

# **Financial crisis**

**explained by  
the theory of Freigeld**

## Introduction

The translation of Freigeld is money of freedom. It characterizes the opportunity to improve our monetary system in the sense that the capital has to serve humans, different to the current period, where we might get the feeling that humans have to serve capital. The theory of Freigeld was primary described by Silvio Gesell<sup>1)</sup>, a German-Argentina salesman and economist. Besides the pathos which prevails in this expression of the early 20<sup>th</sup> century it can be seen as a measure to analyze current events at the financial markets from a different perspective.

Different perspectives enrich economic science as it is the nature of this science to explore relations - relations between supply and demand, salesman and purchaser, creditor and debtor, individuals and society. The theory of Freigeld is not a perspective of equilibrium of supply and demand. It is a viewpoint onto the side and behavior of money and not on the side and behavior of the real economy for goods and services. It is a macroeconomic viewpoint of aggregated values and not of particular ownership structures. It includes the aspect of time. These alternative perspectives allow to introduce terms like boundaries of growth, inequality and crisis, which makes it more simple to characterize the processes and dependences of the recent crisis.

17. march 2012

## **The nature and creation of money <sup>2)</sup>**

Money plays an important role in our daily life. It is an accomplishment of the society which renders division of labour feasible and is therewith absolutely essential for modern life.

- It is a mean of payment and makes direct exchange of goods unnecessary.
- It is a medium of exchange and allows for the setting of prices and the comparison of values of different goods
- It is conditionally a store of value and permits to do the exchange later at a more favourable time.

These functions are the benefit of money in a more global or macroeconomic view. Therein comprises the value of money for the society.

In a particular or microeconomic view it is a negotiation between the actors, to accept money as a counter value for goods and services. Someone selling goods or services can be sure to get the possibility to exchange the obtained money back into goods or services of his own needs or wishes. But in this particular view money can also be seen as a claim. The provider or seller offers goods or services to the society and will receive the right to exchange it into goods or services of comparable value from the society. To be a claim includes also commodities like gold or other goods which were traded like money in the early times of money.

### **The value of money in this particular or microeconomic view is a claim.**

Distinct explanation of one item is a typical approach of economical science. For example, to describe the value of money as a commodity or a claim, is a typical economical consideration. Different perspectives or rather different delimitation of the economical system, like particular or global view, lead to different characterizations, not inevitably to contradictions, but inevitably to divergent interpretations, which are all particular accurate. But it means also, that the economical debate would gain more value, if the perspective or delimitation of economical structures would be taken into account more often.

If we consider money as a claim, then we can also consider bank notes as a kind of promissory notes. It is not inevitably necessary that the tangible value of these notes must be equal to the numbers, which are printed onto these notes. Cashless payments are intangible numbers in the computer network of the bank system. And as most amounts of payment in most countries will be done cashless, we could assert that money is almost intangible.

But we should not deceive ourselves. Money will still be considered as commodity and real asset which is in narrowest woven to reality by the function to be a claim. It crucially influences nearly all decisions of our life at all levels.

If money is narrow, it must be borrowed at the bank. The modern system of banks and central banks coordinate supply and demand of money, by keeping savings in circulation and regulating the demand for new money through loans.

Banks are able to create new money by fractional reserve banking if the need for money is higher than the lendable savings.

