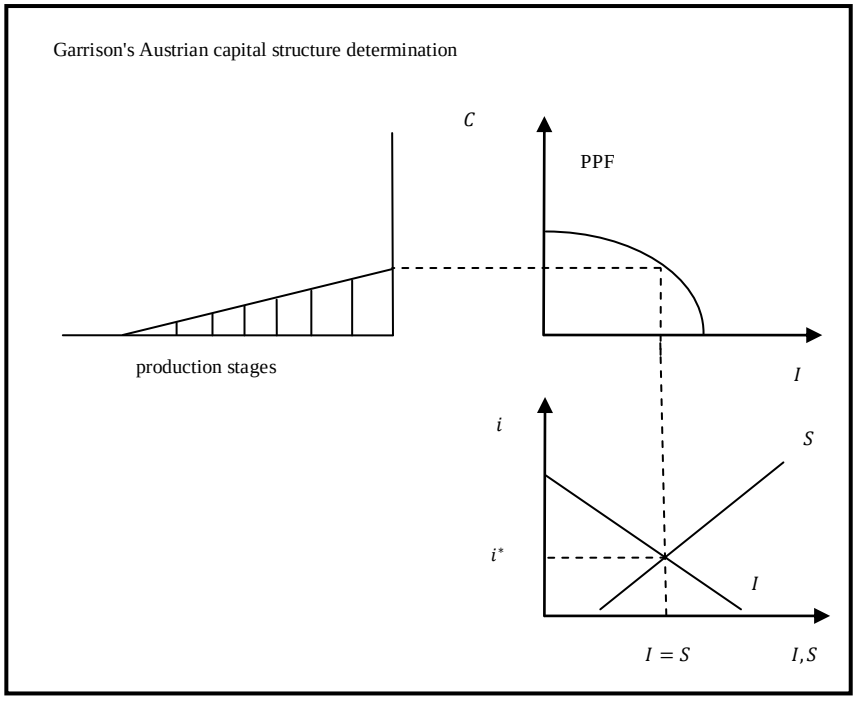


Figure 13: Garrison's Austrian capital structure determination.

Source: Garrison, 2001, p. 50.

The capital market equilibrium thereby decides the amount of investment, and, since investment and consumption are seen as the two alternative uses of real income, this also defines the remaining amount of real income that can be used for consumption. The equilibrium on the capital market thereby defines the inter-temporal structure of production as depicted by the Hayekian triangle. (Garrison, 2001, p. 50)

The inter-temporal structure of production is therefore in line with the consumer's time preferences, which governs the equilibrium in the capital market.

The disturbance of this equilibrium comes about as soon as technological innovation drives the PPF outside or the time preference changes and amends the voluntary saving. Both disturbances are, however, unproblematic, since they lead to a new equilibrium. Therefore, the decisions made are of such a nature that they lead to a new situation, which is as sustainable as the old point of departure. (Garrison, 2001, pp. 57-63)

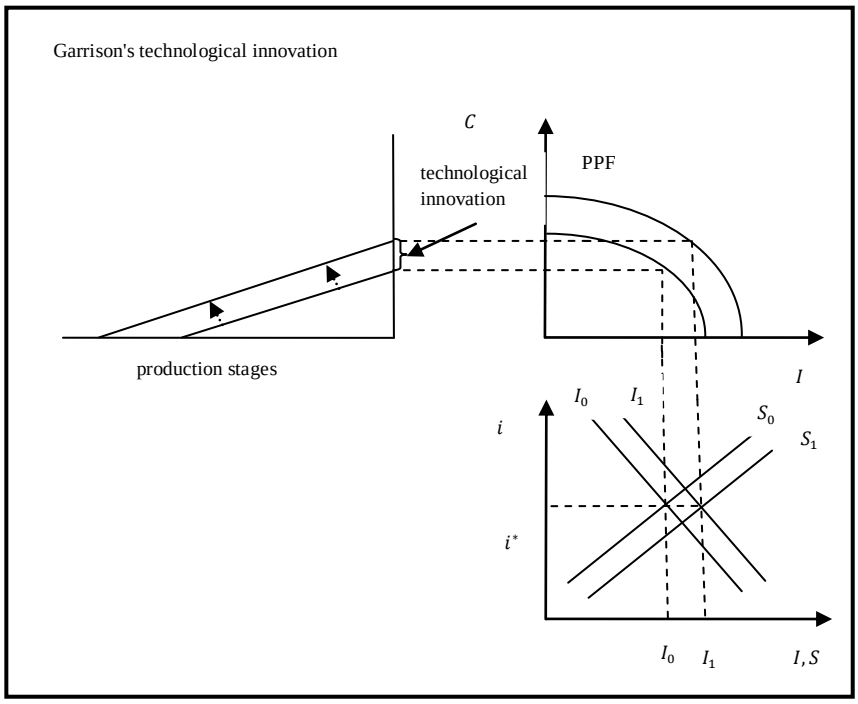


Figure 14: Garrison's technological innovation.

Source: Garrison, 2001, p. 59.

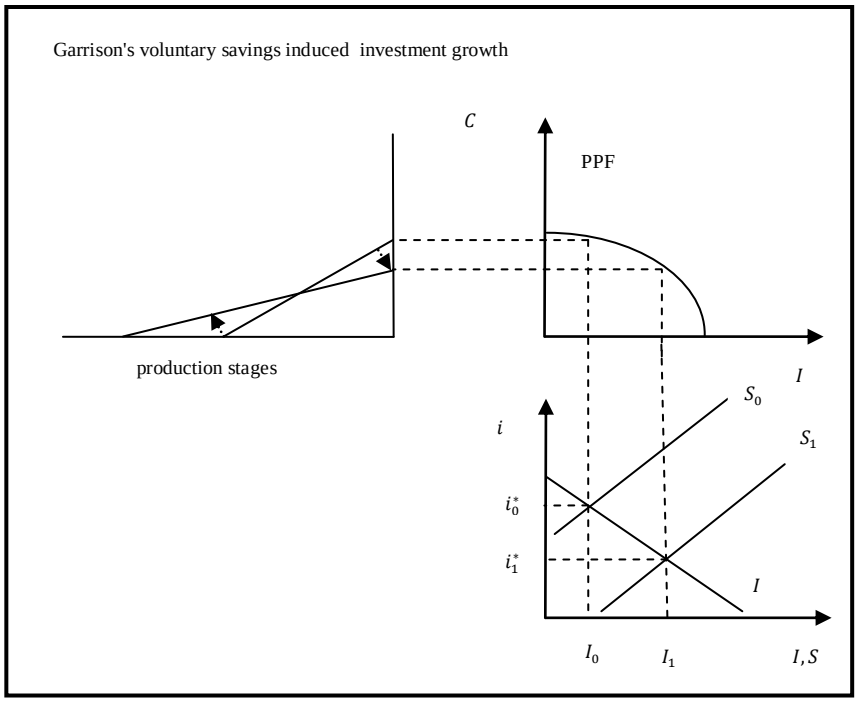


Figure 15: Garrison's voluntary savings induced investment growth.

Source: Garrison, 2001, p. 62.

Neither scenario changes the fact that the chosen time preference is reflected in the capital market and, accordingly, in the saving and investment decisions that determine the inter-temporal production structure. Though, whereas innovation instantly adds production capacity and shifts the PPF outwards, the capacity effect of increased saving and investment increases the secular growth path in the future periods.

The only disturbance that might arise may stem from the specificity of resources, combined with a time preference that is not reflected in the capital market. For capital, the circumstance of lengthening in line with changes in time preference is simply neglected in regard to the problem of frictions in reassigning supposedly specific resources, as is criticised by Klausinger and was already mentioned in the preceding chapters on Hayek. For labour, the specificity is simply assumed away so that labour is reallocated in accordance with the new production structure (Garrison, 2001, p. 65).

According to Hayek, the nature of things is simply that it is easier to increase the amount of waiting and thereby lengthen the production process by postponing the usage of intermediate goods for their final destiny, called consumption, than to undo complementary factor combinations that are destined to become consumer goods in the future in order to hasten their usage for consumption now (Hayek, 2009a[1941], p. 345).

This notion is actually in accordance with that shown in the chapters on Mises and Wicksell, which assumes that, with an increased lengthening of the production process, the ratio of working capital versus durable capital goods diminishes and, with it, the flexibility to undo the lengthening of the production process, since working capital is relatively non-specific and durable capital goods are of a highly specific nature. This, however, does not invalidate Klausinger's critique that was mentioned before. According to Lachmann, the entire structure has to be realigned and that means, in the case of a lengthening of the production process, not only the working capital is transformed into durable capital goods but the existing capital goods also have to be reassigned to second-best uses, and this friction cannot be assumed away that easily.

However, in modern Austrian macro, the disturbance that leads to an unsustainable situation comes solely from the introduction of credit money in combination with capital specificity. The newly introduced credit money poses as additional saving on the capital market and shifts the saving function to the right, resulting in an artificially low interest rate that is below the natural rate of interest (Garrison, 2001, p. 69).

At this point, there arises a problem regarding what is actually being depicted by the PPF. According to Garrison, this situation necessarily includes the phenomenon of over-consumption, which is not included in Hayek's concept (Garrison, 2004, pp. 332-333). Garrison thereby digresses from the functioning of forced saving provided by Hayek and embraces the one provided by Mises (Ahiakpor, 2008, p. 383).

As already mentioned in the chapter on Mises, the phenomenon of forced saving in the case of the Misesian business cycle does not appear as a force that can free the resources necessary for the continuation of the investment process, since the additional consumption compensates the forced saving. If forced saving is able to exceed additional consumption at all, it would be at the end of the cycle when the production capabilities of the consumer goods industries have been eroded by a lacking production of intermediate goods required for the further production of consumer goods. The lengthening of the production process defers the production of these intermediate goods to the future, since, due to increased waiting, they are simply not forthcoming at the amount required in the present situation. The increased amount of intermediate goods would be forthcoming at a later date, but this amount of waiting is not in line with the consumer's time preference.

To contrast Mises with Hayek, as shown in the chapters on Hayek, the forced saving is a crucial element in allocating resources from consumers to producers right from the start. Hence, in adopting the Mises point of view, Garrison sees room for the phenomenon of over-consumption, which is fed by the consumption of capital (Garrison, 2004, p. 332). This capital, which is being consumed in order to increase the amount of consumer goods, comes from the stages in the centre of the Hayekian triangle, which means that resources are bid away from the centre stages towards the final consumer goods stages and the most remote stages of production simultaneously, while at the same time, the production process is being lengthened and the output of consumer goods increased (Garrison, 2004, p. 338). Accordingly, the forced saving is preceded by the phenomenon of over-consumption (Garrison, 2004, pp. 330-331).

According to Ahiakpor, the problem with this over-consumption notion lies in the violation of the concept of the PPF as a maximum production frontier (Ahiakpor, 2008, p. 390). In Garrison's concept, the over-consumption, in concert with over-investment, leads to a point that lies beyond the PPF curve, at least temporarily, and since this amount of production is not sustainable, it must fall back inside the PPF curve

(Garrison, 2004, pp. 340-342). In Garrison's concept, the prefix "over" symbolises that the production is temporarily driven beyond the PPF.

The difference in concept therefore lies in the fact that Ahiakpor wants to perceive the PPF as a technical barrier that defines the factor combinations as technologically possible and efficient, whereas Garrison denies that the PPF is about technological constraints (Ahiakpor, 2008, p. 390). According to Garrison, the PPF as depicted by him merely neglects to incorporate the microeconomic concept of leisure into a macroeconomic concept (Garrison, 2008, p. 400).

The ability to drive production, at least temporarily, beyond the PPF lies primarily in the fact that the input of labour can be expanded beyond the microeconomic leisure-work balance that is perceived by the labour force to be optimal. As soon as wages are increased to meet the unchanged labour-work balance optimum, the production will fall back to the PPF curve. (Garrison, 2008, pp. 398-399)

Hence, the same principle applies, which can be detected with the short-run versus long-run Phillips curve. The production that moves beyond the PPF is neither a violation of technologically possible combinations of production factors (Garrison, 2008, p. 401), nor is it a violation of efficiency, defined as an efficient employment of resources by the entrepreneurs, since such inefficient factor combinations lie within the PPF curve. It is merely an inefficiency for the workforce, since it poses a violation of the optimally perceived work-life balance. However, Garrison argues that this violation is what renders the situation unsustainable. (Garrison, 2008, p. 399)

The question of whether this violation actually poses a sustainable or unsustainable amount of production, however, also hinges on the question of market power with regard to whether the labour force is actually able to negotiate wage increases that bring their work-life balance into an optimal position or whether they are stuck in a suboptimal position for the time being.

However, the problem that is more crucial in this regard is that the increase of labour with a linear-limitational production function necessarily also requires a corresponding increase of capital. With Garrison, the additional capital that is needed stems from the middle stages of production (Garrison, 2004, p. 338). This is also the way in which Garrison depicts the short-term versus long-term Phillips curve in *Time and Money* in 2001. The transient increase in labour employment is accompanied by a corresponding

increase in investment. Hence, both the saving function and the capital demand function on the capital market likewise shift to the right, leaving a situation where the market rate ultimately remains unchanged and still equals the former natural rate of interest. The only problem, however, is that this aggregate amount of production exceeds the PPF because no additional resources have been provided through saving, but the shift of the saving function was induced only through additional credit money posing as saving. (Garrison, 2001, p. 205)

This situation is similar to the one described by Ahiakpor (Ahiakpor, 2008, p. 388). Yet, unlike Garrison, Ahiakpor sees a solution in simply considering an open economy in which domestic resources might come from abroad when they are exhausted (Ahiakpor, 2008, p. 393). Garrison considers this case of an open economy only to the extent that he sees the state financing its budget deficit through selling its bonds domestically, monetising it through inflation, or exporting it to foreign creditors (Garrison, 2001, pp. 115-116). The inter-sectoral financing is thus limited to that of the state financing its deficit domestically or externally. A more comprehensive analysis of an open economy therefore has to wait until the comparison with Minskyian economics in which the three different macro sectors of an economy play a cardinal role in financing an economy's activity.

Whereas the increasing output can be easily explained by an increase of labour input through working overtime when there are still unemployed resources like idle machinery available, which is also described by Hayek, as mentioned in the preceding chapters on Hayek, the simultaneous increase in production of consumer goods and capital goods for the most remote stages of production in a state of full resource employment is far more difficult to defend.

As already laid out in the chapter on Hayek's business cycle theory 2.0, the approach to assume a reduction of capital in some centre or middle stages, to the benefit of the most remote and the consumer products stages at the same time, is questionable, since profits are realised or even rising at all stages, but only at relatively different magnitudes. This means that overall investment in all stages should remain positive but should mostly favour those whose profit incentives are the strongest. The allocation of existing resources away from the middle stages is, however, not relatively less investment at these stages, but outright disinvestment.

The profit incentives are indeed driven by two contradictory factors. On the one hand, the decreasing interest rate increases the profitability of the production stages most remote from the consumer products, and on the other hand, the resulting increasing employment of production factors likewise increases the consumer demand.

The crucial argument brought forward by Garrison with regard to why Hayek's business cycle can logically work without the phenomenon of over-consumption is the argument that part of Hayek's assumption must be a time-lag between the risen nominal income resulting from increased factor employment and the resulting demand for consumer goods. Otherwise, the increased nominal income would immediately result in increased consumer goods demand and the increase in their respective prices, which would reverse the allocation of resources towards the remote stages of production back to the stages of production closest to consumer goods and thereby immediately stop the restructuring of the production process. (Garrison, 2004, p. 335)

In other words, without a time-lag, the rise in wages would result in an immediate and corresponding rise in prices, which means that the overall price level changes without any effect on relative prices (Bellofiore, 1998, p. 552). This then also bears a resemblance to Wicksell’s emphasis on the rise of the overall price level and the neglect of relative prices (Bellofiore, 1998, p. 552). Ahiakpor also brings forward the critique, that Garrison’s approach, which he adopted from Mises, actually neglects the phenomenon of relative price disturbances and the consequential allocation of resources by differences in relative prices (Ahiakpor, 2008, p. 393).

Garrison assumes away any time-lag and instead employs the solution that there is not only a reaction in prices of consumer goods, but also in quantity, which partly accommodates the increased demand for consumer goods (Garrison, 2004, p. 335). According to Garrison, the fact that the increases in nominal income are not evenly spread among production factor providers does not play any role. The fact that the newly created credit money first reaches the capital owners, and only at a later point the workforce in the form of increased wages, is of no importance, since allocational effects thereof are being rectified already in the short-term (Garrison, 2004, p. 339).

However, in my eyes, adopting this kind of approach is tantamount to negating a corner stone of Austrian theory, namely the Cantillon effect.

> "Everybody agrees that the abundance of money, or an increase in its use in exchange, raises the price of everything." (Cantillon, 2010[1755], p. 147)
>
> "If the increase of hard money comes from gold and silver mines within the state, the owner of these mines, the entrepreneurs, the smelters, refiners, and all the other workers will increase their expenses in proportion to their profits. Their households will consume more meat, wine, or beer than before. [...]All this increased expenditures [...] necessarily reduces the share of the other inhabitants in the state who do not participate at first in the wealth of the mines in question." (Cantillon, 2010[1755], pp. 148-149)

The first quote from Cantillon's essay on economic theory depicts that only a general rise in prices occur, whereas the second clearly states that it is the unevenly spread introduction of additional money that favours some at the expense of others who do not yet participate in the rise of nominal income. It is without any doubt that those who are favoured by the redistribution of income are able to increase their consumption, but that does not mean that overall real consumption may increase. As pointed out in the chapter on Mises, this change in income distribution that stems from the disturbance of relative prices actually translates itself into a lasting change of wealth distribution.

Unlike Garrison, Huerta de Soto argues for the point of view that the new money enters the market at a specific point, and since it is not evenly spread, it therefore has the effect that real income of those receiving the newly introduced money first increases at the expense of those whose nominal income increases lag behind the price increases of consumer goods (Huerta de Soto, 2012[2011], p. 409). Hence, the time-lag that transforms newly received money income into consumption spending does not play a role, but rather, the time-lag that plays a role is the one with which all production factor suppliers benefit from the increases of nominal incomes and which represents the disturbance of relative prices. In this regard, Garrison also digresses from his earlier account of the business cycle, which still showed a clear order of subsequent events, starting with the point of entry of the new money, in favour of the capitalists, and the necessary reduction of real consumption, in favour of investment (Garrison, 1978, p. 32).

Also unlike Garrison, who seems to neglect the Ricardo effect in his account, this mechanism is very much alive in the case of Huerta de Soto (Huerta de Soto, 2012[2011], pp. 329-332; pp. 368-370). In the case of an increase in voluntary saving, abstaining from consumption leads to a rise in real wages due to a fall in the prices of consumer goods. In accordance with the Ricardo effect, this then leads to a substitution of capital for labour (Huerta de Soto, 2012[2011], p. 329). In the case of credit extension, on the other hand, it comes to a more than proportional increase of consumer prices compared to increases in wages (Huerta de Soto, 2012[2011], p. 366). This phenomenon is driven by three different factors, which are firstly, a credit induced rise in investment induces wage increases, secondly, the production of consumer goods is reduced due to a reallocation of original factors of production, such as labour, from stages closest to consumer goods production towards stages most remote from consumer goods production, and thirdly, the inflation of prices leads to increased nominal profits, which in turn increases nominal consumer demand, since increased nominal profits are not being used for corporate saving but for consumption through dividend payouts. However, if a rise in wages took place without the other two phenomena, wages and prices would rise in lockstep. (Huerta de Soto, 2012[2011], pp. 364-365)

Garrison does not accept the second phenomenon, in which consumer goods production is reduced due to an initial reallocation of resources from close to consumer goods production stages towards remote production stages. Instead, he believes that, from the start of the business cycle, as in the Mises case, a simultaneous increase in consumer goods production is assumed, which is fed by capital consumption stemming from the middle stages of the production process. However, the problem with this account is not only that there is no negative profitability in the middle stages, and therefore disinvestment in those stages can hardly be justified, but it also fails to take account of the time-lag with which the additional nominal income reaches the different groups of society. The third phenomenon of Huerta de Soto takes account of this incident, as nominal profits are on the rise, and that is exactly because wages do not rise as fast as prices.

The phenomenon of increased nominal profits is more pronounced in its development the closer the company is to the stages of consumer goods production. Also, according to Huerta de Soto, it is at some point even of an adverse nature the more remote the stages of production are from the stages of consumer goods production, where, due to

increases in costs combined with lesser increases in prices of their intermediate products, profits will eventually fall (Huerta de Soto, 2012[2011], p. 367). Yet, a redirection of resources towards the stages closest to the consumer goods production sets in with full force as soon as the stages furthest from consumer goods production experience accounting losses (Huerta de Soto, 2012[2011], p. 375). Whereas, so far, the development at most led to decreasing profits in the stages most remote, the ensuing accounting losses are induced by two combined factors. First, the Ricardo effect leads not only to a reversal of the capital structure, in such a way that, due to decreased real wages, labour is substituted for capital, but also to a relative decrease in demand for capital goods and intermediate goods (Huerta de Soto, 2012[2011], p. 369). Secondly, a halt in the expansion of credit is assumed, which leads to an increase of market rates of interest beyond the level experienced at the business cycle's starting point, first due to inflation surcharges and secondly, through the competition of debtors to obtain the finance required to finish the investment projects and thereby their willingness to pay ridiculous amounts of interest (Huerta de Soto, 2012[2011], pp. 371-373).

Garrison comes up with a similar taxonomy, since he sees the rate of interest to consist of firstly the element of time preference, secondly the inflation element, and thirdly the risk surcharge (Garrison, 2001, p. 108). In Huerta de Soto's taxonomy, the risk element is the one that investors are willing to pay to rescue their investment projects at any costs and for which creditors charge them. According to Garrison's logic, this is not so much due to the demand and supply situation of credit, but due to the perceived risk involved. In this logic, the Ricardo effect described by Huerta de Soto then is the amended Ricardo effect illustrated in the preceding chapter on Hayek's business cycle 2.0.

The difference between Garrison and Huerta de Soto lies in how the mechanism of the business cycle is perceived. According to Garrison, the allocation of resources towards the remote stages and the near stages of consumer goods production takes place at the same time by thinning out the middle stages. In contrast to this, according to Huerta de Soto, the business cycle begins with the lengthening of the production process, which allocates resources towards the stages most remote in the production process, and only as the Ricardo effect gains prominence in conjunction with credit rationing does a liquidation of investment projects and the attempt to reallocate resources towards the stages closest to consumer goods production ensue. Here, the emphasis is on the attempt

to reallocate resources, since, due to the specificity of capital, this will not be entirely successful.

Whereas, in the Garrison case, an absolute and real over-consumption takes place that exceeds that of the point of departure, in the Huerta de Soto case, over-consumption is only a relative term in relation to saving, but not of an absolute magnitude, since real consumption actually decreases.

Both are illustrated in the following two graphics. The first depicts the Garrison scenario and the second the Huerta de Soto scenario, while still using Garrison's graphical approach. The consumption increase in the Huerta de Soto case is therefore not an increase of real consumption but of intended consumption, which cannot be realised. Furthermore, it contains neither an over-consumption nor an overinvestment that would put the production outside the PPF curve. This is due to the fact that not only is a real over-consumption considered to be an impossibility, but the case for overinvestment as seen by Garrison is also considered impossible. Huerta de Soto also does not define overinvestment as an absolute overinvestment, but as an overinvestment that takes place in the stages most remote from consumption, at the expense of investment at the stages closest to consumption, which is to be qualified as malinvestment (Huerta de Soto, 2012[2011], p. 375).

> "The crisis is brought to a head by excessive investment (“overinvestment”) in the stages furthest from consumption [...]. It also erupts due to a parallel relative shortage in investment in the industries closest to consumption." (Huerta de Soto, 2012[2011], p. 375)

In the Huerta de Soto scenario, the shift towards a lengthened production structure must therefore be described by a shift on the PPF.

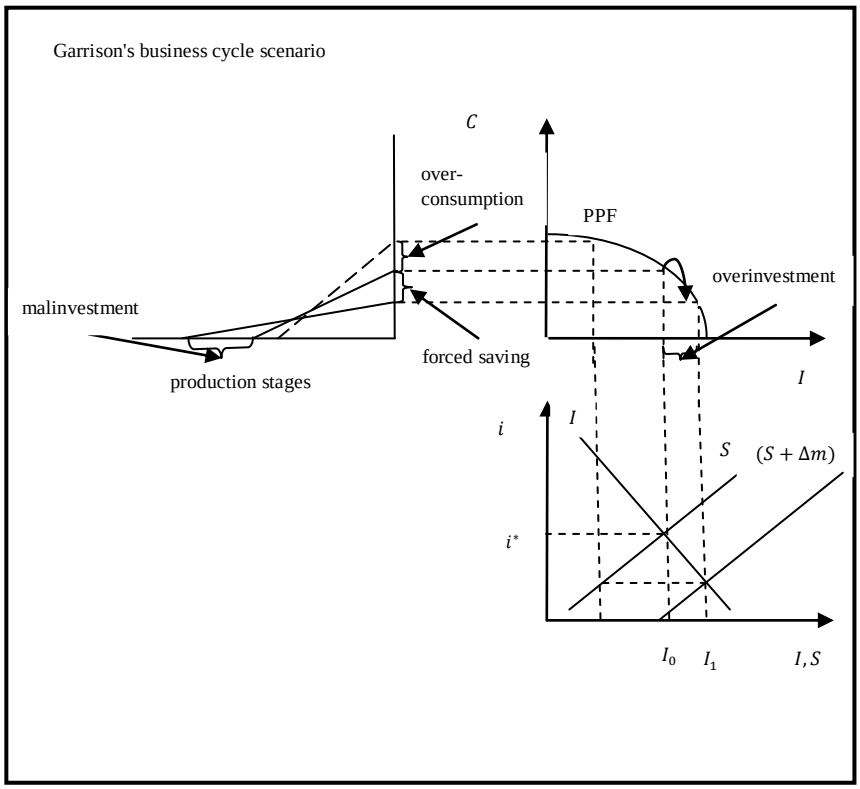


Figure 16: Garrison's business cycle scenario.

Source: Garrison, 2001, p. 69.

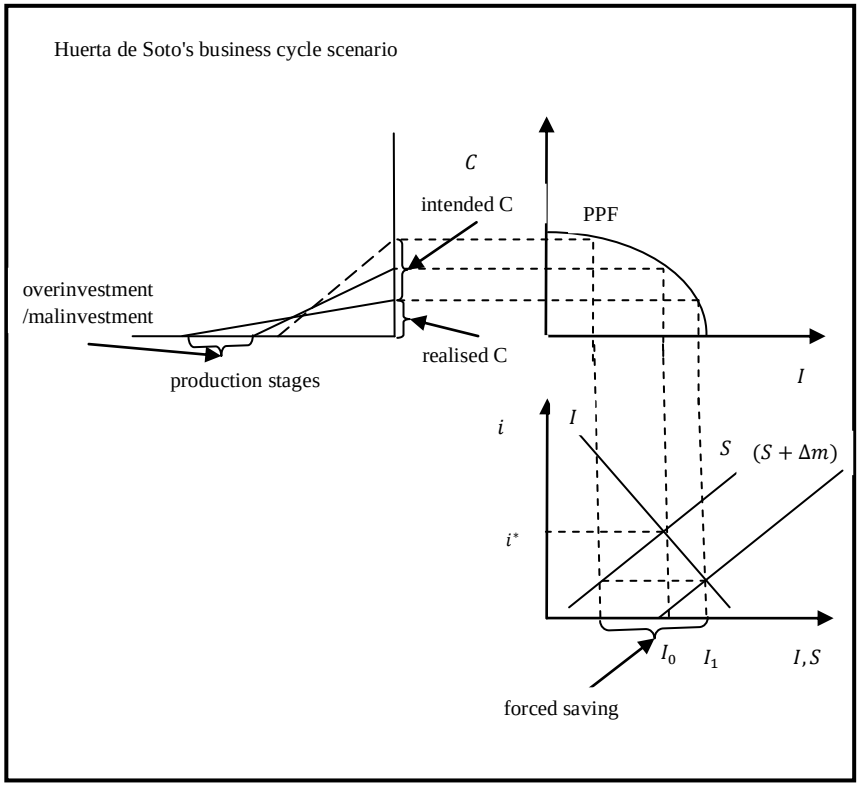


Figure 17: Huerta de Soto's business cycle scenario.

Source: Own figure.

One aspect of Huerta de Soto's business cycle scenario that has not been discussed this far is the case of capital consumption. Whereas in the Garrison scenario, capital consumption appears right at the start by disinvesting from the middle stages of production, the capital consumption in Huerta de Soto's scenario takes place as nominal profits are rising and entrepreneurial dividend payments are increased on the false perception of increased entrepreneurial prosperity (Huerta de Soto, 2012[2011], p. 365).

According to Hayek, the usage of these nominal increases in profits for consumption purposes consequently has the effect that the accumulation of capital is insufficient in regard to maintaining the value of capital at par with the increase of nominal income. Therefore, only ensuring a nominally constant value of capital assets would not suffice to replenish the stock of capital, since a nominally constant value would mean a decreased real amount of capital and thereby result in capital consumption. (Hayek, 1939d[1935], p. 132)

The other reason that Hayek gives for capital consumption would be the coercion of the government to use these profits for (state) consumption purposes or by the imposition of wage increases through trade unions (Hayek, 2009a[1941], p. 346-347).

The effect of such a capital consumption would be an aggregate increase in consumer demand. Though, in the case of increased wages through union power, the result would be a partial reversal of the shortening of the production process, since wage increases would again favour a substitution of capital for labour, but Hayek leaves this special case aside because it remains inconclusive. He therefore concentrates on the case of coercive measures from the government to extract these nominal profits for consumption purposes and comes to the conclusion that such capital consumption results in a further shortening of the production process. Thus, the consequence is the adoption of an even less capitalistic structure, which is of such a nature that this shortening might even become cumulative. The more the economy digresses from a capital structure that is able to provide a steady level of income, the more resources have to be channelled towards consumption, and the less likely it is that the public will be willing to reverse the situation as the required abstinence from consumption increases permanently. (Hayek, 2009a[1941], p. 347-348)

Yet, the reallocation of resources has to again be regarded only as an attempted reallocation of resources, since, due to the specificity of capital, the reassignment of capital goods is rendered to be a highly difficult task at least.

This problem also requires a more detailed look at what the idle resources are exactly. It was already mentioned in the chapter on Hayek's business cycle 1.0 that, in a situation of unemployed resources, these resources might be used to expand the production activities of an economy. Yet, in the light of capital specificity, this is not true for any idle resource, since it was also mentioned in the chapter on Hayek's business cycle 2.0 that this very much depends on the specificity of a resource and therefore the ability to reassign it.

In reference to Hayek, Huerta de Soto points out that idle resources, and especially idle resources in the form of capital goods, in the stages most remote from consumption production, are not idle in the sense that their resurrection would solve the problem of unemployment, since these resources cannot be easily reassigned to other uses in stages closer to the consumer goods production. To put them to productive use would require the employment of a specific combination of complementary resources that are simply not available, since, due to their relative non-specificity, they have been reallocated towards the stages that are closer to the consumer goods production. (Huerta de Soto, 2012[2011], pp. 415-416)

Hence, these resources are not only idle, but they are also obsolete under the prevailing time preference, unless second best uses can be found for them.

Yet, even if there were resources, which were not only idle but also non-specific so that they could be reassigned to other uses, it was shown in the preceding chapter on Hayek's business cycle 2.0 that this would not deter the Ricardo effect at all, since the working of the Ricardo effect does not depend on any objective level of full resource employment, nor is the starting point of the business-cycle a situation of full employment.

According to Huerta de Soto, the provision of idle resources that could be reassigned to other uses does not impede the workings of the Ricardo effect, since, in the case of a credit money expansion, prices of original production factors would not rise as fast in the beginning. However, the new income generated by employing these production factors would eventually increase the demand for consumer goods and lead to a more than proportional rise in the prices of consumer goods compared to the original means of production, which would thereby trigger the Ricardo effect. (Huerta de Soto, 2012[2011], p. 443)

In his assessment, Huerta de Soto refers to Lachmann's "bottleneck" concept (Huerta de Soto, 2012[2011], p. 440). The point Lachmann makes is that the scarcity of resources is not entirely reflected by their prices, which means that scarcities that will be encountered due to certain investment decisions may not be visible in the prices, unless future markets give investors a clue about the scarcities that await them in regard to the complementary resources necessary to continue production (Lachmann, 1978[1956], p. 124). Furthermore, Lachmann points out that idle resources are idle because they are lacking the necessary complementary resources needed for the continuation of production. The price signal may appear with a time-lag, and unless it is not only a temporary "bottleneck" but an absolute "ceiling", scarcity of complementary resources will frustrate the original production plans and leave the capital goods idle. (Lachmann, 1978[1956], p. 107)

Lachmann therefore distinguishes between bottlenecks and absolute ceilings. If the bottleneck is just of a temporary nature that will surely be resolved in the near future, then no price signals should occur in the future market. However, if the bottleneck is only the interlude before the absolute ceiling, then future prices will react, and eventually, scarcity makes itself felt in rising prices for original factors of production. What Huerta de Soto describes as a price increase, which is not as rapid as without such idle resources, merely refers to the fact that bottlenecks have been encountered that are likely to be the advent of the absolute ceiling to come. Hence, the rise in prices of formerly idle resources stems from those complementary resources that lose their status of an overall abundance first and become scarce, in the sense that their absolute ceiling is within reach.

According to this logic, the scarcity in complementary resources, which is not perceived as a transient bottleneck but as the path to an absolute ceiling, makes itself felt in a rise of prices for these resources. This is then what triggers increasing incomes of the providers of these resources, which then increases consumption demand and a rise in consumer prices that is more than proportional, since the credit induced expansion of investment leads to a lengthening of the production process.

The PPF then is the turning point that is reached as an absolute ceiling since a further expansion of production beyond the PPF would require additional complementary resources, which are simply not available to the extent that production could be expanded any further. An expansion of the PPF would require additional

complementary resources either from elsewhere, as suggested by Ahiakpor, or from resource-freeing inventions, as described in the chapter on Hayek's business cycle 1.0.

In contrast, it is also thinkable that, instead of adding new resources or freeing resources through innovation, an economy's production capacity might also deteriorate through excessive depreciation of capital. Garrison depicts such an incident through a shift of the PPF inwards on the abscissa only, representing a decrease in gross investment that results in negative net investment and therefore in capital losses and corresponds with a shift of the capital demand function to the left (Garrison, 2001, p. 150).

The consequence of such a deterioration of capital might indeed be the phenomenon of liquidity preference. According to Garrison, it is crucial to emphasize that the phenomenon of liquidity preference is not what precipitates the downturn, but only a reaction to the breakdown of marginal efficiency of capital (Garrison, 2001, p. 151). According to this interpretation, the phenomenon of liquidity preference is not some psychological phenomenon of a perceived uncertainty but of a real economic risk and real uncertainty that is felt in a massive depreciation of capital.

