Paper for the FMM Conference 2016: Towards Pluralism in Macroeconomics? 20 Years-Anniversary Conference of the FMM Research Network

Proposals for Monetary Reform – A Critical Assessment Focusing on Endogenous Money and Balance Mechanics

by Ruben Tarne
International Economics (MA), Berlin School of Economics and Law

Table of contents

1 Introduction

Ideas and debates about monetary reform have popped up throughout history. Over the last century major events such as the Great Depression in 1929 as well as the great financial crisis of 2008 have proved catalysts for these discussions. Some proponents of monetary reform identify the ability of private banks to create money as the main contributing factor to the outbreak of financial crises. Commercial banks are seen by some as problematic since they tend to inflate bubbles in boom times by providing too much credit; and they provide too little credit after the bubble bursts, prolonging the economic downturn. The idea of being able to control the money volume (and, therefore, the credit volume) in the economy in order to dampen both effects seems to be desirable for many economists. This has been the case after the Great Depression with the 100% reserves banking approach advocated by Irving Fisher (1936) later picked up by Milton Friedman (1948). Contemporary proposals based on these earlier ideas have been put forward by Joseph Huber (2016) and Positive Money, a UK-based NGO (Dyson & Jackson, 2012; Dyson, Greenham, Ryan-Collins, & Werner, 2011). Jaromir Benes and Michael Kumhof also lay out arguments that resemble earlier works of Fisher (2012; 2013). These renewed forays into monetary theory and policy are very similar in effect, though they differ in the details.

The basic proposition is to take away the banks' ability to create means of payment. By doing so, the reformers want to establish a system where banks that want to give out loans to households or firms need to have the means beforehand in the form of savings deposits. This way the banks would become a mere intermediator of loanable funds (as is already portrayed in many up-to-date textbooks). The loanable funds needed for an expansion of economic activities (ceteris paribus) would then originate from the central bank which would transfer the additional means of payment to the government which can then reintroduce them into the economy where they will end up as savings at one point which can then be invested. This assumes that a centralised institution can set a more optimal money supply for the aggregate economy. While the reformers admit that the optimal amount is not possible to determine ex ante, they state that commercial banks are not able to determine it either. "The question therefore becomes one of who is most likely to supply the economy with the 'correct' amount of money: commercial banks in the current system, or an independent committee in the reformed system?" (Dyson & Jackson, 2012, p. 171). Huber suggests that monetary targeting by central banks is superior to interest rate targeting, while stating that it has never been possible to see the former in practice as the ability of banks to create means of payment, e.g. bank deposits, undermine any monetary targeting in the first place (Huber, 2016, p. 150; Benes & Kumhof, 2012, p. 38).

The reform proposals are essentially built on the assumption that a system with 'true' monetary targeting – when banks are prevented from creating money themselves – would be superior to current monetary systems. The indicator for that would be a dampening of credit booms and credit slumps. In order for the sovereign money system (SMS) to be viable, the fundamental assumption is that monetary policy works when the central bank can effectively set the desired amount of money in the system. Hence, the issue of whether such a system is more stable than the current arrangement depends a

lot on the answer to this question: can a central bank determine the amount needed in an economy better than private banks?

The assumption that central banks possess a greater ability to set an appropriate amount of money for an economy will be the main focus of this paper. There will not be a general critique of the reform proposals from an endogenous money perspective as that has already been done to a large extent. Nevertheless, an overview of the relevant literature will be given in chapter 3 (Schulmeister, 2016; Goodhart, 1989; Fontana & Sawyer, 2016; Dow, Johnsen, & Montagnoli, 2015; Fiebiger, 2014).

Instead, the focus of the paper will be on monetary policy in a reformed system with a special interest in the assumption of a central bank's ability to set an appropriate amount of money for an economic system. This assumption rests mainly on the equation of exchange ($M * V = P * T$), in that with a stable velocity of circulation one can influence P and T via setting the amount of means of payment M. Post-Keynesians have criticised this for two reasons: first, the velocity of circulation is regarded as unstable; and second, the economic activity determines the money needed and not the other way around (Godley & Lavoie, 2007, p. 127). While the argument of reverse causality has been developed very well in a stock-flow consistent way, this is not the case for the instability of velocity (ibid.). Interestingly, Wolfgang Stützel (1978) developed a stock-flow consistent equation of the relationship between money and economic activity already in the 1950s and therefore well before Godley and Lavoie (2007).

Following from this, the research questions pursued in this paper will be: what can Stützel's 'general quantity equation' tell us about the inherent assumptions of monetary policy trying to control the money supply? What can this equation contribute to the post-Keynesian critique of sovereign money reform (SMR)?

To answer these questions, the reform proposals (and especially their underlying theory of "how to determine an optimal amount of money for the economy") will be examined in Chapter 2. This way, their theory can be compared to the stock-flow consistent understanding provided by Stützel. In order to locate Stützel's contribution in the current debate, we will make a short review of the newer critiques of sovereign money reform provided by post-Keynesian authors (Chapter 3). Then, Stützel's general quantity equation will be explained by translating it into up to date stock-flow consistent balance sheets (Chapter 4). With the equation in hand, we can gain a better understanding of the assumptions of sovereign money proponents that are required for the velocity of circulation to be stable, and if these assumptions seem realistic or unrealistically restrictive (Chapter 5).

Although Stützel did not use his 'balance mechanics' framework to model the economy, he used it as an analytical tool in order to criticise the equation of exchange. His quantity equation's benefit is that it shows clearly what exactly needs to hold in order for the link between economic activity and money used to remain stable. This will make it possible to evaluate how realistic it is that these assumptions actually hold in a sovereign money system. As it will turn out, the need for means of payment in a certain period rests on a few factors. It depends on the quantity and direction of the transaction flows between the two groups of bank debtors and bank creditors; on the change in the direct credit relations between these two groups; and, finally, on the amount of demand deposits getting turned into long term savings deposits and vice versa. Additionally, it will become clear that a limitation of means of payment does not per se limit economic activity itself, but the possibility of the economy to move 'out of step' – meaning that

less revenue or expenditure surpluses can manifest themselves. And even this is only true as long as there are no other near-monies circumventing the limitations.

2 Proposals for Monetary Reform

Before going into the theories underlying the setting of an 'appropriate' amount of money for the economy, the proposals for monetary reform shall be presented more generally. The present discussion about monetary reform is in itself not new at all. At least parts of it can be traced back to Ricardo (1824) and the debate between the currency and the banking school. It was summarised by Lavoie (2014) as follows:

> Ricardo and the Currency School argued that only coins and Bank of England notes could be considered as money, that this stock of money determined aggregate demand, and that aggregate demand determined the price level, thus giving support to the quantity theory of money. The Banking School, with John Fullarton, Thomas Tooke and John Stuart Mill, argued instead that the definition of money was much more complicated, that aggregate demand determined the stock of money, and that if controls were needed to influence prices, these controls should be imposed on credit aggregates. The Banking School also put forth the 'reflux principle', arguing that if too many banknotes were created, its holders would bring them back to the issuer, and hence the excess would disappear. The Banking School thus supported endogenous money, reversed causality and the need to focus attention on credit instead of money aggregates, just as modern post-Keynesians do. (Lavoie, 2014, p. 184).

Several similar, though not altogether alike, reform proposals were put forward: one is often called "full-reserve banking" or "100%-money" and aims at increasing the reserve requirements of commercial banks to 100%. This plan is rooted in the Fisher proposal from 1934 (Fisher, 1936) and was most prominently reintroduced recently by Benes and Kumhof (2012; 2013).

The other proposals, which were put forward by Huber (2016), Frosti Sigurjonsson (2015), the UK Green Party (2015), as well as Ben Dyson and Andrew Jackson (2012), differ from the full-reserve banking proposal.[1] Their main distinction from the 100% reserve banking approach is that they propose only a single money circuit – central bank money – as opposed to two –central bank money and bank-created money. One could say that in this *sovereign money system* (SMS) 'M1 becomes M0' – (i.e. bank demand deposits become central bank money). While in today's financial system central bank money in the form of reserves is only used by commercial banks to settle their accounts in the books of the central bank, the government, and other commercial banks, in an SMS it is used to settle all debts. However, labels for reform proposals are not used coherently, as for instance Dyson *et al.* (Dyson, Greenham, Ryan-Collins, & Werner, 2011) use the term "full-reserve banking" for their proposal that is identical to Huber's (2016), and Dyson and Jackson's (2012). We will focus on Huber's reform proposals as they are the most elaborate and supported by the most prominent initiatives in Europe, like *Monetative* in Germany, *Vollgeld Initiative* in Switzerland, or *Positive Money* in the UK. We will continue calling them sovereign money reforms (SMR) or sovereign money systems (SMS). Focusing on only these reforms could be criticised, as it will lead to an omission of the whole branch developed by Fisher and Friedman, among

[1] For a historical survey of the different monetary reform proposals in this vein and their different roots, see Lanià (2015).

others. However, this will allow for a more precise analysis and, in the view of the author, will not water down the conclusions of the analysis as the proposals and their basic assumptions are very similar.

2.1 Common Views of the Current Monetary System of Sovereign Money Reform Proponents and Post-Keynesians

This subchapter will deal with the views of SMR proponents of the current system. In chapter 3 the post-Keynesian critique of a SMS will be expanded.

It might come as a surprise to some that in their analysis of the current financial system the SMR proponents have more in common with post-Keynesians than with mainstream economists. There has been a lively discussion between neo-chartalists[2] and SMR proponents, especially in the blogosphere, which shows that there are many disagreements as well. We will go through them here quite briefly. Huber (2014, pp. 42-3) identifies several similarities between neo-chartalists and sovereign money proponents. Firstly, both agree that money is not a 'veil' but a basic constituting element of the modern economy, thereby distancing themselves from neoclassicals. They also understand that money is mainly being created out of thin air, they, too, see the money multiplier as obsolete and causality running from bank credit to bank deposit and from bank deposits to reserves (in normal times) and not vice versa. There is also a similar understanding of the history of money and how it was introduced firstly as a social unit of accounts to measure obligations (ibid., p. 51). However, there are some important differences regarding the question of if money always implies an "I Owe You" (IOU) – meaning some form of debt relation. SMR proponents claim that this is not the case. As soon as there is no interest attached to it and one does not have to repay it, it does not qualify as debt. This will be expanded on in chapter 3 as it seems to be mainly responsible for the diverging views on a SMS. Nevertheless, this dispute does not necessarily have an impact on the balance sheets in a reformed system. That would depend on the way money is accounted for on balance sheets. As there are propositions working with normal accounting conventions without changing the envisaged effects of SMR, this point is more of theoretical importance. However, the different understanding of money is very relevant for the analysis of the viability of an SMS.