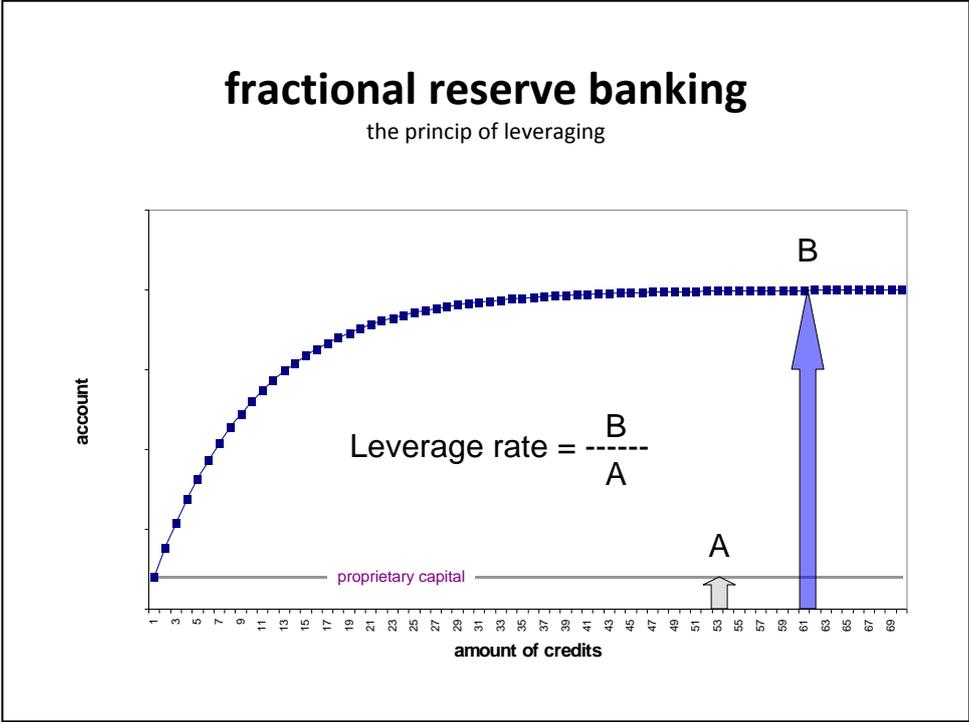


Figure 1 – fractional reserve banking;  
The finitely growth of money if reserve level is constant

Parts of the savings must be kept as reserves, while the other parts can be lend. The lend money flows back into the bank system and increases the primary amount of savings. This is a very short description of an abstract macro economically model of money creation. It is something, which cannot be recognized as fractional reserve banking in the continually and particular transactions between banks and central banks. If the primary reserves would be kept constant, the growth of money would lead to a limited increase.

The relation between reserves and savings is the leverage. The higher the legal reserves the lower the leverage the smaller the clearance for credits and money creation.

From a micro economic view or rather a view of private sector debts disappear when the last rate is paid. From a macro economic view or rather to recognize money as a scheme the process of borrow and lend keeps money in circulation. It is a scene without beginning and end. Debts will never disappear. They are an inevitable component of our monetary scheme.