According the Garrison, the culprit for this real uncertainty and consequent massive depreciation of capital is the state that tries to finance its budget deficit through ever new tricks and feints, such as monetising it through inflation or getting it financed either through domestic or foreign savers by exporting the debt to foreign creditors. The consequence of such actions is the infliction of systemic risk that is undetectable by the market participants, as monetising debt leads to the business cycle and redistribution of wealth, while financing debt by domestic savers leads to crowding-out effects, and the export of debt leads to trade imbalances that deteriorate the export position of local industries. All these actions and their corresponding consequences are, however, not foreseeable by the market participants, and therefore, uncertainty is implanted that is not based on psychological whims but on hard facts. (Garrison, 2001, pp. 113-118)

The consequence of liquidity preference in Garrison's systematic is a shift of the saving function to the left and a corresponding increase in the rate of interest (Garrison, 2001, p. 152). The solution, which is abandoned by Keynes, lies in the option of a deflation in wages and prices that enables the real balance effect to restore the situation, but which, in Keynes' systematic, only increases uncertainty and liquidity preference, which thereby also rules out the Keynes effect through a decrease in the interest rate (Garrison, 2001, pp. 149, 155).

In the long run, a heightened demand for liquidity simply forces the prices to fall by decreased spending and thereby increases the real value of current cash balances (Selgin, 1988b, p. 53). This stance can be complemented by the stance Salerno presents in his chapter on Mises where liquidity preference drives down production due to decreased prices, which in turn drives down wages, i.e. production costs and restores the profitability of production.

Yet, Selgin sees the trouble that, even though this surely works in the long run, in the short run, the falling demand for consumer goods is likely to be interpreted as a lasting decline in prices, which does not correspond with a simultaneous decline in wages, and therefore, a lasting fall in profits is assumed. This then results in an overall decline of production activity and, consequently, a fall in real income (Selgin, 1988b, p. 55).

Salerno counters this position by claiming that this is just a transient situation that rectifies itself, provided that there is also full price flexibility in the market of original production factors (Salerno, 2010, 9. 194). However, this does not mean that there will be not at least a transient reduction in real income:

> "The initial impact of a rise in liquidity preferences is a shrinkage of the revenues and cash balances of those firms which sell directly to the individuals who have decided to build up their inventories of cash. In response to what they mistakenly believe is a permanent decline in the relative demand for their output, these firms immediately restrict their demand for inputs. In consequence, temporary surpluses appear on labor and other resource markets at prevailing prices." (Salerno, 2010, p. 194)

Hence, production is reduced and therefore also real income, and at least temporarily, there is unemployment.

Thus, according to Selgin, the appearance of the phenomenon of liquidity preference calls for an increase in the money supply that neutralises its effect on the demand side, which at least in the short term, disrupts Say's law (Selgin, 1988b, p. 56). This assessment is fostered furthermore by a Hayek quotation:

> "Unless the banks create additional credits for investment to the same extent that holders of deposits have ceased to use them for current expenditure, the effect of such saving is essentially the same as that of

> hoarding and has all the undesirable deflationary consequences attaching to the latter." (Hayek, 1939e[1933], p. 165)

The above quotation is the complete sentence, and the way Selgin quotes it, one might think that hoarding itself has to be compensated for by additional credit money. However, it merely refers to loanable funds that are not being passed on as loans and thereby cause an imbalance of saving and investment that has a similar deflation effect as hoarding. Selgin then also concedes to the fact that Hayek's framework in this regard is not one of a fractional reserve or even fiat money system that enables banks to issue credit without prior saving (Selgin, 1988b, p. 57; Hayek, 1939e[1933], p. 164).

This is, however, a crucial point for Huerta de Soto's critique of Selgin's position as being in line with a money that is not a fractional reserve nor a fiat money system, but a money that is backed a hundred percent by gold reserves, liquidity preference, which would simply induce an increased mining activity for gold, i.e. money which in itself would assure full employment (Huerta de Soto, 2012[2011], p. 550).

The point of departure in the Garrison framework was, however, that the factors that bring about liquidity preference are, firstly, an uncertainty that is based on hard facts, which is induced by the state's financing behaviour and results in a massive capital depreciation, and a secondary effect that shifts the supply function for loanable funds, i.e. the savings function, to the left, resulting in a higher interest rate instead of a lower interest rate, which would be the case if there were only a shift of the loanable funds demand function to the left. In order to come up with a self-regulating solution, Garrison then abandons the shift of the loanable funds supply function to the left and thereby simply ignores liquidity preference (Garrison, 2001, p. 159).

The importance of this point is that, if only the first effect, namely the depreciation of capital, is being considered, then the only determinants of the rate of interest are saving and investment and not the uncertainty, which manifests itself in liquidity preference.

The critique brought forward by Garrison against liquidity preference is that the decision to hold liquidity versus saving comes as an event in stages, since it is first decided how much is to be spent and then how much of it is to be saved and how much to be hoarded. Instead, the more appropriate approach would be a simultaneous optimisation of all three decisions. (Garrison, 2001, p. 151)

The optimisation would then probably be of such a classical manner that spending would not be determined by the marginal propensity to consume but by the optimal combination of saving and hoarding, which then leaves spending as a residual factor.

The version of liquidity preference adopted by Hayek in 1941 in *The Pure Theory of Capita* takes this into consideration and determines saving and hoarding in a simultaneous optimisation between productivity and liquidity preference.

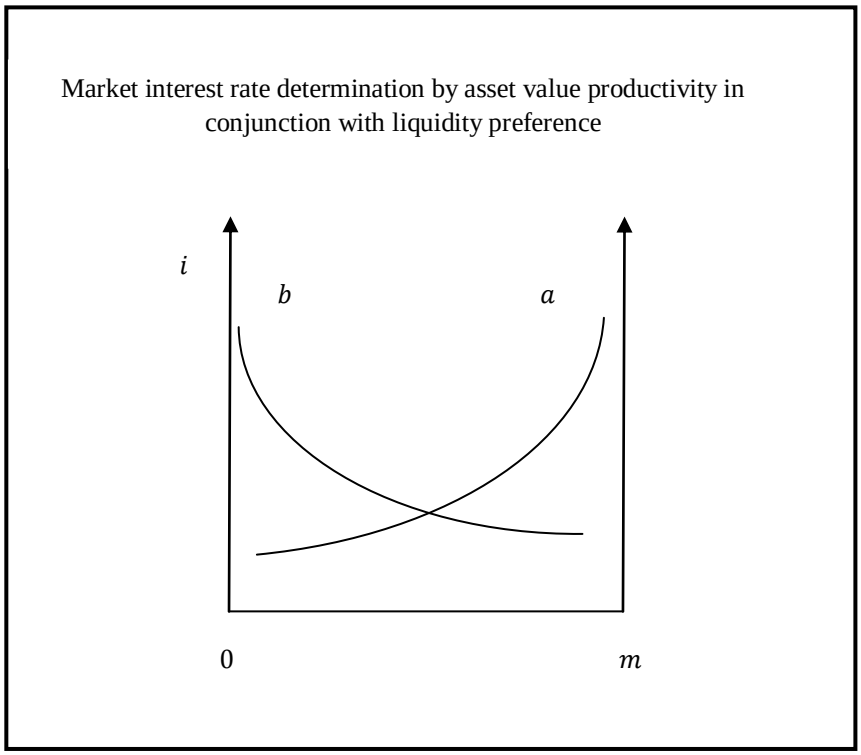


Figure 18: Liquidity preference according to Hayek.

Source: Hayek, 2009a[1941], p. 363.

The *a* function thereby represents a positive inducement to save through the rate of interest, whereas the function *b* represents the decline in expected return on assets as more money is saved and consequently invested. The intersection of both functions then decides how much money is saved and how much is hoarded. The money saved and spent on investement is shown on the abscissa *0m*.

A rise in profitability, such as, for example, through innovation, then shifts the *b* function to the right, whereas the scenario of a massive depreciation of capital, as depicted by Garrison, would shift it to the left. An inelastic and therefore vertical *a* function would then make the interest rate dependent solely on the investments' productivity and therefore exclusively on saving and investment. In constrast, with a fully elastic and therefore horizontal *a* function, the rate of interest would be exclusively

determined by the liquidity preference, which in this case would be absolute and constitute the situation of a liquidity trap. (Hayek, 2009a[1941], p. 363-364)

According to Lawrence H. White, the above-mentioned simultaneous determination of the interest rate by considering both the productivity of investment and the liquidity preference is a compromise position, which acknowledges that money as a loose joint exerts influence on the market rate of interest that disturbs the inter-temporal production structure, which is, however, coordinated by saving and investment and whose equilibrium is determined by time preference. Hence, should such inter-temporal coordination take place at all, it would be impossible that the interest rate is solely determined by liquidity preference. On the other hand, ignoring liquidity preference would also render the peculiarity of money as a loose joint inconsistent. (White, 2008, p. 329)

However, the role of a loose joint may be contested in the concept of a money that is backed by a hundred percent gold, since, according to the logic of Huerta de Soto, the increased mining activity for gold prevents liquidity preference from having any negative effect on employment at all. Furthermore, according to Huerta de Soto, it is not the objective of Austrian economics to defend the validity of Say's law. The true objective is quite the contrary, since it is the credit money creation that is unbacked by prior saving, which induces an imbalance between the amount of capital goods and consumer goods being supplied and demanded while it is not in correspondence with the prevailing time preference anymore. Hence, Say's law is rendered ineffective due to credit money creation in a fractional reserve or fiat money system, which results in a production structure that no longer provides the goods that are being demanded, and effective demand falls short of existing supply because the goods wished for cannot be delivered. (Huerta de Soto, 2012[2011], p. 545)

The chapter on policy recommendations for the resolution of a crisis will discuss the ways in which different monetary systems are seen as the culprit or the saviour regarding boom bust cycles.

Wilhelm Röpke and his description of the "secondary depression" or "secondary deflation" refute the position of Salerno and Huerta de Soto that, even though liquidity preference is a valid phenomenon, it only represents a temporary transition of the economy, which ultimately should have no lasting effects on real income and employment (Röpke, 1936[1932], pp. 119-120).

Huerta de Soto' position is that, in the case of liquidity preference, the mining industry will gain in prominence and thereby eradicate unemployment. The argument that can be brought forward against this position is that it is simply not covered by facts. During the depression of the beginning 1930s, gold mining grew by one third and still was not able to do the trick (Röpke, 1936[1932], p. 129). Nevertheless, the monetary system of the 1930s was admittedly a fractional reserve monetary system and not a hundred percent gold backed monetary system, as envisioned by Huerta de Soto, where the only ultimate liquidity can be provided by the commodity money of gold.

The refutation of the Salerno argument can be seen in line with the one adopted by Selgin. Even though there will eventually be a situation in which the full employment and real income are re-established, there is always a certain time-lag to it, and according to Röpke, this time-lag is the most troublesome feature of the secondary depression. The fall in demand, accompanied by a fall in prices, is not and cannot be met by an immediate fall in wages, since with a first time-lag, there is a reaction in quantity, and with another time-lag, there is a reaction in wages, i.e. costs. Hence, first comes the excess supply of goods and secondly the decreased profitability. (Röpke, 1936[1932], p. 122)

Therefore, even though companies are able to re-establish their cash inflow versus cash outflow ratio prior the drop in demand with a time-lag, it is their increased liquidity preference that induces them to seek a position that shifts this ratio in favour of the cash inflow and curtails their spending and hence their investments. The markets most affected by this development are the markets for raw materials, which experience the most severe drop in prices, since production is continuously curtailed. Under these circumstances, saving or, more precisely, the combination of classical saving and hoarding is always bigger than investing. (Röpke, 1936[1932], p. 123)

Taking up Röpke's point, Huerta de Soto argues that, according to Röpke, there will be a natural floor beyond which the economy will not fall (Huerta de Soto, 2012[2011], p. 453). This might be true, since such a situation is reached when poverty has become so severe that widespread negative saving ensues in order to ensure consumption (Röpke, 1936[1932], p. 129). This then drives down saving towards investment. Until such a situation is reached, the fall in real income may have been so severe that it led to civil unrest and had already shaken the foundations of society at its core (Röpke, 1936[1932], p. 129). This is of course not mentioned by Huerta de Soto.

As Klausinger points out, it is also not the way that Hayek would perceive secondary deflation, since from Hayek's perspective, the secondary deflation is caused by market rigidities that do not allow the economy to adjust. The economic hardship felt will finally help to overcome the crisis by breaking up these rigidities. (Klausinger, 2012b, p. 10)

Yet, according to Röpke, the problem is less about rigidities than about the unavoidable time-lag.

Another aspect mentioned by Röpke and also to be found again in modern Austrian macro, is the mismatch of maturities. Bagus and Howden's analysis of the economic collapse of Iceland in the wake of the global financial crisis is therefore not only described by the already known causation of credit money creation but also by the mismatching of maturities (Bagus and Howden, 2011, pp. 9 ,14).

According to Röpke, the maturity mismatch was fabricated, since the banking system of the 1920s provided more and more savings accounts and then used these to invest in long-term securities. Instead, savers formerly would have invested their savings directly in the securities markets. Hence, the advantage of this development for savers is to hold relatively liquid savings accounts while enjoying relatively higher interest rates of long-term investments at the same time. (Röpke, 1936[1932], p. 126)

The downside of this business model for the bank is that the risk of asset depreciation lies with the bank and not with the savings account holder (Röpke, 1936[1932], p. 127).

The business model described by Röpke is nothing else than the liquidity arbitrage already described in the chapter on Minskyan recommendations for financial market regulation. Röpke's description probably even already contains the risk arbitrage, since savers are not only able to hold more liquid savings accounts, but at the same time, they also gain interest rates, which are not justified from a liquidity arbitrage perspective but only from a risk arbitrage perspective. However, as already mentioned, the risk arbitrage only refers to a reduction of the individual alpha but not the systemic beta risk. Quite to the contrary, it increases the risk dependence on the systemic market risk.

According to modern Austrian macro, the combination of credit money creation, which drives down the market interest rates and the mismatch of maturities, proves to be an especially toxic combination for enhancing the systemic market risk. What happens is that "[...] maturity mismatching translates artificially low short-term rates into

artificially low long-term rates since banks increase the supply of long-term funds by lending long." (Bagus and Howden, 2011, p. 21)

The problem described in the Iceland case is that the central bank's artificially low short-term rates were amply transformed into long-term artificially low interest rates, since government controlled and sponsored entities ensured cheap long-term housing credits, which exacerbated the malinvestment towards long-term investment projects (Bagus and Howden, 2011, pp. 21-22). The problem manifests when liquidity becomes insufficient and causes a fire-sale, which depreciates the banks' assets to a large extent (Bagus and Howden, 2011, p. 22).

The part of the analysis of the collapse of the Icelandic economy that deals with the housing boom, as well as the financial crisis in the US and its connection to the housing boom, brings up another problem. How do consumer credits fit into the Austrian framework when the Austrian framework is really about over- and malinvestment? Garrison points out that the main focus has to be on investment because the capitalist community has more clout to lengthen the production by the incentive of a low rate of interest (Garrison, 2001, p. 71). Hence, the incentive of a low rate of interest works far more strongly in favour of the capitalists to increase investment than for the consumers to drive down saving and increase consumption instead. Garrison therefore sees this very immediate effect on consumption as well, and this is also one of the reasons why he comes up with the Mises style simultaneous increase of investment and consumption (Garrison, 2001, p. 72).

The point that is neglected in this regard is the way a decreased rate of interest amends the nature of consumer spending. Therefore, Huerta de Soto points out that a decreased rate of interest favours consumer spending on more durable goods and goods of a higher quality. Hence, increased consumer credits also favour a production structure that is more complex, more capitalistic, or in Austrian terms, more roundabout. (Huerta de Soto, 2012[2011], p. 406)

The reason for this is that, with a declining rate of interest, the optimal economic lifetime of a durable consumer good also increases, since the discounting of the benefits, minus operation costs and liquidation proceeds, is lowered, and therefore, higher initial purchasing costs and a longer lifetime are justified (Tietenberg, 2000[1996], p. 201).

The answer to the question from the chapter on Hayek's business cycle 2.0 of whether the Ricardo effect is a complementary mechanism or a mechanism that contradicts the first version of Hayek's business cycle depends on the chosen paradigm of the Austrian trade cycle.

In the case of a paradigm that is in line with Huerta de Soto's interpretation, the Ricardo effect plays a very prominent complementary role, since in conjunction with credit rationing, it actually triggers the shortening of the production process, and this also holds true in light of consumer credits, since with increasing interest rates, consumer goods demand also changes from more durable to less durable consumer goods. In effect, it is the increased shortening that succeeds the initial lengthening of the production process and drives down the absolute amount of investment.

In contrast, for Garrison, the Ricardo effect plays no role and cannot play a role in his description of the business cycle, since there is no slow transition towards a renewed shortening of the production process, but a simultaneous pull of resources away from the middle stages towards both ends of the Hayekian triangle, namely towards the most remote and the closest stages of production of consumer goods. Hence, the Garrison cycle has more resemblance with the Mises business cycle than with Hayek's business cycle.

Nevertheless, the contradiction of the Ricardo effect, which Kaldor sees with Hayek's first version of the business cycle, is that it is not an increased lengthening of the production structure during the boom phase that brings about the turning point, but an increased shortening during the boom phase after an initial lengthening prior to the boom phase. The important point is that it is still an account of successive developments taking place and not, as in the Mises version, a simultaneous allocation of resources towards both ends. Insofar as the Ricardo effect leaves Hayek's forced saving version unaltered, as in the absence of resources, which are both idle and complementary, further investment can only be covered by a decrease in real consumption, i.e. by forced saving.

The Ricardo effect then only determines the extent to which the forced saving can be driven until the endogenous forces of the business cycle compel the investors to reconsider their plans and reallocate the resources again in favour of consumer goods production. This is a reallocation, which, due to the specificity of capital, ultimately cannot be realised and which drives down overall investment.

With an increased shortening of the production structure, increased disinvestment in the most remote stages also takes place, and renewed investment in stages closest to the consumer goods production remains mostly only an intention, since specificity of capital hinders the reassignment of specific resources from the most remote stages towards the stages closest to consumer goods production. The result must be a fall in absolute investment activity.

3.3 Austrian policy recommendations for the resolution of the crisis

Just like with the modern Austrian business cycle theory, the recommendations for its resolution or, even better, its prevention in the first place are not undisputed in modern Austrian economics either. In the last chapter, it is already mentioned that a crucial difference lies within the interpretation of the consequences of the phenomenon of liquidity preference.

Whereas for some liquidity preference is just a normal market reaction that ensures the redirection of resources in accordance with the necessities of changes in the real economy, for others, this poses a potential threat for the development of real income. The first interpretation would therefore imply that an increase in liquidity preference only liquidates all the malinvestment and therefore performs an important function in re-establishing a market equilibrium in accordance with time preference. The second interpretation, on the other hand, would see an increase in liquidity preference that would not necessarily be justified, or at least not entirely justified, by real economy events.

The difference in interpretation of liquidity preference therefore corresponds with the distinction Röpke makes between a primary depression that cleanses the economy from excrescences of the former boom and a secondary depression that is a "[...] self-feeding, cumulative process, not causally connected with the disproportionality that the primary depression is designed to correct." (Klausinger, 2012b, p. 7)

The conflicting views therefore are whether an increase in liquidity preference is the instrument that routs out malinvestment or whether the necessary evil of liquidity preference has turned into an all consuming monster. Accordingly, the answers about how to counter the phenomenon of liquidity preference diverge. It was shown that for the former strand of thought, the importance lies within the flexibility of markets, which

allows price reactions that re-establish the profits of entrepreneurs once again, whereas for the latter strand of thought, this remedy appears to be merely a bit of a simplification of what really happens in the economy.

According to Röpke, a decrease in wages may even prove to be counterproductive as long as the time-lag between a reduction in prices and a reduction in wages is not substituted by an instant adjustment, since otherwise, a reestablishment of profits is not achieved, and a further reduction in demand also results (Röpke, 1936[1932], p. 184). Hence, the remedy cannot only be a new expansion of credit, since without re-established profitability, there is no revived demand for credit (Röpke, 1936[1932], p. 138). What is needed in addition must be the state absorbing the additional credit to finance fiscal measures that compensate the decreased private sector activities (Röpke, 1936[1932], p. 199).

As mentioned in the chapter on Hayek's business cycle 2.0, Hayek also considers the application of fiscal measures in order to stabilize consumer goods' prices. However, according to Hayek, the secondary depression might actually help break up market rigidities. Furthermore, any employment of fiscal measures may in fact have the detrimental effect of planting the seeds for another business cycle (Klausinger, 2012b, p. 11).

Even though Hayek's position is in agreement with the principle of flexible markets that allow the adjustment of prices and especially wages, it will be shown in this chapter that this does not concur with the simplified view on things that deems the eradication of market rigidities to be sufficient as a remedy. This is where the importance of liquidity preference comes into play, since the way liquidity preference is interpreted determines very much what kind of financial or banking system is regarded to be the appropriate answer for the avoidance of a business cycle in the first place.

In this regard, this chapter will deal with three alternative Austrian proposals. All of these proposals have in common the abolishment of a central bank and the establishment of a free-banking system that is supposed to ensure that no investment in excess of saving is possible. Hence, as already described in the chapter on Mises, the culprit is the government monopoly of a central bank, which sometimes actively, but at least passively, evokes a moral hazard problem by acting as a lender of last resort.

The difference of these proposals lies in the role that reserves play. The most cautionary approach is certainly the proposal that all demand deposits have to be backed by a hundred percent reserves, which preferably should be gold (Rothbard, 2010[1963], p. 43; Huerta de Soto, 2012[2011], p. 736). Then, there is Selgin's less cautionary approach of a fractional reserve free-banking system, where only a fraction of demand deposits is supposed to be covered by reserves (Selgin, 1988b, p. 30). Hence, the distinction is being made between outside money, which is the commodity money that serves as reserve, and inside money, which is the individual currency created by the bank (Selgin, 1988b, pp. 16-17). The last proposal is Hayek's own proposal, which is not concerned with the holding of reserves of any commodity money such as gold, but instead aims to achieve its 100 percent money goal through a stability in the price level of the issued currency, compared to a basket of commodities such as raw materials (Hayek, 2009b[1976], p. 48).

3.3.1 A hundred percent gold reserve free-banking

The most cautionary proposal regarding the backing of demand deposits with a hundred percent gold actually carries more resemblance to a warehouse for gold than to what nowadays would be considered to be a bank. In this regard, the paper money is more of a warehouse receipt, constituting a document of title for the corresponding amount of gold stored in the bank's vault (Rothbard, 2010[1963], p. 36).

The payment between clients of one bank is then executed by the transfer of the document of title and the corresponding negotiation of endorsement of the corresponding gold from one person to the other. This negotiation of endorsement may be effected by debiting the demand deposit of the payer and crediting the demand deposit of the payee. All of this may be executed without the physical shipment of any reserves, as long as both counterparties are clients of the same bank.

Yet, should the two counterparties be clients of two different banks, the physical shipment of the corresponding gold reserve from one bank to the other would be inevitable in order to not violate the one hundred percent gold reserve backing of demand deposits (Rothbard, 2010[1963], p. 37). The important point this system aims to achieve is that, under such a regime, the only way the amount of money can be enlarged is by an increase of the physical gold reserve (Rothbard, 2010[1963], p. 41).

Unlike in the case of fractional reserve banking, the distinction between outside money in the form of gold reserves and inside money as documents of title is unnecessary, since by the statutory requirements of the system, the two are identical. As in the case of a fractional reserve money, the amount of outside money and the amount of inside money diverge, since only a fraction of the inside money is actually backed by reserves, i.e. outside money, and as inside money may be created ex nihilo, the fractional reserve system is deemed to be "inherently inflationary" (Rothbard, 2010[1963], p. 41).

Furthermore, the fact that the inside money, if defined as a document of title, is, in the case of a fractional reserve system, not instantly redeemable for all demand deposit holders at once, is even regarded as tantamount to fraud (Rothbard, 2010[1963], p. 43). Any creation of inside money ex nihilo, which means in excess of outside money, i.e. fiduciary media, by creating a loan and, with it, a corresponding demand deposit, therefore violates the identity of saving and investment, since the loan is not backed by prior saving in the form of gold stored in the bank's vaults (Rothbard, 2010[1963], p. 41).

A similar violation appears when the bank decides to use the gold reserves in order to create a loan without the explicit prior consent of the demand deposit holder. Since the demand deposit is certified by a document of title that is redeemable at any moment in time, granting a loan on that very reserve creates a new demand deposit for the loan receiver and thereby not only enlarges the amount of inside money but also represents a mismatching of maturities. (Rothbard, 2010[1963], p. 42)

The only way such a mismatching of maturities may be avoided would be by negotiation of endorsement from the original holder of the document of title to the borrower for the time that the loan shall be granted.

The resulting structure in finance and banking would be thus that there would be banks that issue documents of title, i.e. demand deposits, against a corresponding amount of gold reserves and that charge a fee for their warehouse services, which even might include bookkeeping services for their clients. On the other hand, there might be the emergence of mutual investment funds where a part of the deposits would be invested. Hence, there would be the negotiation of endorsement of documents of title towards these investment funds in exchange for shares issued by these investment funds. (Huerta de Soto, 2012[2011], p. 744)

The problem of maturity mismatching would therefore be circumvented by savers becoming shareholders of investment funds, and not creditors that can revoke their engagement by drawing their funds, but only by negotiation of endorsement of shares against documents of title for gold reserves. This negotiation of endorsement may, however, not necessarily be at par with the original purchasing price of the investment fund's shares (Huerta de Soto, 2012[2011], p. 744).

The great advantage of the hundred percent gold backed free-banking proposal is, according to its advocates, in the stability of the system. A bank crisis due to a lack of liquidity would be impossible because demand deposits are fully backed by reserves, and it also would be the end of any business cycle crisis because investment may never exceed prior saving (Huerta de Soto, 2012[2011], pp. 745-747).

Among other advantages, there is supposed to be a reduction in transaction costs, since collective bargaining of wages would not be an issue anymore when steady productivity increases in the face of a fairly stable amount of money, i.e. gold, lead to diminishing prices and thereby automatically result in increased real wages, without the necessity of any wage negotiations and costly repercussions, such as strikes (Huerta de Soto, 2012[2011], p. 751).

Furthermore, a big advantage is then supposed to be the absence of "feverish speculation" and its detrimental effects. According to this perspective, speculation becomes feverish, and thereby harmful, when it is financed by credit expansion, which is not covered by corresponding reserves. (Huerta de Soto, 2012[2011], pp. 753-754)

Nothing much can be said against the first two arguments that a banking crisis and business cycle crisis are prevented, since the proposal indeed ensures liquidity in reserves of the banks at all times, as well as an identity of saving and investment, unless of course liquidity preference, or rather a surge in liquidity preference, is assumed and, with it, the detrimental effects of deflation. As was described above with Röpke, in such a case, the identity of saving and investment is not guaranteed. Instead, investment may notoriously, or even increasingly, lag behind saving. The structure of this envisioned banking system even carries some resemblance with the one mentioned under a post-Keynesian 100 percent money system, with banks that ensure the payment mechanism with demand deposits on the one side and investment funds, which accumulate resources for investment purposes on the other side. Yet, unlike the post-Keynesian approach, under a free-banking regime, the 100 percent money approach with a hundred

percent gold reserve puts gold as its stability anchor at its core and abolishes the central bank. The post-Keynesian 100 percent money system would therefore be able to accommodate liquidity preference, whereas the Austrian fully gold backed 100 percent money could only rely on a doubtful real balance effect, since it is unable to compensate for changes in liquidity preference.

From this Austrian perspective, even with a 100 percent gold reserve, a central bank controlled monetary system is not deemed to be desirable either. Even though it is conceded that there is no possibility for a central bank under such a regime, to issue inside money in excess of outside money, it is nevertheless feared that any additionally obtained gold reserves might be inserted in the market at a certain point and not spread evenly and proportionally among all reserve holders. This thereby causes an increase in the amount of money that disturbs relative prices, resulting in a disruption of the production structure. (Huerta de Soto, 2012[2011], p. 662-663)

Regarding the phenomenon of speculation, it was already mentioned that it plays a huge role in the Minskyan theory of finance, which is why a further assessment of the role of credit money financed speculation will have to wait for the chapter in which a comparison with the Minsky theory takes place.

However, the claim that the hundred percent gold free-banking regime would be able to reduce transaction costs is not very clear. The above-mentioned advantage, which claims that such a regime would make collective wage bargaining obsolete, may be more than outweighed by all the other costs incurred, which transactions under such a regime would bring. The most important disadvantage of such a system would be the impossibility of establishing any clearinghouse that would be able to net cash flow commitments among banks and thereby reduce the physical amount of gold shipments.

The impossibility is not as such owed to a technical imponderability but to a legal one. As mentioned above, the paper currency emitted by the individual banks has practically the legal properties of a document of title. Yet, a clearinghouse consists of a common fund of reserves brought in by the member banks and their corresponding deposits, from which payments are settled among each other (Dunbar, 1922[1891], p. 57-58). However, as cash payment commitments are netted out against each other, the documents of title originally negotiated for endorsement to certain counterparties of the banks' clients also have to be pooled, and effectively substituted, by clearinghouse certificates, which settle the netted payments among the member banks as documents of

title held by the net creditor member banks against the net debtor member banks (Dunbar, 1922[1891], p. 47).

The problem of such conduct is that, by creating clearinghouse certificates, a new type of IOU has been introduced, which is situated in the hierarchy of money underneath gold but above the issued paper money of the different banks, i.e. their issued documents of title on their gold reserves. The concept of a hierarchy of money uses the picture of pyramid[26] and assumes that the most liquid and most widely accepted type of money, i.e. gold, is on top, which allows final settlements, and underneath, there are basically IOUs, which only constitute the promise of final settlement (Mehrling, 2009, p. 1). This kind of hierarchy then corresponds with the typology of gold as outside money and the IOUs underneath as inside money (Mehrling, 2009, p. 3). It is this layering of IOUs that are more or less remote from the actual final settlement of payment obligations that provides elasticity through credit money creation to the system (Mehrling, 2009, p. 5).

However, this elasticity is not compatible with the legal notion of money, which is understood as a document of title that clearly constitutes a strict ownership of the reserve. Any negotiation of endorsement thus has to be directly bilateral and cannot be substituted by an intermediate negotiation of endorsement that is not directly authorised by the original holder of the document of title. According to Huerta de Soto, this is to be regarded as a traditional legal principle whose foundation reaches back to the Roman Empire and, as such, was adopted as a principle of property rights by the Austrian school (Huerta de Soto, 2012[2011], pp. 4, 13-14, 22-23, 29-30).

Selgin's assessment that it is in fact the establishment of clearinghouses that allows banks to reduce underlying reserves also stands in line with this reasoning on the functioning of clearinghouses (Selgin, 1988b, p. 27). In accordance with this assessment, Huerta de Soto depicts the clearinghouse mechanism as a phenomenon of a fractional reserve and not of a hundred percent reserve free-banking monetary system (Huerta de Soto, 2012[2011], pp. 633-634).

The assumption that transfer costs will actually be reduced appears to be rather doubtful when every interbank transaction has to be executed by a physical movement of reserves. This might still be relatively feasible in a small territory but becomes more

[26] It is the same picture used by Hayek in describing elasticity of money in different stages of the monetary hierarchy in "Preise und Produktion" (Hayek, 1976[1931], pp. 109-110).

heroic when a countrywide payment system, or even an international payment system, is to be maintained.

Hence, the development of international trade towards an interconnected world of mutual trade relations is based on financial innovations that aim at reducing transaction costs in order to make international trade more economical. At the beginning of the 20th century, Allyn Young already mentioned the innovative financial tool of the acceptance, or letter of credit, as it is also called, gaining ever more importance and prominence in the field of foreign trade (Young, 1929[1924], p. 4272).

Today, this is still the standard tool of finance in foreign trade. It enables the seller to receive the stipulated amount right away, against the procurement of a document of title for the shipped goods, such as a clean bill of lading, without any concern about whether the buyer actually owns a demand deposit sufficient for the payment. The promise to pay is not being made by the buyer, but by a bank, which finances the purchase. It thus provides the ability for the buyer to purchase the goods without even having a corresponding demand deposit. Instead, the buyer is able to sell the goods on to another party, and it is this further negotiation of endorsement of the bill of lading that covers the non-existing demand deposit. (Ullmer-Schulz and Böttger, 1997, pp. 294-295; Grill and Perczynski, 2003, pp. 461-462)

Hence, the seller need not be concerned with the question of whether his far away customer is trustworthy, liquid, or solvent, since the promise for payment comes from a bank, and the buyer does not even have to provide cash up front, and therefore, neither needs to be concerned about the trustworthiness of the seller. The buyer does not even have to have a corresponding demand deposit, but might satisfy his payment obligation by a successive sales contract that generates the required cash inflow.

All of this is achieved by a complex system of IOUs, which would be impossible under a hundred percent reserve free-banking regime. Instead, such a regime resembles something more like a Western movie, where actual shipments of gold are transported by some Wells Fargo carriage into the wild and open territories in order to furnish some payment. Accordingly, it simply remains a mystery how such a system is supposed to reduce transaction costs. Instead, it transforms international trade into a painstakingly slow and risky business that requires an army of mercenaries to guard all of these transactions in gold, Pinkerton-style.

The question that remains is what effect an increase in liquidity preference would have under such a free-banking regime of a hundred percent gold reserve. According to Rothbard, any increase in liquidity preference would only precipitate a real balance effect that ultimately re-establishes Say's law (Rothbard, 2010[1963], p. 30). Hence, this interpretation of liquidity preference is based on markets without rigidities, or even time-lags, that would prevent an immediate adjustment of prices.

3.3.2 A fractional reserve free-banking

The alternative to such a hundred percent gold free-banking system would then be George Selgin's fractional reserve free-banking system. As mentioned above, the usage of clearinghouses would reduce the necessity to hold reserves, since cash payment commitments among banks could be netted out. The question is whether such a system would be able to provide the stability that a 100 percent money system would require to prevent investment in excess of saving.

The assessment of the 100 percent money qualities of a fractional reserve free-banking regime hinges on the question of whether a clearinghouse mechanism is able to provide the required stability or not. According to Selgin, the distinction between outside and inside money is vital when it comes to liquidity preference because an increased demand for inside money that is induced by a rise in liquidity preference can and should be accommodated by the banks (Selgin, 1988b, p. 55).