Be that as it may, SMR proponents see several problems with the monetary system which are all circling around a 'wrong' amount of money in the system due to private banks' ability to create it, leading to financial instability. The following is mainly based on the elaborations of Huber (2016, chap. 2), yet a similar elaboration can be found in Dyson and Jackson (2012, chap. 4). One of the problems the SMR proponents identify is the disproportion of bank-money in comparison with central bank money. They see this as an indicator of the powerlessness of central banks to control the amount of money in the system. For them, this is a problem, as banks have an incentive in times of high 'animal spirits' to accommodate as many requests for loans as possible. This incentive is enhanced by the 'financial innovations' that lets them sell these loans to third parties and therefore not bear the default risks anymore. The increase in bank loans leads to higher debt levels, which in turn leads to greater financial instability. Therefore,

[2] For differences between post-Keynesians and neo-chartalists, as well as the argument that they are part of the post-Keynesian paradigm, see Lavoie (2013; 2014, p. 212 f.).

banks' ability to create loans, without any relevant restriction, destabilizes the economy as this arrangement is seen to be highly pro-cyclical and the major contributor to the rising debt levels. Likewise, banks tend to restrict their new lending drastically in a financial crisis which therefore leads to refinancing problems for the real economy and restricts real investment. All in all, banks overshoot in both directions, inflating bubbles and harming the economy in a downturn even more by not providing enough credit to the real economy. What is missing, in the SMR proponents' point of view, is a 'stability anchor' for the amount of money; like the gold standard in a way, but flexible. That, Huber says, is not to say that the control over the money supply is a silver bullet, however, without it, no financial regulation could have any significant impact (Huber, 2016, p. 75).

2.2 The Sovereign Money Approach

The sovereign money approach was firstly put forward by Huber and Robertson (2000) and has since evoked movements in several countries, namely in Switzerland (Verein Monetäre Modernisierung), Germany (Monetative), as well as in the UK (Positive Money). The reform proposal that will be presented here is mainly built on Huber (2016), Dyson and Jackson (2012) and also Wolf (2014).

The core of the reform is that only central banks would be allowed to create electronic means of payment (Huber, 2016, p. 103). Commercial banks would therefore lose their ability to create means of payment 'out of thin air.' All money in the sense of means of payment would be central bank money – sovereign money. Hence, the central bank becomes an *issuer of first instance*, being the only issuer of means of payment.

The benefits of this system, accordingly, would be more economic stability by a dampened business cycle. Additionally, it would lead to a smaller public deficit, as the government would have extra revenues in form of the new money injected in the system. Moreover, they hope for more transparency in the system as there would be only one monetary circuit and not two different ones. Also, it would make the system more understandable to the population at large, as the new system would correspond better to everyday knowledge. What is put in savings accounts can be used to invest, and banks do not just create money when they create credit (Dyson, Greenham, Ryan-Collins, & Werner, 2011, p. 5).

The most relevant change in the financial system in order to achieve these goals is the split into transaction and investment accounts.

2.2.1 Transaction and Investment Accounts

In an SMS, banks' customers will have two different kinds of accounts: a transaction account and an investment account (Dyson & Jackson, 2012, p. 178). The transaction account contains the electronic means of payment, the former bank-created demand deposits. It has the same properties as central bank reserves have in the current financial system. There are several similar proposals put forward suggesting how these accounts could be installed exactly (Huber, 2016, pp. 106-115). The simplest would be that the bank accounts of the citizens and firms would be transformed into individual sovereign money accounts that could then be managed by the commercial banks as a service. However, the sovereign money accounts would not show up in the commercial banks' balance sheets, but would appear as off-balance fiduciary managed by the bank. If a

bank goes bankrupt, the transaction account is only touched by this insofar as it would need to put in the management of another bank. The balance would not be effected. Another slightly different approach – put forward by the UK based non-profit *Positive Money* – would have the commercial banks have an extra account at the central bank with all the transaction accounts of their customers (Dyson & Jackson, 2012, p. 178). However, this is a technical detail as in case of a bankruptcy the common transaction account would not be touched either. On the transaction account is only M1 money, which then would be called M as it encompasses paper money, coins, and the new electronic sovereign central bank money. There would not be any interest payed on this sovereign money, as it is deemed completely safe, as long as the central bank system is running (i.e. the central bank doesn't take any drastically measures like changing the currency like in Germany from Reichsmark to Deutsche Mark).

When people want to earn interest on their money they would need to put it in an investment account with a bank. This money is then transferred from the transaction account of the customer to the investment account of the bank which can now loan these funds to other customers, firms, or other banks. The bank may offer different types of investment categories, involving different levels of risk and interest rates. In order to lend out money the banks need to have money beforehand, mostly in form of savings. In addition, the funds invested here are not subject to insurance by the government. However, there could be an insurance scheme among banks to make less risky investments safer in order to give a higher incentive for the customers to place their funds in the banks' investment accounts. This way, the reformers hope, the connection of risk of losing money and the chance of earning money are aligned again as they were apparently lost when banks got bailouts in times of financial crisis. These funds are the corresponding amounts of financial assets that are subsumed under $M2 - M1$. Consequently, the banks can't increase 'M1' in their own accord anymore. This would make it possible for the Central bank to control the exact amount it sees fit, which is of major importance for the monetary reformers.

Dyson and Jackson compare the current system and the SMR system in a simple table (Table 1) with each other in order to show the major differences.

Several statements are of special interest here. That in an SMR system banks cannot create means of payment poses the general questions of if there are banks anymore, or only investment banks or hedge funds; as they can only lend out money that they acquired from savers before. One could argue that the SMR would therefore imply a 'hedge fund-isation' of the sector, with additional payment services of the financial economy. Besides, this would also mean that the sovereign money system would become a system where the loanable funds theory would hold. The interest rate would bring together investment and savings decisions, leading to higher interest rates when households provide only a smaller part of savings to investment accounts and with lower interest rates when people want to save more.

> As a result the interest charged on loans will reflect the real time preferences of society as a whole: if society wishes on aggregate to defer consumption to a future period (i.e. save), the rate of interest will be low as individuals will place more of their money into Investment Accounts. Likewise production should increase as more business investment takes place, ensuring that the economy as a whole can satisfy the demand for increased future consumption. (Dyson & Jackson, 2012, p. 197).

This statement is a connection of the neo-classical growth model by Solow (1956) with its full capacity utilisation and one good, which can be either invested or consumed, in combination with the loanable funds theory by Robertson (1934). This would imply that at least some of the SMR proponents see the SMR system as having inherent stability mechanisms where the economy reacts to the savings decisions of the households in a rather smooth way.

Table 1: Differences between current and SMR system (Dyson & Jackson, 2012, p. 241)

Current System	Reformed System
Money and purchasing power is created by banks when they make loans	Money and purchasing power is created by the state in response to decisions made by the Money Creation Committee
Loans create new purchasing power	Loans simply transfer purchasing power between savers and borrowers
Loans increase the money supply	Loans have no impact on the money supply
Loan repayments decrease the money supply	Loan repayments have no impact on the money supply
New money is created in tandem with an equal amount of debt	New money is created free of any corresponding debt
An increase in bank investment in one part of the economy does not require a reduction in spending elsewhere	An increase in bank investment in one part of the economy requires a reduction in (or 'deferment' of) spending elsewhere in the economy, so that the purchasing power can be transferred from a saver to a borrower
Banks can lend as [sic!] and when they find a credit-worthy borrower, and can find any necessary central bank reserves after the loan has been made	Banks must first raise funds from Investment Account holders and other investors before they can make a loan

2.2.2 The Monetary Creation Committee

Having introduced key components of the SMR proposal, it remains to touch upon the steering of the economy via setting the amount of means of payment. This requires an institution that will decide on the right amount of money.

Similar to the current system, SMR proponents anticipate an increase in the demand for money, but banks cannot provide it anymore. Instead, there needs to be another player issuing new money. SMR proponents do not see this as simply a technical and logistical question, but also as a democratic one. They see it as a logical further development that the state finally becomes the sovereign of money and currency (Huber, 2016, p. 144). However, in the eyes of the SMR proponents, the government is not to be trusted with the money creation itself as it would likely use control of the money supply in an unsound, and potentially corrupt way. Fiscal and monetary policy is to be separated (ibid., pp. 111-112). Like the ECB, the Monetary Creation Committee (MCC) would have to fulfil the policy goals that the government sets, most likely an inflation target, maybe even an employment target. This would depend on democratic

decision making processes. The MCC will then set the supply of money it deems necessary in order to fulfil the policy goals and will, in the normal case, credit the government with this amount. The government itself is free to do with the money as it pleases (ibid., p. 148). The MCC can also use the money to loan it to banks for interest or sell it for financial assets, however, it can also credit the accounts of the citizens if it deems it necessary. To reduce the amount of money in the system, the MCC can (with the agreement of the government) reduce the governments account at the central bank. Other options are the discontinuation of rolling over credits that it has given to banks or by selling securities which it already owns (Dyson & Jackson, 2012, p. 216). Another tool could be the prolongation of the holding requirements for investment deposits, which could serve as a manipulation of the velocity of circulation (Huber, 2016, p. 151).

The more interesting question, though, is: how is the MCC going to know how much money is needed? In order to answer this question, we will need to understand how SMR proponents evaluate the effects of different MCC operations on output and inflation. This will be discussed in the following chapter.

2.2.3 Monetary Policy by Monetary Targeting

Central to the understanding of these monetary reforms is the idea of being able to control the quantity of money. They see monetary policy by controlling M1 (or M in the SMS terminology, as M1 becomes central bank money) as superior to the interest rate control used in the current system (Huber, 2016, p. 150). In their view this has never been attempted since all efforts to control the monetary supply were undermined by the ability of banks to create money (ibid.). Therefore, in an SMS the setting of the monetary base (or high-powered money) would be finally possible. Following Huber, the central bank should then adjust the high-powered money according to the potential output of the economy (ibid., p. 149-150). This would imply that there is something like a potential output which is independent from the money supply. The interest rate should then follow and be determined by the market. Dyson and Jackson are not using the concept of potential output explicitly. However, most of the SMR proponents base their idea of monetary policy on the equation of exchange by Fisher (Fisher & Brown, 1911, p. 26):

$$M * V = P * T \tag{1}$$

whereas M are means of payment in the economy; V is the velocity of circulation of this money, i.e. how many times was the money used in a certain period on average; P is the average price of a good; and T is the number of transactions. As mentioned, we will now define M1 as M in the equation. This is because it is used in this scenario to settle transactions rather than illiquid financial assets, and is accepted by economic actors (except for the bank deposit part of M1 that is not accepted by banks for settling transactions between themselves). This does not mean that other assets cannot work as means of payment, as transaction parties only have to agree on the same means of payment. That can be practically everything. However, in the current system M1 could be regarded as the predominant means of payment. Further, as mentioned above, the SMR proponents regard M1 as money and the rest (M2-M1 or M3-M1) only as more or less liquid promises on M1. Moreover, Stützel's general quantity equation will also work with M1 and sees the other money aggregates rather as financial assets.