**But money creation is not a circuit cycle it is a growing helix <sup>3)</sup>**

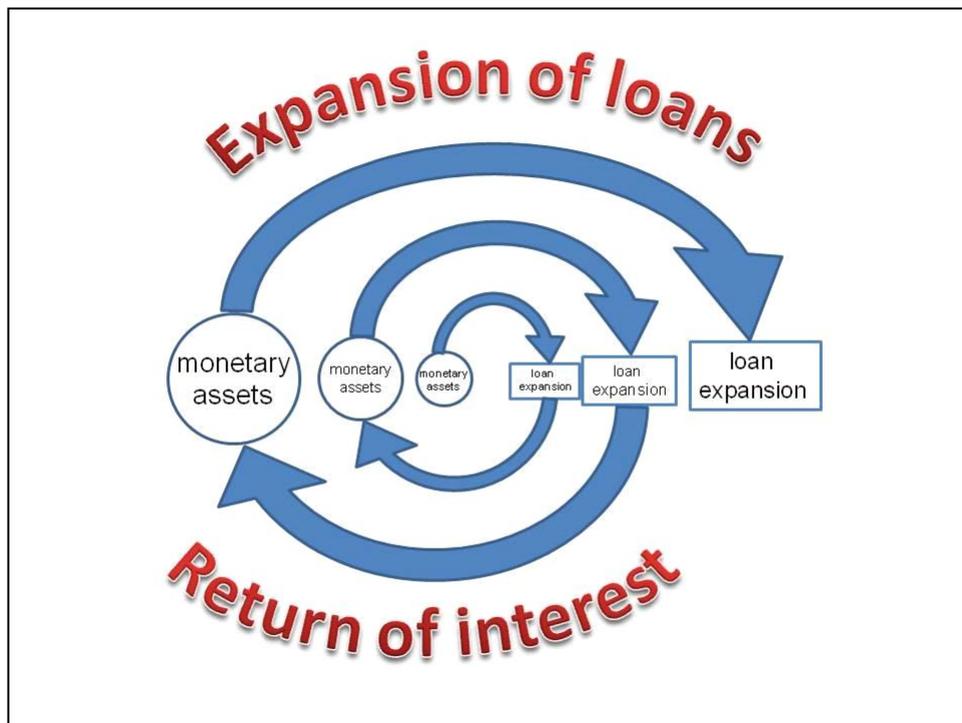


Figure 2 – the helix of monetary growth

Looking again from the macroeconomic or aggregated perspective means that not only the lend money also interest rates must be paid back. This increase of money stock will be accomplished by fractional reserve banking. It is also an abstract model of something which cannot be perceived in the daily business of transactions.

Caused by the backflow of interest rates, the demand of money is always higher than the available and lendable savings. The accredited economic science describes this with the tenet that money is always a narrow good. It leads to the so called helix of monetary growth.

## monetary time beam and criticism of interest

Unwinding the helix of monetary growth leads to the monetary time beam. It is an important model of explanation in the theory of "Freigeld".

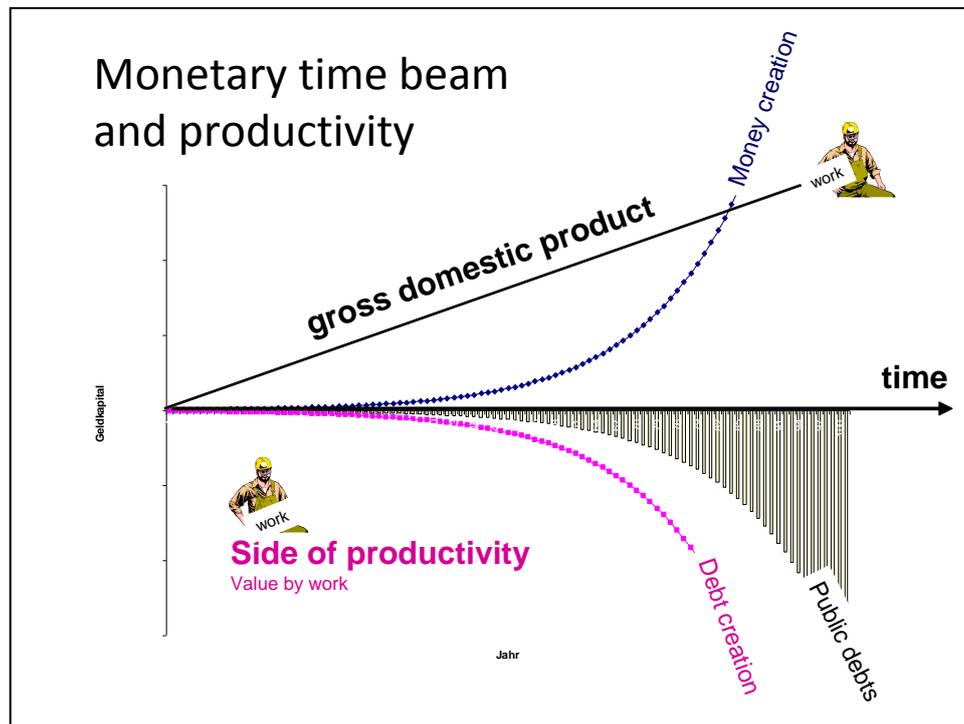


Figure 3 – monetary time beam

Money supply grows exponential in an interest based monetary system due to compound interest. In times of non crisis most of the capital will be lend so that the total debts will grow equivalent to the money assets and as well exponential way as a mirror image.

The side of debts or liabilities will be also called side of productivity, because debtors must be productive to be able to acquit their debts. After all, this coercion to refund these incurred liabilities is the intrinsic nature of money. The surplus or backflow of interest, seen aggregated in the helix of money growth leads to a continuous demand for new money and continual increase of money supply.