Another distinction that is important in this regard is the distinction between transfer credit and created credit. An increase in liquidity preference induces the bank's clients to increase their deposits with the intention to reduce their current demand for goods. The increase of these deposits may then be used to grant additional credit by the same amount and thereby create additional deposits or outright fiduciary media, which will then be used for demand on goods. Hence, the increased demand for inside money is accommodated, since the negative demand effect for goods by the increased liquidity preference of one group of deposit holders is compensated by the granting of loans, which instead turn into effective demand for goods. In the case of a decrease in demand for money due to a drop in liquidity preference, the process would have to be the other way round, i.e. the granting of loans has to be curtailed to the same extent because otherwise transfer credit would turn into created credit. As transfer credit corresponds

with voluntary saving, created credit corresponds with forced saving, since more credits are being made available for investment purposes than people are prepared to curtail their spending. The inflationary effect on prices then forces a reduction in real consumption on all whose income does not rise correspondingly. (Selgin, 1988b, pp. 60-61)

As was already mentioned, the interpretation about the consequences of liquidity preference differs between the hundred percent reserve free-banking system and the fractional reserve free-banking system. In contrast to their position, the real balance effect according to Selgin does not serve as a remedy in the short run, but instead, a drop in real income is likely to occur (Selgin, 1988b, p. 55). As long as only an additional demand for inside money that is induced by a rise of liquidity preference is accommodated, no additional demand for goods will be the consequence. Hence, the existence of liquidity preference already justifies a diverging amount of outside versus inside money.

However, if banks are in the position to issue more inside money than is backed by outside money, then what hinders them from issuing inside money by creating loans that finance investment in excess of saving? According to Selgin, the clearinghouse mechanism provides two stabilising features that prevent this from happening.

First, it is assumed that only one bank plays the maverick and grants additional loans in excess of liquidity preference, i.e. creates inside money through created credits and not transferred credits. The consequence would be that, in the clearinghouse mechanism, this bank increasingly moves into a net debtor position vis-à-vis all the other banks, as the excessively issued fiduciary media ends up in the hands of any other bank, since it was used as a means of payment by the client of the issuing bank. The consequence is a drainage of reserves of the issuing bank, which is consequently forced to reduce its business as its ability to settle accounts through the clearinghouse mechanism shrinks. (Selgin, 1988b, p. 68)

Yet, the clearinghouse mechanism that curbs credit creation, which enables investment beyond saving, only works as long as no excess reserves can be obtained (Selgin, 1988b, p. 68). A distinctive feature of this free-banking architecture is that no obligatory reserve requirements exist, unless they are part of a statuary mutual agreement of the clearinghouse members. Hence, the reserve holding is economised to such a degree that they provide the banks with the ability to settle accounts through the clearinghouse

mechanism, and therefore, no excess reserves are accumulated. (Selgin, 1988b, pp. 28, 31)

Nevertheless, according to Selgin, the institution of a clearinghouse should also be able to provide the option of interbank lending in times of crisis. That is, when one bank is unable to settle its account, another bank might help out by lending it excess reserves, like in the Federal Funds market, but in a more transitory fashion and not as a permanent interbank credit market. (Selgin, 1988b, p. 29)

Now the contradiction becomes apparent, since there is either already a full economising of reserves, which leaves no room for excess reserves and therefore no potential for interbank lending, or there are excess reserves at individual banks, and therefore, interbank lending is also possible, and it is the interbank lending that economises the holding of reserves. Hence, formerly nonearning excess reserves are now used for interbank lending. In the case of interbank lending, the above-mentioned constraint of the clearinghouse mechanism to curb the issuance of excess inside money is partly being lifted.

In fact, the interbank lending market becomes an ideal instrument for banks to bridge reserve gaps whenever they appear in the clearinghouse mechanism. It therefore enables banks to meet their minimum reserve requirements or the reserves needed to settle their accounts at the clearinghouse by obtaining reserves bilaterally on the interbank market. (Gertchev, 2012, p. 218)

This carries the potential to amend the reaction of the other banks entirely. The expanding bank is able to increase its profits and market share by the excessive issuance of loans, at least as long as the clearing mechanism does not drain its reserves (Huerta de Soto, 2012[2011], p. 634). Yet, with the existence of an interbank credit market, the expanding bank is able to defer that clearing mechanism and continue its expansion of profit and market share, since it is able to obtain the reserves it needs for the settlement of its clearinghouse account on the interbank credit market. In such a situation, the only viable option for the competing banks to re-establish their market position is either to form a cartel, which collectively puts pressure on the expanding bank to settle its account and thereby to dry up its access to interbank credits, or to embark on an expansionary policy themselves (Gertchev, 2012, p. 214-215). Yet, the formation of a cartel that prevents the expansion of a single bank proves to be difficult because, by obtaining credit on the interbank market, the expansionary bank allows the reserve

providing banks to participate in the generation of extra profit through the expansion (Gertchev, 2012, p. 219).

The factors that determine the extension of the interbank credit market are supposed to be threefold. First of all, the degree of concentration determines the extent to which transactions can be netted out within banks. The more decentralised a banking system is, the more vibrant the interbank credit market becomes as the financing needs gain in complexity. Secondly, the size of the interbank credit market is expected to show an inverse correlation with the statuary reserve requirements, since with a hundred percent reserve requirement, no excess reserve accumulation for interbank credit is possible, and with a decreasing statuary reserve, the scope for excess reserve, and therefore for interbank lending, increases. Thirdly, the trustworthiness between banks decides whether the counterparty is deemed able to finally honour its obligations and is therefore eligible for receiving credit. (Gertchev, 2012, pp. 220-221)

The freezing up of the interbank credit market then is to be interpreted as the request to honour the obtained obligations and the cessation of rolling over existing credits (Gertchev, 2012, p. 226).

Hence, any of the mentioned factors may bring the interbank credit market to a halt and finally curtail the credit expansion. This could be an increased concentration of banking institutions, an increase of the mutually determined reserve requirements of the clearinghouse, or the mutually shared doubt in the ability of a bank to honour its obligations. However, as long as the interbank credit market is still operational, it is more likely that the reaction of the other banks to the expansion of one bank will be to follow suit and thus result in a likewise expansion of the entire banking sector.

In fact, this notion refutes the existence of a constant reserve multiplier, which determines a certain correlation between the amount of outside and inside money (Gertchev, 2012, p. 219).

Selgin agrees with this refutation of a constant reserve multiplier, and yet, this does not mean that this simultaneous expansion of all banks can go on unchecked. Even though a simultaneous and uniform increase of credit expansion, i.e. issuance of inside money, by all banks nets out their corresponding debit and credit positions, and therefore, no change in the original net credit and debit position occurs that was apparent before the expansion started, the growth in the sheer size of transactions makes an overall increase

of reserves necessary for precautionary reasons. What drives up the overall demand for reserves in such a case is the sheer rise in volume and, with it, the increased default risk, which the intermittent mismatch of debit and credit clearings could provoke. What Selgin refutes is that there exists a constant reserve multiplier but also that no such correlation would exist that ultimately curtails credit expansion to such an extent that there is no change in nominal prices. (Selgin, 1988b, pp. 74-82)

The logic of this assessment again has to be seen in the light under which the phenomenon of liquidity preference is interpreted. A rise in liquidity preference leads to a corresponding increase in the provision of inside money, which can only be extended to such a degree that it does not change the volume of transactions taking place, since otherwise, the existing overall reserves would not be sufficient to cover the increased risk of default, due to the higher variance of debit and credit settlements. Hence, in order to prevent any increase in the volume of transactions, the increase of inside money has to be neutral in the sense that it does not amend overall spending, but only compensates for the drop in spending due to the increase in liquidity preference. Under this logic, fractional reserve free-banking would indeed not be inflationary.

What makes fractional reserve free-banking inflationary is more the violation of reserve principles. If a constant overall amount of reserves is assumed, then no creation of credit can occur that is in excess of saving. However, the situation changes when the simultaneous and uniform extension of inside money has led to a state of despair for banks, since they are unable to settle their clearinghouse accounts, due to an overall insufficiency of reserves for the actual volume of transactions, and the reaction is not to curtail the amount of inside money accordingly, but simply to come to a mutual agreement of watering down the reserve standards.

Allyn Young describes this incident, and Perry Mehrling makes one aware of the way that, in a state of despair regarding the sufficiency of reserves, members of the clearinghouse in New York came to the mutual agreement in 1907 to issue clearinghouse loan certificates against the provision of acceptable collateral by the banks short in supply of reserves. These clearinghouse loan certificates were then treated like clearinghouse certificates, even though the underlying collateral were not gold reserves but some other assets. (Young, 1929[1924], p. 4297; Mehrling, 2011, p. 32)

Huerta de Soto's suspicion, that, with a fractional reserve free-banking system, there eventually appears a central bank that acts as a lender of last resort is not unfounded at all (Huerta de Soto, 2012[2011], p. 638). In fact, according to this notion, it is the bankers themselves who then ask for an institutionalised lender of last resort in the form of a central bank (Huerta de Soto, 2012[2011], p. 669). This is precisely what happened with the establishment of the Federal Reserve, since the Federal Reserve Act met the bankers' request for short-term loans, such as trade acceptances but also business and farm loans, to be accepted as collateral (Mehrling, 2011, p. 32).

The reason why short-term loans found acceptance as collateral has to be seen in the banking school doctrine of self-liquidating bills of exchange, whose discounting merely serves as a very short-term form of finance for the employment of working capital. Since their issuance and their settlement, and hence the creation and destruction of fiduciary media, happen almost simultaneously, no lasting increase in fiduciary media should be detected.

This is not entirely true for short-term loans, which are not bills of exchange but loans to finance the employment of working capital for an extended period of time, as is typical in the agriculture sector. At the time that the Federal Reserve was founded, these loans played a major role, which is why these kinds of loans were also accepted as collateral. The point is that the establishment of an institutionalised lender of last resort who would be able to bridge these bottlenecks in financing the employment of working capital was precisely because, without such an institution, the shortage in reserves caused a rise in interest rates and drove in gold reserves from Europe, which would then furnish the increased requirements of reserves in order to ensure the settling of accounts at the clearinghouse in a situation of increased transaction volumes which were owed to the seasonal requirements of an agricultural crop cycle. (Mehrling, 2011, pp. 32-33)

The intention of such legislation was therefore to make a distinction between the productive financing of working capital and the financing of speculative long-term securities and to allow elasticity of reserves and of inside money, only for bridging the seasonal requirements of transaction peeks. The reason this attempt failed is the fact that, for the interbank lending, the underlying collateral were in fact the bank's balance sheets, which were laden with long-term securities, and therefore, obtaining liquidity on the interbank credit market depended on the ability to obtain liquid reserves against the provision of long-term financial engagements, which therefore constitutes a mismatch

of maturities. As long as there is a ready market for these securities, the usage of them as collateral is unproblematic. A problem only arises when the value of the collateral is in doubt. This constitutes the speculative nature of interbank finance, whose functioning depends on the valuation of the underlying collateral. (Mehrling, 2011, p. 34)

The absence of surges in interest rates, thanks to the Federal Reserves' accommodation of demand for inside money for financing working capital, also resulted in a comfortable interbank credit market, which was hence not put under stress and able to operate under low interest rates and increasing valuations of assets, i.e. securities (Mehrling, 2011, p. 42).

> "Intervention to stabilize seasonal and cyclical fluctuations produced low and stable money rates of interest, which supported the investment boom that fueled the Roaring Twenties but also produced an unsustainable asset price bubble." (Mehrling, 2011, p. 42)

This is precisely the scenario that Mises warned against when attacking the banking school doctrine of neutrality on prices in discounting bills of exchange (Mises, 1978[1928], p. 104).

Hence, the problem of maturity mismatch in fractional reserve banking is not the only one that needs attention from the law of large numbers, but also the problem of favourable short-term interest rates translating themselves into the financing of long-term assets, as already mentioned above in the chapter on modern Austrian macro.

As with Selgin, the problem of fractional reserve backing is, on the one hand, solved by arguing that not all demand deposit holders will require cash by gold withdrawals at the same time, and therefore, statistical modelling on how much reserve should be provided for transaction purposes would prevent illiquidity (Selgin, 1988b, p. 67). The components that decide about the amount of reserve holding are the asset and liability structure and the resulting likely debits and credits with the clearing house, as well as a precautionary factor determined by the sheer size of transactions (Selgin, 1988b, p. 72).

On the other hand, Selgin proposes a case of a legal structuring of assets and liabilities, including the matching of maturities by using term deposits and thereby matching possible cash outflows with probable cash inflows, as well as using legal elasticity,[27]

[27] Katharina Pistor defines the concept of legal elasticity as follows: "A legal system committed to the rule of law is meant to apply law irrespective of status or identity. Contracts are designed to create

which allows demand deposits under certain circumstances to be redeemable only by a predetermined delay.[28]

Yet, the actual reality of contractual agreements is that contracts are mostly incomplete when it comes to the foresight required in order to design the contract in such a way that it allows for sufficient elasticity under uncertainty. Such elasticity would, for example, provide such leniency to the debtor to redeem the contractual obligations by a certain delay should specific circumstances materialize that render it impossible to redeem demand deposits on request. (Pistor, 2013, p. 326)

The clearinghouse therefore only allows financial elasticity to the degree that IOUs, such as clearinghouse loan certificates, are mutually accepted, in the sense that they are perceived as substitutes to clearinghouse certificates. Should this acceptability fade, the consequence would be a request for immediate redemption in the ultimate money of gold or whatever commodity money is supposed to be the reserve. Yet, the institutionalised lender of last resort, in the form of a central bank, breaks with this principle, since it is able to issue credit in the form of official fiduciary media against collateral it deems to be acceptable. As already mentioned in the chapter on Minsky, it is only in the absence of a lender of last resort that banks are forced to sell assets in order to meet their cash outflow commitments.

Therefore, according to Salerno, there is no difference between solvency and liquidity in the case of fractional reserve banking, since demand deposits are backed by reserves of the ultimate money, i.e. gold, and the liquidation value of all other assets. Hence, an increase in liquidity preference resulting in a fire-sale of assets not only represents a situation of illiquidity but also of insolvency as asset valuation decreases dramatically and eradicates equity. (Salerno, 2012, p. 115)

So, when a central bank is able to avoid a situation of widespread illiquidity and insolvency on a national level, the question remains of what can do the trick on an

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credible commitments that are enforceable as written. Yet, closer inspection of contractual relations, laws and regulations in finance suggests that law is not quite as evenly designed or applied throughout the system. Instead, it is elastic. The elasticity of law can be defined as the probability that ex ante legal commitments will be relaxed or suspended in the future; the higher that probability the more elastic the law. In general, law tends to be relatively elastic at the system's apex, but inelastic on its periphery." (Pistor, 2013, p. 320)

[28] As the latter option is actually one of legal elasticity, in the sense of a Legal Theory of Finance (LTF) by Katharina Pistor, which also plays a role in the Minskyan solution of a crisis, this phenomenon and its possible consequences will be dealt with in more detail at a later stage when the two theory strands are compared; See pp. 317-320.

international level. The same problems that apply to the situation on a national level also apply to the situation on an international level.

The development of the business cycle theory did not happen in some sort of historic vacuum, but also has to be considered with the background of the Great Depression at the end of the 1920s and the beginning 1930s. According to Barry Eichengreen's assessment, the cause for the Great Depression was, to a substantial degree, in the US Federal Reserve's policy to neutralise gold inflows, which prevented an expansion of inside money and a subsequent devaluation of the dollar in order to prevent further outflows of gold from Britain to the US (Eichengreen, 1992, p. 204).

In contrast to this, Hayek sees the causal fault for the collapse of the world economy in the expansive monetary policy adopted by Great Britain in order to avoid deflation. According to Hayek, this deflation was justifiable due to reduced production costs attributable to technological innovation. It is therefore the shrinking ratio of outside money towards inside money by the Bank of England that posed a violation of the gold standard. (Hayek, 1999a[1932], p. 158)

According to this logic, the US abstaining completely from neutralising the expansionary effect of the gold inflow would have consequently allowed the Bank of England to expand its inside money supply even more. The misconduct of the Federal Reserve was merely to suspend the neutralisation of gold inflows whenever economic activity was slack, and it therefore suited their own interest, even though they knew that Great Britain would always continue to counter its deflation by increasing the supply of inside money even further. This also freed the Federal Reserve from any concern that an expansionary monetary policy would eventually backfire, since they could rest assured that the excessive monetary policy by the Bank of England would impede any significant reverse gold flows. (Hayek, 1999a[1932], p. 159)

In fact, Eichengreen is in accordance with Hayek that the cessation of the neutralisation policy, or the adoption of an expansionary monetary policy, in the US, depending on whether one sees it from the Eichengreen or the Hayek perspective, coincides with phases where economic activity slackened (Eichengreen, 1992, p. 210). Hence, in contrast to Eichengreen, Hayek's conviction is that the Federal Reserve never fully engaged in any neutralisation of gold inflows but instead also adopted an expansionary monetary policy. According to Hayek, the request put to the US Federal Reserve to counter the outflow of gold from Britain to the US with an even more expansionary

monetary policy is nothing but an absurd assessment, since this would have only resulted in a severe inflation and an even more dramatic crisis. (Hayek, 1999a[1932], p. 159)

In order to understand the fear of inflation at that time, it has to be taken into account that the fear of inflationary tendencies was also substantial on the side of the Federal Reserve, even though industrial production in 1928 was lower than in 1924, and commodity prices were not on the rise. What provided concern regarding inflationary tendencies were the stock-market valuations of the Wall Street boom. The Federal Reserve was therefore highly concerned with a reallocation of resources away from stock-market speculation and towards real economy investment. Yet, an increase in the Federal Reserve's discount rate increased the interest rate level and thereby led to further inflows of capital from Britain to the US, further fuelling the stock-market bubble. On the other hand, a continued expansionary monetary policy also did not enhance real economy investment but instead went into stock-market speculation. The options open to the Federal Reserve were either to coerce the banks to use fresh credit only for real economy investment or to increase interest rates in order to prick the bubble. As a first option, the coercion of credit for industrial purposes was chosen by discounting only bills of exchange and short-term loans that were backed by real economy activity. However, it proved difficult to pinpoint such purposes exactly and led to portfolio shifts of financial institutions that did not require discounting with the Federal Reserve in order to fill the finance gap of speculators. (Eichengreen, 1992, pp. 217-219)

Eventually, the policy of discriminative discounting proved to be ineffective, which is why the Federal Reserve turned to the second option of sharply increased interest rates (Eichengreen, 1992, pp. 250-251).

It is important to understand why the outflow of gold reserves from Britain to the US took place in the first place. Surely, they were the results of persistent balance of payment imbalances, which were not rectified by an increased rate of interest by the Bank of England. Because the economy was fragile, the Bank of England feared that further economic stress caused by a heightened interest rate would ultimately result in severe political instability. (Eichengreen, 1992, pp. 211-213)

Yet, expansionary monetary policy could have continued in Britain without any accompanied outflow of gold reserves. The point is, however, that the IOUs that Britain provided as a substitute for gold did not find the acceptability required for proxy money.

As Elisabeth Allgoewer points out, the standards for reserve requirements varied widely among central banks at that time. Next to gold, inside money was therefore backed by foreign gold-backed currencies, as well as state securities. (Allgoewer, 2008, p. 58)

This point is crucial when it comes to the acceptability of foreign currencies as IOUs substituting actual gold reserves.

Unlike other central banks, the US Federal Reserve only allowed the backing by gold and by bills of exchange, as well as other short-term loans of the real economy. According to Eichengreen, the accumulation of treasury securities through open market operations was only allowed to offset a decline in the discounting of private sector short-term credits in a case of an economic slump, which thereby restricted the ability of open market operations substantially. Furthermore, with a persistent balance of payment surplus, combined with the unacceptability of foreign currency as reserve and the relatively high reserve ratio requirements, the balance of payment surpluses translated into an automatic request for redemption in gold. (Eichengreen, 1992, pp. 194-195)

The only two ways to escape this is either firstly, the abolishment of the gold standard and therefore the disposal of the redemption of IOUs in gold, or secondly, loans granted on a bilateral basis, which break with the automatism of gold transfers and provide leniency for a delay in redemption. The former was the ultimate consequence of the Great Depression, which albeit came too late and whose freedom of manoeuvre was not fully exploited (Eichengreen, 1992, p. 393). The latter depended on bilateral credit agreements, which were achieved now and then, but only as an exception and not as a rule (Eichengreen, 1992, p. 209).

The increased deterioration of the British pound then was consequently followed by a lack of confidence by other nation's central banks and their request for an immediate redemption of currency reserves in gold. The financial elasticity that the fractional reserve system provided was countered during the crisis by a widespread lack of mutual trust and the cessation of mutually granted credit. (Allgoewer, 2008, p. 58)

The result was the overall flight into the ultimate money of gold and a resulting decrease of the central banks' reserves, which also led to a decreased amount of inside

money and thereby to deflation. This in turn eroded confidence and increased liquidity preference even further and thereby deteriorated the reserve base even more. (Allgoewer, 2008, p. 59)

It is important to note the parallel with the chapter on Keynes and liquidity preference, since it is seen in the Minskyan framework that an increase in liquidity preference means striving for the most liquid asset, which, in a gold backed fractional reserve system, is the outside money of gold.

Even if it started out as a free-banking system, the consequence in a gold backed fractional reserve system is that the transformation of the clearinghouse into an institutionalised lender of last resort in the form of a central bank is almost inevitable. The same restrictions that apply nationally also apply internationally, as long as the ultimate outside money is gold. Hence, on an international level, the national central banks face the same restrictions as the domestic banks nationally. The way to provide financial elasticity internationally would then be to ensure mutual acceptance of IOUs, for example by creating an international clearinghouse, which allows pooling and economizing reserves on an international level, as well as an international interbank market for central banks, which ensures that excess reserves of one central bank are made available to another. Then again, such an international clearinghouse would face the same difficulties as the national clearinghouse, since at some point in a situation of an overall liquidity crisis, i.e. reserve shortage that endangers the settlement of accounts, member banks might be willing to accept clearinghouse loan certificates as substitutes for clearinghouse certificates. This is when the international clearinghouse gradually turns into an international central bank as a lender of last resort.

In the absence of such an international central bank, another option would of course be for all central banks to coordinate their expansionary monetary policies in such a manner that allows them to grow uniformly and that was not achieved prior the Great Depression (Eichengreen, 1992, p. 393). Such concerted action would only be achievable if all central banks would be able to engage in an expansionary monetary policy, such as by open market operations. This was not the case prior to the Great Depression because, for example, the US Federal Reserve was only allowed to use open market operations for neutralising gold inflows by selling treasury securities and by purchasing treasury securities only in order to compensate for a reduction in bills of exchange discounting in a situation of a slacking economy. It was, however, not

permissible to do so in order to expand the amount of inside money beyond that evening out of reductions of inside money due to reductions in real economy activities. Furthermore, even if there is the possibility for a concerted and uniform expansionary monetary policy, any such policy is limited by the increased requirement in reserve holding for precautionary reasons, due to increased transaction volumes.

The idea of an international central bank is effectively also what Keynes had in mind in his proposal for Bretton Woods, as an institution with a "synthetic reserve asset" that is able to issue paper credit that is internationally accepted as a means of settlement, such as a clearinghouse loan certificate. Instead, the International Monetary Fund (IMF) was established as a global clearinghouse, and at the time of its founding, it was still based on gold reserve. (Eichengreen, 1992, pp. 398)

Though this changed as with the abolishment of the Bretton Woods system, the IMF's Special Drawing Rights (SDRs) were not defined by an amount of gold equivalent to the US dollars' gold exchange ratio, but by a basket of currencies, namely today the euro, Japanese yen, pound sterling, and US dollar (IMF, 2014, p. 1). Hence, today the SDR has become a synthetic reserve asset, and unlike gold, it is not a static reserve but has been subject to changes in volume three times since the end of the Bretton Woods system. The last time it was increased was in 2009 by almost tenfold, from formerly 21.4 billion SDRs to now 204 billion SDRs, in order to cope with the aftermath of the global financial crisis (IMF, 2014, p. 2). Hence, it could be interesting to assess whether the international reserve of SDRs is increased to such a degree that the settlement of increased volumes of international transactions, which could be induced by a uniformly applied expansionary monetary policy of the world's most important central banks, should pose no trouble to the global payment system.[29]

[29] In the chapter on Minsky, it was mentioned that the actual world's reserve currency is the US dollar. Even though this belief is widely held to be true, since most commodities are denominated in US dollars, it is actually not true in the international hierarchy of money where SDRs are the ultimate money above the US dollar. However, the issuance of additional SDRs is a rare occasion and was owed in 2009 to the severity of the financial crisis. The issuance of US dollars on the other hand, is a unilateral matter of the US Fed, which, with the role of the US dollar as a world reserve currency, can be regarded equal to an increase in gold in a gold backed currency system (D'Arista, 2009, p. 644). The downside of this, however, is that, in the situation of the financial crisis, the international supply, with the global reserve currency US dollar, also depends highly on mutual liquidity swaps with other national central banks who would then end up with questionable collateral on their balance sheets that required rolling over financing in US dollar (Mehrling, 2011, p. 121). Roughly one fourth of the Fed's balance sheet increase in the wake of the crisis actually consisted of such liquidity swaps with foreign central banks (Mehrling, 2011, p. 3). The problem this kind of system might also cause is that central banks, which are not part of mutual liquidity swaps agreements with the US Fed, are factually excluded from direct access to the 'almost' ultimate money and can therefore also not take part in a uniform expansion of credit money, since there

Ultimately, Selgin's concept of a free-banking fractional reserve system then turns into some sort of a system that we already have, unless of course it is absolutely prevented that the clearinghouse obtains any lender of last resort functions. However, as already mentioned, history shows that, in the US, this was initially not established by the state but by a mutual agreement through the member banks themselves. The limits of an inelastic outside money like gold will then eventually be met again as soon as an international clearinghouse is established, which eventually faces the same restrictions that the national clearinghouses faced before. When member banks come to the same kind of agreement that they came up with on a national level before, a global clearinghouse with lender of last resort functions will have been established and with it a synthetic global reserve as the ultimate outside money.

As Mises already pointed out, the Currency School adopted a far too limited scope, since it only considered an expansionary monetary policy in one country, and constant monetary policies in all the others, but not a concerted and uniform expansion in all countries. Such a unilateral expansion would indeed be checked by increased imports, which lead to balance of payment deficits and thereby to an outflow of gold reserves. Yet, this does not hold true for a uniform and global expansion. (Mises, 1978[1928], p. 108)

The resolution of the moral hazard problem created by a lender of last resort system of national central banks is thereby only deferred further and further up the evolving global financial hierarchy, until a global clearinghouse faces the same restrictions formerly faced on a national level. In order to protect financial elasticity and thereby to keep the payment system, i.e. the settlements of clearinghouse accounts, intact, the disciplinary effect of a fractional reserve system, which the Currency School envisioned by a gold reserve standard, would then only come into practice when the global level in the banking hierarchy is reached. It is then the sheer volume of transactions that forces a limit on the creation of inside money, since existing gold reserves no longer suffice to ensure the unimpeded settlement of clearinghouse accounts.

Considering the problem of redeemability of currency in both of the above-mentioned alternative free-banking architectures, it might be appropriate to ask whether redeemability is a necessary feature at all. As was already mentioned, the first alternative of a hundred percent gold free-banking system lacks the financial elasticity

always exists the danger that they will issue liabilities that will turn against them by draining their US dollar reserves and their inability to alleviate this by liquidity swaps with the US Fed.

to cope with increases in liquidity preference, at least when one assumes that an increase in liquidity preference actually has detrimental effects on real income. Furthermore, it results in a payment system of an almost pre-medieval nature, which has the potential to make global trade possible only at almost prohibitively high transaction costs. Both of these are results of the necessity that inside money always has to be redeemable by the outside money of gold at a hundred percent. By the probable adoption of lender of last resort institutions, the second alternative of a fractional reserve free-banking system has the potential to delay the disciplinary function of redeemability so far into the future that the global economy will ultimately be at the verge of collapse.

In the chapter on Minsky, the Modern Monetary Theory/ Chartalist framework can certainly answer the question of whether redeemability is a necessary feature clearly with a "no". According to their definition, money is a creature of the state, and it is of value due to legal tender laws and its obligatory use to pay taxes to the state. Yet, in a free-banking system, legal tender laws do not exist because any bank can emit its own currency. Yet, as Hayek shows in his own free-banking architecture, and as will be discussed in the following section, redeemability is in fact not an obligatory feature in free-banking either. However, the abolishment of redeemability is not part of Hayek's free-banking architecture from the start but something that evolves through his insight that transaction costs matter.

3.3.3 Hayek's free-banking

The first version of Hayek's free-banking architecture stems from the year 1943, and unlike the other two above-mentioned free-banking proposals, it is not a gold based architecture, but it is instead commodity based and explicitly denounces gold (Hayek, 1999b[1943], p. 106). Even though it denounces gold, there is no question of whether the international gold standard has the ability to establish an internationally accepted money without being at the discretion of any international monetary authority or to provide an automatism for disciplining monetary policies and making it thereby foreseeable (Hayek, 1999b[1943], p. 106).

The disadvantage of gold is to be seen more in its lack of elasticity and the questionable allocation of resources it causes. The introduction of the gold standard in another

country and the increase in liquidity preference both result in an increase in demand for gold and therefore also in its value. This increase in value attracts new mining activities for gold, but since such mining activity is a lengthy process, additional gold reaches the market rather belatedly and is therefore not able to accommodate deflationary pressure, but when it finally materialises, it might even cause inflationary pressure. (Hayek, 1999b[1943], p. 108)

The hundred percent gold standard therefore does not only lack the required elasticity to react on decreases or increases of liquidity preference, but also has the potential to cause monetary fluctuations.

Connected to this aspect that the amount of gold is relatively inelastic is the fact that increased demand for gold increases the value of gold backed money over time. Such an increase in demand for gold backed money may stem from increased liquidity preference or an increased amount of gold backed currencies, but it may also stem from productivity increases, which make gold scarcer in comparison to other commodities. The important disadvantage of such a money is not the increase in purchasing power itself, which poses no problem, at least with a functioning real balance effect, but is derived instead from the financing problems that such increases in the value of money constitute. According to Hayek, the fact that gold backed money is subject to increases in value discourages debtors from entering into nominally fixed loan contracts, as the real burden of debt thereby increases over time. (Hayek, 2008[1979], p. 19)

This assessment is an important contradiction to the one made prior by Hayek and to the way the assessment is depicted in the chapter on Hayek's business cycle 1.0. There, it is laid out that decreases in prices, which are due to productivity increases, do not pose any difficulties and, in the Austrian sense, are not even considered as deflation as such. This might hold true from a real balance perspective, but from a financing perspective with nominally fixed debt payment obligations, it most certainly does not. Even with equally decreased costs in raw materials, intermediate products, and wages, the real burden of nominally fixed debt payment obligations increases and so does the real burden of contractually fixed interest payments, therefore resulting in increased real financing costs. In order to compensate for the nominally constant cash outflow obligations of loans under decreasing prices, and therefore for the increased real financing costs, either other cash outflow obligations have to decrease over-proportionally compared to the decreased final goods prices, or the real balance effect

would have to be able to stabilise turnover to such an extent that the constant cash outflow commitments are met by constant cash inflows in the face of falling prices. Hence, it is not sufficient to re-establish profitability. Rather, a re-established equilibrium between cash outflow commitments and cash inflows, i.e. liquidity, is required. Though, with a time-lag in the reaction of the decreases of costs, in comparison to decreased final goods prices, not only is profitability re-established with a time-lag but also the cash flow equilibrium. Yet, while an intermediate decrease in profitability does not pose any immediate threat, a decreased liquidity does pose a threat when nominally fixed debt payment obligations cannot be met anymore. It is then of no concern whether, at some point in the near future, a real balance effect will reconcile cash inflows with cash outflow commitments, since such a future point may never even be reached because illiquidity is instantly fatal.

Another aspect is that gold, unlike other commodities, almost exclusively serves only the one purpose of being the most liquid asset, but beyond that, it is of no practical use in the real economy. Hence, an increase in its price allocates resources to the production of something that only provides liquidity but serves no other productive purpose at all. (Hayek, 1999b[1943], p. 108)

The money system envisioned by Hayek is therefore one that takes account of this lacking flexibility of a hundred percent gold-backed money, as well as its questionable allocation of resources. Instead of backing inside money with gold, it is prefferable to achieve this backing by other commodities, such as raw materials. Any increase in liquidity preference, and therefore an increased amount of inside money, then results in a built up of stocks of specific commodities and raw materials that can be used for a wide array of production purposes. Once the liquidity preference again diminishes, all these materials can be put instantly to productive use. (Hayek, 1999b[1943], pp. 109-110)

In other words, risen liquidity preference results in an increased amount of working capital, and a subsiding liquidity preference results in a decrease of working capital as it is transformed into long-term capital assets that are destined for specific production purposes. In this sense, liquidity is not just a liquidity of financial positions, but also a liquidity that provides an economy with the actual flexibility to rearrange its production process. (Hayek, 1990[1976], p. 89)

Hayek's first version starts off by still providing a monetary system in which actual redeemability of inside money into the outside money in the form of a basket of commodities and raw materials is given. In fact, such redeemability would not differ from that of a 100 percent gold standard in free-banking, since in the same manner, the inside money would constitute a document of title constituting proprietary rights to the corresponding amount of outside money, yet in this case, not gold but an array of commodities.

In a later version, Hayek refuses the notion of redeemability and instead only refers to a concept of price stability in reference to a basket of specific commodities. It is up to the emitting bank to determine which assortment of commodities the privately emitted currency is pegged against, and it very much depends on what kind of clientele the bank is aiming to attract. (Hayek, 1990[1976], pp. 48,74)

Hence, it depends on the kind of working capital in which the bank's customers would like to be liquid. To 'be liquid in' has to be understood in the sense of 'to be flexible in' as to what kind of working capital best serves their purpose of retaining flexibility in regard to their production possibilities. This function of liquidity is not watered down once redeemability is abolished, but instead, only the amount of created inside money decides about the price level of the currency in connection to the basket of commodities.

In the first version of Hayek's free-banking monetary system, it is not the banks themselves that keep stocks of commodities, but instead, such service is provided by adjoining entities that provide this service to the banking system as a whole (Hayek, 1999b[1943], p. 112). In Hayek's later version, redeemability is then abolished due to the costs such warehousing would incur. Instead, trust in a currency is established by its discipline to create no amount of inside money that would deteriorate the purchasing power of the currency (Hayek, 1990[1976], pp. 48-49). Alternatively, as Selgin puts it in his version, no additional inside money is generated by created credit, but only by transfer credit. The price level then assures the function that retains the flexibility in accordance with the level of liquidity preference, since the prices for the underlying commodities are not prone to fluctuations. Therefore, they are subject neither to slumps, in the case of increases in liquidity preference, nor to rises, in the case of decreasing liquidity preference. The allocation of resources in an economy through the price mechanism therefore ensures that production and extraction of these commodities is

kept stable, and this allows for the production possibilities to be flexible in accordance with the liquidity preference.