The left hand side of the equation of exchange multiplies the average total amount of money being held by economic units in a period with the times this money was going around on average. The right hand side of the equation multiplies the average price of the goods and services being sold in that period with the total amount of transactions. Thereby, one obtains the total value of transactions. The equation builds a connection between the flow of transactions in a period with the corresponding stock of money. Bringing the stock of money in relation with the flow of the transaction value is the connecting residual of the velocity of money. The equation is always true as it is defined that way. When the left hand side changes, the right hand side has to change accordingly at the same moment. Causalities are not inherent in the equation. To use it in terms of causality, one needs a theory or some assumptions. The proponents of the quantity theory of money, like the monetarists, argued that the velocity of money is rather stable and increases in the money supply would lead to an increase in the price level as long as the amount of transactions does not react accordingly (Fisher & Brown, 1911, p. 33 ff.). The amount of transactions is hard to quantify as it implies all kind of transactions and not only those that contribute to the GDP. For GDP, only the selling of finished products is recorded while intermediate products and financial transactions are not. Nevertheless, GDP is often used as a proxy for total transactions as the real number is usually not available and a link between GDP and total transactions is assumed (Mankiw, 2016, p. 108).

SMR proponents see the velocity of money as relatively stable (not constant), too, meaning it does not fluctuate much in the short term and follows a long term stable average trend. Hence, an increase in economic activity has to increase M1. Or, as Huber puts it, "Wirtschaftswachstum beinhaltet eine erhöhte Finanzierungsnachfrage, erhöhten Zahlungsverkehr, und somit einen erhöhten Geldbedarf" (Huber, 2016, p. 33).[3] However, the velocity of circulation, if calculated as $GDP/M1$, has declined in the last decades in many countries as the economy grew at the same time, casting some doubt on the claim that V is rather stable. This puzzle has been picked up by SMR proponents (Huber, 2016, p. 33 ff.; Dyson & Jackson, 2012, p. 142 ff.) and in some way by SMR critic Schulmeister (2016, pp. 10-11). SMR advocates claim that the decline in the velocity of circulation is mainly due to the rise in the financial sector. As more of the existing money is being used for transactions not increasing GDP, the velocity might seem to decline while it is actually not. Therefore, Werner (2005, p. 185 ff.; 1997), like Schulmeister (2016, p. 11) proposes to disaggregate the equation of exchange into 'real' transactions and financial transactions. Werner classifies the real transactions as transactions "that are part of GDP, such as investment and consumption" (1997, p. 284) and financial transactions as "such as speculative real estate purchases, which are not part of GDP" (ibid.). Therefore, he disaggregates equation (1) into:

$$MV = M_R V_R + M_F V_F \quad (2)$$

$$PT = P_R T_R + P_F T_F \quad (3)$$

Where M_R is the money used for reals transactions and V_R the corresponding velocity of circulation; while M_F is the money used for financial transactions with V_F being the corresponding

[3] "Economic growth implies a higher demand for finance, more monetary transactions and therefore a higher need for money" [authors' translation].

velocity of circulation. P_T is the average price of real transactions while P_F is the average price of financial transactions. T_R is the amount of real transactions and T_F the amount of financial transactions. Since (4) and (5) hold at the same time:

$$M_R V_R = P_R T_R \quad (4)$$
$$M_F V_F = P_F T_F \quad (5)$$

Since Werner defines T_R as transactions that are part of GDP (Y), he continues:

$$M_R V_R = P_R Y \quad (4')$$
$$with\ V_R = (P_R Y)/M_R = constant$$

He assumes that the velocity of circulation for money used in GDP-transactions is constant. It should be noted that his reformulation is not very precise as intermediate products that are bought and sold within in the supply chain (like the wholesale-retail relations) do not contribute to the GDP measure and are neither sold as financial products. One could now make the assumption that transactions of unfinished products would rise and fall in fixed relation to GDP. This would mean that one would under-estimate the total transactions compared to the amount of money, however, in a stable relation. Yet Werner (2005, 1997), as well as Dyson and Jackson (2012, p. 117 ff.), who adopt Werner's analysis, do not make this assumption explicit. This makes equation (2) at least questionable.[4]

Based on Werner's equation Dyson and Jackson make statements about the effects of newly created money on inflation and output under different scenarios (2012, pp. 242-246). First, the most relevant case (as it is seen as the 'normal case' of spending money into the economy): via granting it to the government. This can be like a gift, hence an expenditure of the central bank and a revenue to the treasury.[5] Depending what the government spends it on in the first place – consumption and services or investment – it affects the economy. If it spends it on productive investment then money supply and GDP are going to increase while prices stay constant, or, e.g. due to lowered costs for companies thanks to better infrastructure, even fall. If it is spent for consumption or services, the effect would depend on the capacity utilisation of the economy. If it is at full capacity utilisation, the increase in money leads to inflation, if it were below full capacity it would lead to more demand, leading to more output, i.e. a higher GDP without inflation. Of course this is always just the first round, as the money will be spent several times in the course of a year (if that is the period in question). If it is spent more on production inducing things it will not have an effect on inflation but on GDP. Different channels include: new money given directly to the citizens as kind of a "dividend" which would probably increase demand as well being used to pay down debt or put in investment accounts. Depending on the relation of these different uses, the effect

[4] Werner even goes a step further and replaces M1 with credit as he sees it more fit to describe the money that is going to be spent and not going to lie idle. A similar argument for determining aggregate demand has been put forward by Keen (2014) and was criticised by Palley (2014), Lavoie (2014) and – from a balance mechanics point of view – Reissl (2015).

[5] They also have a long discussion about how to display this in the balance sheets as they do not see the central bank money as a liability. Again, as mentioned above, though this would be an interesting discussion to entertain, the system works the same way with normal double entry bookkeeping, with which we will work here.

on the economy will be different. Consumption increases prices if the economy is running at full output already and increases output when it is running below. Additional investment, depending on its effectiveness, would increase output in the longer run. In general, the money entering the economy will be used several times, making the overall effect rather unforeseeable. Therefore, even with this simple equation Dyson and Jackson conclude that not all money creates inflation, as it is more complicated and depends on what the money is spend on (2012, p. 250). However, they do not consider a change in the velocity of circulation. Huber's view of the relationship between money supply and economic output seems to be simpler, as he states that inflation would not stem from real economic activity anymore as the flexibility of the modern economy can accommodate almost any demand. This makes in his view Friedman's famous statement "inflation is always and everywhere a monetary phenomenon" (Friedman, 1991, p. 16) true (Huber, 2016, p. 71).

By understanding the effects of changes in the amount of means of payment on the economy, what is the assessment of the SMR proponents on how the right amount of money is going to be determined? Unfortunately, both Huber and Dyson and Jackson do not provide much more guidance. While Dyson and Jackson acknowledge that setting the right amount of money is probably going to be a difficult task and has to be done based on the theories above and on the experiences of the past, i.e. one could name it an incremental approach. In Huber's opinion the setting of the money base can target the interest rate in the economy way better than the interest rate the money base (2016, p. 149). Therefore, output and inflation can be better targeted by setting the money supply.

What does this tell us for an assessment of the underlying assumptions of the monetary targeting? On the one hand, it is interesting to note that there has not been a rule formulated yet of how to set the right amount of money, like a Taylor-Rule for the central banks today. The authors are more or less cautious with their claims and rather opt for an incremental approach. The way how money is implemented in the economy is apparently quite important and the MCC does not have real control about the effects, as it depends on the economic actors, how they will use the money. However, among others, the assumption of an unstable velocity of circulation is not really considered. The disaggregation of the equation of exchange seems to be enough for them to prove that for the real economy the velocity is stable. This would be heavily criticised by Nicholas Kaldor (1970). This and other critical remarks of post-Keynesians will be presented in the next chapter, before having a look at Stützel's view of the relationship between money and economic activity, in order to fit the addition Stützel's view presents into the overall critique.

3 Post-Keynesian Critique of Monetary Reform Proposals

As mentioned above, several parts of the debate between SMR proponents and post-Keynesians can be traced back to the currency vs. banking school debate. While a good historical analysis of the debate can be found in Arie Arnon (2011), the newer contributions will be summarised here briefly. Overall, the post-Keynesian reaction to the SMR proposals has been very critical. Nevertheless, the similarities in the understanding of the financial system have been positively emphasised (Fiebiger, 2014, p. 227). First, the different understanding of money should be explained, as it lies at the root of many disagreements. Then, post-Keynesians doubt that an SMS would be able to control the

base money anyway, as new private money would emerge. And lastly, even if the SMS was able to set the money base, the system would be even less stable than today. This is also the part where Stützel's contribution fits in. The following is, of course, only a brief overview, leaving out many interesting questions. However, the core of the critique should become clear.

3.1 The Nature of Money

What is the real nature of money? Randall Wray proposes to define money as an abstract measuring unit and differentiates between this unit and the assets denominated in this unit of account (Wray, 2012, pp. 8-9). "Money is not what money does. Some money-denominated assets function as media of exchange or means of payment. While these functions are typically fulfilled by certain money-denominated assets, this does not make any particular asset that so functions money" (ibid., p. 9). Therefore, money only emerged when people started giving each other credit which was then denominated in a unit of account (Dyson & Jackson, 2012, p. 34). This was only possible when private property came about and therefore private loans where possible. With time the unit of account for these credit relations was measured in wheat. Credit relations where then settled with money in its physical form as a means of payment in wheat and later in clay tables, wooden tally sticks, golden coins or paper IOUs (Wray, 2012, p. 20). One important consequence is also that the real amount of wheat does not restrict the amount of credit relations measured in wheat units of account. According to the chartalist – or state money – theory, money was typically brought into existence as a social unit of account by states used for measuring obligations. When governments spend their own created means of payment, like coins, they create a liability, an IOU. In order to be working as a credit relation, governments need to accept their own IOUs to settle debts with them. This is the case when people pay their taxes or pay fines. Therefore, government money is redeemable by taxation. This gives the government money it's 'value,' not it's backing by gold, for instance (Innes, 1914, p. 152).