The only difficulty that arises is that such a system also creates its own mechanisms that provide it with financial flexibility, which potentially counters the financial discipline it originally intends to ensure. Hayek explicitly refers to this with the term "parasitic currencies" (Hayek, 1990[1976], p. 64). These are currencies that would be established by other financial institutions by the creation of demand deposits denominated in the original private currency but really constituting a redeemability in that original currency. The parasitic currency then uses the original private currency as a reserve currency or as its outside money. According to Hayek, such a process cannot be discouraged legally by the originally emitting bank and also should not be discouraged because of the flexibility it provides to the payment system. Yet, it should not be encouraged either, in the sense that the parasitic currency then provides created credit instead of transfer credit and feels free to do so, since it perceives the issuing bank, in case the of a liquidity drain of its reserves, as effectively acting as a lender of last resort by accepting the parasitic currency at par. Hence, such a function of a lender of last resort should not be exercised by the issuing bank in order to prevent the moral hazard of excessive risk taking by the parasitic bank. (Hayek, 1990[1976], pp. 64-66)

Nevertheless, the above analysis might still be too short sighted in the face of modern finance. As is shown in the chapter on Minsky, there are financial institutions, such as mutual money funds and structured investment vehicles, that were not considered to be banks as such; neither were the financial arms of corporations, which partake in credit money creation, even though some of them meanwhile obtained bank licenses. Even without such a legal sanction as a bank license, companies are taking part in banking activities, and the bank license only ensures access to central bank facilities (Fasse, 2014, p. 16-17).

Effectively, any company that requests the issuance of a credit note[30] from its counterpart, for example, for a faulty but already paid delivery, creates credit money, since it defers its payment request to some unspecific point in time. In case of a longstanding business relationship between two companies, the commitment stated in the credit note might be honoured at a later date when another business transaction between the two takes place, even though it is immediately due for reimbursement, like

[30] For definition of a credit note see Business Dictionary, 2014.

a demand deposit. Hence, the generation of credit money, i.e. the creation of IOUs denominated in one or the other currency, is a matter of daily business conventions and does not even require a banking licence. Furthermore, assuming a business relationship where both companies are in turn buyer and seller of goods or services of one another, a huge amount of business transactions may effectively take place solely based on the issuance of mutual invoices and credit notes and hence only based on the commitments to pay currency with currency transactions, which only takes place after netting each other's invoices and credit notes. When these resulting IOUs are being accepted as a means of settlement by further third parties that usually also do business with the original two parties in the form of an acceptance or bill of exchange[31], a parasitic currency has effectively been established already.

The settlement in the underlying currency then may be deferred by mutually granting credit for some time, until some imbalances build up or some party that needs the actual currency for other payment obligations actually requests payment in the original currency. The original currency then is the reserve of that parasitic currency, and whether the system breaks apart depends on the net debtors' cash management in reserves and their ability to finally honour their debt obligations in the original currency. Should the accumulated debt obligations exceed their ability to acquire the necessary reserves, and should there be no lender of last resort who helps them out, the system of that parasitic currency will collapse. Hence, everyone will scramble for reserves, and an increase in liquidity preference will ensue and, with it, the intention of position making as well as a cessation of credit granting.

It is important to note, however, that no banks are required for such a process to ensue. The argument made by Hayek is, of course, that, without a lender of last resort, the contagious moral hazard of excessive risk taking will not spread any further, but that nevertheless assumes that such a process only occurs in one relatively isolated area of the economy and not in the economy as a whole. Hence, only one of the privately issued currencies suffers from excessive risk taking by one of its parasitic currencies, and all other issued reserve currencies and their parasitic currencies do not. That seems to a be a bit of a heroic assumption, since it is not clear why all of the parasitic currencies of all the privately issued reserve currencies should not be able to expand uniformly. Harold Rose critises exactly this, since according to him, the problem in Hayek's architecture

[31] For definition of bill of exchange see Encyclopaedia Britannica, 2014.

lies not so much in one currency expanding but in all currencies expanding uniformly (Rose, 2009[1976], p. 27).

On the one hand, Hayek's banking architecture really takes account of liquidity preference, and it does so not only in the sense of liquidity as a financial position but also with liquidity in the sense of flexibility in the adoption of production procedures by providing a working capital composition that reflects that required flexibility. Furthermore, the flexibility is not only reflected by the working capital composition but also by the ratio of working capital to long-term asset, which both reflect the liquidity preference resembled in the asset structure with regard to the allocation of more or less liquid assets.

On the other hand, it is unable to really avoid the issuance and expansion of parasitic currencies and, with it, the risk of widespread default. Hayek points out that, in accordance with Gresham's law, in a free-banking flexible exchange rate system, any badly managed currency will eventually be driven out of the market. This is something that is contrary to what happens with a badly managed state monopoly currency under fixed exchange rates. Here, the fixed exchange rate works to the disadvantage of the well managed currency, since an increased amount of loosely managed currency increases the rights of recourse in the well managed money despite its limited availability. Hence, as the exchange rate enforces the acceptability of the badly managed currency, it substitutes the well managed currency, since loans taken on in the badly managed currency can be serviced to the advantage to the debtors. (Hayek, 1990[1976], pp. 41-42)

The crucial point about Hayek's banking system functioning in accordance with Gresham's law then lies essentially in the flexible exchange rates. Furthermore, there has to be at least one well managed currency and not uniformly expanding currencies, i.e. badly managed currencies.

It is then the flexibility of the exchange rates that sorts out the bad apples. Yet, with parasitic currencies expanding without much increased usage of the original privately issued reserve currency, a scarcity of the underlying commodities might ensue, which increases the price level of the original reserve currencies (Hayek, 1990[1976], p. 89). This induces the issuing banks to reduce their issued private reserve currency. The tightening of the issuance of currency not only affects the privately issued reserve currencies and their parasitic currency, which caused the trouble, but also all privately

issued reserve currencies almost indiscriminately, only depending on the composition of their commodity baskets as they are, more or less affected by increased commodity scarcities and rising prices. It has to be remembered that the source of trouble is not necessarily the privately issued reserve currency itself but some remote parasitic proxy currency.

The problem that the misconduct of some parasitic currency has an effect on all issuing banks is owed to the fact there is no redeemability into some outside money on top of the hierarchy. As was shown above with a private fractional reserve banking system and the establishment of clearing houses, the net deficits of the parasitic currency would have to be honoured in the form of the privately issued reserve currency, and in between, the reserve issuing private banks the net deficits have to be honoured by some outside money on top of the financial hierarchy. Yet, with differing baskets of commodities determining the price level of each privately issued currency in a different manner, such a common and single denominator is not part of the design.[32]

According to the former British Financial Secretary and Economic Secretary to the Treasury Douglas Jay, such a design as the one laid out by Hayek then only results in a conflict about what the exchange rate between the currencies actually would be and finally requiring the state to pass a legal tender law, which determines a common denominator that provides such a basis (Jay, 2009[1976], p. 27). This effectively means that there will be an outside money residing on top of the hierarchy in the form of a synthetic reserve money.

The question that still has to be answered, though, is what role the deflation plays in a depression. This may depend on the chosen financial architecture. According to Klausinger, the deflation can only be of any function in Hayek's world when a commodity reserve currency is assumed, as in the case of the gold standard. When the credit expansion leads to a situation in which the amount of outside money in the form of commodity money is not sufficient anymore to support the payment system, a shrinkage of the amount of inside money, and with it, a drop in the general price level,

[32] It could also be thinkable that exchange rates are established by uncovered interest parity (UIP) arbitrage, but this does not always hold true, since for a time, there may be speculation against the law of UIP arbitrage holding true when there are mismatches in liquidity swaps of different currencies where the hedging party is reimbursed for its risk taking in speculating against the UIP arbitrage that would hold true if there were no mismatch in the liquidity swaps market (Mehrling, 2011, pp. 76-77). Nevertheless, what is missing here is the hierarchy of money in which there is one ultimate money at the top, and where relative exposures of currencies against one another in terms of the ultimate money could be distinctly determined.

becomes inevitable. However, the situation is completely different in the case of a managed fiat currency where the central bank can always adjust to the increased liquidity preference by providing a greater amount of reserves. (Klausinger, 2012b, pp. 8-9)

Of course, that is unless the central bank in the fiat currency system refuses to accommodate the increased liquidity preference.

Hayek's free-banking architecture then can be seen as a mixture of the two systems. The private banks can meet an increased requirement for liquidity by issuing a greater amount of their currency. This currency is then, however, used by the parasitic currencies as reserves. Hence, in a crisis, the initial shortening of the issued private currencies would only go so far as to re-establish the old price level with regard to the currency's commodity basket. The banks would counter any increase of liquidity preference that precipitates a further drop in prices by issuing an increased amount of their currencies. Unlike in the case of a 100 percent commodity reserve system, there would only be a primary deflation, which liquidates the excesses, but an increased liquidity preference beyond that point would be countered by the accommodation of that liquidity preference by an increased issuance of currency. A secondary deflation, which feeds on itself by an ever-increasing liquidity preference, would be countered by an increased money supply. This is something that is not possible in the case of a 100 percent gold backed money or a fractional gold reserve central bank currency, but it is possible in the Selgin case of a fractional gold reserve backed free-banking system.

The case of a secondary deflation theoretically only becomes a possibility for a hundred percent gold or commodity backed currency and for a fractional gold reserve central bank currency. In the first case, an accommodation of increased liquidity preference is excluded by definition because there is an identity between outside and inside money. In the second case, as shown above, it is the external drain of gold reserves that will be exacerbated by a central bank issuing more inside money and thereby increasing its net debtor position towards other central banks, which only increases the external drain of reserves. In contrast to that, with the fractional gold reserve free-banking system, as was shown, the external drain of reserves of one private bank is only the gain in reserves of another private bank. Hence, only the private bank that excessively inflated its inside money is being forced to reduce its amount of inside money, whereas the other private banks' ability to accommodate an increased liquidity preference that goes beyond the

destruction of created credit remains undeterred. Yet, as was shown above, this only is true as long as there has been no uniform expansion of inside money by all private banks in one country. In such a situation, a point will be reached where the reserves will not suffice anymore to keep the payment system intact. As was shown in this chapter, the imminent threat of a collapse of the payment system calls for a lender of last resort. As history shows, this is a call that does not necessarily come from any state authority but from the banks themselves. This is when the fractional gold reserve free-banking system transforms itself into a fractional gold reserve central-banking system, which of course may face the same constraints of a net debtor position of the domestic financial system versus a net creditor position of foreign financial entities. With vast increases in inside money, all of the domestic banks and their central bank would be net debtors to foreign banks and experience an external drain of reserves, which would leave the entire domestic financial system with a diminished ability to accommodate an increasing liquidity preference.

The secondary deflation in the world of Hayek is the symptom as well as the cure of market rigidities (Klausinger, 2012b, pp. 9-10). The fact that prices for resources and wages do not instantly follow the drop in final goods prices and thereby re-establish profitability is the consequence of market rigidities, and that is what precipitates the secondary deflation. The drop in demand for resources and labour then forces the suppliers thereof to give up price and wage levels that they have become accustomed to and accept the new realities. However, as was shown above by Röpke, it must be remembered that, for the real balance effect to work through a re-established profitability, it is not sufficient to break up market rigidities so that prices for resources and wages follow the drop in final goods prices, but there must not be any time-lag of price and wage adjustment at all. In a 100 percent gold backed free-banking system or a fractional gold reserve central banking system, some time-lag of price and wage adjustment is already sufficient for a secondary depression that drags the economy into the abyss and provides no cure to the system whatsoever.

3.4 Assumptions regarding prices, rate of interest, and rational behaviour

As it is described in the chapter on Hayek's business cycle 1.0, Hayek stands in the tradition of Austrian price theory of imputation of prices of Carl Menger and Böhm-Bawerk. As shown in the chapter on Böhm-Bawerk, it is therefore not a theory of cost added price calculation in the sense of a bottom-up price calculation starting with production costs, but it is a top-down price formation taking the demand for final goods as the starting point and deriving all prices and profit margins from there. This is in line with Hayek's claim that there is "No such thing as a [...] cost push inflation". (Hayek, 1990[1976], p. 95)

According to Hayek, even though it could be that wage earners or suppliers of raw materials induce a rise in wages and prices of raw materials through monopolistic price setting, this does not mean that the general price level of final goods prices will also be automatically on the rise. Unless the government adds additional money to the market through its central bank, no such inflation will occur. (Hayek, 1990[1976], pp. 95-96)

> "Neither higher wages nor higher prices of oil, or perhaps of imports generally, can drive up the aggregate price of all goods unless the purchasers are given more money to buy them. What is called a cost-push inflation is merely the effect of increases in the quantity of money which governments feel forced to provide in order to prevent the unemployment resulting from a rise in wages (or other costs) [...]." (Hayek, 1990[1976], p. 95)

Yet, Hayek concedes that the nature of monopolistic price setting is not that the prices for resources like wages and raw material prices lead to an unemployment of those same resources but of less employment of other resources (Hayek, 1990[1976], p. 96). Since the demand for the resources whose price setting is of a monopolistic nature is relatively inelastic, an increase in their prices leads to a reduction in the demand for other resources, for whom the demand is relatively elastic, since their importance is less prominent when it comes to the satisfaction of higher ranked wants in an ordinal scale.

A monopolistic price setting and competition

As already described in the chapter on Mises, the nature of monopolistic price setting is that the suppliers of resources are able to curtail their supply without there being any substitute or near-substitute to replace it. In other words, there needs to be price inelasticity that allows for the supplier to reduce his output in such a way that the increase in price is higher than the decrease in output. Yet, in microeconomics, monopolistic price setting always takes place within the realm of price elasticity and never in the realm of price inelasticity. The reason for this is simply that, as long as the region of price elasticity has not yet been reached, there still is room to increase the generated profit. Hence, the price maximum of a monopoly is reached in the region of price elasticity. (Herberg, 1994b[1985], p. 89)

In other words, monopolistic price setting increases the price right up to the point where the combination of positive price effect and negative quantity effect, resulting in a negatively sloped marginal revenue function, lead to a marginal revenue that equals marginal costs. Hence, an increase in price is worthwhile as long as the marginal costs are still above the marginal revenue. (Mankiw and Taylor, 2008[2006], pp. 357-359)

Another point of critique regarding the monopolistic competition in modern micro certainly must be the assumption of a U-shaped marginal cost curve. As it is described in the chapter on Hayek's business cycle 2.0, the only production function that can logically be assumed is a linear-limitational production function with decreasing average costs and linear marginal costs. As was shown in the chapter on Minsky, this is also the production function in the world of Minsky. In a footnote in the chapter Hayek's business cycle 2.0[33], it was also indicated that the notion of a perfect competition market is logically irreconcilable with a linear-limitational production function. This assessment is also in line with the post-Keynesian assessment that a linear-limitational production function with a downward sloping demand curve has to be assumed for any individual company, i.e. a monopolistic world without a market supply curve (Keen, 2011[2001], pp. 89, 123). For a monopoly, the profit maximum would of course not be determined by a price that is at the intersection of the marginal revenue function with the marginal cost function. Instead, it would opt to make a profit by choosing a price on its marginal revenue function that exceeds its average costs. In

[33] See p. 190.

such a situation, the fact that a monopolist sets its price in the elastic price region holds true.

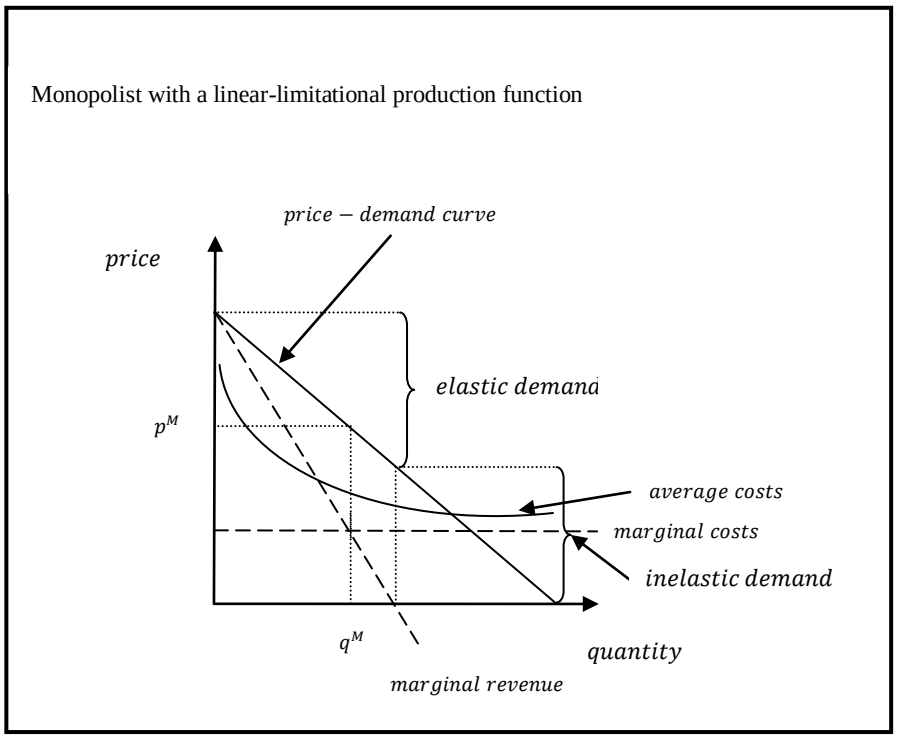

Figure 19: Monopolist with a linear-limitational production function.

Source: Own figure based on Mankiw and Taylor, 2008[2006], p. 369 and Herberg, 1994a[1985], p. 277.

Mises' criticism that monopolistic price setting must depend on the ability of a company to cut output due to inelastic demand is only true in relative terms. Any monopolist will take advantage of the inelastic demand up to the point when demand becomes elastic again. Hence, Mises' criticism that monopolistic competition merely describes a competition among substitutes or near substitutes, which therefore cannot be regarded as truly monopolistic, runs too short, since any monopoly sooner or later reaches a region of demand elasticity, and the difference is merely a difference of the degree to which a monopolist is able to take advantage of a more or less inelastic room for price setting. According to the Robinson-Amoroso relation, the marginal revenue function is always divided into an elastic upper part and an inelastic lower part, as shown in the graph above (Herberg, 1994a[1985], pp. 246-277). Accordingly, it is the steepness that decides how far up the monopolist can drive the price until the elastic part of the marginal revenue function is reached.

What Hayek criticises about the concept of monopolistic competition is then more about the fact that the same unrealistic assumptions of perfect competition are being transferred onto the concept of monopolistic competition, especially the assumption that

there is a uniform market price and that the demand function is known to the market participants (Hayek, 1948a, pp. 94-95). Hayek expressly mentions some crucial assumptions with regard to perfect competition. These assumptions are, first, the homogeneity of goods, the relatively small size of companies, and their inability to influence prices; secondly, the supposedly free entry into markets and the absence of price rigidities; and thirdly, the complete knowledge that all market participants supposedly possess. (Hayek, 1948a, pp. 94-95)

The assumptions of a large number of market participants, that market entry as well as market exit are assumed to be unrestricted, and that price setting is ultimately influenced by supply and demand are certainly assumptions that could also be made for the market of monopolistic competition, but what sets it apart from perfect competition is the fact that the goods being traded are not homogenous but heterogeneous, and market transparency is not a necessary characteristic either (Herberg, 1994a[1985], pp. 316-317).

In fact, in his essay *The Meaning of Competition*, Hayek describes a competition of heterogeneous goods that serve to satisfy differing preferences determined by individual needs, and these are being paid tribute to by product differentiation and advertising (Hayek, 1948a, pp. 96-97). Or, as Lachmann puts it, "[...] most actual market forms are hybrids of monopoly and competition." (Lachmann, 1977[1954], p. 143)

> "The function of competition is here precisely to teach us *who* will serve us well: which grocer or travel agency, which department store or hotel, which doctor or solicitor, we can expect to provide the most satisfactory solution for whatever particular personal problem we may have to face. [...] The reasons competition in this field is described as imperfect have indeed nothing to do with the competitive character of the activities of these people; it lies in the nature of the commodities or services themselves. If no two doctors are perfectly alike, this does not mean that the competition between them is less intense but merely that any degree of competition between them will not produce exactly those results which it would if their services were exactly alike." (Hayek, 1948a, p. 97)

The chapter on Böhm-Bawerk refers to the idea that the missing identity of costs and prices, which should be assumed in accordance with the imputation of prices, and which

is due to market frictions, is caused by the inability to accommodate changes in preferences straight away. It is therefore the change in wants and the inability to satisfy these wants immediately that causes the mismatch of costs and prices and therefore profits. In other words, the ability to meet a specific set of customers' wants, determined by individual preferences by only a few or even only one competitor, gives rise to monopolistic price setting. Furthermore, it takes time for other market participants to develop the ability to satisfy these altered customer preferences. This is the connection between market frictions and the change in preferences, as described by Böhm-Bawerk and the "imperfect" competition that Hayek describes. The monopolistic price setting and, with it, the generation of profit is possible because it takes time for all entrepreneurs to adapt their production to ever changing and specific customer preferences determined by ever modified needs, and it is initially only met by one competitor or a very small minority.

> "It is only in a market where adaptation is slow compared with the rate of change that the process of competition is in continuous operation. And though the reason why adaptation is slow *may* be that competition is weak, e.g., because there are special obstacles to entry into the trade, or because of some other factors of the character of natural monopolies, slow adaptation does by no means necessarily mean weak competition. When the variety of near-substitutes is great and rapidly changing, where it takes a long time to find out about the relative merits of the available alternatives, or where the need for a whole class of goods or services occurs only discontinuously at irregular intervals, the adjustment must be slow even if competition is strong and active." (Hayek, 1948a, p. 103)

In this sense, competition is to be seen as a dynamic process, which is driven by the permanent alteration of product qualities and active price setting (Kirzner, 1997, p. 64).

The homogeneity of goods is therefore not a wishful precondition for any meaningful concept of competition that takes individual preferences seriously. Neither is full market transparency a precondition for competition but rather the result thereof (Hayek, 1948a, p. 101). According to Hayek, the only precondition that retains acceptability is ensuring free market entry and therefore the removal of any market entry barriers constituting market rigidities (Hayek, 1948a, p. 104).

A twofold determination of the rate of interest

In *The Pure Theory of Capital*, Hayek takes up the above-mentioned Böhm-Bawerk connection between price formation and the rate of interest. As was mentioned in the chapter on Böhm-Bawerk, there are three reasons in Austrian theory for the rate of interest phenomenon. The first reason is the inter-temporal scarcity of real income; the second is what nowadays is referred to as praxeological Pure Time Preference Theory; and thirdly is the notion of productivity. In *The Pure Theory of Capital*, Hayek dismisses the second reason of Böhm-Bawerk for the rate of interest as an irrational reasoning (Hayek, 2009a[1941], p. 320). In this sense, the under-valuation of the future is not founded on any rational economic intention but instead on an irrational failure to grasp the requirements of the future and therefore to indulge every whim without thinking about the consequences. As described in the chapter on Böhm-Bawerk, this concept has therefore more in common with a drug addict than with economic optimising behaviour. It is important to note that the dismissal of Böhm-Bawerk's second reason for the rate of interest also equals the dismissal of the concept of Pure Time Preference Theory, which, as described in the chapters on Mises and Böhm-Bawerk, is based on Böhm-Bawerk's second reason for the rate of interest. It is therefore a refutation of the praxeological or tautological time preference theory, as propagated by Mises and his disciples of modern Austrian economics like Murray Rothbard and his followers.

The remaining two reasons for the rate of interest are therefore the inter-temporal real income optimisation and the productivity of investment (Hayek, 2009a[1941], p. 320).

Lachmann describes the first reason as finding its counterpart in the price system by the increase in spot prices compared to future prices. In other words, an increase in perceived scarcity of real income today leads to increased spot prices today, in comparison to future prices where real income is expected to be relatively more abundant than today. The increased difference between spot and future prices may be owed to the fact that, in a case of a credit money induced boom and an accompanying rise in investment that is not accommodated by increased voluntary saving, i.e. a change in time preference, present real income is increasingly withheld from consumption purposes and turned into means of future production, which in turn increases the abundance of future real income. A rise in the rate of interest takes account of this change in inter-temporal real income distribution, and if it is prevented from taking

place, this sends out misleading signals about the change in inter-temporal scarcity of real income in conjunction with the prevailing time preference. (Lachmann, 1978[1956], p. 124)

The second remaining reason is not a physical productivity anymore but instead has to be seen as a price valued productivity (Hayek, 2009a[1941], p. 170). The concept of a price valued productivity used by Hayek is a marginal price value productivity, which Hayek calls the marginal productivity of investment and which expresses the marginal value productivity, depending on the expansion of the investment period of a specific input (Hayek, 2009a[1941], p. 179). The marginal productivity of investment is thereby to be understood as a time rate (Hayek, 2009a[1941], p. 179). A time rate means that it is a proportional rate of increase in contrast to an absolute rate of increase. The proportional rate of increase is the concept of a rate of interest, whereas the absolute rate of increase is the compound interest. Hence, a constant rate of interest or proportional rate of interest, which "[...]in order to obtain it, we have to divide the absolute rate of increase of the product due to a given extension of the investment period by the amount of the product", results in a growing absolute rate of product value (Hayek, 2009a[1941], p. 177). A constant rate of interest therefore corresponds with an exponential compound interest function, which shows an exponential growth of product value in correlation with time (Hayek, 2009a[1941], p. 175). The importance of this observation lies in the fact that many different productivity curves with differing amounts of initial inputs and lengths of investment periods may simultaneously touch the same compound interest curve (Hayek, 2009a[1941], p. 184). This means that they show the same rate of interest in their tangential point with the compound interest (Hayek, 2009a[1941], pp. 184-185). White states, "The (constant) ratio of its slope to its height represents the interest rate, which is assumed to be the same over each interval." (White, 2008, p. 184)

Yet in the same manner, it is possible that a variety of compound interest functions touch these productivity functions at a different tangential point, resulting in a different ratio of slope and height and therefore in a different rate of interest. It is from this argument that Hayek derives the assessment that the equalisation of marginal productivity of investment is a necessary, but not a sufficient, requirement for an equilibrium. (Hayek, 2009a[1941], p. 185)

In other words, the equalisation of marginal productivity of investment does not provide a definite proportional rate of growth or rate of interest that would qualify as an equilibrium.

Yet, Hayek concedes that the above-mentioned simultaneous validity of different productivity functions runs into difficulty when a specific complementarity of production is assumed. First of all, the decision for a longer production process can only be executed by choosing an alternative production process and not by the extension of an existing investment project. Secondly, the decision to choose a longer production process for one input changes all the other productivity curves, as there is a change in relative values. (Hayek, 2009a[1941], pp. 185-188)

> "The value of any part of this total income stream will depend on, or will be a function of, the investment periods of all the units of input used." (Hayek, 2009a[1941], p. 188)

> "The factor which limits the possible extensions of the investment periods is that as one unit of input is invested for a longer period, the output stream at the earlier date is reduced and the value of the products maturing at this earlier date is consequently raised. This means that the value of the marginal products of units of input invested for that earlier date increases, with the result that it becomes profitable to invest more for that date." (Hayek, 2009a[1941], pp. 190-191)

In referring to the condition of a constant income stream, Hayek explains that the maximisation of the current income stream is brought about by an equalisation of the marginal productivity of investment. Differing marginal productivities of investments therefore pose an arbitrage situation, which realigns the amount of and time length of input invested in the chosen investment projects (Goodspeed, 2012, p. 129). In order to retain a constant income stream, it is, however, necessary that choosing a lengthened production process at one point has to be compensated by choosing a shorter production process at some other point, which compensates for the shortage of consumer goods brought about by the lengthening of the former production process (Hayek, 2009a[1941], pp. 160-165).

Hence, all investment projects will generate the same marginal productivity, and yet, opting for a longer production process for one investment simultaneously changes the

productivity functions of all the other investments, as the relative values of outputs and inputs change as well.

The difficulty in assigning a definite marginal productivity of investment that would serve as an equilibrium rate of interest solely based on the equalisation of the marginal rate of productivity of investment is, according to Hayek, that the concept of waiting, as an aggregate or average amount, cannot be measured in any way. The core problem for the inability to measure the aggregate or average amount of waiting brought about by choosing a lengthened production process is that there is no such thing as a subsistence fund as imagined by Böhm-Bawerk. (Hayek, 2009a[1941], p. 190)

The fundamental flaw of the concept of a subsistence fund is that it does not consist of readily consumable items but of intermediate products, which cannot be turned into final consumer products at a definitive speed of transformation. This speed of transformation into consumer goods depends on the complementarity of the economy's entire production process, i.e. the way that originary resources and intermediate products are being combined. (Hayek, 2009a[1941], pp. 85-86)

The combination of inputs, however, depends on their relative prices, and as was mentioned already, relative prices depend on the rate of interest. Prices of a certain final good, which are discounted at the equalised marginal rate of productivity and which exceed their costs, pose an arbitrage opportunity resulting in an increased production thereof and therefore an increased demand for that input, which brings the marginal rate of productivity back in line with all the other marginal rates of productivity (Goodspeed, 2012, p. 129). Hence, if the interest rate, defined here by the marginal productivity of investment, governs the speed of transition by which the intermediate products of the subsistence fund are being transformed into final consumer goods, i.e. the amount of waiting induced by a lengthening of an investment alternative, it is impossible that the amount of waiting alone could determine the equilibrium rate of interest. Nor is it possible that the rate of interest determines a measurable amount of waiting, since there is clearly a circularity in their relationship.

Yet, the problem of determining an aggregate or average period of production, along with the impossibility in establishing a positive correlation between the length of the production period and the capital value, is not new and was already laid out in the chapter on Böhm-Bawerk. Lachmann provides the consequent advice to take time out of the equation if the concept of productivity enhancement by increases in the number of

stages in production is to be rescued. This is exactly what happens in Hayek's *The Pure Theory of Capital* and what marks a great difference to his former work on business cycle theory.

A definite equilibrium rate of interest can then only be determined if time preference is considered (Hayek, 2009a[1941], p. 191). As was laid out above, the time preference in this regard is not the Pure Time Preference Theory as understood by Mises and his disciples but the inter-temporal optimisation of real income, which ultimately determines the realignment of production. Goodspeed explains, "Such a realignment of the structure of production would be sustainable, though, only if the corresponding output profile were justified by the time preference of consumers." (Goodspeed, 2012, p. 139)

In the sense of an inter-temporal optimisation of real income, the time preference therefore does not depend on any irrational under-evaluation of the future. Instead, constant preferences are also assumed, regarding time preference in a certain set of situations, which is represented by an indifference curve showing the indifference between present and future real income distribution.

> "[This][...] therefore means that, faced with the same possibilities, a person will at different moments of time distribute his resources in the same way between present and future." (Hayek, 2009a[1941], pp. 218-219)

However, this does not mean that the income distribution is necessarily of an equal manner between present and future, but it could also be that the intended income distribution is of such a manner that future income is to be increased at the expense of present income, or the other way round. The important feature is just that, under the specific set of circumstances, the chosen action will be the same, regardless of the point in time. Yet, with changing income, it is the set of circumstances that varies. (Hayek, 2009a[1941], p. 219)

The intended income distribution between present and future, i.e. time preference, determines the slope of the indifference curve, which means "[...] the time preference of the individual as represented by his marginal rate of substitution between equal present and future income streams" (Hayek, 2009a[1941], p. 234). The difference in the set of circumstances is taken account of by the varying slope of the indifference curve at the

45 degrees line (*w*) representing the equal distribution between present and future income.[34] Therefore, a negative slope at the point of interception of the two curves represents a positive time preference under the actual set of circumstances, whereas a vertical intersection represents a time preference of zero. (Hayek, 2009a[1941], p. 234)

The equilibrium amount of saving and investment will, however, be determined by the tangential point between the indifference curve and the transformation curve. Whereas the indifference curve takes account of the fact there is a diminishing marginal rate of distribution between present and future income, the transformation curve takes account of the fact that there is a decreasing marginal price valued productivity of investment (Hayek, 2009a[1941], p. 229).

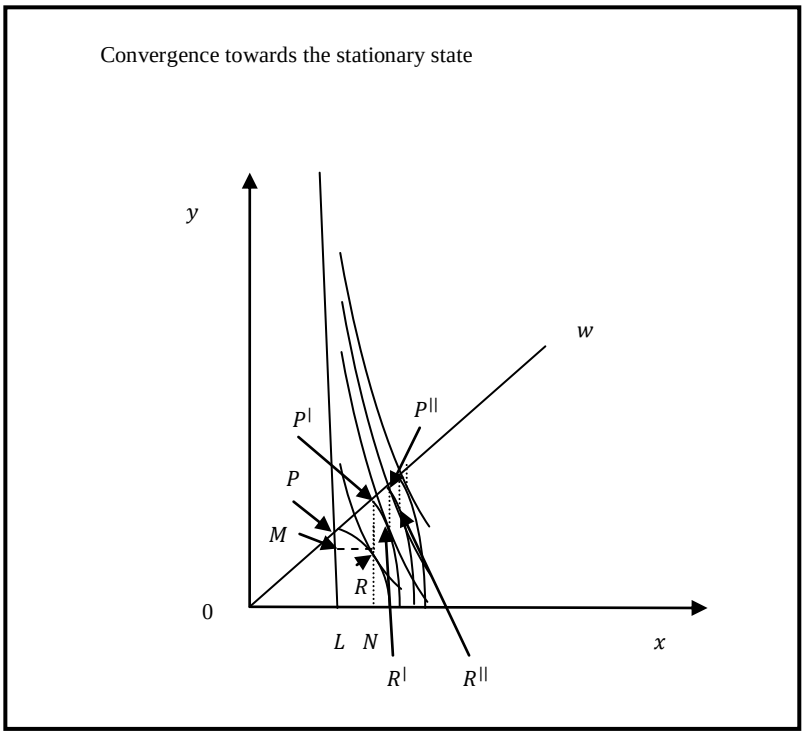

Figure 20: Convergence towards the stationary state.

Source: Hayek, 2009a[1941], pp. 222, 233.

The graph shows with 0y the present and with 0x the future income. If the actual income at the starting point is represented by LP, the amount that is being saved and invested is therefore represented by MP, which is determined by the tangential point R of the indifference curve and the transformation curve. The investment then results in a present income in the following period of NP', and the tangential point R' of the successive indifference curve and transformation curve determines the level of saving in

[34] It is of course also imaginable that the slope of the succeeding indifference curves change with an increased level of income.

that period. The tangential point of the indifference curve and the transformation curve represents the equality of the marginal rate of substitution between present and future income and the marginal productivity of investment. (Hayek, 2009a[1941], pp. 222-226, 233)

> "Whether and when a stationary position will be reached depends on the rate at which the productivity of investment decreases as the amount invested increases, compared with the change in the rate of time preference consequent upon the increase in income." (Hayek, 2009a[1941], p. 234)

The rate of interest is therefore determined only by the marginal rate of productivity until a stationary position is reached where no further saving takes place. Only then will it be the time preference that determines the rate of interest. Whether the interest rate will then be zero or positive depends on whether the slope of the indifference curve at its tangential point with the transformation curve and its simultaneous intersection with the 45 degree line of equal income distribution between present and future shows a slope of zero or a negative slope. In the case that the tangential point of indifference curve and transformation curve do not intersect with the 45 degrees line, but only approximate it with decreasing and infinitely small steps, the saving will continue indefinitely, and the rate of interest will be governed by the marginal rate of productivity of investment. (Hayek, 2009a[1941], pp. 234-235)

In other words, the marginal rate of productivity of investment will only approximate the rate of time preference, since the time preference in a certain period is represented by the intersection of the 45 degrees line and the indifference curve, which, in the approximation case, will never be actually met by the tangential point of indifference curve and transformation curve.