> It is true that all the government paper money is convertible into gold coin, but redemption of paper issues in gold coin is not redemption at all, but merely the exchange of one form of obligation for another of an identical nature. (Ibid., p. 165).

Therefore, the claim that money could be created into being without creating a corresponding debt, as some SMR proponents do (Dyson & Jackson, 2012, p. 23), would be contested by this view. While having a very similar view on how money came into being, Dyson and Jackson as well as Huber (2014, pp. 51-52) do not conclude that all money is tied to a form of debt. They pose the question if banks create 'credit' or 'money' (ibid., p. 61). They state that credit can only be regarded as such when there is credit risk attached to it. As soon as bank deposits are covered by default insurances, backed by the government, there would be no meaningful distinction between central bank money and bank money. As they see central bank money free of default risk, they do not see bank money which is covered by default insurance, as credit money.

Chartalists see bank money not as money – a social unit of accounts – but as a money-denominated liability. Central bank money is the risk-free representation of the social measure of value and can therefore serve as the 'ultimate' backing for credit money (Wray, 2012, p. 31). However, central bank money is seen as being an obligation

regardless (ibid., p. 33). It is of a different quality as privately issued means of payment, as citizens are required to pay their taxes with it, but it is an IOU nonetheless. This difference in the understanding of money probably lies at the heart of many disagreements, be it the emergence of new private money, as going into credit relations ca not be restricted by the shortage of some special form of money; or generally the focus on the amount of money, which is in post-Keynesian view just a reflection of underlying credit relations. The former brings us to the next big disagreement: the ability to circumvent a restriction of means of payment.

3.2 Emergence of Near-Monies

This argument was brought forward by Kaldor (1970) when he criticised the monetarists and the equation of exchange. He argued that, as soon as the system would become too restrictive, credit relations will appear outside the system. That the current system is able to provide liquidity when it is needed is for him the main reason why the velocity of circulation is stable. Any (creditworthy) new demand for money would be met with new supply, allowing for relatively stable interest rates (ibid., p. 8). As soon as supply with means of payment would become inflexible (and that is what would be desired by SMR proponents in times of boom), the interest rates would start rising, at a certain point evoking circumvention mechanisms like private credit, promissory notes, etc. As Knut Wicksell already showed, in a system with fixed means of payment, even a negligible amount can settle all kinds of transactions, as long as the economic units can give each other direct credits (1898, p. 55). These points have been picked up by several authors like Charles Goodhart and Meinhard Jensen (2015, p. 23) and Dow *et. al.* (2015, pp. 14-16). They fear that banks would invent near-monies like short-dated time deposits or find other ways around regulation.

3.3 Stability in a Reformed System

Another disagreement is, whether the proclaimed increased stability of the financial system can be achieved in an SMS. As explained above, this is supposed to happen through dampening the business cycle. This means for instance, that in times when financial markets start to increase their prices too fast in the eyes of the MCC, they either decrease the amount of money in the system or do not inject new money. This is understood to increase the interest rates and thereby dampen the boom phase. Schulmeister (2016, pp. 10-11) criticises that this would lead to a slowdown of the real economy. Therefore, asset price inflation would have a stronger negative impact on the real economy than today. By setting the desired amount of high powered money the MCC cannot dictate what the money will be used for. When the MCC gives money to the government, they do not decide what the government will spend the money on. As already explicated by Dyson and Jackson (2012) above, the effects on inflation and output will probably vary very much. Any ‘re’-steering would face the same problem. Even when the MCC gives money to banks with the condition to invest it in the real economy, this could lead to diversion of other sources of credit that could then fuel speculative financial transactions (Dow, Johnsen, & Montagnoli, 2015, p. 11).

On another note, Ulrich Bindseil, a central banker, argued that in the current system, the demand for central bank reserves is extremely interest rate inelastic (Bindseil, 2005,

p. 16). This could be an indicator that the demand for means of payment could follow an unstable path which is not quite foreseeable, which could lead to high fluctuation of short term interest rates if the central bank were not to accommodate, which would rather induce instability into the system. One possibility for this, as will be shown by Stützel, is that payments and receipts do not have to come in an even flow but can fluctuate quite a lot. If the MCC would want to avoid this problem, without going back to the current policy of interest rate setting, it would need to provide an appropriate amount of means of payment into the system. Dow *et al.* doubt that an MCC could find this amount of money as there is no model how to derive it (Dow, Johnsen, & Montagnoli, 2015, p. 12). Another reason for the one is that as banks give out credit before necessarily having the required amount of reserves, they have to adjust their reserve position at all costs. This would not occur in an SMS.

However, the part of the discussion where Stützel fits in best is the question how the MCC can set an appropriate amount of money? What determines the need for means of payment in an economic system? The presumed high fluctuation of short term interest rates due to the inelasticity of demand for reserves is an indicator that this could be thorny endeavour. Bindseil himself referred to Walter Bagehot, who already observed this more than 100 years ago (1873). Stützel's quantity equation will indirectly make this point too, as the demand for means of payment in a fiat money system could change quite rapidly without changes in the amount of transactions.

Another general puzzlement for post-Keynesian authors is the fact that SMR proponents do not draw the conclusion from the practically financial crises free period from 1930s to the mid-1970s, that strict financial market regulations are the most important contributor to financial stability. Why would the ability to create money out of thin air be a problem now when it was no problem back then (Fiebiger, 2014, pp. 229-230)? Moreover, has not been the emergence of the shadow banking system the real problem, i.e. institutions that act now like banks would act in an SMS? The collapse of Lehman Brothers, which did not have a bank license, as the outbreak of the great financial crisis, is seen as a confirmation of this assessment (Goodhart & Jensen, 2015, p. 27).

Obviously, post-Keynesians propose a broad range of financial market regulations as well, as they see the system today as being highly prone to financial crises (Palley, 2004; Herr, 2016; Schulmeister, 2016; Dow, Johnsen, & Montagnoli, 2015). This is all not to say that SMR proponents do not agree with most of the financial regulation proposals put forward by post-Keynesians, because they do. However, in their view these proposals would not have the desired effects, as banks could still create means of payment (Huber, 2016, chap. 5). Yet, there argument lacks elaboration at this point.

4 A Balance Mechanics Perspective

Balance mechanics, developed by Stützel (1978; 1979) in Germany in the 1950s, are very similar to the stock-flow consistent framework used by post-Keynesian economists today (Godley & Lavoie, 2007). Building on the same importance of looking closely at stocks and flows to make sure 'nothing gets lost', Stützel focussed on these relationships as an analytical tool rather than for model building.

4.1 Stocks

Therefore, Stützel uses the concept of looking at a group and the complimentary group that makes up the rest of the economy. The groups can have any size as long as both groups make up for the entire economic entity. Groups can be a single economic unit or a group of units, while the complementary group would be either the rest of the economy or the rest of the world. Like in the stock-flow consistent framework, Stützel makes very clear distinctions between stocks and flows of economic transactions. Every units' stocks can be recorded in a balance sheet. The accounting conventions used here are in accordance with ESA 2010 (European Union, 2013) and rely mainly on Lindner (2015). The assets of an economic unit are made up of financial and tangible assets. Gross financial assets encompass all kinds of financial assets, which can be split in the categories of means of payment and other financial assets. Means of payment (*m*) – sometimes also called 'money' – are the most liquid financial assets that are accepted as means of payment. These differ substantially from the other financial assets (*ofa*) that are usually only a promise to be exchanged for means of payment in the future but are not used as means of payment themselves. In monetary economies means of payment are usually cash – like coins and banknotes – as well as demand deposits held at banks. For banks themselves demand deposits do not have the quality of means of payment, they themselves settle transactions only with central bank money (ibid., p. 6). What is regarded as money can apparently differ. It is generally different between banks and non-banks but as soon as any financial asset is used to settle debt, it can be regarded as means of payment. This is what happened with the shadow banking system before the crises, where shadow banks' liabilities became increasingly acceptable as money (Wray, 2012, p. 33). The difference between means of payment and other financial assets becomes increasingly important in times of financial crises when debtors fail to meet their obligations and creditors try to swap their other financial assets, which are losing value, for secure means of payment (Lindner, 2015, p. 6).

For a simple overview of the definitions used in the balance mechanics Table 2 shows the balance sheet of an economic unit. Depending on the kind of unit, the composition varies. Households usually hold more financial assets than liabilities and own tangible assets in the form of real estate. Firms usually have more liabilities than financial assets and own tangible assets in the form of machines and property. They usually have a high net worth. Banks however, have a low net worth and own mostly other financial assets.

Table 2: Balance sheet (Lindner, 2015, p. 7)

Assets	**Liabilities and Net Worth**
Gross financial assets, *gfa*	Liabilities, *l*
Means of payment, *m*	Debts
Other financial assets, *ofa*	Stocks
Loans	
Bonds	
Stocks, etc.	
Tangible assets, *ta*	Net worth, *nw*
Machines	
Houses, etc.	

Following from the balance sheet we can state the net worth of an economic unit as

$$nw = ta + gfa - l \tag{6}$$

The financial wealth of an economic unit can be derived from its gross financial assets less its liabilities. This we call in accordance with Lindner (2015) the net financial assets (*nfa*) of an economic unit

$$nfa = gfa - l \tag{7}$$

with

$$gfa = m + ofa \tag{8}$$

$$nfa = m + ofa - l \tag{9}$$

With these relationships we can understand what kind of flows affect which stocks.

4.2 Flows

We will distinguish between three important flows. The first are the income-consumption flows and affects the net worth of a unit. While income (*y*) can stem from an increase in any asset on the asset side, consumption (*c*) signifies a decrease of any asset on the asset side. Therefore

$$\Delta nw = y - c \tag{10}$$

The second type of flow of importance is the revenue-expenditure flow. When an economic unit realises more revenues (*r*) than expenditures (*e*), its net financial assets increase and vice versa. We can therefore write

$$\Delta nfa = r - e = \Delta m + \Delta ofa - \Delta l \tag{11}$$

The last flow to distinguish is the receipt-payment flow. This is only concerning the change in means of payment. Put in an equation we write

$$\Delta m = receipts - payments \tag{12}$$

Treating these flows separately is very important when talking about monetary phenomena. E.g. there can be receipts without revenues, when an economic unit is buying a financial asset, or a revenue without a receipt, when an economic unit is selling a car but does not get paid directly.

Stützel set up a quantity equation that would establish a connection between the trade turnover in a certain period (flow) with the change in the volume of means of payment (flow). This of course is different from the equation of exchange (1) that draws a connection between the money stock (stock) and the trade turnover or alternatively the GDP (flow). However, since the monetary reformers also claim they only want to adapt the changes in the amount of means of payment to the changes in the turnover, this will not diminish the applicability on the reform proposals (Dyson & Jackson, 2012, p. 170).

4.3 The General Quantity Equation

The relationship between economic transactions and the ensuing change in means of payment and credit in an economic system, which is similar to the balance mechanics approach, can already be found in Lautenbach (1952, p. 44 ff.), written in the 1940s, although in a rather unstructured way. Stützel, a student of Lautenbach, expanded on his work in 1953 (Stützel, 1979) and later developed his systemic framework of balance mechanics in his habilitation in 1957 (Stützel, 1978). He derived an equation that tries to encompass all the economic phenomena that change the means of payment needed for settling a certain 'net' of economic transactions. This chapter will present these economic phenomena that need to be considered in order to arrive at a general quantity equation (Stützel, 1978, pp. 208-229).

4.3.1 Trade Lockstep

In order to make the equation more accessible we will lean on simple balance-sheet and transactions-flow matrices as they are widely used in stock-flow consistent modelling (Godley & Lavoie, 2007). Thus, we will start with a small economy with two units and a universal bank where both units hold their accounts. The economy is an overdraft economy, meaning the economic units have a credit line. To simplify, there are no banknotes in the system and any means of payment are held as deposits at the bank. The bank itself has no equity and all its assets are loans to economic units. At first, there is no money in the system. The financial balance sheets of all three parties are zero. Unit A and B have tangible assets (*ta*) worth 100 'money units' *m* each. Tangible assets do not have a counterpart in the balance sheets, while all financial assets need to have a corresponding liability (Lavoie, 2014, p. 266). This means that the sum of all asset or all liability sides must add up to the amount of tangible assets. The transaction flows need to balance out, as every economic unit's expenditure is another unit's income. However, when units produce tangible assets (i.e. they invest) or consume them their amount changes. Depreciation, which is also often called "consumption of fixed capital", does reduce the amount of tangible assets (Lindner, 2015, p. 8).

First and foremost, for any increase in the means of payment (*m*) to be required, units need to realise either expenditure or revenue surpluses. Otherwise, when every unit has the exact amount of revenue as expenditures, they move in step or in "lockstep", "Gleichschritt", as Stützel called it (1979, p. 49). Lockstep means that financial balances of the economic units do not change from the beginning to the end of a period, as they do so only when someone has a revenue or expenditure surplus. If all economic units increased their expenditures by the same absolute amount, it would not be enough to define a state of lockstep, as balances could still appear, depending on where the revenues accumulated themselves. All the extra expenditures could for instance flow to a single economic unit which would realise a huge revenue surplus while all the other units would have big expenditure surpluses, as their only revenue could come from the one unit. Lockstep is only realised when every unit spends exactly what it earns in a certain period. The longer the respective period, the bigger the likelihood that intratemporal[6] surpluses and deficits realise themselves *within* this period. Therefore, means of payment could be needed in order to settle the economic transactions of a period. These

[6] While Stützel calls it *inter*temporal netting (i.e. between periods), he quite certainly means *intra*temporal netting (i.e. within a period).

are the limitations of the period analysis which we will expand on in chapter 5. Table 3 shows this lockstep trading where both economic units sell each other their tangible assets of the same value. To illustrate the trade, we have a sequence of actions in our example as B buys the assets from A first. Therefore, B takes out a loan from the bank (*bc*) in order to get *m* and uses these to buy the tangible assets from A. As *m* is also a liability to the bank it shows up as liability in the banks' balance sheet as demand deposit (*dd*). After that, A increases it's expenditures by the same amount, buying the tangible assets from B. At the end of the period the balance sheets look the same with no change in means of payment.

Table 3: Two economic units, overdraft economy, one bank, trading in lockstep

Period/Transaction	Economic units					
	A		B		Bank	
	Assets	Liabilities	A	L	A	L
Beginning of period 1	100 ta		100 ta			
B takes out a loan from the bank to buy A's tangible assets.	*- 100 ta* *+ 100 m*		*+ 100 m* *+ 100 ta* *- 100 m*	*+ 100 bc*	*+ 100 bc*	*+ 100 dd*
B sells A it's tangible assets.	*+100 ta* *- 100 m*		*- 100 ta* *+ 100 m* *- 100 m*	*- 100 bc*	*- 100 bc*	*- 100 dd*
End of period 1	100 ta		100 ta			

The situation does not depict a "strict" revenue-expenditure lockstep as one could easily divide the period into two or more periods, which would lead to the units realising expenditure or revenue surpluses. Hence, it is important to state that this happens within the relevant period and that possible intra*temporal* netting takes place (ibid., p. 209). In theory, an expansion in economic activity is possible to realise without any means of payment used, when everyone is moving in "strict" lockstep. This would mean that the in step movement is realised even in the smallest period possible – making it impossible to separate the single transactions. As the length of the period approaches zero, the means of payment needed approach zero as well. This, of course, is a hypothetical case with almost no chance of being realised in an economy. However, it shows one extreme instance in which an SMR would not work at all, as the economy could expand or contract regardless of the central bank setting the money base. Only when there is a deviation from lockstep, a change in the amount and value of economic transactions will have an influence on the change in means of payment. However, one can already see that a change in the deviation from lockstep could counteract any restriction set on the change of means of payment.

Stützel, in order to arrive at an equation linking the two phenomena of economic activity and changes in the means of payment, defined an indicator for how far an economic setting was deviating from revenue-expenditure lockstep. It is the sum of all revenue surpluses in relation to the total amount of economic transactions (Stützel, 1978, p. 226). The more revenue (and vice versa expenditure) surpluses are realised, the more the system deviates from lockstep and the more (ceteris paribus) means of payment are needed to settle the transactions. The sum of the surpluses is put in relation

to the total amount of transactions. If every transaction leads to a revenue surplus of the value of the transaction then the deviation from lockstep is 1.

Calculating the total amount of revenue surpluses in relation to the overall transactions we simply add the absolute value of all surpluses (i.e. revenue and expenditure) and divide it by 2. This way we do not have to differentiate between the units with revenue or expenditure surpluses beforehand. As the absolute values of revenue and expenditure surpluses have to be of the same size for the whole economy, the revenue surpluses are half the size of all surpluses[7].

$$\frac{1}{2}\sum_{i=0}^{n}\left(\frac{\left|r_{i,t}-e_{i,t}\right|}{T_t}\right)=\frac{1}{2}\sum_{i=0}^{n}\left(\frac{\left|\Delta nfa_{i,t}\right|}{T_t}\right)=deviation\ from\ trade\ lockstep \qquad (13)$$

The index of *i* stands for all the economic units of the aggregate economy, *t* for the time period in question and T_t for the economic transactions in that period. The latter could be defined as transactions that generally change the net financial assets of the economic unit involved in the transaction – if the single transaction is looked at individually and therefore lockstep is excluded (i.e. revenue and expenditure surpluses happen)[8]. This is a different definition of transactions as in the equation of exchange (1), as it includes the transactions of unfinished products but excludes financial transactions. So, it encompasses more than the GDP-relevant transactions (i.e. also unfinished products, reselling of products, etc.), but less than all transactions (i.e. no financial transactions). Financial transactions would not change the net financial asset position of the economic units involved, being in a situation of lockstep or not, but only the composition of the financial assets held[9].

4.3.2 Straddle Effect

Taking for granted that deviation from trade lockstep ≠ 0 (i.e. there is deviation), we can look at the effects that revenue and expenditure surpluses can have on the volume of means of payment. Therefore, we will look at our simple economy again (Table 4). We start with unit B taking out a loan from the bank in order to have the means of payment to buy 100 *ta* from A. Thus, we arrive in period 2 in a situation where unit A is a creditor to the bank as it holds its means of payment as a demand deposit, i.e. the bank is indebted to A. Conversely, unit B is a bank debtor, as it owes the bank the loan it took out. This is the normal state in an economy, as usually one can be either a bank creditor or bank debtor, even when one is only holding cash, which is a liability to the central bank (Lavoie, 2014, p. 206).

This is a fundamental distinction Stützel makes use of. He states that it makes all the difference if transaction flows go rather from bank debtors to bank creditors or vice versa. In Table 4 we have the case in period 2 of the bank creditor A giving bank debtor B money in exchange for tangible assets. The balance sheets contract also, because the

[7] Revenue (expenditure) surpluses always represent changes in nfa when changes in asset prices are omitted, as these can influence nfa without corresponding revenue (expenditure) surpluses.

[8] To be precise about this is important as we just learned that transactions only change the net financial asset position, if they are not offset by other transactions. And the more a system is trading in lockstep, the more changes in net financial assets are set off.

[9] Interest payments would change the net financial asset position and are therefore categorised as expenditures and revenues for the banks.

economy is defined as an overdraft economy where revenues automatically pay down bank debt[10].

Table 4: Two economic units, overdraft economy, one bank, negative straddle effect

Period/Transaction	Economic units					
	A		B		Bank	
	Assets	Liabilities	A	L	A	L
Beginning of period 1	100 ta		100 ta			
B takes out a bank loan in order to buy 100 *ta* from A.	*+ 100 m* *-100 ta*		*+ 100 m* *- 100 m* *+ 100 ta*	*+ 100 bc*	*+ 100 bc*	*+ 100 dd*
End of period 1/ Beginning of period 2	100 m		200 ta	100 bc	100 bc	100 dd
A buys 100 *ta* from B.	*- 100 m* *+ 100 ta*		*+ 100 m* *- 100 ta* *- 100 m*	*- 100 bc*	*- 100 bc*	*- 100 dd*
End of period 2	100 ta		100 ta			

Coming back to our small economy, B's inflow of means of payment will reduce his debt with the bank as it has a credit line. The reverse case can be seen in Table 5 with an alternative period 2. As unit A does not have tangible assets it will sell a service instead, which will not manifest as tangible assets in B's balance sheet. However, if A would use its labour to build B a tangible asset, it would newly appear in B's balance sheet.