It is hereby important to note that all the saving taking place is voluntary saving, which means that all investment is fully covered by an equal amount of voluntary saving, which also means that at no point is the time preference being violated by credit money creation that might result in increased spot prices compared to future prices. In accordance with Lachmann's understanding of inter-temporal real income scarcity represented by spot and future prices, there would therefore be no reason for the interest rate to increase.

The same is true when the situation is that of an overall unemployment of resources. The investment in such a case only reactivates idle resources without any increase in spot prices. This situation is actually consistent with Keynes's multiplier effect, which generates its own saving. (Goodspeed, 2012, p. 137)

As spot prices remain unchanged, it poses no violation of time preference in the logic of Lachmann. In the chapter on Keynes, it was already described that the equilibrium interest rate is indeterminate, since investment creates its own saving at any rate of interest through the working of the multiplier effect.

Likewise, in the above description of Hayek's determination of the rate of interest, it is clear that, unless the stationary state, i.e. final stationary equilibrium, is reached, only the marginal rate of productivity of investment determines the rate of interest, at least as long as investment is accommodated by voluntary saving, i.e. time preference is not violated. Furthermore, it was established that the equalised marginal rate of productivity of investments on its own is indeterminate in regard to an equilibrium situation, since equalisation of marginal rates of productivity is only a necessary, but not a sufficient, criteria for an equilibrium situation. What limits the choice of any combination of investment projects is the way in which this amends the output schedule in comparison to the time preference. That means that the interest rate is not determined by time preference but by marginal productivity rates of investment, as long as the investment does not run contrary to time preference by inducing a perceived scarcity of present real income compared to future real income, which makes itself felt by increased spot prices in comparison to future prices. As long as there is no violation of time preference, the equalised marginal rate of productivity is, however, indeterminate. This is precisely the case in resource unemployment, when the equalised marginal rate of productivity can be anywhere, as long as the resulting investment does not violate time preference, and thus, the investment does not feed itself on forced saving, which increases spot prices, but instead relies on the resurrection of idle resources, which keeps spot prices unchanged.

Hayek thus states the condition of a stationary equilibrium as follows:

> "The members of the society must distribute their total resources between use for present and use for future consumption in such a way as to make the relative values of the different types of resources exactly proportional to their relative costs of production, where "cost of

> production" includes the uniform timerate of return on resources invested." (Hayek, 2009a[1941], p. 264)

Any other situation would represent a situation where increased investment would make a different allocation of resources worthwhile in time, since the relative values of resources would, for example, still be above their relative costs. Hayek ultimately comes to the conclusion that such a situation will most likely never be reached, and yet, the opportunities for arbitrage will at least steer the economy in the direction of an equilibrium (Hayek, 2009a[1941], p. 265). The reason why it is rather unlikely that a stationary equilibrium will ever be reached is that it would require constant data in the form of preferences, knowledge, and supply of originary resources. This is a constancy that is unlikely to happen, and even if it takes place, the changes towards a stationary equilibrium will get less in magnitude but might never cease entirely and thereby result only in the approximation of a stationary state. (Hayek, 2009a[1941], p. 264)

A mutual learning and the equilibrating tendency

The reason the economy is moving towards an equilibrium situation, which albeit might never be reached, is twofold. First, it is about knowledge, and secondly, it is about arbitrage. In *Economics and Knowledge*, Hayek points out that economic science has been very much concerned with the division of labour but has neglected the role that division of knowledge plays in the economy (Hayek, 1948b[1937], p. 50). According to Hayek, the equilibrium situation really is about individual plans to coincide. Therefore, it is not of primary importance that constant data is assumed. As long as market participants are able to align their expectations and make their individual plans compatible to one another, equilibrium can be achieved even under changing but mutually expected data (Hayek, 1948b[1937], pp. 40-41). Therefore, knowledge plays a pivotal role for Hayek, which can be traced throughout his work (Gamble, 2006, pp. 111-112).

The importance of knowledge can be seen in the fact that knowledge is privy to those who acquire and use it. Furthermore, it often does not need to be explicit, but may be subconscious and therefore inarticulate. It therefore poses to be an impossibility to collect knowledge centrally in order to put it to use by any central state authority. (Gamble, 2006, p. 115)

In *The Use of Knowledge in Society*, Hayek makes the point that knowledge therefore has to be with the person that is concerned with the task at hand, and it is decentralisation that ensures that knowledge is put to use when and where required. Yet, the immediate knowledge of any person is insufficient to ensure that the decision being taken is in line with changes in data of the whole economy. The price system is the device that ensures that such information is communicated. In this regard, prices convey immediate information about a change in scarcity, without the necessity for the decision maker to grasp entirely how this change has come about. It therefore reduces complex events to a digit number, which automatically precipitates amended decisions when it comes to the use of resources, products, or their substitutes. (Hayek, 1948c[1945], pp. 83-86)

According to Kirzner, equilibrating tendencies in Austrian economics are therefore governed firstly by the principle of mutual knowledge and secondly by the principle of entrepreneurial discovery. The principle of mutual knowledge thereby reflects the principle proposed by Hayek that market participants gain ever more detailed knowledge about one another's intentions. (Kirzner, 1997, p. 62)

The principle of entrepreneurial discovery is joined together out of the Hayekian approach of the learning of knowledge through the market process and the Mises stance that the entrepreneur is to be characterised as a forward looking speculative seeker of profits (Kirzner, 1997, p. 67).

Yet, there seems to be a distinctive difference between Kirzner and Hayek on the one side and Mises on the other.

The speculative nature of Mises's entrepreneur means that it is a future oriented activity, and profit seeking therefore works through the anticipation of future prices. This, however, requires information that is not included in present prices. (Salerno, 2010, p. 222)

Yet, according to Hayek, it is the competition process itself that provides the information (Hayek, 1948a, p. 106). Likewise, Kirzner also sees competition as the force that provides us with entrepreneurial discovery (Kirzner, 1997, p. 69). In contrast to this position, Salerno argues that, in the case of Mises, the forward looking and speculative entrepreneur requires the gathering of information as a precondition in order to enter any competitive process (Salerno, 2010, p. 187).

According to Kirzner, it is impossible to be actively and systematically looking for profit opportunities, since such is classified as previously undiscovered due to the fact that it was not even known that this information was not known (Kirzner, 1997, pp. 71-72). This kind of uncertainty can be identified as a Knightian uncertainty where only "estimated probabilities" can be attached, which means assumed probabilities that attempt to impose some sort of subjective order on something that is not orderly but serves for the human mind to rationally cope with uncertainty (Foss and Klein, 2012, pp. 81-84). Yet, Foss and Klein do not want this concept to be thrown together with that of complete uncertainty, as developed by Keynes. In their minds, the distinction between "class probabilities" and "case probabilities" is what makes rational judgement still possible (Foss and Klein, 2012, p. 86). The former is probability in the statistical sense, since certain probabilities can be attached, whereas no definite probabilities can be attached to the latter, but the likelihood of different incidents can be put in an order of likelihood as to what incident is more likely or less likely to happen (Salerno, 2010, p. 221).

The Kirzner approach therefore serves as a more detailed foundation of Hayek's principle of increased mutual knowledge, since it refers to entrepreneurial discovery as a general attention, yet not to any focussed and systematical gathering of information about profit opportunities (Foss an Klein, 2012, p. 52). In the systematic of Hayek and Kirzner, it is therefore the increased mutual knowledge that provides additional and formerly entirely unknown knowledge about opportunities for profits, i.e. arbitrage.

Yet, the case of Mises begs the question: if the process of competition and, with it, the resulting prices, cannot be perceived as the sources of knowledge, but the knowledge is instead to be regarded as a precondition for the competitive process, then where does the knowledge come from?

It comes from or, better, is embodied in "ideal types" (Salerno, 2010, p. 222). This goes back to Mises, who claims that an ideal type "[...] is always the representation of complex phenomena of reality, either of men, of institutions, or of ideologies." (Mises, 1998[1949], p. 62)

Thus, expectations are formed on future reactions of other market participants (Salerno, 2010, p. 221). According to Salerno, the question of how the praxeological a priori truth of economic theory plays itself out in the concrete form of economic history is governed by the employment of "ideal types" (Salerno, 2010, pp. 222-223). Yet, even if ideology

inhibits here and there the true understanding of what, for example, the creation of additional money supply means, in the end, the a priori praxeological truth filters through and leads to inflationary expectations (Salerno, 2010, pp. 222-223). Hence, ideal types in this regard provide no insight in economic theory understood as praxeology, since it merely describes the perception of information under predetermined categories of the mind, which might have been formed by ideology but do not alter the a priori truth of economic theory and the fact that it plays itself out sooner or later.

However, in the tradition of Mises, this assertion stands in contrast to the methodology adopted by Hayek. According to Hayek, the way knowledge is acquired is the crucial point in economic theory because it represents the object of empirical verification or falsification and "[...] is concerned not merely with implications but with causes and effects [...]" (Hayek, 1948b[1937], p. 33). In this citation, Hayek refers explicitly to Karl Popper's *Logik der Forschung*, and this is where Hayek adopts the methodology of critical rationalism (Sprich, 2008, p. 87). The topic of empirical enquiry would therefore be under which conditions there is a tendency towards an equilibrium and what is the process through which individual knowledge is amended (Hayek, 1948b[1937], p. 45). The human action, as understood by Hayek, is that of rational behaviour in the sense of conscious, and therefore purposeful, behaviour (Hayek, 1948b[1937], p. 47). Hayek's purpose is, however, not to explain a hypothetical world consisting of rational agents but to explain the conditions of rationality (Sprich, 2008, p. 90).

In order to comprehend what this rationality means in conjunction with critical rationalism, it has to be understood that, according to Popper's critical rationalism, modern science has shown that any final explanations are impossible to achieve, since scientific research can only offer an approximation of reality but can never finally expose the essence of a phenomenon (Popper, 2005[1977], pp. 215-220). This is not remote at all from the Kantian perspective that the human mind is unable to grasp the world as such, but only through the employment of individually formed mental categories, and this pessimistic view on the human's inability to obtain perfect information can be found in Hayek as well (Gamble, 2006, p. 119). The stimuli of the exterior world are therefore categorized in different manners and can therefore never represent a one on one equivalent of the exterior phenomenon (Sprich, 2008, p. 115). Yet, it is possible that there is a mutual understanding through communication because, even though human minds do not categorize equally, they do so similarly (Gamble,

2006, p.119; Sprich, 2008, p. 117). This means that from "[...] knowing our own mind we can know the minds of others." (Gamble, 2006, p. 119)

The crucial difference in the understanding of rationality between Mises and Hayek is the fact that, with Mises, the process of learning and therefore of understanding the other's reaction and behaviour is of no importance, whereas for Hayek it is. For Mises, "ideal types" carry no meaning for economic theory itself. They only help to understand how economic theory plays itself out, but that does not question that it ultimately plays itself out and is an a priori truth. In contrast to this, Hayek assigns an importance to the kind of ideal types that are selected and whether they carry any resemblance with reality, i.e. whether they are empirically true (Hayek, 1948b[1937], p. 48).

Accordingly, the question is not whether the axioms "pure logic of choice" or praxeology are a priori truths or not, since for the chosen ideal types, they certainly are, but that does not mean that the chosen ideal type resembles reality (Hayek, 1948b[1937], pp. 48-49). Ideal types matter because they carry the assumption about how knowledge is mutually shared, and this, as shown above, is a matter of cause and effect when it comes to the question of how an economy moves towards equilibrium.

The difference between the praxeology by Mises and the critical rationalism paradigm in Hayek's work can best be described by the example of Edgar Allan Poe's *The Purloined Letter*. This is a detective story in which the private investigator Dupin is hired by the prefect of the police to retrieve a compromising letter of the queen of France, which is held by a minister for the purpose of blackmail. The prefect of the police is at the end of his wisdom because Dupin describes him as merely a mathematician who is able only to apply his police methodology rigorously in searching for the letter but is unable to assume an empirically viable ideal type for the minister that serves him to apply his mathematical methodology in a meaningful way. Therefore, a poet, a mathematician like the minister, and Dupin himself are required. Finally, Dupin retrieves the letter because he is able to put himself into the mind of the minister, and this is why the police prefect did not succeed, since he lacks the poetic sentiment, which provides one with the ability of empathy. (Poe, 2004a[1845], p. 367-382)

Looking into Poe's literature theory, this has a twofold meaning. Firstly, aesthetic delivered by poetry is a universal category of the human mind and, in the Kantian sense, a transcendental truth (Poe, 2004b[1850], p. 701-703; Scruton, 2004[2001], p. 46). In another instance, Poe claims that the effect the arts aim to achieve should be calculated

without any intuition and solely governed by mathematical precision (Poe, 2004c[1846], p. 676-677). In the Kantian world mathematics is a self-evident synthetic a priori truth (Scruton, 2004[2001], p. 48). The contradiction between the employment of transcendental empathy and mathematical a priori truth can be resolved. Poe plays with the reader in so far as he creates a story that induces the attempted effect with the reader. He therefore designs the text in accordance with his assumptions about probabilities based on intuition, i.e. forms ideal types in order to actually achieve the attempted effect with the chosen ingredients. That means, however, that there can be a deviation between the actual effect and the attempted one. The moment of uncertainty evolves through taste, such as in reference to the beauty of aesthetic about which Poe writes: “Its sole arbiter is Taste” (Poe, 2004b[1850], p. 702).

Thus, every human mind shares the fact that everyone possesses a category called 'beauty'. What stimuli is being categorized in what way as 'beauty' is still a matter of individual preferences, which govern the aesthetic categorization of the stimuli and thereby result in a certain effect that is different for every human being.

Hence, if praxeology is, in the Kantian sense, seen as a synthetic a priori truth in the same way as mathematics, it remains meaningless if not applied to assumptions of ideal types that are somewhat realistic and provide a cause and effect relation that is empirically viable. According to Hayek's logic, it is not sufficient to simply say that market participants anticipate the reaction of their counterparties, since it has also to be asked how mutual knowledge is being amended so that the economy is driven towards equilibrium. In the allegory of Poe's literary theory, this is what forms assumptions about ideal types that become ever more realistic and provide the application of means to end, which more and more serve the intended effect. In this logic, without the amendment of knowledge or growing mutual knowledge based on empirically gained knowledge, such a cause and effect relation would never lead to a mutual and decentralized adjustment of plans.

Of course, this does not mean that such ideal types, in any of the minds of the market participants or scientific observers, will ever represent the full and essential picture but can only be approximations of reality. This is then also the reason why, even if constancy in data is assumed, any rational behaviour in the sense of a conscious and purposeful behaviour will never lead to a stationary state but, at best, to a continuing approximation thereof.

The connection between price formation, rate of interest, and rational behaviour is thus that the price setting can indeed be interpreted as one of a monopolistic nature, but with a Leontief linear-limitational production function, and it is the monopolistic profit that works as an incentive for resource allocation through arbitrage by realigning the production structure, also in accordance with time preference, in the sense of providing the right goods at the right time. The price system thereby provides the information for mutual learning, which ensures that resource allocation is successively brought in line with wished for goods in their respective quantity, quality, and availability in time. However, this process of mutual learning can never be complete, due to constant and unforeseeable changes in data, as well as through the limits of the human mind to build ideal types as mental categorizations, which can actually only be approximations of reality at best. The human mind may therefore be rational to the extent that it intends to serve a certain purpose, but the information upon which it acts must remain incomplete, and therefore, complete foresight, as well as completely coinciding mutual plans, cannot be achieved.

4 Common aspects and crucial differences between Hayek and Minsky

The most important common aspect of both theories is the fact that the causes of the boom bust cycle are monetary reasons founded in the phenomenon of credit expansion and financial innovation. Furthermore, the reason for the business cycle is seen as an endogenous development of financial fragility. Yet, according to Bagus, this is where the common aspects end (Bagus, 2012a, p. 237). The assessment of Prychitko is similar and states that the Minskyan theory is more about financial technicalities and not so much about disequilibrium in the monetary field (Prychitko, 2009, p. 2003). Furthermore, it is claimed that what is missing in Minsky is the explanation of how the boom develops into bust, since the preceding period of tranquillity remains vague as to what it means in regard to equilibrium theory and entrepreneurship. If relative tranquillity means coordination of plans, then what causes the bust? In other words, how can the seed of the downturn be an inherent part of tranquillity if there is coordination of plans? Without a theory of entrepreneurial decision-making, what could coordinate plans? (Prychitko, 2009, pp. 202, 209) Additionally, it is criticized that Minsky's theory is based merely on psychological factors rather than on monetary factors of credit money creation, resulting in real economy disturbances (Prychitko, 2009, p. 210). This then also has to be seen in connection with the Minsky theory failing to grasp the significance of economic coordination through relative prices. This is a deficiency that shows itself in the recipe to overcome the crisis by a reflation of prices in order to prevent a Fisher style debt deflation, without realising that this only prevents the necessary readjustment of relative prices in accordance with time preference (Prychitko, 2009, p. 211). From the post-Keynesian side on the other hand, it is claimed that the rate of interest is a purely monetary phenomenon, whereas it is a real phenomenon for Hayek (Kregel, 1985, p. 137).

In what has been shown in this thesis so far, some of the above-mentioned differences are true, but others are merely crude oversimplifications. It is true that, for Minsky, in a credit money creating economy, the rate of interest is a monetary phenomenon, as in the tradition of Keynes. Yet, it was also shown that if conditions in the Minsky world are being restricted to a situation where there is an exogenous money and no liquidity preference or a 100 percent money, then the assumption that the rate of interest is some indeterminate monetary phenomenon falls apart. It is no coincidence that both the post-Keynesian Minsky and the Austrian Huerta de Soto refer to the 100 percent money work of Henry Simons (Minsky, 1986a, p. 172; Huerta de Soto, 2012[2011], p. 731). As

is shown in this thesis, both the post-Keynesian Minsky followers, as well as the Austrians, come up with a 100 percent money design that is supposed to prevent financial instability. The difference is of course that the post-Keynesian approach is state and fiat money oriented, whereas the Austrian approach is free market and commodity money oriented. Yet, the objective to avoid financing through credit money creation, and thereby to ensure an investment that is covered by prior saving, is the same. Hence, for Minsky, the precise formulation should be that, in the case of liquidity preference and credit money creation, the rate of interest is a monetary phenomenon that has, however, real effects on the economy. Yet, as is stated at the end on the chapter on Minsky, even this qualification is not so crystal clear, and there might also be room for a natural rate of interest in the theory of Minsky, which is of course not explicitly part of Minsky's theory itself but a possible extension thereof, since the concept of a Minskyan-Wicksellian interest rate policy is introduced.

On the other hand, the interest rate concept of Hayek is at least in its final version of *The Pure Theory of Capital* not the same concept anymore which attracted criticism from Sraffa. Instead, the marginal rate of productivity employed by Hayek is not a physical rate of productivity but rather a price valued rate of productivity. This implies that the marginal rate of interest is not some physical rate of interest or own-rate of interest in its own commodity but equal to Keynes's concept of an own-rate of interest in money terms. (Goodspeed, 2012, pp. 20-23)

Furthermore, it has been established in this thesis that the equilibrium rate of interest in the *The Pure Theory of Capital* is primarily determined by this price-valued productivity and only to a secondary degree by time preference. The time preference as understood by Hayek is not Pure Time Preference Theory but a concept of inter-temporal optimization of real income. Such a concept is indeed missing in the Minsky theory in which consumption expenditure and saving as a residue, in accordance with the theory of Keynes, is governed by social conventions and ultimately by psychology. A Ricardian equivalence hypothesis is also rejected, and therefore, no need seems to arise to adjust consumption to inter-temporal real income scarcity, especially when it is assumed that budget constraints are lifted through credit money creation. Yet, the Minsky theory also claims that an increased lack of cash flows supporting the debt payment obligations ultimately results in financial instability and precipitates the bust.

The disciplinary force of finance thereby comes to bear through a financial instability, which is not sustainable and ultimately results in increased liquidity preference. As was shown, the phenomenon of liquidity preference is not entirely contested by Hayek either. What is contested is its quality as a solely monetary phenomenon and how liquidity preference works. First of all, according to the Austrian theory, liquidity preference can be a reaction to real economy imbalances that are being rectified through liquidity preference. In this sense, it would not be a monetary but a real phenomenon, and it is therefore not necessarily a psychological matter. Secondly, liquidity preference cannot be seen in isolation from productivity. Rather, the amount of the asset structure that is being held liquid depends on the inter-play of time preference, understood as inter-temporal scarcity of income and liquidity preference. It was mentioned above that the rate of interest according to Hayek is predominantly determined by productivity and only to a secondary degree by time preference. In the chapter on Hayek, it was also laid out that this is based on the assumption that, in the inter-temporal process, there exists an equality of saving and investment at every period, and therefore, no violation of time preference occurs. On the other hand, the violation of time preference results in a surge of spot prices compared to future prices. This relative increase in spot prices compared to future prices will also make itself felt in the marginal productivity of investment. As cash flows are discounted, the increase in cash flows in the present due to increased spot prices has a more pronounced effect than the decrease in cash flows in the future due to decreased future prices. As shown in the graph below, the consequence for the productivity of an investment would be an increase in the internal rate of interest.

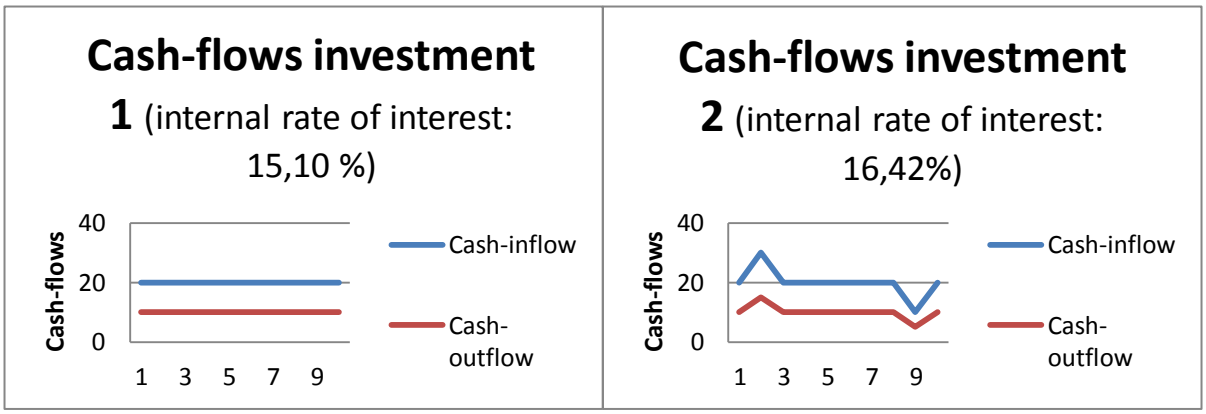

Figure 21: Productivity effect and time preference.

Source: Own figure.

It is therefore valid to say that time preference through the productivity of investments and in conjunction with liquidity preference determines the degree of liquidity in the asset structure. An increased price value productivity would thereby precipitate a shift from liquid working capital towards specific capital assets of investment projects.

It is hereby important to note that, as was shown in the chapter on Keynes's monetary economy, the liquidity preference is understood by the post-Keynesian school not as a crude categorization of liquidity that is synonymous with money, but in fact as a matter of liquidity in a relative sense of balance sheets structured by assets of varying liquidity from short-term to long-term. It is therefore not quite true when Garrison states that Keynesian liquidity preference necessarily involves a "loose link" between saving and loanable funds (Garrison, 2001, p. 140). Instead, liquidity preference is a matter of more or less durable assets, and liquidity preference therefore determines the spread in interest required for holding long-term instead of short-term assets. Hence, post-Keynesians also recognize the reallocation of resources from long-term, and therefore less liquid, to short-term, and therefore more liquid, and vice versa. Or expressed in Austrian capital terms, from specific, and therefore less liquid, towards all-purpose, and therefore more liquid, and vice versa.

Furthermore, it was shown in the chapter on Minsky that, according to him, the own-rate of interest of money only dominates the own-rates of interest by its liquidity preference as long as there are no inflation expectations that induce market participants to flee from money and instead to opt for tangible assets. Such a claim is similar to the one made by Lachmann that the commodity own-rate of interest may be higher than the money own-rate of interest in a case of severe inflation, and in such a case, money does not "rule the roost" (Lachmann, 1978[1956], p. 76). Hence, in such a case, there would be no liquidity preference in terms of money, but only the productivity of real assets would play a role, in conjunction with their degree of liquidity. This shows that there is a bridge between Hayek's Austrian theory and the Minsky theory regarding liquidity preference.

It was shown that both theories deny the existence of rational expectations, but the way uncertainty is dealt with differs. The normal case in the post-Keynesian world is that of an under-employment situation of resources because of liquidity preference induced by uncertainty. The logic runs thus that, since there is always some degree of uncertainty, there is always some under-employment of resources. Even if it is not outright hoarding

of money that qualifies as liquidity preference, it is the asset structure that keeps assets in a relatively liquid form and therefore relatively uncommitted to the production process. Or in the Austrian logic, relatively unspecific working capital is not being committed to the production process, to the degree that saving would render it to be possible. However, as was shown, this is mostly assumed by Austrian theory when a shortening of the production structure takes place in the wake of a crisis, and the specificity of the capital assets impedes the restructuring and prevents a capital structure that is in line with saving, as governed by time preference. In the case that second-best uses are not available for specific capital assets, it is therefore also the attempt to turn specific capital assets into unspecific working capital to be integrated into a shorter production structure that constitutes a surge in liquidity preference.

Liquidity preference in this Austrian logic is then not so much a tool to counter uncertainty, as in the post-Keynesian case, but more a transient situation that is brought about by the restructuring of the economy. Under normal conditions, though, uncertainty is countered, according to Hayek, by a process of mutual learning, which works through the price system, since this is what provides arbitrage, i.e. profit opportunities, which ultimately leads to a mutual convergence of plans. Wherever there is profit to be made that is above the average marginal productivity of investment, resources will be allocated in line with inter-temporal scarcity. Yet, the case of liquidity preference is not that clear cut with Hayek either. It was shown that, in his proposal for a free-banking system, he gives allowance for a liquidity preference that does not seem to serve any immediate restructuring purposes and therefore must be grounded on a psychological disposition to hold liquidity. Hayek makes this allowance because an accommodation by the creation of money is not considered to be detrimental for such a liquidity preference.

In fact, in accordance with Hayek's proposed banking architecture, it serves to provide a very concrete form of working capital liquidity through the commodities, which serve as price anchors of the issued currency. In this case, it would indeed be a liquidity preference that results in the stock piling of working capital that stays uncommitted to any particular production process for the time being. The perception that liquidity preference should actually be accommodated was, as was shown, also adopted by the fractional reserve free-banking of George Selgin.

The Minsky theory, on the other hand, can also no longer assume the pronounced existence of liquidity preference at the pinnacle of the boom if the boom indeed shows full employment or near full employment of some resources. From an Austrian perspective, this of course does not mean that there are no idle resources anymore or that there is no unemployment of labour, but that these resources are obsolete because they are specific and cannot be integrated into the production process at hand, or market rigidities prevent an allocation of resources that would ensure their full employment.

In accordance with this assessment, Leijonhufvud points out that the business cycle of boom and bust cannot really be a Keynes story because it contradicts the above-mentioned assumption that there is normally an under-employment of resources and that it should therefore be an Austrian business cycle story instead (Leijonhufvud, 2009, p. 742). Yet, when it comes to the modern world of finance and its innovative dynamism, the Austrian business cycle theory appears to be inept, since it lacks the understanding of the innovative aspect of finance that goes far beyond the Austrian reflex to find the culprit in the central bank and its interest rate rigging. This is what makes it also a Minsky story and gives explanatory credit to both theories (Leijonhufvud, 2009, p. 743).

In this thesis, it was shown that the assessment by some Austrians to see liquidity preference as just a painful but necessary tool that readjusts the economy, depends very much on the unrealistic assumption that the real balance effect eventually re-establishes demand, provided that costs follow falling prices in the situation of a liquidity preference induced deflation. As was argued by Röpke, anything that even remotely diverges from an instant adjustment of prices and costs renders such a real balance effect ineffective. This insight is inherent in the Fisher debt deflation, since debt payment obligations are nominally contracted obligations, i.e. financing costs, which cannot adjust to falling prices. It was shown that what is required according to Minsky are not just monetary measures of the central bank, avoiding defaults and drops in asset prices by acting as a lender of last resort, but, additionally, fiscal measures by the treasury in order to re-establish profitability and underlying cash flows. This position is not foreign to the one that was ascribed to Röpke, since he also emphasizes that a self-feeding deflation can only be reversed by monetary credit expansion in conjunction with expansionary fiscal measures of the state.

In Austrian theory, relative prices of final goods, intermediate products of the different stages, and originary resources determine the profit margins, and this also finds a counterpart in the Minsky theory. Albeit, in the Minsky theory, there is of course no time preference and no imputation of prices in the Austrian sense. What Minsky provides instead is a two price system, which is governed by the demand price for assets that is determined by the discounted cash flow expectations to be generated by that asset, and the supply price of that asset, which is determined by its production costs, including the financing costs. The difference between the two is the profit margin the investment is likely to generate. Investment is then driven to the point where the asset demand price deducted by the marginal borrower's risk equals the asset supply price plus the marginal lender's risk. Marginal investors are then those who reduce their expected profit margin to zero when borrower's and lender's risk are taken into account. The demand price for an asset is governed by consumer goods prices that are expected to be obtained in conjunction with the quantities that are expected to be sold, i.e. by the turnover, which is then deducted by the production costs. On the other hand, the supply price of an asset is determined by the profit expected to be generated by its production in the light of the seller's market power, the input prices of commodity resources, and labour, as well as financing costs. It was already mentioned that this two price system has no allocation function, in order to ensure any optimal allocation of resources in any Pareto optimal way, and certainly not in any time preference sense.

It surely can be argued that the Minsky theory is not a system of price imputation but of cost adding. Although, this is probably not entirely true. The definition of profit in the Minskyan sense has to be understood in a much broader sense and may also include overhead costs for technologically unimportant activities, such as marketing or public relations (Minsky, 1986a, p. 155). A drop in expected consumer goods prices may therefore precipitate the reduction in activities that are not perceived to be vitally important. In other words, depressing the profit expectations through a drop in consumer goods prices not only reduces the demand price for assets, but it may also equally lead to a reduced ability of asset suppliers to generate profits or to cover overhead costs of less vital activities, which induces them to economize on these activities, which may, however, depend on the market power of the firm to set prices (Minsky, 1986a, p. 155). Yet, what potentially increases supply prices through cost adding is the fact that, with a drop in consumer goods prices in the wake of a crisis, a rise in liquidity preference and therefore in financing costs also takes place. Investment

decisions are also not bound by any immediate budget restrictions, since the effective demand is brought about by credit money creation and is not limited by any loanable funds. Yet, investments are validated by hindsight, in as much as they are able to generate sufficient cash flows to meet the debt payment obligations the entrepreneurs have entered upon.

On the other hand, Austrians can be accused that their imputation of prices neglects the effect that foreign trade has on relative prices. Foreign economic agents may, for example, demand intermediate products and thereby increase profit margins that are entirely disconnected from the domestic demand for the final consumer goods. In the case that these intermediate products cannot be easily substituted in the production of final consumer goods, i.e. their demand is relatively price inelastic, and this is also true for the respective consumer goods, it furnishes their producers with a market power that ultimately results in cost adding. Provided that the overall paradigm is that of an endogenous credit money creation economy, this then leads to an overall rising price level.

The critique that Minsky is more concerned with financial technicalities and the innovation of financial instruments, which Austrians see as the core of his financial instability hypothesis and not the monetary disequilibrium, insinuates that Minsky is indifferent towards the misallocation of resources. This, however, is not the case. As was described earlier in the chapter on Minskyan policy recommendations, according to Minsky, the central bank actually should fulfil a pedagogical role by leaving the markets in doubt about when and how exactly the central bank will exercise its function of a lender of last resort in case of a crisis.

This is how the Chinese central bank tried to put discipline back into the market and to lower the amount of credit financed investment by putting a temporary hold on the refinancing of banks through repo facilities when it felt that credit money creation got out of bounds and created overinvestment, as well as the allocation of ever riskier financial assets. Hence, it refrained from accepting certain financial assets as collateral. The decision to abstain from providing liquidity to the market took place in a situation when inter-bank lending was already troublesome. (Hong, 2013, pp. 1, 23)

Thus, the central bank did not immediately step in as a lender of last resort. The intention was to curb "shadow bank" and speculative activities (Frangos, 2013, p. 32).

Yet, according to contemporary Minsky followers like Wray, this is seen as inappropriate, since under the modern financial architecture of a highly interlinked structure of securities, such a policy would put the entire system at peril instead of rectifying the misallocation. Hence, the alternative approach mentioned in this regard is the proactive regulation, which provides an ever-evolving regulatory framework that tries to catch up with the perils of financial market innovations and discriminates against financial assets, either by banning them or by using varying discount rates for repo, depending on the risk assessment of the supervising body. Supervision of financial markets can then not be seen as something that is divorced from central banking but that has to be an integral part of it.

For the European Central Bank, a supervisory role is already enacted.[35] The supervisory function is to encompass, among other things, the setting of capital requirements, which may depend on cyclical phases in the economy, and thereby taking account of the business cycle as well as "[...] other measures aimed at addressing systemic or macro-prudential risks [...]" (European Commission, p. 20). The supervisory function of the ECB will therefore decide the banks' ability to furnish credits, depending on their equity requirements, as well as the assessment of systemic risk. To provide financial market stability in the wake of the euro crisis, the ECB already accepted securities such as Asset Backed Securities (ABS), of a lower rating as collateral in order make refinancing easier for troubled banks (Rexer, 2013, p. 15). Furthermore, it reduced the discount rate for some ABS where it seemed to be appropriate and increased it for other securities where it feared that risks were not reflected by the charged discount rate (FAZ, 2013, p. 15). However, *The Economist* expressed the concern that the trouble with this kind of stability providing supervisory role, which overlaps with monetary policy, is that not only basic rules are being provided but also that actual entrepreneurial decisions are being influenced (Economist, 2011, p. 6). It was already mentioned in the chapter on Minskyan policy recommendations that this kind of proactive regulation actually amounts to allocation decisions made by the supervisory authority, which then is the central bank. This is something that is highly criticised from the Austrian perspective, since it is perceived to be tantamount to socialist central planning when it is no longer

[35] "The ECB will be responsible for specific tasks concerning the prudential supervision of credit institutions which are established in Member States whose currency is the Euro (participating Member States) with the objective to promote the safety and soundness of credit institutions and the stability of the financial system. [...]This Regulation confers on the ECB specific tasks concerning policies relating to the prudential supervision of credit institutions, with a view to promoting the safety and soundness of credit institutions and the stability of the financial system, with due regard for the unity and integrity of the internal market. " (European Commission, 2012, pp. 3, 18)

the business acumen that decides the allocation of resources but rather the macro-prudential regulation by the central bank and what it deems to be prudent or foolish investment behaviour (Polleit, 2014a, p. 43).