Table 5: Two economic units, overdraft economy, one bank, positive straddle effect

Period/Transaction	Economic units					
	A		B		Bank	
	Assets	Liabilities	A	L	A	L
Beginning of period 2	100 m		200 ta	100 bc	100 bc	100 dd
B goes into bank debt in order to buy a service worth of 100 m from A	*+ 100 m*		*+ 100 m* *- 100 m*	*+ 100 bc*	*+ 100 bc*	*+ 100 dd*
End of period 2	200 m		200 ta	200 bc	200 bc	200 dd

[10] This is an important assumption that Stützel did not make explicit himself. Economic units will use all their revenues to pay down their bank debt immediately. This assumption makes sure that bank creditors only hold deposits and no bank credit at the same time. Their *net* financial assets are their *gross* financial assets as they do not have any liabilities. The reverse is true for the bank debtors where all members only hold liabilities but no deposits. The economic units realize the minimum of liquidity all the time. As soon as they can reduce their liquidity by paying back bank credits with liquid means of payment, they will do so. Stützel deals with liquidity concerns when he tries to make a connection between the *stock* of means of payment and the flow of economic transactions. He states that any liquidity concern is a behavioural assumption of economic agents deciding to hold liquidity. Therefore, he introduces them only after stating his general quantity equation which is supposed to hold up regardless of the behaviour of economic units. However, the assumption that economic units actively pay back their liabilities as soon as they have the means to do so could be regarded as a behavioural assumption as well. As he is working in an overdraft economy one could uphold this assumption more easily. Still, one would need to make also the assumption that has only one bank account and one cannot have several accounts were some are credited and some debited. Then, an inflow of means of payment could either reduce the volume of bank credit or leave it unchanged, depending on which account the money is debited. Further below, in footnote 12, we will expand his quantity equation in order to drop these assumptions.

The balance sheet of the bank, like the corresponding means of payment, expands. From these simple stock-flow consistent balance sheets we can derive that for the relationship of changes of means of payment and economic transaction it is important to take into account whether bank debtors or bank creditors realise revenue surpluses. Stützel tries to quantify this "straddle effect" of the transactions on the overall bank balance sheet and give it a value between $+1$ and -1. A straddle effect of $+1$ means that every bank creditor realises a revenue surplus, while every bank debtor an expenditure surplus. Therefore, the transactions lead to increases of the banks' balance sheet by 100 % of the total amount of all revenue surpluses. Conversely, a straddle effect of -1 signifies the case where every bank creditor realises an expenditure surplus while every bank debtor realises a revenue surplus. Consequently, the transactions lead to a decrease in the banks' balance sheet of the total amount of all revenue surpluses combined. When bank creditors or bank debtors trade within their respective 'group' of bank creditors or debtors the balance sheets do not change – given the bank accounts have credit lines. This can be seen in Table 6 and Table 7. Table 6 shows an economic transaction between unit A and C who are both bank creditors. While means of payment are transferred from A to C the length of the banks' balance sheet is unchanged. Only the composition of the demand deposits changes from being in the possession of A and C to being only in the possession of C.

Table 6: Economic transactions within the group of bank creditors

Period/Transaction	Economic units							
	A		B		C		Bank	
	Assets	Liabilities	A	L	A	L	A	L
Beginning of period 1	100 m			200 bc	100 m		200 bc	200 dd
A buys a service from C	*- 100 m*				*+ 100 m*			
End of period 1				200 bc	200 m		200 bc	200 dd

Table 7 shows the opposite case where A and C are bank debtors and make the same transaction. Again, the length of the banks' balance sheet stays the same size, while the composition changed. C does not owe anything to the bank anymore, while A doubled its indebtedness via the bank.

Table 7: Economic transactions within the group of bank debtors

Period/Transaction	Economic units							
	A		B		C		Bank	
	Assets	Liabilities	A	L	A	L	A	L
Beginning of period 1		100 bc	200 m			100 bc	200 bc	200 dd
A buys a service from C. both have a credit line at the bank	*- 100 m*	*+ 100 bc*			*+ 100 m*	*- 100 bc*		
End of period 1		200 bc	200 m				200 bc	200 dd

The possible outcomes of the straddle effect due to different transactions between bank debtors and creditors can be summarised as in Table 8.

Table 8: The straddle effect II (Grass & Stützel, 1988, p. 264)

		Making payment	
		Bank debtor	Bank creditor
Receiving payment	Bank debtor	Credit volume remains constant → straddle effect = 0	Credit volume decreases → straddle effect negative
	Bank creditor	Credit volume increases → straddle effect positive	Credit volume remains constant → straddle effect = 0

In a more technical but precise form, the straddle effect can be described as the revenue surpluses (or the negative value of the expenditure surpluses) of the group of bank creditors in relation to the overall revenue surpluses (Stützel, 1978, p. 211). Usually, the amount of all revenue surpluses is bigger than that of the group of bank creditors or debtors alone. If they are the same size, then all units from the bank creditor group must have revenue surpluses and all bank debtors expenditure surpluses. The balance sheets will expand by the full amount of revenue surpluses; therefore, the straddle effect is $+1$.

$$straddle\ effect_{nfa,t} = \frac{r_{bc,t} - e_{bc,t}}{1/2 \sum_{i=0}^{n} |r_{i,t} - e_{i,t}|} = \frac{\Delta nfa_{\mathrm{bc,t}}}{1/2 \sum_{i=0}^{n} |r_{i,t} - e_{i,t}|} \qquad (14)$$

The revenue surplus of the group of bank creditors is equal to its changes in net financial assets[11]. Units in the groups can have expenditure or revenue surpluses also vis-à-vis their group members as they can have transactions within their group as well. These, however, will net out as soon as the aggregate of the change in net financial assets is calculated since one units' income is offset by the other units' expenditure. The total revenue surplus does not contain any intragroup netting, as it is adding all the individual values; however, there is intra*temporal* netting taking place as the surpluses are always calculated at the end of the respective period. A unit that has a revenue surplus early on in the period can for instance have an expenditure surplus at the end of it. The longer the time period, the more intratemporal netting is usually done. Only in the very special case of strict revenue-expenditure lockstep, the netting is zero, even for the shortest periods possible.

4.3.3 Direct Credit Relations between Non-Banks

Until now we have solely dealt with real transactions causing changes in the net financial assets of the trading partners like buying a car (i.e. decrease in financial assets, increase in tangible assets). Now we will look at financial transactions that do not change the value of net financial assets but their composition. Direct credit relations between non-banks are for instance issuances of company bonds, direct credits or trade credits. Coming from the equation of exchange (1), these relations are not included in a meaningful way, or rather are assumed to stay constant. To illustrate this, Stützel put forward the thought experiment that the economy would go on for a while, say eight

[11] This only holds with asset price changes staying constant. Otherwise, *nfa* could increase without any corresponding revenue surplus.

days, doing all the transactions it did before, with the important difference that they would not move any means of payment, but merely give each other credit (Stützel, 1979, p. 179). Means of payment would only be used for small things, like buying tickets for the public transport or the like. Hence, the economic actors would have a lot of expenditures without payments and revenues without receipts. Consequently, their balance sheets would grow with the direct credit relations. The equation of exchange (1), does not really give a satisfying relation between real transactions and the velocity of money. The real amount of transactions does not change, but the money being used for transactions is actually quite small. While the money used would circulate very much, the rest of the money base would not circulate at all. As total transactions go down, the velocity of money would be very small. If one were to include the real transactions in the $P * T$ part of the equation the tautology would not work anymore, as no means of payment were used for these transactions (at least in the period in question). For the equation of exchange to hold, the direct-credit relations between non-banks would need to stay the same for each economic unit at the beginning and the end of the observed period (ibid.). What it shows is that the velocity of circulation is in the end a rather empty concept that offers a narrative – how often does one unit of money change hands – which it actually does not live up to, as it is not what it necessarily shows. In the end it is a rather arbitrary gap filler for the equation of exchange. This does not change in the least, when the equation of exchange is disaggregated like in equation 2.

Obviously, the direct credit relations between non-banks seem to be important to examine if one wants to make a statement about the change in means of payment needed in a certain period. Therefore, we will look at the example above in a more systematic way, relying on the balance sheets we used before. Table 9 depicts the situation above. Without any means of payment, transactions can be made if the seller is willing to give the buyer a credit (*dc*). The equation of exchange would just record no transactions, no money stock and no movement.

Table 9: Two economic units, one bank, overdraft economy, direct credit and transaction between non-banks

Period/Transaction	Economic units					
	A		B		Bank	
	Assets	Liabilities	A	L	A	L
Beginning of period 1	100 ta					
B buys 100 ta from A, A gives B a direct credit	*- 100 ta* *+ 100 dc*		*+ 100 ta*	*+ 100 dc*		
End of period 1	100 dc		100 ta	100 dc		

These kind of direct credit relations are important, i.e. for all supply chains where the wholesalers often give direct credits to the retailers. Usually, when no direct transaction between the credit partners is involved, there will be a flow of means of payment in exchange for a credit. This would then be a change in the composition of the financial assets of the units. This can be seen in Table 10 and Table 11, which show the simple credit relations between a bank creditor and a bank debtor and its effect on the banks'

balance sheet. As can be seen, when bank creditors (A) give a direct credit to bank debtor (B) then, provided bank debtors pay back their debt or have a credit line, the means of payment in the system decrease. This is – at least potentially – without any 'real' transaction necessarily happening. In Table 10 we see a restructuring of the net financial assets of both A and B. A is changing its liquid means of payment for a promissory note from B, while B is apparently rather owing money to A than to the bank. The second case is the opposite, when a bank debtor (B) increased its bank debt and changes this for a promissory note of the bank creditor (A). In reality this can for instance happen when B is more credit worthy than A and can therefore get better conditions on the credit. It then passed the means of payment on to A with which it might is in a supply chain relation.

Direct credit relations between bank debtors and bank creditors change the volume of bank credit in a similar way as the revenue and expenses surpluses. When bank debtors or bank creditors give out loans within their respective group, it does not affect the volume of bank credit.

Table 10: Two economic units, one bank, overdraft economy, direct credit from bank creditor to bank debtor

Period/Transaction	Economic units					
	A		B		Bank	
	Assets	Liabilities	A	L	A	L
Beginning of period 1	100 m			100 bc	100 bc	100 dd
B borrows m from A.	*- 100 m* *+ 100 dc*		*+100 m* *- 100 m*	*+ 100 dc* *- 100 bc*	*- 100 bc*	*- 100 dd*
End of period 1	100 dc			100 dc		

Table 11: Two economic units, one bank, overdraft economy, direct credit from bank debtor to bank creditor

Period/Transaction	Economic units					
	A		B		Bank	
	Assets	Liabilities	A	L	A	L
Beginning of period 1	100 m			100 bc	100 bc	100 dd
B takes out a bank loan. A borrows m from B.	*+ 100 m*	*+ 100 dc*	*+100 m* *- 100 m* *+ 100 dc*	*+ 100 bc*	*+ 100 bc*	*+ 100 dd*
End of period 1	200 m	100 dc	100 dc	200 bc	200 bc	200 dd

Therefore, it makes sense to have a measure that describes the effect of direct credit relations between non-banks on the amount of needs of payment. This can be, again, described by a straddle effect with bank creditors giving more loans to bank debtors or the other way around. The straddle effect of these direct credit relations, or, to stick more with Stützel's vocabulary, of the shifting in means of payment that are connected to the direct credit relations can be described as follows: it is the change in means of payment held by the group of bank creditors in relation to the sum of the absolute changes in means of payment of every single unit.

$$\text{straddle effect}_{m,t} = \frac{\Delta \text{m}_{\text{g,t}}}{1/2 \sum_{i=0}^{n} |\Delta m_{i,t}|} \tag{15}$$

For Table 10 $\Delta m_{g,t}$ would be -100, as A is reducing its holdings of means of payment by 100; the sum of the absolute changes in means of payment would be $1/2\,(|-100| + |+100|) = 100$. Here, we take only the direct credit effect on B into account which is an increase of means of payment by 100. The outflow of 100 means of payment Therefore, the straddle effect would be -1, signifying that the full amount of direct credit volume reduces the amount of means of payment. This, of course, is only true when B has a credit line or the behavioural assumption holds that it paying back any outstanding bank credit.