This criticism reflects the Austrian claim that Minsky is not clear enough about what relative tranquillity really is. The fact that no qualification is being made about whether relative tranquillity is actually a phase where individual plans are converging, and the boom-bust situation is to be perceived as a situation where, at some point in this relative tranquillity, the convergence of plans somehow derails, culminating in a boom-bust situation. It remains unclear at which point the economy actually derails. In other words, it remains unclear at which point there is a situation where investment no longer adheres to the convergence of plans but instead turns into overinvestment and malinvestment.

The Austrian puzzlement with this aspect is quite understandable, since in their theory, that point can easily be pinpointed. It was shown that the overinvestment, or malinvestment in Austrian theory, is brought about by monetary disequilibrium, which results in investment not being covered by prior saving. Yet, it was pointed out that this strict relation might actually not reflect the complexity of reality where there can be an under-employment of resources, innovation that frees resources, and saving functions that also depend on the level of income. It could of course be argued that the post-Keynesian framework is valid in an under-employment situation, but then Austrians would argue that the situation of under-employment would require not even one resource to be scarce, thereby serving as a bottleneck, in accordance with Austrian capital theory, and this situation is rather limited. Therefore, if this were ever valid, it would be so in times of the deepest recessions, but not under normal circumstances.

Yet, Hayek and the Austrian business cycle theory in general entirely neglect the role that resource freeing innovations play. It can be seen that Kalecki's simplified equation of profit equals investment actually represents the forced saving as understood by Hayek. In the extreme Kalecki case, consumers do not save at all, but the entire saving is being done by the entrepreneurs through the generation of profit, which means that there is no voluntary saving left but only forced saving. According to Austrian theory, this kind of investment would be overinvestment and malinvestment from the start, since it is not covered by voluntary saving. Yet, Austrians do not take into account how resource freeing innovation could actually make this investment viable. It was laid out

that Schumpeterian innovation actually increases productivity, and therefore, the assumption that investment financed by forced saving always results in accelerating consumer prices in the end, due to decreased consumer goods production in favour of capital goods production, does not hold true, but instead, increased productivity reverses that process. As resources are realigned in accordance with the technological innovation, the increase in productivity results in increased consumer goods production.[36] In such a case, the lengthening of the production process by inserting additional stages of production would not be met by a successive shortening of the process but by an enlarged Hayekian triangle.

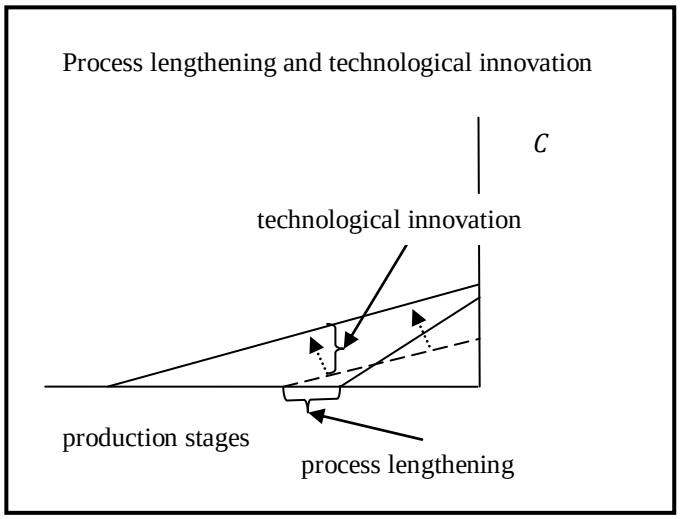

Figure 22: Process lengthening and technological innovation.

Source: Own figure.

An important argument brought against this by Austrians would be, of course, that capital is specific, and therefore, resources are not easily realigned. Yet, this leaves two important effects unaccounted for. First of all, any realignment should be difficult and not only the shortening but also the lengthening, as often claimed by Austrians, because the entirety of resources has to be realigned to a new linear-limitational production function. Therefore, the argument that lengthening is more feasible than shortening because, in the former case, unspecific working capital is transformed into specific long-term capital assets, and in the latter case, the transformation would have to be the other way round, might prove a point that it is more costly, since it might involve the decomposition of machinery, i.e. its scrapping. However, this does not free both scenarios from the necessity that second-best uses have to be found for a great part of

[36] Hence, the inflation would only be of a temporay nature since rises in innovative Schumpeterian productivity increases the supply of consumer goods.

specific capital goods through the entirety of the realignment. Secondly, by referring to Hayek's *The Pure Theory of Capital*, it was shown that the freeing of resources through innovation also takes place through the amortisation process where no reassignment of resources is required.

Whereas the Minsky theory takes account of productivity enhancing Schumpeterian innovation and actually incorporates it not only with regard to technological innovation but also with regard to financial innovation, the Austrian theory of Hayek tends to ignore it. The consequence is that the Austrian theory has a clear-cut understanding about the allocation of resources through relative prices and can pinpoint exactly where overinvestment and malinvestment begin. Yet, from the Minsky perspective, this proves to be a crude oversimplification of reality. From a Minsky perspective, the question of where the misallocation of resources starts therefore has to remain far more vague and is depicted by the qualitative investment categories of Hedge, Speculative, and Ponzi. It is being made more operational by the assessment of Perez that misallocation of resources starts where financial innovation no longer translates itself into real economy productivity increases. Hence, the quality of investment deteriorates during the boom, since with easy credit available, the investments become increasingly speculative or even Ponzi.

A diminishing quality of entrepreneurial decisions during the boom can also be found in modern Austrian theory. The argument is similar to that of Minsky and Perez that entrepreneurs are able to go ahead with investments because they receive cheap funding through easy credit and that these investments only remain viable as long as the boom continues (Engelhardt, 2012, pp. 182-183). These investments are feasible due to the fact that the "entrepreneurial component", i.e. the estimated lending risk, as it was called by Mises, is reduced in order to furnish entrepreneurs with the necessary credit (Evans and Baxendale, 2008, pp. 88, 91). What is at the core of this concept is therefore a mispricing of risk that entrepreneurs will default on their debt, or in Minskyan terms, this equals a reduction in the perceived lender's risk. Yet, at the same time, the entrepreneurs are willing to go ahead with their investment projects, as some find themselves guided by the interest rate charged to them, which in some cases is based on a mispricing of risk (Evans and Baxendale, 2008, p. 91). Consequently, this means that for some entrepreneurs, their asset valuation is based on an interest rate that is too low with respect to their individual risk involved. This leads them to underestimate the future interest rate (that is to prevail if risks are accounted for) and leads them to "[...]

overestimate the value of capital goods [...]" as the discount rate on which their investment decisions are based is too low (Engelhardt, 2012, p. 182).

In Minskyan terms, this means that the perceived borrower's risk is reduced as well. According to Minsky, when the interest rate charged is raised again, there is a reduced margin of safety as the payment obligations for interest rate payment are increased, and the value of capital is decreased. The Austrian argument goes in the same direction, since it sees the investors at the margins getting into trouble, i.e. those who entered into investments on false assumptions regarding underlying asset values from the start (Evans and Baxendale, 2008, p. 91). What exacerbates the situation is that those entrepreneurs who perceive the overvaluation of assets will sell these assets to those who are misguided by distorted risk assessment, and since these "bad" entrepreneurs are furnished with finance, they are able to enter the market during the boom (Engelhardt, 2012, p. 183). In other words, entrepreneurs whose asset values have soared during the boom are willing to realise their profits by selling their assets, and other entrepreneurs, who are keen to join the bonanza, are willing and able to buy these assets as the risk perception is distorted, and finance is available.

However, the aspect of innovation is not part of the Austrian story. As was described in the chapter on Minsky[37], according to Minsky and Perez, the bonanza is not just some monetary phenomenon that comes out of thin air, but a real economy bonanza, which is induced by productivity enhancing innovation. The decreasing quality of investment during the ensuing boom is, according to Perez, however, owed to the fact that an increasing number of investors is more engaged in investments that merely resemble bets on the continuance of the boom. This is of course where the resemblance with the Austrian approach can be found, since an increasing number of bad entrepreneurs enter the market with false perceptions about the capital value of their investments.

As was shown in the chapter on Minsky, what reverses the perceived risk in Minsky's theory is the deterioration of balance sheets as increasing debt payment commitments through increased indebtedness can no longer be sufficiently met by cash inflows, and the whole structure of finance increasingly moves from Hedge to Speculative and from Speculative to Ponzi. This ultimately results in increased liquidity risk, and everyone tries to make position by shifting the balance sheet structure from relatively illiquid long-term assets towards relatively liquid short-term assets. This then also precipitates a

[37] See pp. 125-126.

shortening of the balance sheets as levels of indebtedness are tried to be reduced, resulting in credit-rationing. In the logic of Minsky and Perez, the financial innovation, that induced the boom, turns sour, since an increasing amount of investments does not create underlying cash flows anymore because the initial financial innovation has lost its momentum to increase real economy productivity due to the decreasing quality of investments.

The Ricardo effect reverses the process in the Austrian business cycle, as envisioned by Hayek in his ultimate version of the business cycle. It was laid out in the chapter on Hayek's business cycle 2.0[38], as well as in the chapter on modern Austrian economics[39], that the version that is compatible with the Hayekian notion of the business cycle, which refers to the forced saving defined by Hayek, in contrast to the way it is defined by Mises, requires a business cycle systematic that incorporates the Ricardo effect. Only with the Ricardo effect can there be a clear-cut case for a lengthening of the production process, which is succeeded by a shortening towards the pinnacle of the boom. The Mises-based Garrison version is untenable with this notion of the Ricardo effect, since it assumes a simultaneous allocation of resources towards the most remote stages of production, as well as towards those closest to consumer goods production, by thinning out the middle stages. It was shown that according to Garrison's assessment, this is brought about by simultaneous and yet conflicting forces where a market rate of interest that is below the natural rate of interest precipitates a lengthening of the production process, whereas increased profit margins in the stages closest to consumer goods production, which were brought about by increases in consumer goods demand through increased employment, precipitate resources to be drawn at the same time towards consumer goods production.

In contrast to this Misesian assessment, with the Ricardo effect, the resources will be shifted first towards the most remote stages of production, by lengthening the production process and making it more capital intensive, as long as Hayek's "multiplier" increases. The process is reversed when the "multiplier" falls, and resources are allocated towards consumer goods production, and the number of production stages is reduced as capital intensity declines. Yet, in the chapter on Hayek's business cycle 2.0, it is also assessed that the decline of the "multiplier" cannot be driven by a fall in real wages only, as what is required is a fall in real wages in combination with an upward

[38] See pp. 187-199.
[39] See p. 224.

sloping credit supply function, where the rate of interest including risk margin depends on the absolute amount of capital invested.

Furthermore, it was stated that this kind of credit supply function resembles the post-Keynesian endogenous credit money supply function of a structuralist nature. In the chapter on Hayek's business cycle 2.0, it was also shown that it is the Ricardo effect that turns Hayek's business cycle theory into an endogenous theory that is devoid from any externally precipitated turning point. This claim becomes even more relevant in its latest version, which is comparable to the Minskyan endogenous money approach, since the turning point is precipitated by credit rationing in conjunction with falling real wages.

Like in Minsky, the credit rationing part is driven by an increased perception of risk, depending on the level of indebtedness, whereas the increasing drop in real wages shows the failure of the production structure to generate the amount of output that would be required under the prevailing time preference. In Minskyan terms, it shows the failure of investment to translate itself into real economy productivity increases that increases the supply of consumer goods, since wages rise faster than productivity or "components of the mark up" in the consumer goods industry increase compared to wages (Minsky,1986a, p. 284). Both cases resemble Hayek's reasons for inflation where productivity is unable to keep up with increased demand for consumer goods, induced by wages rising through increased employment and profit margins in the consumer goods industry rise relative to wages, resulting in decreasing real wages.

It was already shown that both theories assume a linear-limitational production function. The difference, however, is that, whereas in the case of the Austrian theory, the production function shows a definite capacity limit that is governed by the scarcity of complementary resources, the production function in the Minsky case does not have any explicit capacity limit. The capacity limit in the Minsky theory is merely imposed by the limited ability to generate credit money, which again is limited by the upward sloping credit money supply curve, which in turn is a consequence of increased risk perception of liquidity risk that expresses itself in an increased liquidity preference. The increased risk perception, and with it, the increased liquidity preference, are again the consequence of investments that do not generate sufficient cash flows to validate the debt payment commitments. Such imbalances may, however, proceed for quite some time before perceived to be problematic.

As was mentioned according to Minsky, any investment project with a gestation period of several years may already appear to be a Ponzi project, since during its gestation period, generated cash flows are able to meet neither principle nor interest payments, but this might be the case when the project is sold at a lump-sum payment after a couple of years, when, for example, investment banks become active to look for potential share- or bondholders. Therefore, the Minsky theory abstracts from scarcity of complementary resources, insofar as the emphasis lies on finance.

The truth is that taking the linear-limitational production function seriously requires looking behind the veil of finance in order to find out where these complementary resources may come from. It was shown that loanable funds, which cannot be found in the private sector because investment exceeds saving, can be financed by credit money creation or a change in money velocity. The important point, however, is that if these investments are unable to induce a multiplier effect that increases real income to such an extent that there is an ex-post identity between private sector saving and investment, or at least that the imbalance seen in the ex-ante situation has not been exacerbated until the ex-post situation, then the investment has generated further imbalances among the different macro sectors of the economy. In other words, the investment project in the private sector is sucking resources from the other macro sectors and thereby increases the imbalances, for example, by increasing the import of resources that are financing the private sector investment, i.e. providing the complementary resources which are required to continue the investment. In the example of the investment project with a long-term gestation, such an increasing imbalance may continue for several years. Yet, after some years, the investment project is ready to produce or to be sold. Hence, it will be able to generate the hoped for real income to readjust the imbalances as it produces or as it is simply sold abroad and is exported.

As long as this credit money financed investment continues without providing additional real income, there may be a rise in consumer goods prices, if not offset by consumer goods imports, and consequently, investment will be covered by profit, or in Austrian terms, by forced saving, to a more pronounced degree. Yet, what counteracts this development is the productivity of the investment or, more precisely, the innovative quality that will determine the productivity of that investment and therefore the degree to which it is able to add real income and validate the finance that was necessary to erect it. As mentioned before, the productivity enhancing innovation is not restricted to

technological innovation, and its ability to create additional real income but also includes the financial innovation that helps provide the required resources.

When Bagus claims that Austrian theory also deals with financial innovation, he is stretching the facts a bit. In reality, Austrian literature is very shallow when it comes to dealing with financial innovation and its institutional habitat beyond the central bank. Normally, it is guided by the immediate reflex that the whole system is corrupt anyway and needs radical replacement by a free-banking system. This is at least the version that recently was also explicitly propagated or at least resonates in parts of the German press (Polleit, 2014a, p. 43; Polleit, 2014b, p. 31; Fischer, 2014, pp. 20-27). The kind of free-banking that is envisioned from this radical point of view is a 100 percent gold backed free-banking system (Polleit, 2013). Contrary to this, the Minsky approach takes the institutional changes that come with financial innovation very seriously and even goes so far as to claim that there is no such thing as a unique form of capitalism, but capitalism presents itself in many forms, and these institutional settings matter. These institutional settings develop over time, and they govern the incentives by which the actors behave.

Accounting is thereby not something that can be divorced from economics but something that is essential to it. Creating commercial papers by bestowing them with outstanding debts and selling these papers proves to be a convenient way to realise profits today, which really would be due in the future (Häring, 2014, p. 11). These profits that are merely based on cash flow expectations, which might materialize or not, then serve as a basis for financial asset values. The same is true for what is shown in the chapter on Minsky, with regard to the difference between German and Anglo-Saxon accounting standards. Where the German law provides a safety barrier, which prevents a spiral of increases in asset valuations in combination with increasing indebtedness, the Anglo-Saxon accounting standards do not, and are therefore prone for speculative valuations of assets to spiral out of control. This may result in dividends paid on 'fairy tale' profits that are not being supported by underlying cash flows.

It is not as if such an assessment is not involved in Hayek's theory, and he is also aware of capital consumption due to the accounting of fantasy profits. What is often missing in Austrian theory, though, is dealing with the institutional setting and how this setting results in risk assessment and risk distribution on an institutional level, as well as how

due diligence gets compromised when the economy is transformed from traditional banking to the money manager capitalism of shadow banking.

A bit of an exception would be in fact the account of Bagus and Howden, who analyse the institutional setting on how the financial crisis played itself out in Iceland and also what role the Icelandic banks, central bank, the government, as well as the IMF, played in creating moral hazards. Yet, it never reaches the depth to analyse what role the innovation of financial instruments and institutions play in the transformation of the financial system. (Bagus and Howden, 2011)

As an answer to what ultimately caused the crisis, the fractional reserve fiat currency is again referred to, along with the fact that, under a 100 percent gold system, the problem would not have occurred (Bagus and Howden, 2011, p. 124). The same is true for Bagus's account of the euro crisis, since it predominantly deals with why central bank fractional reserve issued fiat money is the source of trouble and why, with a 100 percent gold standard, none of it would have happened in the first place (Bagus, 2012b[2010], pp. 91-111). This always sounds a bit like wishful thinking, since the aforementioned reflex comes through to get rid of the actual system by which modern finance is run and to implement this almost utopian idea of a gold backed free-banking system that redeems us from all the evils of government interference with money. As already was pointed out in the chapter on Hayekian policy recommendations, such a monetary regime would pose other severe problems when it comes to maintaining a functional payment system that is to ensure the frictionless movement of goods and services, especially internationally. Furthermore, it was mentioned that there is no guarantee that IOUs are not being issued by the private sector that are not backed by any reserve currency, and this is in fact a matter of daily business conduct among firms.

Unlike imagining Utopia, as some Austrians tend to do, it is important, according to Minsky's theory, to know where the apex of the system is, what institutions play by what kind of rules, and how financial innovation undermines these rules and requires the formation of new rules. The equivalent of this concept in Austrian theory could be the establishing of ideal types of institutions that actually have an empirical meaning and can tell us something about how mutual learning and plan coordination takes place, but also how the seeds of increasing imbalances take root. This is an approach that would also be in line with Hayek's understanding of the empirical importance of ideal types.

5 Hy or Hayek?

In the preceding chapter, it was mentioned that, according to Leijonhufvud, both the Austrian business cycle theory and Minsky's post-Keynesian financial instability hypothesis have an explanatory value. This thesis very much supports this assessment, even though it has to be asked where exactly do we find the explanatory value, and which of the two tells the more conclusive story. Should it then be Hy Minsky or F.A. Hayek to whom we should turn to when looking for an explanation of the crisis? What makes comparing these two schools of thought even more daring is that they come from very different ideological angles. This becomes most apparent when the role of the state, and of the central bank in particular, are assessed. Even though both schools certainly agree that the central bank is a powerful state monopoly, the difference in the perception of this monopoly could not be further apart.

For the Minsky school, the central bank provides, in its role of a lender of last resort, the means necessary to prevent an overall fire-sale of assets, as a result of a surging liquidity preference. In this role, it provides the state with enough breathing space to 'save the day' by enacting fiscal measures through parliamentary legislation, which re-establishes the profitability of private sector assets. The Austrian school on the other hand, sees the central bank as the main culprit, who corrupts the whole system by bailing out the economy, no matter what kind of foolish decisions of politicians, bankers, businessmen, or households caused the crisis in the first place. In the Austrian perception, it thereby inflicts an ever-increasing degree of moral hazard and in combination with its monetary policy, which is not governed by any natural rate of interest considerations, lures economic agents into decisions that are not sustainable in the light of prevailing time preference.

Taken to the ideological extreme, no schools of thought could be further apart from one another.

For the post-Keynesian Minsky school, Mario Seccareccia makes the case for a socialization of investment in the tradition of Keynes. The argument is that only the state has the foresight that is necessary to engage in long-term infrastructure projects to the advantage of the entire economy, which ultimately increases the private sector's assets productivity. (Seccareccia, 2011, pp. 74-77)

To be clear, in no way is there any attempt made to lay out a concept of a complete socialization of investment that would cumulate in a socialist centrally planned economy, and therefore, it is a bit unjust to speak of an extreme position. A really extreme position would be that of a fully-fledged socialist centrally planned economy like North Korea.

Yet, from an Austrian perspective, the influence of the state would be very far reaching, considering the combination of investment socialization, at least to some degree, with that of a state run employer of last resort program, which already received mentioning in the Minsky chapter. Accordingly for Hayek, there is a closeness of Keynesianism to socialism, which is routed in this belief that the economy can be managed from a macro level, ignoring abstract general rules of economics for serving the purpose of achieving short-term goals rather than long-term sustainability (Hayek, 1992[1988], p. 57). What this ultimately means is the interference of the state with production decisions and, due to the scarcity of resources and the effect such decisions have on relative prices, also with the consumer decisions.

Of course, the other extreme would be Austrian anarcho-capitalism in the tradition of Murray Rothbard and propagated by his disciples like, for example, Hans-Hermann Hoppe, where not only the central bank is abandoned but any state authority, including the state monopoly of compulsory public education, as well as even defence and security. The picture Rothbard paints about compulsory public education is one of the state trying to use the education system as a means of brainwashing and enslaving the younger generations in order to force them into blind obedience to the state (Rothbard, 1999a[1971]; 1999b[1971], p. 53).

Likewise, the way that Hoppe depicts the state monopoly on defence and security, where due to the monopoly installed by the state, the public is left with no other choice but to turn to the state for protection, even though they might feel inclined to organize it by themselves. The example that is given in this regard is that of communities in the 'old west' that assigned their own judges and law-enforcers. By usurping the power of defence and security, the state would ultimately turn into an oppressor, and democracy would only be an instrument for the usurping of power for oppression and exploitation. (Hoppe, 1997)

From this kind of perspective, no matter what kind of service is provided by the state, it is not wilfully chosen by the public but forced upon it in combination with the

enforcement of tax collection (Rothbard, 2000[1974], pp. 56 - 57). In this context, Robert Murphy also claims that people in a failed state like Somalia, where no functioning state authority exists anymore, are better off now, and that anarchy-capitalism does not automatically result in the emergence of warlords (Murphy, 2011; 2005). Yet, this argument sounds, if not even cynical, then ignorant at best, in the face of people from the failed states of Africa trying to cross the Mediterranean sea by risking their lives at the perils of the seas in order to reach European soil with states that are able protect their basic human rights. Obviously, people from Mexico are taking the same ordeal on themselves by crossing into the US because they do not find it so pleasant to live in areas where the state authorities have failed, and drug tsars are ruling the place. In fact, in some of these communities that are being terrorized by drug tsars, people try to protect themselves by forming militias, but these militias themselves then usurp power over the citizens due to their unique 'defence abilities' (Endres, 2014). This is of course something that is not part of the utopian anarchy-capitalism idea of a town in the 'old west'.

To make it clear, this kind of extreme modern Austrian ideology is not part of Hayek either. According to Hayek, there exists an obligation for the state to provide jurisprudence, as well as security, as a precondition of a legal framework in which a competitive market economy can function:

> "It is the first general thesis which we shall have to consider that competition can be made more effective and more beneficient by certain activities of government than it would be without them.[...] That a functioning market presupposes not only prevention of violence and fraud but the protection of certain rights, such as property, and the enforcement of contracts, is always taken for granted.[...] Where the traditional discussion becomes so unsatisfactory is where it is suggested that, with the recognition of the principles of private property and freedom of contract,[...], all the issues were settled, as if the law of property and contract were given once and for all in its final and most appropriate form [...]." (Hayek, 1948d[1947], pp. 110-111)

Furthermore, the state has the obligation to provide public goods, which by their inherent properties are also natural monopolies, where competition is not possible and which are public because "[...] no price can be charged to the beneficiaries or, rather,

that it is not possible to confine the benefits to those who are willing or able to pay for them." (Hayek, 1948d[1947], p. 111) This certainly is not only true for sanitation and health, as mentioned by Hayek (1948d[1947], p. 111), but also for education, since the positive external effects are not confined to those who pay for it but are essential for the development of the society as a whole.

Additionally, apart from providing legal rights and law-enforcement, as well as other public goods, the state also has to be a compassionate state, since according to Hayek "[...] in modern society we must take it for granted that some sort of provision will be made for the unemployed and the unemployable poor." (Hayek, 1948d[1947], p. 112)

Hayek's insight that a society cannot do without a state that provides public goods, which otherwise would not be provided by the free market but are essential if we want to speak of a modern and civilised society, sharply sets him apart from Austrian anarcho-capitalists. In fact, this is why Hoppe 'denounces' Hayek as a social democrat (Hoppe, 2011). From a Minskyan perspective, this provides Hayek with a common ground to tread on. Yet, Hayek's insight is not driven mainly by what is civilised and proper for a modern society to do. The aim is to provide these amenities in order to make the market economy work more effectively. From a Minskyan perspective, this means to provide state expenditure, which enhances the profitability of private assets. It was already mentioned that, according to Minsky, such expenditure is supposed to be government investment in infrastructure and not government consumption through transfer payments. From the Austrian perspective, this could be understood as the provision of complementary resources whose scarcity is impeding growth. It was already laid out with Röpke that, in a case of a crisis when saving falls on futile ground because it is not being transformed into private sector investment, it is up to the state to put these resources to use.

However, not only in the case of a crisis can it prove to be advantageous for the state to become engaged in providing public goods or even actively participating in the market through nationalised industries.

Garrison analyses both cases and comes to the following conclusions. In the latter case deficit spending that is used for the promotion of a nationalised industry, such as steel, may cause a crowding-out effect through an increased market rate of interest but may also provide complementary resources at subsidized prices, which favour the built-up of lengthy production structures that have a high productivity. This depends, however, on

whether the increase in the market rate of interest does not deter more investors through crowding-out and does not have a shortening effect on the production structure, which outweighs the lengthening effect of the nationalised capital intensive industry and therefore leads to a less capital intensive capital structure. In the former case of a public good, such as infrastructure, provided by the state, the public goods also constitute complementary resources, which attract investment where the combination of private resources with these public resources are advantageous for the investors. The success of these public goods to serve as complementary resources still depends on the insight of the government to allocate its resources in such a manner that would also be chosen in a free market environment and therefore as if there were a possibility to exclude users who are not willing to pay for the good. In other words, the resources only prove to be complementary when deemed to be useful in incorporating them into the production structure of the private sector. Anything else would just be a "monument" that does not serve any productive use and would decrease instead of increase the capital intensity, i.e. shorten the production process and decrease the overall production possibilities. (Garrison, 2001, pp. 90-96)

As already mentioned for Minsky, the government, as an employer of last resort, is not about the state handing out transfer payments for staying idle. Firstly, it is to keep the workforce agile and flexible as an integral and active part of society, whereas secondly, it is the productive nature of such public works that is supposed to keep a check on inflation as well, since these programs are supposed to add real income instead of just handing out effective demand increasing transfer payments. Combining these employer of last resort programs with the erection of infrastructure or the provision of other public goods, like in the education sector, recreational or cultural activities or facilities, as well as community services for the old and sick, could provide such complementary resources. It would do so because it would increase the movement of people, goods, and services, in the case of infrastructure, and enhance the productivity of the workforce in the case of education and recreation, or in absorbing some part of the burden to provide a meaningful pastime to an elderly relative if such could also be provided by community centres.

Joseph Stiglitz provides an example of how important the role of the state can be in providing the protection of legal rights to its citizens, in combination with the provision of infrastructure, with the town of Medellín in Colombia. Whereas it was terrorized and ruled in the past by the drug tsar Pablo Escobar, nowadays the rule of law and the civil

society have regained ground. The severe income inequality that became manifested in the slums provided the drug cartels with fresh recruits in the first place. The strategy to counter this was to provide public transport infrastructure that enabled people from the slums to look for work in other regions and to commute in order to make a better living. Also, the provision of public education independent of someone's income played a huge role in this regard. Furthermore, the state invested in sanitation, streets, and parks in order to increase the quality of life. (Stiglitz, 2014)

What this shows is that the provision of public goods is not merely some nicety by the state that is founded on a subjective perception of what is just, but that it has consequences for the provision of complementary resources and therefore for the ability of an economy to grow. What can be learned from Austrian theory is that, once a restructuring of the production process is necessary, the most important factor is the ability of resources to reallocate, and this includes the workforce as well. Yet, for the workforce to be productive and flexible, it has to be educated and has to have the opportunity to commute or to travel.[40] Hence, market flexibility cannot only be a matter of price flexibility, but it must also ensure that any movement of resources, as well as the reassignment of specific resources, is possible at all. In this context, an employer of last resort program is less a means of social welfare and more a means to keep the unemployed workforce employable so that, once economic growth picks up, they can be integrated into the private sector again.

From the most radical Austrian anarcho-capitalism point of view, the question may arise of why there should be any compulsory education at all. Why should it not be sufficient that only a minority is able to read and write?

The answer to this question is provided by the PISA study of the OECD which evaluates the "Reading Literacy", "Mathematical Literacy", and "Scientific Literacy" (including computer literacy), as well as "Cross-Curricular Competencies", to ensure the ability to transfer knowledge from one field to another, and it does so primarily with regard to competences required for the solution of everyday problems faced in a modern society and the ability to transfer knowledge for the solution of new problems. All of

[40] The reallocation of workforce from Oklahoma to California during the great drought of the 1930s, as described in John Steinbeck's famous novel *The Grapes of Wrath*, would have been unthinkable without Route 66, and it received an almost mythical image as the road to the 'promised land' of California: "Highway 66 is the main migrant road. 66-the long concrete path across the country, waving gently up and down on the map, from Mississippi to Bakersfield-over the red lands and the gray lands, twisting up into the mountains, crossing the Divide and down into the bright and terrible desert, and across the desert to the mountains again, and into the rich California valleys." (Steinbeck, 1992[1939], p. 160)

this is done with the primary aim to increase productivity in the participating economies through the enhancement of human resources. (Baumert, et. al., 2002, pp. 3-4)

In accordance with this, the German education system, and in particular, the vocational education system, is designed to provide competences for a life-long learning, combined with the professional expertise on the job, in conjunction with a profound general education, social skills, skills of individual development and personal goal setting, and finally, the competence to achieve these goals in a changing environment (Ministry of Education of the German federal state of Schleswig-Holstein, 2002, pp. 3-4).[41] In other words, this kind of public education has nothing in common with the one described by Rothbard, but instead, it is a means for increasing labour productivity in conjunction with the personal fulfilment of the individual human being in society.

According to Hayek's description in *The Road to Serfdom*, the problem with providing public goods through government planning lies in the impossibility "[...] for any mind to comprehend the infinite variety of different needs of different people which compete for the available resources and to attach a definite weight to each." (Hayek, 2001[1944], p.62)

Hence, it is impossible to ensure that the provision of public goods is actually in line with what would otherwise be expressed by relative prices, if any market for such goods existed.

In the same way, is it impossible to ascertain any objective terminology of social justice that would tell the authorities what the essence of "common purpose", "common good", or "general interest" would be, since they only carry a subjective, not a definite objective meaning that is shared by everyone, and therefore, they cannot serve to legitimate any public policy by what is deemed to be proper and just. Furthermore, this legitimisation cannot even be derived from democratic voting. (Hayek, 2001[1944], pp.60-64)

The point is that, once some socialist central planning entity is installed, it does not matter whether it has been legitimised by democratic means once, since the liberty that the citizens have relinquished to this state authority is so extensive that, once a plan has been designed, it will not be accommodated to the interests of minorities, but will be

[41] In Germany, to obtain a vocational title, such as a plumber or foreign-trade clerk, requires a three-year apprenticeship in the dual system of on the job training and vocational college education, which ensures a guaranteed level of professional competence.

pressed through with the full force of the state (Hayek, 2001[1944], pp.138-142). In this regard, one might detect a contradiction that, on the one hand, Hayek sees the necessity for the state to provide public goods, and on the other hand, it seems to be impossible to provide such goods, due to the knowledge problem and the un-attainability of objectivity in the evaluation of justice.

This contradiction cannot be easily resolved, and Hayek is even blamed for neglecting the fact that knowledge exists on different levels, and therefore, decision making has to take place on different levels as well. Some knowledge and its respective decision making is sufficient on the micro level, such as a medical doctor curing the disease of a patient, but some pattern can only be seen and reacted upon on the macro level, such as when this disease is not some singular event but in fact an epidemic that the state authority has to react upon and can only react upon centrally based on aggregated macro data. (Olssen, 2010, p. 34)

Combined with this assessment of different levels of knowledge is the accusation by Olssen that Hayek ignores this by restricting the state's competences to providing a legal framework and is neglecting the provision of public goods entirely (Olssen, 2010, p. 42). However, as described above, this kind of accusation does not do Hayek justice, since he does see the importance of the state in providing public goods such as healthcare. The problem still remains of how such public goods can be legitimized if any objective legitimization, due to the knowledge problem, as well as the establishing of any objective set of social goals that can be derived from some objective understanding of justice, is impossible.

Furthermore, Olssen points out that the trust Hayek puts into ever achieving an equilibrium is rather limited because mutual learning must always remain incomplete, and furthermore, constant changes in external data will not help either to come to a convergence of individual plans (Olssen, 2010, p. 27). Therefore, the way out is the legitimisation of decisions on the macro level through democratic legislation, in such a way that it does not pose an undue infringement of individual liberties that are by their very nature part of the micro level, since they can be resolved autonomously from the macro level (Olssen, 2010, pp. 35-37). What is important for democratically legitimized planning on the macro level is that it adheres to the principle of subsidiary decision making, since decisions that can be taken autonomously on the micro level should not be relegated to the macro level, unless they prove to be a pattern that is unintelligible

and irresolvable on the micro level, like an individual illness versus an epidemic, or in economic terms, the difference between the unsystematic individual risk of a single asset or enterprise, in contrast to the systemic risk, which determines the volatility of assets and enterprises in correlation to the business cycle.

As was laid out in the chapter on Minsky, the increase of systemic risk remains undetected on the micro level by the economic agents, since their way of assessing it is governed by historical correlations, which might not hold true in the actual present state and could only be detected on the macro level, for example by a risk assessing entity of the central bank, through assessing the fragility of the financial structure by using the Minskyan categories of Hedge, Speculative, and Ponzi finance.[42]

Yet, the macro level institutions may of course also err due to the impossibility of complete information and the inability to come up with objective social values. The rule of thumb, according to Olssen, should therefore be that stability is to have priority in comparison to growth (Olssen, 2010, p. 35). This means that there is a trade-off between the dynamic of growth and economic stability. This rule of thumb provided is of course a normative economic prescription, and ironically, it might even be shared by the 100 percent gold backed free-banking proponents or, in general, by those who think the economy will find its redemption in some kind of 100 percent money architecture. Yet, what it shows is that there is no definite, can be no definite, assessment of what public goods the state should provide and to what degree, but if it should have any broader legitimacy at all, it always has to be something that is decided upon in a democratic process and is therefore first and foremost a normative and not an economic decision.

Above, it was mentioned that the two extremes could best be represented by the socialist centrally planned economy like North Korea and the Austrian anarcho-capitalist's territory that is void of any functioning government authority, i.e. a failed state like Somalia. Now, as most economies usually are neither of the two, and the immigration rates of these two countries are probably not that high, it can be assumed that most people would choose a hybrid economy that includes state activity and free markets. The decision of how high the ratio of state activity is, can of course not be

[42] This might be achieved by using methods like stock flow consistent modelling (SFC-modelling), which is able to detect the discrepancies in cash flow commitments due to debt financing of assets and cash flows generated by these assets through separating the economy into different sectors with aggregated balance sheets and cash flows in between sectors (Godley and Lavoie, 2012[2006], pp. 23-56). This is a model that was also adopted as a forecasting tool at Goldman Sachs (Zezza, 2009, pp. 3, 20).

entirely normative, but has to take economic considerations seriously as well, since it might constitute a trade-off between socially desirable public goods and the degree to which these goods could be provided by a free market and therefore reflect the preferences of consumers, which make themselves felt in mutual market learning via the price system. This does not mean, however, that the underlying paradigm can be based on the naivety of a perfect market, nor on that of a market in the boundaries of strict budget restriction, since credit money creation is possible and will always be possible as long one party issues an IOU that is accepted by its counterparty or even by a third party as a means of settlement.

5.1 The Austrian-post-Keynesian synthesis

Even though Minsky never cited Hayek, the following quotation by Minsky in fact depicts the Hayekian business cycle up to the point when finance comes into play, and the question therefore should not be Hy or Hayek, but a synthesis of both theories, which would constitute an Austrian-post-Keynesian synthesis.

> "In a business cycle expansion the demand for investment goods increases. A greater demand for labor to produce investment goods increases employment and, in turn, wages, profits, and prices. Once investment employment rises, then the demand for consumption goods, for consumption-goods output, and for employment in consumption-goods production increases; as a result, the gross profits of consumption-goods production increases. Thus, an initial increase in investment-goods employment and wages leads to rising employment, wages, and prices in consumption goods. This process, however, is limited by financial-market reactions to increased financial layering and the emergence of fragile structures conducive to crises and cyclical downturns. Available finance, in effect, sets limits to the increase in wage rates in investment-goods production." (Minsky, 1986a, p. 268)

The question therefore is how Minsky's insight that there is, always will be, and has to be economic growth propelled by innovation and, with it, financial instability, can be combined with Hayek's insight that capital is specific and that, therefore, the

misallocation of resources through money as the loose joint has severe consequences for the sustainability of economic growth.

The answer is to build on what they have in common and to use some of their differences as complementing factors for a synthesis of the two theories. In the last chapter, it was already laid out what they have in common and where there are differences. The strength of Hayek is his emphasis on the misallocation of resources in a world where resources are scarce, and therefore, unlike in Keynes's world of abundance, there is a trade-off between the usage of resources either for consumption or for investment. This restriction is best depicted by Garrison's PPF. Furthermore, there is a natural rate of interest, which is determined by the equilibrium of saving and investment, in accordance with time preference. Finally, there is the insight that capital is specific and that capital intensity makes itself felt in the complexity of the production process and therefore in the number of production stages involved. The length, i.e. complexity, of the production structure, on the other hand, assumedly shows a positive correlation with productivity. Therefore, what will be incorporated into the synthesis from the Hayek perspective is firstly the Hayekian triangle, in order to account for capital intensity, as well as for the absolute extent, to which capital is employed and its resulting output of consumer goods. Secondly, in order to take account of the trade-off relation in a situation of resource scarcity between consumption and investment, the PPF will be part of the synthesis as well. Thirdly, in order to take account of the natural rate of interest, there has to be a capital market with a savings and an investment function. However, the modification here is that, by considering the Minskyan emphasis on finance, it rather has to consist of a function that represents sources of finance from all macro sectors and, accordingly, uses for finance in all macro sectors. The saving therefore has to be understood in a broader way that is not restricted to private sector saving but that incorporates the saving of all macro sectors, which means imports and taxes as well $(S + T + M)$.

In the same way, use of this finance is not restricted to investment but also contains exports and government spending $(I + G + X)$. The $(I + G + X)$ function is, however, assumed to be vertical because the investment activity only depends indirectly on the natural rate of interest and only under specific circumstances. In order to simplify matters, it is assumed that government spending and exports are independent of any interest rate considerations. The fact that investment is only indirectly determined by the natural rate of interest and only under specific circumstances means that, for most of the

time, the natural rate of interest is either indeterminate or hidden behind imbalances of the three macro sectors. This is the crucial point at which the conjunction with the Minsky world starts.

The market rate of interest is determined in accordance with Hayek's final version of the Ricardo effect and the Minsky endogenous structuralist money approach, which means that there is a credit supply curve that is horizontal up to a certain degree of indebtedness, i.e. creation of credit money, and from then on, it is upward sloping. The upward slope takes account of the increased risk that is perceived in the increased indebtedness. On the other hand, the increase in risk perception results in an increased liquidity preference, which makes itself felt in credit rationing, since an increasing number of economic agents tends to prefer more liquid short-term assets and try to achieve that by position making and balance sheet shortening. It is important to reiterate that the point from which there will be an upward slope with a resulting tightening of credit is not a definite point of circumstances, but it either may be resolved by productivity increasing technological innovation or may be covered up for a long time by increasing imbalances between the three macro sectors. The investment is determined by the Minskyan determination of the level of investment, as shown and explained in the chapter on the Minskyan business cycle. It is therefore determined by future expectations in profits, which in the form of capital value dictates the asset's demand price and the incurred costs for the asset's production including financing costs, which dictates the supply price, in conjunction with the marginal lender's risk that is added to the asset's supply price and the marginal borrower's risk that is subtracted from the asset's demand price. A further adjustment that is necessary for the synthesis is taking account of the Keynesian multiplier. To do so, Garrison invented the "Keynesian demand constraint" (KDC), which expresses all investment and consumption combinations that result in an equilibrium real income in accordance with the multiplier (Garrison, 2001, p. 136).[43] The KDC will find its limit where it reaches the PPF, since from there on, the scarcity of resources prohibits the simultaneous increase of investment and consumption and is replaced by a trade-off relation.

In order to show how the business cycle plays itself out, four different scenarios are chosen. It is assumed that the point of departure is below the PPF in a situation of overall resource unemployment. Then, the investment is increased at the PPF. Firstly, it

[43] $Y = C + I\,;\; Y = cY + C_0 + I\,;\; C = \frac{C_0}{1-c} + \frac{c}{1-c}$ (Garrison, 2001, p. 136)

is assumed that investment increases, but no resources from other macro sectors can be made available, and that the investment is of a technologically innovative nature. Secondly, the same resource constraints are assumed as before, but furthermore, it is assumed that the investment is futile in the sense that it is unable to change the current growth path by technological innovation. Thirdly, it is assumed that investment increases and resources can be made available from other macro sectors and that the investment is technologically innovative. Fourthly, it is again assumed that resources can be made available from other macro sectors, but the investment is again futile when it comes to changing the current growth path by technological innovation.

The momentum that starts the whole process always is the increase in investment. This increase can be brought about by more optimistic expectations or a lower market rate of interest at constant expectations. Both of these options increase the capital value of assets and thereby their demand price P_K. Furthermore, it decreases the asset supply price P_I because finance costs are reduced, and since there still is overall resource unemployment, other input prices are not on the rise either. Additionally, the risk perceptions regarding lender's risk, as well as borrower's risk, are extenuated. The combination of the rising difference between asset demand and asset supply price and the extenuated risk perception lead to an expansion of investment from I_0 to I_1. Simultaneously, there will be a shift of the $(I + G + X)$-function to the right as investment increases, and exports, as well as government spending, are assumed to be stable. Since all of this happens in a situation of overall resource underemployment, there will be a functioning multiplier effect that resurrects the idle resources in the private sector and thereby precipitates a shift of the $(S + T + M)$ -function to the right as well, resulting again in an ex-post identity of saving and investment, in accordance with the Keynesian multiplier. Since the starting point is in a situation of resource underemployment, it does not matter where the market rate of interest is because the multiplier effect, in this situation, always ensures the ex-post identity of saving and investment, and therefore, in a situation where there is no resource scarcity, there will be no determinate natural rate of interest either as such would require a limitation through time preference, in the sense of inter-temporal scarcity of real income, which, as was shown in the chapter on Hayek, cannot be the case in a situation of resource underemployment. As long as the growth of investment takes place within the realm of resource underemployment, there is a simultaneous widening and lengthening of the

production structure, which implies that there is an increase in capital intensity, as well as in the absolute degree of capital employed.

The entire situation will still change once the PPF is reached, and the multiplier effect stops functioning due to resource scarcity and is instead replaced by a trade-off relation between consumption and investment. For the natural rate of interest, this means that the $(I + G + X)$-function still moves to the right but can no longer be followed by the $(S + T + M)$ -function because, first of all, it is assumed that the multiplier has become ineffective, and secondly, no resources can be drawn from the other two macro sectors. The result is that, instead of a simultaneous lengthening and widening of the production, there is only a lengthening at the expense of consumption. In other words, the investment is financed by increases in corporate profits, which can be obtained due to the fact that, under current real income, in conjunction with the prevailing marginal propensity to consume, economic agents are unwilling to reduce their intended consumption, which drives up consumer goods prices and results in forced saving in the face of increased scarcity of resources. The consumption is thereby not determined by the market rate of interest, as in Austrian theory, but by social conventions, which result in a marginal propensity to consume in accordance with Minskyan theory. This is so because this is a world with credit money creation, where economic agents are not so much restricted in their consumer decisions by immediate budget considerations resulting from their present real income, but by their ability to obtain credit for consumption purposes. It is therefore not a residue that is left after saving has been deducted from real income.

In the first case shown, the investment is initially financed by forced saving or corporate profit. The scarcity of resources is depicted by a shift of the $(I + G + X)$-function to the right, which is not immediately followed by an equal shift of the $(S + T + M)$ -function to the right. In this situation, there is therefore a determinate natural rate of interest i_*^n, but it is also assumed that this is not reflected by the financing conditions on the credit market, which is symbolized by the dotted upward swinging credit supply curve. In this situation, there is therefore a lengthening of the production structure taking place, as can be witnessed by the dotted line in the Hayekian triangle, because the market rate of interest is below the natural rate of interest. In other words, there is an incentive for a lengthening of the production structure, i.e. making it more capital intensive, because the inter-temporal scarcity of resources leads to increased profit margins, in conjunction with a market rate of interest that does not reflect this inter-temporal scarcity, and

thereby increases the capital value of more complex investment projects with a longer gestation period. Furthermore, it is assumed to be of a technologically innovative nature, which leads to a parallel upward shift of the Hayekian triangle, since with the implementation of innovation, the productivity of the entire economy is enhanced. It was laid out in the chapter on Hayek that, even though it is in contrast to Hayek's own assessment, by applying Hayek's arguments brought forward in *The Pure Theory of Capital*, this thesis comes to the conclusion that nearly all productivity enhancing innovation must be resource freeing innovation if it ever is to successfully disseminate into the economy. The effect then is that the PPF is driven outward by the innovation.

Finally, if the productivity enhancing and resource freeing force of the innovation is strong enough, it is able to more than compensate the initially experienced reduction in real consumption and to finance the newly attained level of investment. The increase in productivity thereby increases consumer goods output, whereas the resource freeing works, like in the case of idle resources, that are being resurrected to new uses and thereby ensure the ex-post identity of saving and investment. It is important to reiterate again that the freeing of resources takes place in the amortisation process, which is why frictions that are due to the re-assignment of assets still play a role for the restructuring of the production process in general, but for the resource freeing that is due to innovation they do not in particular. The overall result may then be a PPF that ensures the new level of consumption, as well as the new level of investment. For the natural rate of interest, this would mean that the $(S + T + M)$ -function will also shift to the right, and the natural rate of interest will be back on its previous (indeterminate) level $i_0^n = i_1^n$.

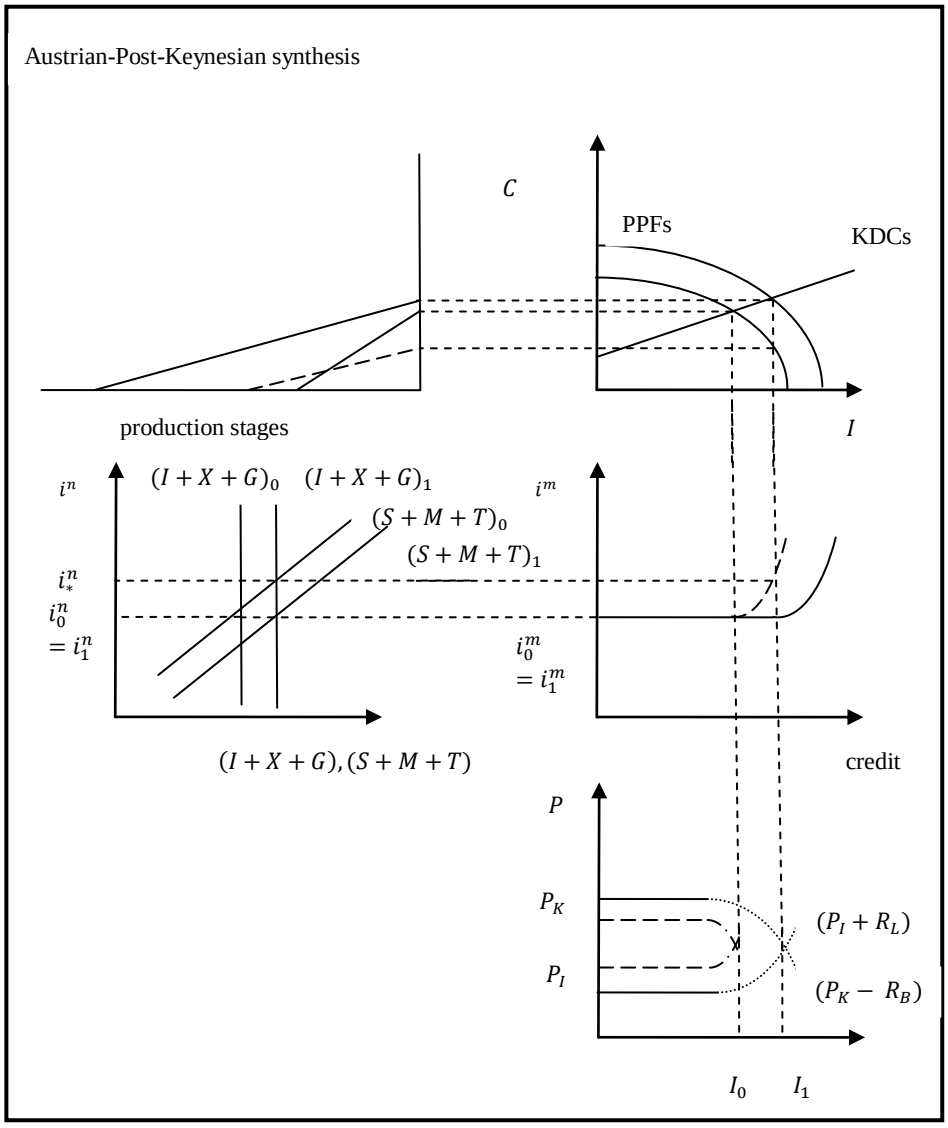

Figure 23: Austrian-post-Keynesian synthesis 1st case.

Source: Own figure.

In the second case, the same process ensues as before. This time, though, the investment is not of a technologically innovative nature and therefore fails to increase the overall productivity of the economy at an instant. The result is that, after the lengthening of the production process, no upward shift of the Hayekian triangle will occur, and the $(S+T+M)$ -function will not shift to the right, since there is no resource freeing from the investment that could ensure the ex-post identity of saving and investment. This could be ensured only by an increase in voluntary saving, which will not take place at the present marginal rate of consumption, in conjunction with the present real income. Yet, this scarcity of resources becomes apparent through an increase in the natural rate of interest, which rises from i_0^n to i_1^n and therefore above the initial market rate of interest i_0^m, which in turn leads to a lengthening of the production process. The fact that the Hayekian triangle does not shift upwards after its initial lengthening results in

increased profit margins for consumer goods, due to forced saving that is not superseded by productivity increases and resource freeing from technological innovation but instead results in investment being attracted to the consumer goods industry. However, since there is a resource scarcity, the only way to realise this is to re-allocate resources from the production stages most remote from the consumer goods production to the stages closest to the consumer goods production. The point is, however, that the capital assets invested in the remote stages cannot be easily reassigned to stages of production that are closer to the consumer goods production because they are specific. The result is that the formerly initiated investments in remote stages are less profitable than originally envisioned, since demand now concentrates on consumer products and is thereby making stages of production relatively more profitable that are closer to these consumer products, which, however, cannot satisfy the intended consumption because a reassignment of resources proves difficult due to their specificity. This also includes labour, if some level of vocational education is to be assumed in a modern economy. The failure of investment to translate itself into an instant increase of overall productivity therefore frustrates the profit expectations of the latest investors, who invested in remote stages of production.

The result will be that they might no longer be able to service their debt payment obligations, either in interest or even in interest and principle. What ensues from here is an increasing risk perception regarding the indebtedness of the economic agents, resulting in position making and, with it, in an increased liquidity preference that tightens credit creation. Thus, the credit supply curve becomes increasingly inelastic in correlation with overall indebtedness and is therefore upward sloping. This is when the natural rate of interest makes itself felt on the credit market through the increasing scarcity of resources that cannot be resolved and therefore poses an inter-temporal scarcity of resources because real income could most probably be increased in the future through the newly initiated, more capital intensive investment, but it cannot alleviate the present or near future situation and therefore violates the consumers' time preference in the sense that they want to consume now and not in a couple of years when the gestation of the new investment has finally come to fruition. The consequence for the investment activity then is the following. The increased price and profit margins in the consumer goods industry have a decreasing effect on real wages, most pronounced in those industries that are closest to the consumer goods production. Since labour is also specific to some extent, there will not be an easy shift of labour from the remote stages

to the stages closest to consumer goods production. Furthermore, if wages are even assumed to be sticky, as Hayek assumes in his second version of the business cycle, for example, due to current collective labour agreements, there will neither be a significant increase in nominal wages in the industries closest to consumer goods production, nor will there be decreasing nominal wages in industries most remote from the consumer goods production. Consequently, there will be no incentives for huge labour movements or anything that prevents real wages from falling. As was shown in the chapter on Hayek, falling real wages combined with credit rationing lead to the Ricardo effect and therefore to a shortening of the production process, which means that, ultimately, industries most remote from the consumer goods production will be forced to liquidate their capital assets, which ultimately drives down overall employment and investment.

In Minskyan terms, it is the combination of falling demand for the companies' intermediate goods and increasing finance costs that force them to make position by liquidating their assets, since their balance sheets are increasingly deteriorating, transforming from initially Hedge to Speculative and finally to Ponzi finance when cash flows are no longer sufficient to cover interest or principle payments. Once their situation becomes apparent to their lenders and credit dries up, they are forced into position making. The point, however, is that only some of these specific capital assets can be reassigned to second-best uses in industries closest to the consumer goods production and probably only at a reduced price that takes account of the costs in reassigning these capital assets. Many other assets may only be liquidated into relatively unspecific working capital by being scrapped, and that will be the value they will be able to fetch on the market.

What ensues is therefore a drop in production and employment in industries that have to liquidate their assets, and this precipitates a drop in general employment and thereby in consumption demand as well. As a result, the expected profits in industries closest to consumer goods production will also drop, in conjunction with an increased market rate of interest, which drives down the capital value of assets and reduces the demand price thereof. Assuming that the decrease in market power for suppliers of capital assets in industries most remote and the increase in market power for suppliers of capital assets in industries closest to consumer goods production, which was brought about by the shortening of the production structure, net each other out, then there would be an increase in the supply price of capital assets due to the increased financing costs.

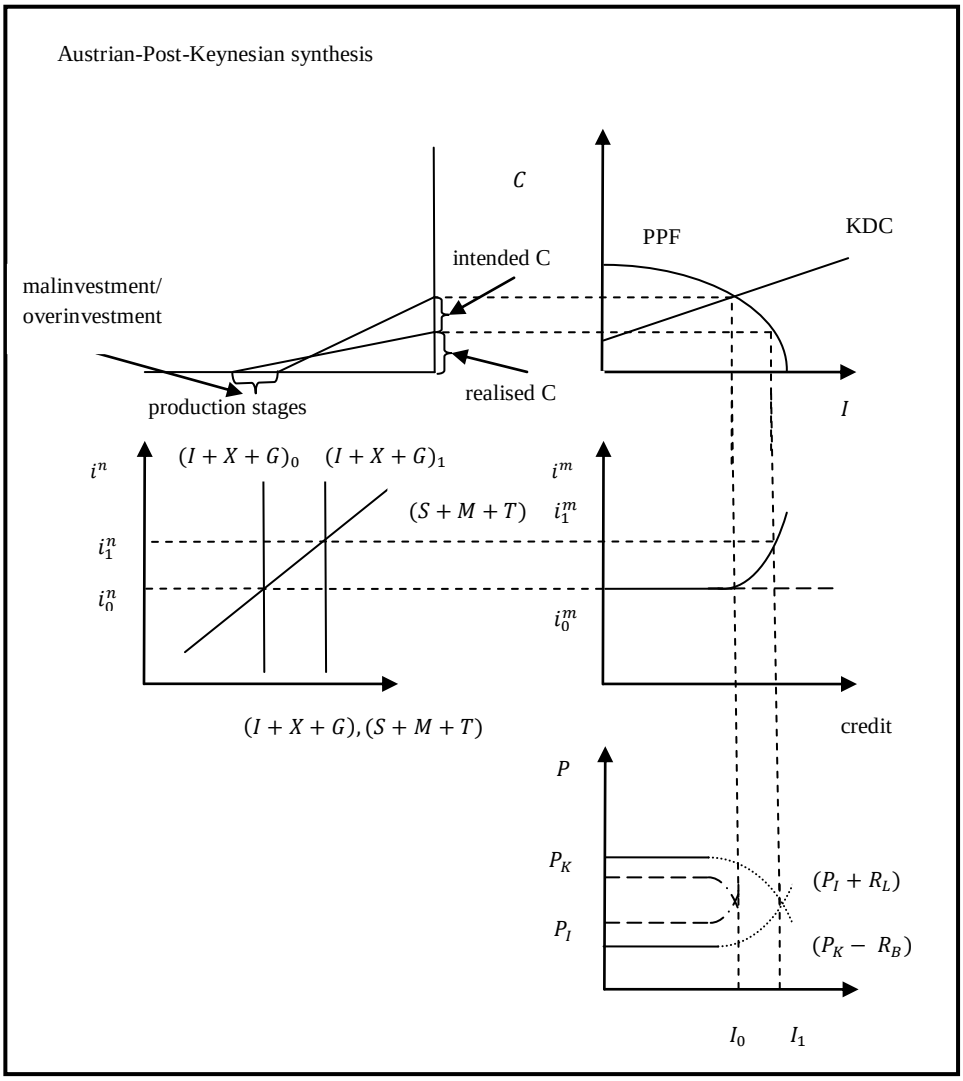

Figure 24: Austrian-post-Keynesian synthesis 2nd case.

Source: Own figure.

Furthermore, the increased marginal risk for borrowers and lenders will increase the steepness of the borrower's and lender's risk function and therefore reflect the increased risk perception in correlation to the overall level of indebtedness. The result of all of this is a decreasing overall level of investment, since industries closest to the consumer goods production also find that their profit expectations have been frustrated. Not only that, but just like the most remote industries before them, they are now experiencing a deterioration of their balance sheets as realised cash flows are increasingly lagging behind debt payment obligations, which is compounded by increasing financing costs. Also, their balance sheets will shift increasingly towards Ponzi finance, which will force them into position making as credit dries up for them as well. Finally, almost everyone will be forced into position making in order to get their hands on liquidity, and a fire-sale of assets will ensue in which no-one can afford to act as a lender of last resort or

may want to act as a value oriented investor to take advantage of falling asset prices. As described in the chapter on Fisher, this is so because a debt deflation takes place in which debt contracts state nominal obligations that can no longer be covered by falling asset prices in the case of a fire-sale, which means that the indebtedness actually increases because the value in assets decreases more rapidly than the debt can be reduced. The consequence is that there will still be rising liquidity preference and therefore a rising market rate of interest, which prevents the Keynes effect as well. Secondly, since financing costs are increasing, and other input prices like wages may be sticky, there will be no re-establishment of profits in the face of falling prices, and therefore, no capital value oriented investor may be found, which means a real balance effect is excluded as well. What comes then is the self-propelling secondary deflation as Röpke described it.

The next two cases are merely special cases of the former two in which the financing constraint is a bit relaxed in comparison, since the difference between the former two cases and the following two cases is the assumption that, in the following two cases, any ex-ante imbalance between saving and investment can also be rectified ex-post by a change in the saving position in one of the two other macro sectors. This is important insofar as it constitutes another source of finance or resources that is neglected by Austrian economists but was introduced into the Minskyan theory.

The third case therefore starts again at the point where the KDC reaches the PPF, and again, there will be a shift of the $(I + G + X)$-function to the right. This time, however, the $(S + T + M)$ -function is able to follow and also shifts to the right, even though private sector saving may not be able to follow, since at this point, there is resource scarcity that prevents the multiplier effect from working. The $(S + T + M)$ -function is nevertheless able to follow suit because the private sector investment is financed by a corresponding imbalance in one of the two other macro sectors. Instead of additional saving provided by voluntary saving or by forced saving, it would be thinkable that the economy has a negative current account instead, which means it draws more resources into the country than it exports and thereby finances the increase in investment and in consumption through imports. Likewise, it would be thinkable that, in order to increase private investment, the government decides to establish a government bank like the German KfW (Kreditanstalt für Wiederaufbau) as its sole equity holder and finances its activities by an increase in taxes, resulting in a government budget surplus. In both cases, this would result in the PPF being pushed outside, which is symbolized in the

graph in case number four by a dotted PPF. The new PPF is drawn in a dotted line because the newly found production possibility space is merely something that is based on macro sector imbalances and not yet on any real private sector improvement of production potential, but only on resources temporarily drawn from other macro sectors. While, for the increase in imports, the KDC may remain as it was, for a government budget surplus, it would have to be drawn below its initial position because an increase in taxes reduces the real income of consumer households, no matter whether it is an income tax or a value added tax.

The difference would, however, be that an income tax not only reduces the potential to consume but also the potential to invest, whereas a value added tax discriminates against consumption rather than against investment, which makes itself felt in the way the PPF is drawn, since the value added tax results in a favourable trade-off relation for investment in comparison to consumption (Garrison, 2001, p. 103).

Yet, in order to keep things simple, the following two graphs only depict the case of an increased current account deficit. Again, it is assumed that, for the third case, the investment is of a technologically innovative nature, and therefore, the Hayekian triangle is able to grow in length and width almost simultaneously. It is thereby able to increase the private sector saving ex-post by the same amount that investment was increased, which was initially not financed by forced saving, as in the first case, but by an increase in imports.[44] After the private sector saving has been brought into equilibrium again with private sector investment, and assumedly, government budget has been balanced all the time, accounting principles necessarily require the current account to be balanced again as well. The expanded PPF then turns into a solid PPF, since it represents the real production potential of the private sector without any resources drawn from other macro sectors. Since the financing through an increase in imports (or an increase in government sponsored loans) provides the private sector of the economy with an additional source of finance, it is likely that the steepness in the borrower's risk function, as in the lender's risk function, decreases and thereby provides even more room for the expansion of investment.

[44] An increase in government budget would effectively be like forced saving initiated by the government but would, in accordance with Minsky's theory, not necessarily result in inflation, since effective demand is partly transferred from consumption through income tax, as well as particularly by value added consumer tax and also partly from private investment through income tax to state sponsored investment. A value added tax would therefore shift demand from consumption to investment, whereas an income tax, and in particular, a corporate income tax, would shift private market determined investment towards private state sponsored investment.

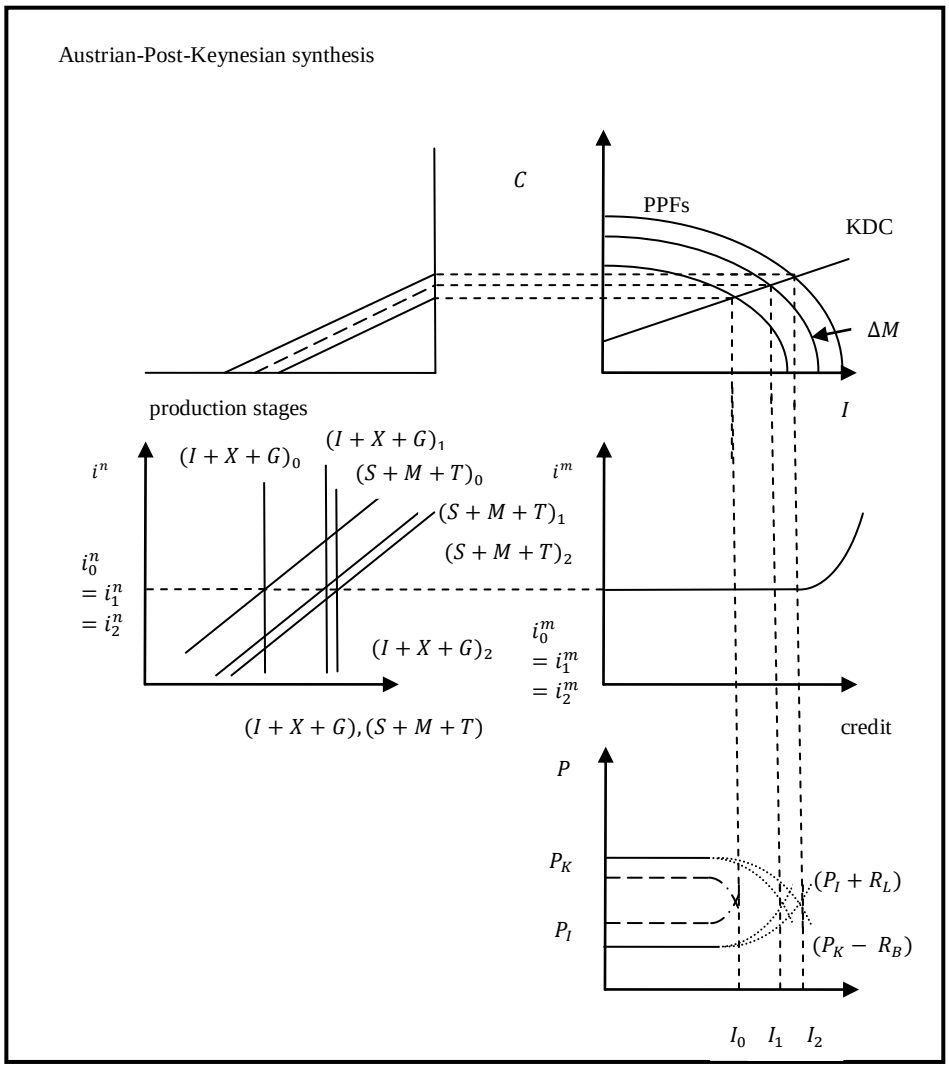

Figure 25: Austrian-post-Keynesian synthesis 3rd case.

Source: Own figure.

This is rather likely because economic agents may not be able to judge immediately whether the investment carried out is productivity enhancing or not. However, since cash flows are still validating their investment decisions, there are no signs to the contrary, but everything seems to work out smoothly. This is the relative calmness that Minsky talks about. Where the investment is in fact technologically innovative, this further expansion based on the improved financing conditions may well be justified.

In the fourth case, however, the investment fails to generate technological innovation that generates productivity increases that would result in an ex-post identity of saving and investment and instead only increases the macro sector imbalances further, until some point is reached at which these imbalances are no longer sustainable.

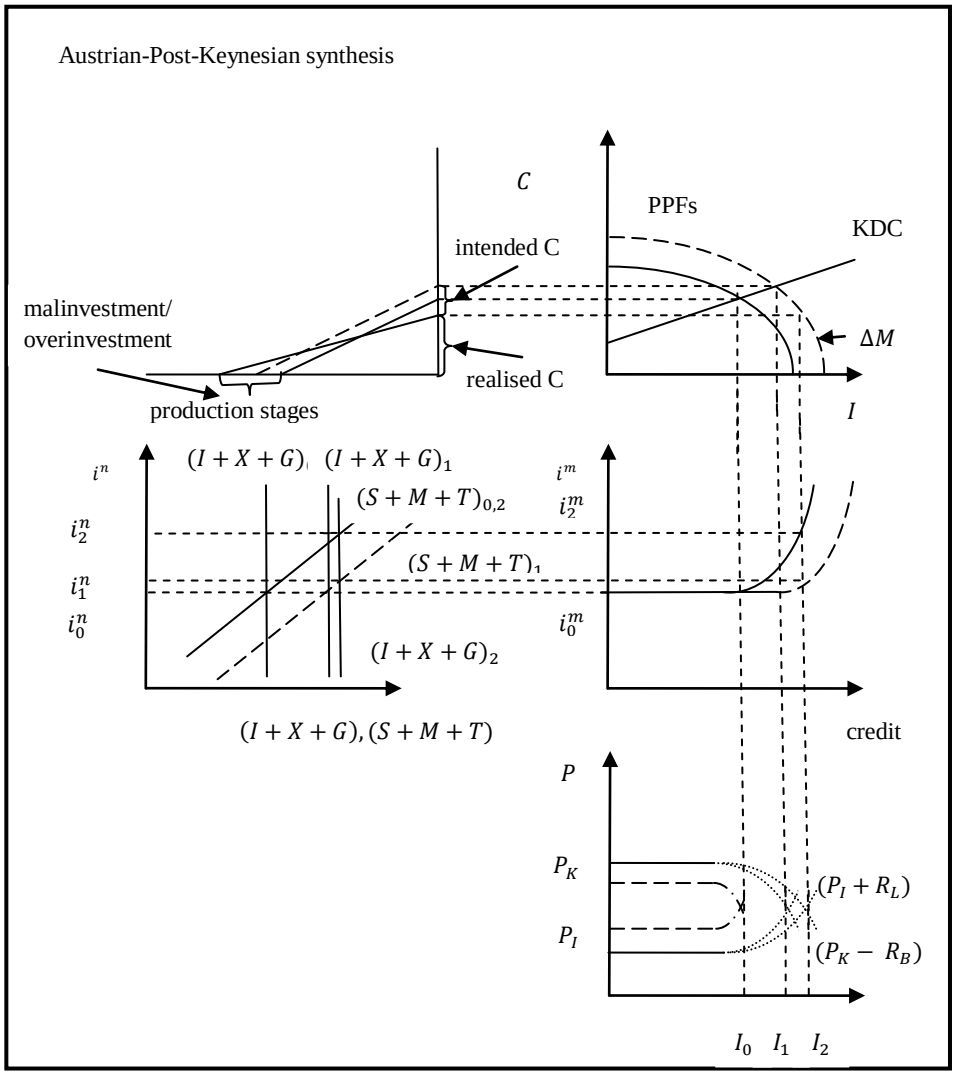

Figure 26: Austrian-post-Keynesian synthesis 4th case.