To sum up, we can already make some statements about the changes in bank credit volume. The bank credit volume increases, if the revenue surplus from bank creditors vis-à-vis bank debtors is higher than the direct credit flow from bank creditors to bank debtors. And conversely, the bank credit volume decreases, when the revenue surplus from bank creditors vis-à-vis bank debtors is smaller than the direct credit flow from bank creditors to bank debtors.

However, there is one more part that needs to be included as well. This is the possibility of bank creditors to change their demand deposits in longer term bank deposits. What happens then is a simple reclassification of the bank money into savings account money, which cannot be accessed immediately. It switches from M1 to – depending on the modalities – M2 or M3. If a bank creditor changes its means of payment at the bank into a long term savings account, the means of payment by non-banks decrease. Therefore, these changes have to be included into a quantity equation.

4.3.4 The General Quantity Equation

Finally, bringing all the definitions above together, the balance mechanics relationship between economic activity and the changes in the volume of means of payment held by non-banks – the general quantity equation, can be stated (Stützel, 1978, p. 227).

$$\begin{aligned} &(\text{trade turnover} * \text{deviation from trade lockstep} * \text{straddle effect}_{nfa,t}) \\ &+ (\text{purely finance induced means of payment shifting} * \text{straddle effect}_{m,t}) \\ &- \text{increase in long term bank deposits} \\ &= \text{increase in the volume of means of payment held by non-banks} \end{aligned} \tag{16}$$

The first part of the equation deals with the revenue and expenditure surpluses that are realised and how they are distributed between bank creditors and bank debtors. The second part includes the direct credit relations between bank creditors and bank debtors and how they affect the change in means of payment. The last part was briefly mentioned and accounts for the possibility of bank money changing into illiquid financial

assets. In here one could also include the emission of bank shares. More technically we can also write with help of equations 13-15 and with what was discussed above[12]

$$
\begin{aligned}
&\mathrm{T}_t * \frac{1}{2}\sum_{i=0}^{n}\left(\frac{\left|r_{i,t}-e_{i,t}\right|}{T_t}\right) * \frac{\left|r_{bc,t}-e_{bc,t}\right|}{1/2\sum_{i=0}^{n}\left|r_{i,t}-e_{i,t}\right|} \\
&+ \frac{1}{2}\sum_{i=0}^{n}\left|direct\ credit\ granting_{i,t} - direct\ borrowing_{i,t}\right| * \frac{\Delta \mathrm{m}_{bc,\mathrm{t}}}{1/2\sum_{i=0}^{n}\left|\Delta m_{i,t}\right|} \\
&- \Delta LBD_t \\
&= \Delta \mathrm{M}_{NB,t}
\end{aligned}
\tag{16'}
$$

The equation therefore states the direct relation between the trade turnover and the change in means of payment held by non-banks. If the trade turnover T_t were to increase, the change for the need for means of payment would depend entirely on the behaviour of the rest of the equation. How can an economic system react to a limitation in the means of payment? This is a very relevant question for any monetary policy trying to restrict the amount of means of payment, like the SMR proponents which we will investigate in the next chapter.

5 Implications for Monetary Policy in a Sovereign Money System

How could an economic system react when the change in means of payment is zero, which would reflect the wish of the MCC to dampen the credit cycle? First, we will look at the current system and then see if this is applicable in an SMS as well.

The economy could of course keep the transactions constant, therefore establishing a link between means of payment and economic activity which would be in the interest of the MCC. However, economic activity could also increase as long as one of the other parts of the equation counterbalances this effect. Therefore, a) a decrease in the deviation from trade lockstep, b) a higher transaction volume going from bank creditors to bank debtors or going on within these groups, c) more direct credits being borrowed (if they are in total going more from bank creditors to bank debtors), d) a higher proportion of direct credits going from bank creditors to bank debtors, or e) an increase in long term bank bonds could enable the system to still increase its economic activity without the need for more means of payment.

[12] If one is to abandon the assumption of minimal liquidity (see footnote 10), one could simply expand the equation by a term that includes the amount of money that is held liquid, while it could have been used to pay down *bank* credit. As one can easily see, as soon as the minimal liquidity assumption is abandoned, the amount of means of payment in the system is going to increase.

$$
\begin{aligned}
&\mathrm{T}_t * \frac{1}{2}\sum_{i=0}^{n}\left(\frac{\left|r_{i,t}-e_{i,t}\right|}{T_t}\right) * \frac{\left|r_{bc,t}-e_{bc,t}\right|}{1/2\sum_{i=0}^{n}\left|r_{i,t}-e_{i,t}\right|} \\
&+\frac{1}{2}\sum_{i=0}^{n}\left|direct\ credit\ granting_{i,t} - direct\ borrowing_{i,t}\right| * \frac{\Delta \mathrm{m}_{bc,\mathrm{t}}}{1/2\sum_{i=0}^{n}\left|\Delta m_{i,t}\right|} \\
&-\Delta LBD_t \\
&+\Delta m_{NB,t}\ \text{which could have been used to pay down bank debt} \\
&= \Delta \mathrm{M}_{NB,t}
\end{aligned}
\tag{17}
$$

These are not statements about causalities, mere balance mechanical relationships. They show the ways in which a system can react, facing a restriction of means of payment. By doing so, they also show the implicit assumptions that would need to hold, in order for a link between a change in the means of payment and the economic activity to be stable. If the SMR proponents expect this link to be stable, they would need to support this claim by going through the components of Stützel's equation of exchange and explaining the causations behind them. This has not been done so far, as the disaggregation of the equation of exchange provides no further insight into these factors. It keeps the velocity of circulation for 'real' transactions stable, does not look into direct credit relations between non-banks and does not incorporate trade lockstep or straddle effects.

In an SMS the relationships are of course a little different, as non-banks and banks share the same means of payment and banks cannot create money anymore, which would lead to them being normal economic units as far as the equation is concerned. Therefore, a restriction of means of payment could restrict deviation from trade lock-step, or transactions going from overall creditors to overall debtors. Likewise, it could restrict the direct credit granting from overall debtors to overall creditors, which would increase itself the means of payment, as well as the possibility to liquidate long term loans. However, it does not restrict economic activity in itself as for this to hold, several assumptions have to be made. The first one is, that economic units do not deviate less from trade lockstep in total. Additionally, they should not be allowed to shift the economic transactions in a way which would lead to more revenue surpluses for debtors. Furthermore, an assumption were to be made that the direct credit relations did not change in a way that creditors give more loans to debtors (the combination of the total volume with the straddle effect is important), and finally, the volume of long term bank credit were not to increase. These assumptions do not have to be as strict, because the overall effect of all these phenomena is what counts. For example, the liquidation of long term bank loans could increase if it is counterbalanced by a smaller deviation from trade lockstep or another effect.

Regardless of possible circumventions of the means of payment by the emergence of new, unregulated kinds, restrictions could always be circumvented by synchronising payments and transaction flows. This could be especially important within supply chains. Private clearing houses could emerge, synchronising the in- and outgoing payments, as suggested by Kaldor (1970, p. 7). This topic has been only briefly touched upon yet by the SMR proponent Gudehus (2015, p. 441) but in no sufficient depth to realise its possible impact.

What Stützel's quantity equation, as well as the equation of exchange, both fail to incorporate is a treatment of different intratemporal phenomena. The equations only look at the beginning and at the end of each period and do not observe what is happening within it. However, as Stützel elaborates, the need for means of payment can hugely differ between two periods that look quite similar with respect to the values before and after a period (1978, pp. 229-235). The longer the period concerned, the higher intratemporal netting becomes and the less one can say about the amount of means of payment needed at a certain moment in time. It could be important to know if a unit's expenditures were happening all at once in a period or in small more frequent instalments. When the revenue stream would be equal in both cases, then the unit would need more means of payment as if it were to handle its' expenditures in one big payment. If

this is a pattern for the whole economy – one might think of the day when wages are usually paid – then this can have a huge importance on the means of payment needed. If they would be restricted to an average value, like possibly in an SMR system, these different short term patterns could become very important for the systems stability. Therefore, it would be very important to consider if one is to set a fixed amount of means of payment for a certain period. This is another complication that the SMR proponents have to keep in mind.

Stützel's general quantity equation shows, that the amount of means of payment required in an economy is very hard to determine beforehand. Moreover, simple aggregation over a longer period of time would probably not be able to deal with large short term deviations on the individual level. The assumptions that have to be made are very restrictive and have so far been made only implicitly. Therefore, an explication and elaboration of these assumptions is needed to be provided by SMR proponents. Alternatively, the possible reactions should be incorporated into their still very basic model of monetary policy. Furthermore, they should elaborate how they would go about measuring these quite specific effects. This poses the question if this is possible to achieve at all and simultaneously keep it manageable.

As post-Keynesians read the quantity equation 'from right to left', meaning that the economic activity causes the changes in money supply and the velocity of circulation. As a consequence they never really bothered how the connections really work as they see it as practically irrelevant. At least, I could not find any post-Keynesian literature dealing with the connections of economic activity and the money stock (or the change thereof) in stock-flow consistent terms, yet. One could say that Stützel answered a question which was never posed by post-Keynesians themselves. His answer however, could help in the discussion with those who read the quantity equation 'from left to right', as it clearly shows on what assumptions this reading is based. Another benefit of Stützel's view in this regard is that it does not need to make use of the very flimsy concept of velocity of circulation in order to make the relationship between economic activity and change in means of payment clear. This way there might be a way out of always reinforcing this very visual idea of a circulating entity.