Source: Own figure.

In the case of the increasing current account deficit, the result might be a devaluation of the currency, which increases exports and curbs imports. In the case of the government budget surplus, the checking factor could be the tax payer, who, as an electorate, puts a hold on government sponsored private investment that turns out to be a futile non-event. Both circumstances are depicted in the graph by the $(S+T+M)$ -function, first in being able to follow the shift to right of the $(I+G+X)$-function, but ultimately in retreating again through a shift to the left, once this source of finance is revoked. As in the second case, the result would be a definite natural rate of interest. The consequences are, as already described in the second case, that, in order to maintain the level of investment, it would be necessary to reduce consumption, which is not going to happen voluntarily, and therefore, time preference is violated and makes itself felt through the inter-temporal scarcity of real income. Consequently, the downturn takes place, but

more dramatically this time, since the increasing macro sector imbalances allowed the misallocation of resources to continue to a much greater extent as financial instability on the balance sheets remained undetected because it was covered up by increasing macro sector imbalances, which provided investment-validating cash flows.

What can be taken from the Austrian-post-Keynesian synthesis is that there lies a tremendous growth potential in innovative investment, and this growth potential can be increased much further by financing this investment with resources that come not only from the private sector but also from all macro sectors. However, at the same time, this growth potential bears a dramatic risk of a great downfall when, instead of generating innovative investment, this abundance in financing resources is being misappropriated towards the erection of monuments. Still, this is not only true for activities initiated by the state, but also for private sector investment. Yet, as was described earlier, the quality of investment varies over time. Whereas, prior the beginning of the boom, the investment may be innovative and productivity increasing, as well as resource freeing, it is likely to become more and more detached from the innovative momentum and develops into investment that no longer contains the same innovative qualities that would provide a perpetual boom but rather turns into bets on the boom that are doomed to go bust. What is required therefore is first of all to provide an investment environment that allows investment to flourish in order to give innovative investment the chance to change the realities of the world and to propel human society into formerly unthinkable spheres of technological progress, and secondly, to install checks and balances that ensure that imbalances are not able to build themselves up to such an extent that, once they become unravelled, they carry the potential of dragging the entire economic system into an abyss.

From a fiscal point of view, what can be done is for the state to provide complementary resources like infrastructure in order to increase the profitability of private sector assets. This proves to be especially important in a situation of a severe crisis, when monetary policy on its own might be able to stabilize asset prices but is insufficient when it comes to re-establishing profitability. As was laid out in this thesis, the problem of crowding-out private investment or increasing inflation by debt financed fiscal measures that might be accommodated by monetary policy is less of a problem during a crisis. The notion that the central bank would be able to pump money into the economy by expansionary monetary policy misses the point of endogenous credit money creation and liquidity preference. Once there is no endogenous generation of credit money

through the private sector, a lot of the reserves provided by the central bank will not be utilized for credit money creation but will be used for hoarding liquidity. Instead, business banks tend to hold reserves above the minimum requirements with the central bank instead of utilizing their increased space for manoeuvre by handing out more credit money (Pache, 2014, p. 34). In the same way, investors abstain from seeking credits for investment purposes and instead decide to opt for hoarding, which could be witnessed in the financial crisis of 2008 when world cash reserves suddenly increased by an estimated thirty percent and investors like Berkshire Hathaway decided to still hold more than 40 billion US dollars in cash during the year 2012 (Häring and Schnell, 2012, p. 1).

5.2 A central bank backstopped free-banking system

Central banks answered the collapse of markets for assets used as collateral in the wake of the financial crisis of 2008 not only by acting as lenders of last resort, but also, for example, by the Federal Reserve adopting a new role of dealer of last resort by taking private sector financial assets onto its balance sheet in massive open market operations (Mehrling, 2011, pp. 122-123). Consequently, the balance sheets not only of the Federal Reserve but also of the ECB more than quadrupled in comparison to credit money creation and volume of money defined as M2[45] and M3[46] (Pache, 2014, pp. 34-35). This shows that, without re-establishing profitability, the role of a lender of last resort is not sufficient, since the breakdown of capital values inhibits value oriented investors from obtaining these assets and leaves them without any market value, thereby posing a risk far too high for private sector dealers to put them onto their balance sheets.

On the other hand, as was already mentioned in the chapter on Minsky, it is questionable to appeal to the financial industry to hand out credit by neglecting due diligence just in order to restart the economy, since this might turn out to be a restart on the wrong foot. When investors try to make profit by insufficiently pricing risk that is not reflected in a low market rate of interest environment by choosing high yielding

[45]Fed: including cash, demand and term deposits as well as commercial money market papers.
[46] ECB: including cash, demand and term deposits, commercial money market papers as well as bonds with a duration of two years. (Pache, 2014, p. 35)

asset backed securities and financing their asset acquisitions with increasing leverage, then there is a danger that financial instability is being reintroduced.[47]

In their study on the quality of credit granting in correlation with market concentration, Dewatripont and Maskin come to the conclusion that a more centralized financial system with a small number of big players delivers more financial stability and efficiency than a highly competitive financial market with many small players. According to their assessment, this is due to the distinct ability of larger institutions to provide a more intensive monitoring of their debtors, which puts an emphasis on long-term financing relationships instead of short-term financing. (Dewatripont and Maskin, 1995, pp, 549, 553)

This assessment is actually confirmed by the study of Kranton and Swamy on the development of the financial system under British rule in colonial India. It is shown that the introduction of British bankruptcy law increased the issuance of credit, since in the case of default, reimbursement can be sought via the courts, whereas before, creditors had a monopolistic status with long-standing relationships to their debtors of monitoring them. The old system therefore resulted in a willingness to accept in-between debt moratoria, since creditors could rest assured that their monopolistic profit would compensate them for moratoria inflicted losses. The increased competition that resulted from the introduction of the British law had two important consequences. Firstly, credit became cheaper and more abundant, and secondly, defaults became more frequent, and moratoria non-existent, as an automatism of debt liquidation through the courts set in, and losses through debt moratoria could no longer be covered by monopolistic profits. (Kranton and Swamy, 1999, pp. 3-4, 12-14)

From the Minskyan perspective, this actually represents a case in which legislation enables financial innovation, since instruments are used that were not known before and that increase the availability of finance, and yet, these instruments ultimately also lead to an increased financial instability. One way to reduce financial instability would therefore be to have a financial market that is less competitive and thereby results in stricter due diligence of big market players and, once a crisis occurs, is able to absorb it by legal elasticity through debt moratoria, since monopolistic profit margins can serve as a buffer against transient losses. However, this only addresses the solvency problem and not the liquidity problem. Finally, in a case of a liquidity crisis, what is required is

[47] At least this is also the concern expressed by several market participants in the "Handelsblatt" in April 2014 (Cünnen, 2014, pp. 1, 4-5)

that the state authorities, and the central bank in particular, provide legal elasticity. Pistor refers to Mehrling's insight that the Federal Reserve not only acted as a lender of last resort within the strict boundaries ascribed to it by the law, but it also actually stretched these boundaries by becoming a dealer of last resort in a wide range of securities, which originally was not part of its mandate (Pistor, 2013, p. 321). Furthermore, Pistor points out that legal elasticity is relatively high at the apex of the system and becomes successively lower towards its periphery, and this could also be witnessed in the way the financial crisis of 2008 was resolved (Pistor, 2013, pp. 319-320). Consequently, practicing legal elasticity very much depends on whether the existence of the entire system is at stake and not on whether there are some singular and isolated cases of bankruptcy. Hence, in a situation where the survival of the entire system is at stake, it is important that legal elasticity is acted out by the most powerful entity that has the most resources or, even better, unlimited resources like a central bank (Pistor, 2013, p. 323). In other words, what is required is an institution that is able to absorb the losses in liquidity, as well as in solvency, that other economic agents would otherwise experience and that would be insupportable for them, should they be forced to show leniency to their debtors by being forced into legal elasticity. Yet, Pistor makes out a paradox that the financial system might be rescued by the legal elasticity, but it is this very same legal elasticity that undermines the credibility of the system, since laws are bent and contractual agreements amended (Pistor, 2013, p. 323).

The consequence is of course that of moral hazard that contracts are being entered upon with the knowledge that their pricing does not reflect the underlying risk, but this risk may well be neglected because there is an expectation that finally legal elasticity will absorb that risk through central bank and government bailouts. Michael Polous of "Oliver Wyman's financial services" pointed out in *The Wall Street Journal* that it is therefore the obligation of the central bank to force equity and liquidity standards upon banks that counter this moral hazard problem (Poulos, 2014, p. 13). Since equity and liquidity requirements are costly for banks because they force them to restrict their lending and decrease their potential for leveraged financing, it serves as an inherent pricing-in of liquidity and solvency risk. However, regulating banks, and thereby forcing these costs upon them, also means increasingly favouring finance through the issuance of debt securities and not through bank lending that might ensure a higher degree of due diligence (Poulos, 2014, p. 13). The problem of providing a level playing field for banks and shadow banking was already mentioned in the chapter on Minsky,

and the failure to do so poses the risk of regulatory arbitrage and, furthermore, creates the incentive to bet on the legal elasticity provided by the central bank. This is also what is meant when, as mentioned before, according to Austrians, the role the central bank played during the crisis is what corrupts the entire system. Larger private banking entities would then only exacerbate the corruption of the system with their potential to blackmail the central bank with the 'too big to fail' argument of system relevance.

It was already laid out that central bank supervision to avoid crises suffers from two important deficiencies. First of all, it may avoid crises by employing proactive supervision influence on business decisions and thereby would be involved in the allocation of resources, which is not its mandate, and secondly, it cannot foresee the true consequences of all financial instruments evolving. What at first seems to be a benign, or even efficiency increasing, financial instrument might, with hindsight, turn out to be highly systemic risk increasing. This may be so, since the same instrument that once provided resources for technological innovation later turns into an instrument that channels resources into investments that are increasingly decoupled from real economic growth and thereby constitute ever-rising liquidity risk through increased speculative and Ponzi finance. Therefore, the alternative answer would be to look for the Austrian proposal of a free-banking system in which competition among currency issuing banks is supposed to provide the stability that the central bank system is lacking, due to its inability to prevent moral hazard, since in order to rescue the system, it is forced into legal elasticity.

In the chapter on Hayek, it was already laid out that the only free-banking system that can be deemed workable at all is a system somewhere in line with the one proposed by George Selgin. First of all, it is a fractional reserve system, and secondly, unlike Hayek's proposal, it sticks to the paradigm of money as a hierarchical system with one ultimate money at the top of the pyramid. The first characteristic of fractional reserve banking is of importance because it provides the banking system with the vital option to accommodate increases in liquidity preference, and secondly, it ensures that a clearinghouse system can be installed, which is crucially important for maintaining a modern payment system. The second characteristic of the hierarchical paradigm of money ensures discipline through the redeemability of liabilities in some ultimate money and thereby also provides a common standard of value for exchange rates among privately issued liabilities, i.e. currencies.

As was mentioned before, Selgin's proposal also includes the necessity for legal elasticity, which is situated institutionally on the level of the currency issuing banks, in the form of some debt payment moratorium clause that enables banks to pay out reserves with a delay and therefore gives them time to get their hands on the sufficient amount of the ultimate money. This requires that the counterparty, i.e. the creditor, generates monopolistic profit margins in this relationship, which provide him with a buffer that not only enables him to absorb the losses resulting from such deferred payments, but also ensures his readiness to enter into such a contract in the first place because he may rest assured that a long-term business relationship with monopolistic profits will compensate for these losses in the long run. However, in a competitive financial market environment with competitive price setting, it is unlikely that the creditor will enter a contract that states a potential moratorium if there is not some sort of compensation for this risk provided up front. Again, this only addresses the solvency risk and not the liquidity risk, since in the case of a widespread liquidity crisis, such a pre-agreed moratorium would not help solve the crisis because it would just transfer the problem to the counterparty, i.e. the creditor, who has payment obligations to fulfil, which he will default on if payment of reserves by the bank is suddenly suspended.

As was already explained, the Selgin approach also requires a lender of last resort to ensure the stability of the payment system by increasing the ultimate money in the case of a liquidity crisis. The free-banking approach proposed in this thesis can therefore not rely on a commodity money like gold as the ultimate money, but has to rely on an internationally accepted synthetic ultimate money, i.e. the SDRs of the IMF.

Also, the proposal to replace the US dollar with the SDR in real practice as an international reserve currency is not new. It is also laid out by Jane D'Arista and focuses on the fact that, under the current regime, the provision of the US dollar as an international reserve currency is based on the US running an increasing current account deficit against the rest of the world, which thereby is able to acquire the factual world reserve currency of the US dollar (D'Arista, 2009, p. 634). The concept is designed in such a way that it still provides nations with the possibility of retaining an autonomous monetary policy, which could be backstopped in a case of drained reserves by an international clearinghouse, which would then act as a lender of last resort, while not imposing on monetary policies of national central banks and also leaving their ability to influence exchange rates untouched (D'Arista, 2009, pp. 649-650). This, however, is contrary to Hayek's assessment that fixed exchange rates are vitally necessary to impose

monetary discipline as otherwise the easy way of creating money and devaluating the currency would be the chosen path (Hayek, 1990[1976], pp. 108-109). However, national central banks retaining their freedom in influencing exchange rates could result in them trying to avoid a devaluation of their currency by using lender of last resort facilities of the international central bank. Combining this insight with the lender of last resort in the form of an international central bank, which can provide further liquidity in the form of the ultimate synthetic money at its discretion, would create a tremendous moral hazard problem, since there would be no disciplining force left to contain excessive credit money creation because national central banks could always rest assured that, no matter how loose their monetary policy is in creating liabilities, there will always be the ultimate money available to them that prevents their monetary policy from turning against them by leaving them illiquid with regard to the ultimate international reserve currency. The result may be excessive risk taking regarding the financing of investment and no corrective force, which checks the misallocation of resources, since any investment binge will always be validated by monetized fiscal measures and the lender of last resort on an international level by backstopping any drain in liquidity on the national level even though these investments might eventually have the productive quality of 'monuments', which is none. Instead, it would be important, according to Hayek, to combine flexible exchange rates with a system of competing currencies in order to ensure monetary discipline (Hayek, 1990[1976], pp. 108-109).

The way that such an international central bank could still act as a lender of last resort and exert discipline would be through the discount rate at which the competing currency issuing banks are able to refinance themselves should they get into a liquidity crisis. This discount rate may first take account of the relative indebtedness within the clearing system towards the other banks, in order to take account of the excessive liabilities standing against it and, secondly, by the relative market rating of the securities that are being used as collateral, such as private sector securities and government bonds. This would ensure that the immediate liquidity crisis is resolved, since the net debtor gets access to the ultimate money but would only get it at far inferior terms in comparison to a net creditor bank. This net creditor bank could use the advantage in obtaining securities from the net debtor bank, either by purchasing it or by using it as collateral for credit provided to get reserves of the ultimate money at far better conditions than the net debtor bank. It could thereby pass part of this liquidity on to the net debtor bank, for

example, by granting additional credit that is more favourable for the net debtor than if it would obtain it from the international central bank. Alternatively, the net creditor bank could also provide the net debtor with interest rate swaps[48] that provide the net debtor with more affordable long-term credit and therefore some breathing space. For the net debtor, all of this would still mean that this increases the costs in creating credit money and would induce it to drive up its interest rate in order to decrease its credit money creation. The net creditor, on the other hand, is likely to take on some of the net debtors' securities at a favourable price, since it could use it for carry trade[49] by financing it at a much lower interest rate. This way, the net creditor would, however, increase its exposure by creating additional credit money, i.e. liabilities, which would ultimately reduce its net creditor position, since the net debtor is also forced to contract its currency supply and reduce its exposure. Now this contraction in credit money supply by one currency would of course be potentially troublesome if each bank represents one separate country where legal tender laws forbid the usage of any other currency since in the case of the net debtor's country the contraction of currency creation would cause a deflation and defaults on debt as liquidity dries up. This would, however, not be the case if both competing banks are present at the same time and in the same country, since the net creditor bank would take on some of the business of the net debtor bank that the net creditor bank perceives worthwhile in pursuing.

In practice, the existence of several competing currencies in one place is probably not too difficult from a technical point of view, since their common denominator is the ultimate reserve money SDR, and the different private currencies may only be electronic accounting figures with differing exchange rates, depending on their relative exposure to one another in terms of the ultimate money. Hence, there might be no bank notes or coins, but only bank cards providing electronic access to demand deposits for transaction purposes, and prices would always be quoted in SDRs. Banks would then still have the freedom to finance investments by credit money creation that they think are technologically innovative and will therefore reap cash flows that justify the risk of financing them. On the other hand, too much risk taking will breach the trust in the respective bank and cause customers to withdraw their deposits and drain the bank reserves even further, which exerts more discipline in due diligence or eliminates the bank if it continues with its hazardous behaviour. The international central bank and clearinghouse would increase the amount of the synthetic reserve currency in order to

[48] For definition and explanation of interest rate swaps see PIMCO, 2008.
[49] For definition and explanation of carry trade see Häring, 2008.

protect the payment system, but it would do so under principles that have a disciplining effect. This disciplining effect could ultimately exert a relative convergence in value of the different currencies, since the market forces would eliminate hazardous currency issuers, and other banks would absorb the part of their business that is not Ponzi or overly speculative.

National governments, on the other hand, could impose taxes[50] denominated in SDR but could accept all currencies in relation to their exchange rate with SDRs. This way, governments would also exert discipline on banks, since the relative values in a currency's ability to settling taxes decreases with its abundance. Governments could still finance public amenities by going into debt, but they would have to keep a keen eye on how this ensures the overall productivity of the economy because otherwise, tax revenues might slump and endanger the projected cash flows that are required for servicing the debt. The provision of public goods, such as a legal system, security, infrastructure, education, healthcare, social welfare, and employer of last resort programs, are then to be perceived as investments into the production potential of an economy, rather than under the premise of social justice. In a case of a crisis with surging liquidity preference, the state would be able to take advantage of the fact that the envisioned free-banking system is able to accommodate an increase in liquidity preference by increased credit money creation, from which some of these unproductive industries that caused the problems might be exempt, but not necessarily the state,[51] which could step in and compensate the decreased private sector activity by providing complementary resources in the form of state investments, for example, by erecting new infrastructure or science and technology projects in order to re-establish the profitability of private sector assets.

[50] Also, in regard to how the tax system should work, there are some striking similarities between an Austrian like Garrison and a post-Keynesian like Minsky. Garrison emphasizes that value added consumer taxes are to be favoured over income tax because income taxes reduce the potential to invest, whereas value added consumer taxes curb consumption in favour of investment (Garrison, 2001, pp. 102-104). Minsky, on the other hand, refuses the usage of corporate income tax because this reduces the equity base for investment and is therefore conducive to financial instability. However, when it comes to preventing inflation, Minsky prefers a personal income tax over a value added consumer tax, since this is potentially inflation increasing. (Minsky, 1986a, pp. 305-306)
It is interesting to note that both refuse an income tax that has the potential to inhibit investment or respectively induces leveraged investment.

[51] Likewise, it would also be possible that the state retains a state bank, which provides credit money for fiscal expenditure in times of crisis, but this state bank would also be restricted by the same refinancing facilities as all the other banks and would therefore have to contract its exposure again, once productivity enhancing fiscal measures no longer result in increased tax revenues for the state.

6 Conclusive remarks

This thesis compares the financial instability hypothesis of Hyman P. Minsky and the business cycle theory of Friedrich A. Hayek, resulting in the Austrian-post-Keynesian synthesis. Yet, from the Hayek side, this synthesis is not only based on Hayek's business cycle theory, but is also extended by concepts that were published by Hayek in *The Pure Theory of Capital*, as well as in his publications on free-banking. Without the concept of a price valued marginal productivity of investment, it would be impossible to bridge the Sraffa critique and the Keynesian marginal rate of efficiency.

It is also established that the natural rate of interest remains indeterminate, as long as it is just governed by the marginal productivity, and becomes determinate only as soon as it is governed by time preference, in the sense of an inter-temporal scarcity of resources. This inter-temporal scarcity of resources, however, only gains importance when a sufficient supply of resources for investment through saving does not follow up or has come to a halt. Only then will the natural rate of interest be determinate and dependent on time preference. This connects the state of the economy assumed by Keynes with the state of the economy assumed by Hayek. During the state of relative resource unemployment, the natural rate of interest also remains dependent on productivity, rather than on time preference, and therefore remains indeterminate. This situation changes as soon as the inter-temporal scarcity of resources becomes more articulate, and the natural rate of interest becomes determinate once it is governed by time preference. At this point, the Keynesian multiplier becomes ineffective and is substituted by the production possibility frontier and therefore by a trade-off between consumption and investment. It was, however, also shown that this production possibility frontier cannot be a static concept, but its inward and outward shifting very much depends, apart from secular growth, on technological innovation as well as the possibility of financing investment through all three macro sectors. Both innovation and inter macro sector provision of resources can be a chance to increase the production possibilities and therefore expand the production possibility frontier, as long as the investment is validated by increasing productivity. Yet, it can also pose a severe risk when investment decouples from real economy productivity and instead turns into mere betting on productivity increases.

The important contribution of Hayek is the fact that there is no easy remedy for the misallocation of resources through relative overinvestment and malinvestment, since

capital is heterogeneous and cannot easily be reallocated. The contribution of Minsky lies with the understanding that the institutional framework of financial markets, and its interplay with innovation, may result in a long period of relative tranquillity during which expectations are fulfilled, but the process of derailment creeps in almost undetected by economic agents. With Minsky, there is therefore no definite point at which investment turns into malinvestment, but it is instead a much more gradual shift that cannot be exactly pinpointed in regard to what stage the economy has really reached, how much of the investment is malinvestment, and how much of the investment is sustainable under normal circumstances.

The phase of relative tranquillity, on the other hand, can also be understood as a phase of increased mutual learning in the Hayekian sense, where an increased convergence of economic plans among economic agents takes place, which at some point is, however, derailed as expectations for cash flows become more and more frustrated, and debt payment obligations cannot be met by an increasing number of economic agents. However, the mutual learning, as well as its derailment, is closely linked to what Hayek refers to as ideal types. The way that institutions digest information and economic agents build their expectations based on this information cannot be divorced from institutional ideal types, since the kind of accounting standards and macro prudential rules that are being adhered to matter. For the question of accounting standards, the difference between German HGB and international IAS should again be referred to. Whereas the German HGB law prohibits any mark to market valuation of assets above their production or purchase values, the IAS does not. Whereas the HGB therefore puts an automatic ceiling on spiralling asset price increases in combination with ever-higher rates of indebtedness, the IAS does not. This difference in asset valuation in turn provides very different accounting profits and equity valuation, and, with it, more cautious expectations with the German HGB or, potentially, more exuberant expectations in the case of IAS. In the same way, macro prudential tools, like the requirement to hold more equity for certain financial assets that are deemed to be more risky than others, would change the pricing of these assets and therefore change their capital values. The mutual learning, and also its potential derailment, therefore very much depend on institutional ideal types and their institutional setting.

One way to deal with this could of course be to change the ideal types of financial markets in such a way that their mutual learning is most in line with that of a free market economy, which means by the introduction of free-banking. It has been made

abundantly clear in this thesis that the 100 percent gold or commodity backed free-banking is not an option for a global and interconnected economy where free and uninhibited international trade has become paramount for a global and prosperous economic development, since such a monetary system would require the physical transport of the respective amount of gold from one bank to the other bank for transactions to take place. The idea of a 100 percent gold backed free-banking, as well as the anarcho-capitalist doctrine of the abolishment of any state institutions, can, in this regard, only be perceived as ideological positions of the most extreme and unrealistic fashion.

More credibility, on the other hand, can be granted to the Austrian fractional reserve free-banking idea, as well as the 100 percent money idea, from the post-Keynesian perspective. It was also shown in Hayek's writings on free-banking that a banking system must be able to accommodate a surge in liquidity preference, and a fractional reserve free-banking system is able to provide this. The downside for the fractional reserve free-banking model is, however, that it cannot completely prevent the occurrence of a financial crisis. On the other hand, the downside of a 100 percent money system from the post-Keynesian perspective would be that, even though, in contrast to the Austrian 100 percent gold-money system, it is able to provide a functioning payment system, it would turn the economy into a very static economy in which only formerly saved resources can be used for investment, and investment cannot be financed by credit money creation. What is missing therefore is the financing through forced saving. This would surely provide the financial system with a lot of stability but would, at the same time, make innovation in the Schumpeterian sense impossible, since this actually depends on a dynamic financial system with credit money creation that gives entrepreneurs the chance to try out new ideas, which can boost productivity, that might not get a chance as easily in a very static financial system.

The entire debate of how to reshape the global financial system by a 100 percent money system, fractional reserve free-banking, or, as it is proposed in this thesis, a global central bank governed fractional reserve free-banking system, can most likely not amount to much more than intellectual jousting. The parties involved to agree on establishing a financial system that differs pronouncedly from the one at hand are probably too manifold to agree on a radical new design. Furthermore, such a decision is also governed by vested interests of geopolitical players, who would like to see their

own currency either retaining the status of an international reserve currency like the US or gaining such a status in the future, like China.

The consequence for the question of how the financial system can then be reshaped in order to avoid future crises, or at least the severity of a crisis, would then rather be met by the adoption of a central bank architecture in the Minskyan sense. This is also what is actually happening with the ECB. The new role that the ECB is adopting is very much in line with what the Minskyan theory has to say about its role as a lender of last resort, as well as with the role the central bank should adopt in supervising the banking system. The function of the ECB's Single Supervisory Mechanism (SSM) is to provide financial stability (European Commission, 2012, p. 18). Effectively, through the SSM, the ECB then also obtains the obligation to provide financial market stability next to its primary goal of price stability.

Regarding the lender of last resort function, the General Director of Market Operations at the ECB Ulrich Bindseil states explicitly that this function has to be obtained by the ECB in order to avoid a self-propelling fire-sale of assets, even if that might require extraordinary measures like the broadening of eligible collateral, as well as emergency liquidity measures for non-banks (Bindseil, 2014, pp. 236-242).

The way to deal with the potential moral hazard attached to such operations may be resolved by "constructive ambiguity", which means by not establishing any legal automatism for these measures, in order to avoid the banks pricing in of lender of last resort expectations by the central bank under any circumstances. Furthermore, these measures are to be costly, as well as stigmatising, for the banks. (Bindseil, 2014, pp. 242-245)

This concept of constructive ambiguity is actually in line with Minsky’s proposal regarding the central bank, to leave the economic agents in doubt as to what extent the central bank will act as a lender of last resort in order to force the banks to clean up their balance sheets in time.

Yet, it of course remains questionable whether these tools are sufficient to avoid moral hazard, since, even though such emergency liquidity actions may not be put in writing, their factual application may nevertheless create expectations, which are then priced in

by neglecting the liquidity risk of certain financial assets.[52] Another approach would therefore be Barbera and Weise's concept of a Minsky-Wicksellian Taylor rule, which was mentioned in the chapter on Minsky. This amended Taylor rule would require an active calculation of the natural rate of interest that takes account of the increased inter-temporal scarcity of resources on the upward sloping part of the business cycle and the increased liquidity risk on the downward sloping part of the business cycle. Such a tool would therefore be able to incorporate Hayek's lessons of the Austrian business cycle theory, regarding the danger of relative overinvestment and misallocation of resources, as well as Minsky's post-Keynesian lesson, regarding the necessity for the central bank to take account of the increased liquidity risk that not only has the potential to wipe out misallocated investment but, through the self-propelling Fisher debt deflation process, also sound investment. Such a monetary policy could therefore serve to avoid the building up of huge malinvestment, since liquidity risk is also being priced in through time preference, in the sense of an increasing inter-temporal scarcity of resources, and a vast secondary deflation is being avoided by the provision of emergency liquidity in order to accommodate increased liquidity preference. This could ensure that the business cycle becomes less pronounced and that the effectiveness of constructive ambiguity of central bank measures is increased, since less malinvestment has to be rectified, and the incentive to conduct moral hazard becomes less prominent, while the pricing-in of liquidity risk is already taken care of through setting the interest rate by the central bank during the upward movement of the business cycle in line with an increasing inter-temporal scarcity of resources.

The ensuing inter-temporal scarcity may then be more immediately observed in the surge of spot prices of assets than in a surge of prices for goods and services, since the surge in asset prices signals a scarcity in production resources before it will be felt in prices for consumer goods and services.

Whether the natural rate of interest can be calculated by using five-year forward yields of Treasury Inflation Protected Securities (TIPS), as proposed by Barbera and Weise, also depends on the monetary policy of the central bank. As long as the central bank restricts itself to set the overnight interest rate, it might hold true that market forces may govern the yield curve of the long-term bonds. However, this will be less true when the

[52] Furthermore, if regulation is only restricted to official banks but, in a crisis, emergency liquidity is also provided by the central bank to shadow banks, there is a clear incentive for regulatory arbitrage by avoiding costly regulation through instead choosing to invest in the shadow banking sector.

central bank tries to influence the long-term part of the yield curve in order to restart private sector investment lending by decreasing long-term interest rates through refinancing banks long-term in the state of a crisis.

The rule Ulrich Bindseil proposed for setting the short-term rate of interest actually takes account of the Wicksellian factor, since an active setting of the Wicksellian real rate of interest, i.e. the natural rate is suggested, and it also takes account of an increasing liquidity risk spread during a crisis, which is consequently to be deducted when setting the short-term interest rate[53] (Bindseil, 2014, p. 172). In this regard, it resembles the Minsky-Wicksellian Taylor rule proposed by Barbera and Weise. Though, additionally, it also tries to take into account the unstable transmission mechanism from short-term to long-term interest rates by also deducting the term spread between short-term and long-term interest rate in setting the short-term interest rate (Bindseil, 2014, p. 172). This may, however, prove to establish a rather circular relationship between the active calculation of the natural rate of interest proposed by Barbera and Weise and of the interest rate policy of the central bank[54].

Furthermore, once the central bank is in danger of reaching the lower zero bound of its short-term interest rate, it might choose to influence the long-term rate directly (Bindseil, 2014, p. 173). Otherwise, in a situation where short-term finance, provided by the central bank, is not sufficiently translated into long-term finance in the corporate sector, an increased term spread can no longer be compensated by further reductions in the short-term interest rate, should a negative short-term interest rate be avoided.

Yet, during a crisis, the direct influence on the long-term rate should not matter that much, since there usually is a relative unemployment of resources, and therefore, a determinate natural rate of interest might not be found anyhow, but it would matter once relative resource unemployment declines, and the inter-temporal scarcity of resources becomes more apparent. If central banks want to amend their Taylor rule by taking account of the prevailing natural rate of interest, they will therefore have to put a lot of emphasis on developing tools to actively calculate that rate, unbiased by central bank monetary policy, in order to avoid any circularity to the best possible extent.

[53] What is to be added next to the Wicksellian interest rate factor, in setting the short-term interest rate, is of course the expected inflation rate (Bindseil, 2010, p. 172).

[54] Surges in term spread, which exceed the average term spread by which the calculated natural rate of interest is brought to a present basis, will then reduce the short-term interest rate further, even though the imminent increase in term spread may only be a sign of the calculated natural rate of interest increasingly deviating from the central bank short-term rate and thereby changing the slope of the yield curve.

On the other hand, it was also shown in the chapter on Schumpeter that an increase of the market rate of interest, induced by the central bank in a boom situation with increasingly optimistic expectations, may actually provide only another incentive for money velocity increasing and liquidity stretching financial innovation that further fuels the excesses of the boom.

Tools for detecting financial instability due to liquidity risk are already given in the form of SFC-modelling, which is also employed in its own variation by the ECBs General Director of Market Operations (Bindseil, 2014, pp. 15-35). As mentioned earlier, SFC-modelling combines aggregated balance sheets for different economy sectors with the cash flows in between them. A future line of research could be how the Austrian-post-Keynesian synthesis is empirically evaluated and put to use by using SFC-modelling. This kind of modelling should be ideal for this kind of purpose, since it is based on accounting principles and therefore also takes institutional ideal types seriously. The aim would have to be to investigate how market valuations of assets and their cash flows differ with regard to their remoteness from consumer goods production, depending on the business cycle. It would be interesting to see whether Austrian school economists are right that certain industries represent a capital value volatility that is in line with an Austrian business cycle. It would therefore be interesting to analyse how the business cycle plays itself out from industries most remote from consumption towards the industries closest to consumption. Such a model would have to be able to detect volatility that sweeps through from capital values and cash flows of the machine tool industry into heavy industry tools manufacturers, as well as construction tools manufacturers, towards consumption goods providers. It would also be of interest to explore how global trade, with its exports and imports of resources, amends national business cycles, as some economies turn into nearly perpetual debtors and others into creditors, and all of them are, because of this, inevitably plunged into a global business cycle. Hopefully it was made abundantly clear in this thesis that, in the end, this leaves hardly any winners, but mostly only losers if no stately authority comes to the rescue. Yet, there still remains the question of how global financial regulation, in conjunction with monetary and fiscal policy, can ensure an allocation of resources that is sufficiently efficient and stable, but also dynamic enough not to destroy the potential of future technologically innovative leaps of mankind.

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Eidesstattliche Versicherung:

Hiermit erkläre ich, Frank Felgendreher, an Eides statt, dass ich die Dissertation mit dem Titel:

„Alternative monetary institutional policies of H. P. Minsky and F. A. Hayek: The comparison of two alternative theories of inherent financial instability in a capitalistic economy“

selbstständig und ohne fremde Hilfe verfasst habe.

Andere als die von mir angegebenen Quellen und Hilfsmittel habe ich nicht benutzt. Die den herangezogenen Werken wörtlich oder sinngemäß entnommenen Stellen sind als solche gekennzeichnet.

Horst/ 12.05.2015 _____

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