The incorporation of liquidity preference, a behavioural concept which would be of interest for post-Keynesians in determining the amount of high-powered money in an economy, is still a little difficult. With the equation in footnote 12, we can incorporate changes in liquidity preference of the population insofar, as it would have effects on changes in long term bank deposits, as well as in holding means of payment liquid, which could have been used to pay down bank debt. It could also have an impact on the direct credit relations between non-banks. An increase in the preference for liquidity could then lead to a) a reduction in long term bank debt, b) an increase in the money holdings which could have been used to pay down bank debt, or c) in a reduction of direct credit granting between non-banks.

6 Conclusion

The SMR proponents base much of their idea on the assumption that controlling the monetary base would lead to more nominal as well as real stability. This claim has been contested by many post-Keynesians arguing that there is no model which could suggest how much money would be needed in a certain period. The SMR proponents base much

of their analysis on the equation of exchange, which had been criticised by Stützel in a stock-flow consistent way already in the 1950s, and whose disaggregation did not provide much more insight. Therefore, by reintroducing Stützel's critique, a clearer understanding of the needs for means of payment could be established, adding value and clarity to the criticism of the idea of setting the money base.

Stützel makes it very clear, and more so than the post-Keynesian critique so far, what really influences the change in means of payment in a certain period. These are a) the volume of transactions, b) the deviation from trade lockstep, c) the straddle effect of transactions, with payment rather going from bank creditors to bank debtors or vice versa, d) the changes in direct credit between non-banks, e) the pattern of these direct credits, going more from bank debtors to bank creditors or the other way around and f) the changes in long term bank bonds. Furthermore, regarding the stability of a system, the intraperiod patterns of transactions and payments influence the need for means of payment at certain points in time, which are overlooked in a period analysis, but matter greatly. Stützel clarifies the argument of unstable velocity, which has been put forward by post-Keynesian authors. For SMR proponents to move forward, they would have to elaborate why they think Stützel's general quantity equation would behave in a stable way, which they have not done so far.

Until then, it seems quite impossible that the setting of the 'high powered money' would work in a stable manner. More likely, the reactions are unpredictable and any re-steering by the MCC would lead to unpredictable consequences as well. Interest rates would be highly fluctuating leading to more uncertainty and slower growth. Moreover, a limitation of the amount of money does not necessarily restrict the direct credit relations between the economic units, as already suggested by Wicksell.

In further research, the simple accounting relationships could be supported with empirical research of how relevant each part of the equation would be in different economic settings.

7 Literature

Arnon, A. (2011). *Monetary Theory from Hume and Smith to Wicksell: Money, Credit and the Economy.* New York: Cambridge University Press.

Bagehot, W. (1873). *The Lombard Street: A Description of the Money Market* (3. ed.). London: Henry S. King & Co.

Benes, J., & Kumhof, M. (2012). The Chicago Plan revisited. *IMF Working Paper WP, 12*(202).

Benes, J., & Kumhof, M. (2013). The Chicago Plan Revisited. *Revised Draft of February 7, 2013*. Retrieved from http://web.stanford.edu/~kumhof/chicago.pdf

Bindseil, U. (2005). *Monetary Policy Implementation: Theory - Past - Present.* Oxford: Oxford University Press.

Dow, S., Johnsen, G., & Montagnoli, A. (2015). A critique of full reserve banking. *Sheffield Economic Research Paper Series*(March 2015).

Dyson, B., & Jackson, A. (2012). *Modernising Money - Why Our Monetary System Is Broken And How It Can Be Fixed.* London: Positive Money.

Dyson, B., Greenham, T., Ryan-Collins, J., & Werner, R. A. (2011). *Towards a 21st Century Banking and Monetary System: Submission to the Independet Commission on Banking.* Retrieved March 30, 2016, from The New Economcis Foundation: http://www.neweconomics.org/page/-/files/Submission-ICB-Positive-Money-nef-Soton-Uni.pdf

European Union. (2013). *European System of Accounts: ESA 2010.* Luxemburg: European Union.

Fiebiger, B. (2014). 'The Chicago Plan revisited': a friendly ciritque. *European Journal of Economics and Economic Policies: Intervention, 11*(3), pp. 227-249.

Fisher, I. (1936). *100% money: Designed to keep checking banks 100% liquid; to prevent inflation and deflation; largely to cure or prevent depressions and to wipe out much of the national debt* (revised ed.). New York: Adelphi.

Fisher, I., & Brown, H. G. (1911). *The Purchasing Power of Money - Its Determination and Relation to Credit Interest and Crises.* New York: MacMillan.

Fontana, G., & Sawyer, M. (2016). Full Reserve Banking: More 'Cranks' Than 'Brave Heretics'. *Cambridge Journal of Economics, awaiting publication*.

Friedman, M. (1948). A Monetary and Fiscal Framework for Economic Stability. *American Economic Review, 38*(3), pp. 245-264.

Friedman, M. (1991). *Monetarist Economics.* Oxford, UK/Cambridge, USA: Basil Blackwell.

Godley, W., & Lavoie, M. (2007). *Monetary Economics: An Integrated Approach to Credit, Money, Income, Production and Wealth.* New York: Palgrave Macmillan.

Goodhart, C. A. (1989). *Money, Information and Uncertainty* (2. ed.). London: Macmillan.

Goodhart, C. A., & Jensen, M. A. (2015). A Commentary on Patrizio Lainà's 'Proposals for Full-Reserve Banking: A Historical Survey from David Ricardo to Martin Wolf'. *Economic Thought, 4*(2), pp. 20-31.

Grass, R.-D., & Stützel, W. (1988). *Volkswirtschaftslehre - Eine Einführung auch für Fachfremde.* München: Vahlen.

Green Party UK. (2015). For the Common Good: General Election Manifesto 2015. *Green Party of England and Wales*.

Gudehus, T. (2015). *Dynamische Märkte: Grundlagen und Anwendungen der analytischen Ökonomie* (2. ed.). Berlin: Springer.

Herr, H. (2016). After the Financial Crisis: Reforms and Reform Options for Finance, Regulation and Institutional Structure. *FESSUD Working Paper, 63*.

Huber, J. (2014). Modern Money Theory and New Currency Theory - A comparative discussion, including an assessment of their relevance to monetary reform. *Real-World Economics Review, 66*, pp. 38-67.

Huber, J. (2016). *Monetäre Modernisierung - Zur Zukunft der Geldordnung: Vollgeld und Monetative* (5. ed.). Marburg: Metropolis.

Huber, J., & Robertson, J. (2000). *Creating New Money: A Monetary Reform For The Information Age.* London: New Economics Foundation.

Innes, A. M. (1914). The Credit Theory of Money. *Banking Law Journal, January*, pp. 151-168.

Kaldor, N. (1970). The New Monetarism. *Lloyds Bank Review, 91*(1), pp. 1-18.

Keen, S. (2014). Endogenous Money and Effective Demand. *Review of Keynesian Economics, 3*, pp. 271-291.

Lanià, P. (2015). Proposals for Full-Reserve Banking: A Historical Survey from David Ricardo to Martin Wolf. *Economic Thought, 4*(2), pp. 1-19.

Lautenbach, W. (1952). *Zins, Kredit und Produktion.* (W. Stützel, Ed.) Tübingen: J.C.B. Mohr (Paul Siebeck).

Lavoie, M. (2013). The monetary and fiscal nexus of neo-chartalism: A friendly critical look. *Journal of Economic Issues, 47*(1), pp. 1-31. Retrieved from Department of Economics, University of Ottawa.

Lavoie, M. (2014). A Comment on ’Endogenous Money and Effective Demand’: a Revolution or a Step Backwards? *Review of Keynesian Economics, 2*(3), pp. 312-332.

Lavoie, M. (2014). *Post-Keynesian Economics: New Foundations.* Cheltenham: Edward Elger Publishing.

Lindner, F. (2015). Does Saving increase the Supply of Credit? A Critique of Loanable Funds Theory. *World Economic Review*(4), pp. 1-26.

Mankiw, N. G. (2016). *Macroeconomics* (9. ed.). New York: Worth Publishers.

Palley, T. I. (2004). Asset-based Reserve Requirements: Reasserting Domestic Monetary Control in an Era of Financial Innovation and Instability. *Review of Political Economy, 16*(1), pp. 43-58.

Palley, T. I. (2014). Effective Demand, Endogenous Money, and Debt: a Keynesian Critique of Keen and an Alternative Theoretical Fframework. *Review of Keynesian Economics, 3*, pp. 312-320.

Reissl, S. (2015). A critique of Keen on effective demand and changes in debt. *Real-World Economics Review, 72*, pp. 96-117.

Ricardo, D. (1824). Plan for the Establishment of a National Bank. In D. Ricardo (1951), *The Works and Correspondence of David Ricardo. Volume 4: Pamphlets and Papers 1815-1823.* Camebridge: Camebridge University Press.

Robertson, D. H. (1934). Industrial Fluctuation and the Natural Rate of Interest. *The Economic Journal, 44*(176), pp. 650-656.

Schulmeister, S. (2016). Das "Vollgeldsystem" - Notwendige Reform oder gefährliches Allheilmittel? *Austrian Institute for Economic Research, Working Paper* (518).

Sigurjonsson, F. (2015). Monetary Reform: A Better Monetary System for Iceland. *Report Commissioned by the Prime Minister of Iceland, March*.

Solow, R. M. (1956). A Contribution to the Theory of Economic Growth. *The Quarterly Journal of Economics, 70*(1), pp. 65-94.

Stützel, W. (1978). *Volkswirtschaftliche Saldenmechanik.* Tübingen: J.C.B. Mohr (Paul Siebeck).

Stützel, W. (1979). *Paradoxa der Konkurrenz- und Kreditwirtschaft.* Aalen: Scientia.

Werner, R. A. (1997). Towards a New Monetary Paradigm: A Quantity Theorem of Disaggregated Credit, with Evidence from Japan. *Kredit und Kapital, 30*(2), pp. 276-309.

Werner, R. A. (2005). *New Paradigm in Macroeconomics.* New York: Palgrave/Macmillan.

Wicksell, K. (1898). *Geldzins und Güterpreise - Eine Studie über die den Tauschwert des Geldes bestimmenden Ursachen.* Jena: Gustav Fischer.

Wolf, M. (2014, April 24). *Strip private banks of their power to create money.* Retrieved July 15, 2016, from Financial Times: https://next.ft.com/content/7f000b18-ca44-11e3-bb92-00144feabdc0

Wray, L. R. (2012). Introduction to an alternative history of money. *Levy Economics Institute of Bard College, Working Paper* (717).