It also leads to a permanent growth of gross domestic product, which can be drawn in the monetary time beam on the side of assets. Irrespective of drawing the nominal or real GDP emphasizes the different shape between GDP and money supply and shows that there is no straight correlation between these two curves, especially if the bigger part of the GDP of an economy is based on production of real goods and services and not on financial transactions. But must it show this correlation, if we consider the model of a closed economy? How to link the world of money with the real economy of goods and services is still an enduring contention in economic science. But two aspects are probably certain.

It is self-evident that money is linked with tangible goods and services through the price. It is the function of money to be a unit of account. Whereas the accrual of pricing is very well developed as the central object of the model of equilibrium in economic science.

The second aspect of connecting money with the real economy is that money assets will be backed by receivables and collaterals and the continual demand of debtors for new money keeps money always narrow, which corresponds with the economic theorem that money is always a narrow good. It keeps money in circulation and ensures the value of money.

As already mentioned, economy is a system of perspectives. If the request consists of a sustainable and long term monetary system and not of the necessity to earn a maximum of return of invested capital, then some critical points in an interest based system become obvious.

The critical point is not that the system grows in an exponential way. If money is neutral, not only money and prices, also income grows in equal manner. Purchasing power and the distribution of welfare would keep constant for everybody. The possible consequence of increasing prices would mean, that it would also lead to increasing numbers and in time the decimals would have to be shifted to follow a currency reform.

The critical points are caused by interest compound and described by interest criticism respectively theory of “Freigeld” which list three main items.

- **mass gravity behaviour of interest based money.**

Interest compound is the most powerful means to collect money. It is self-evident, the more a creditor will lend the higher the return will be.

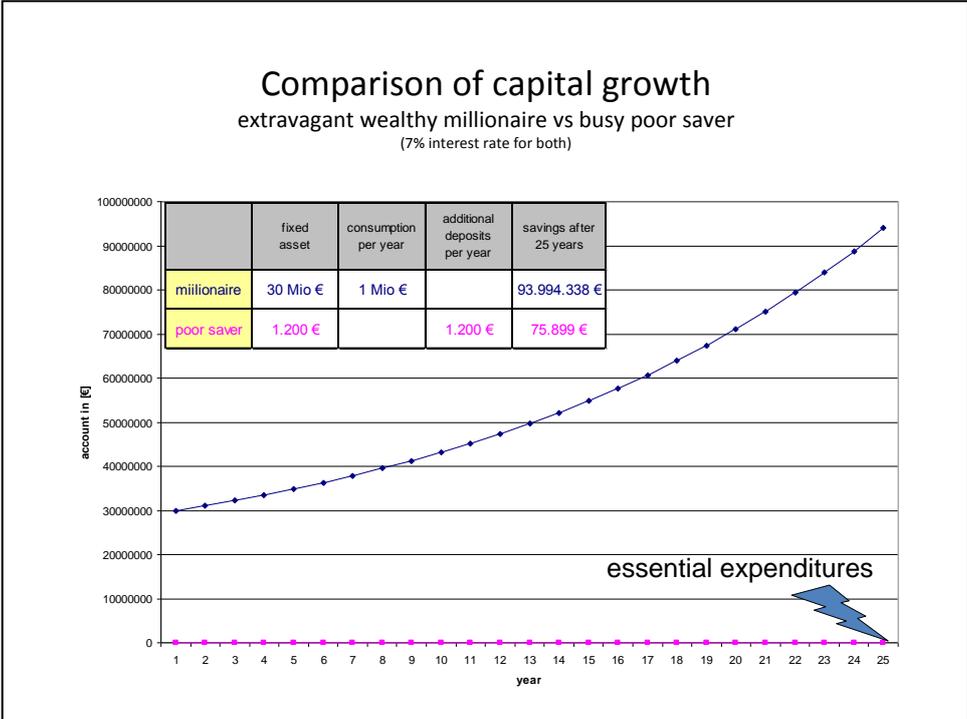


Figure 4 – growth of accounts with different level of starting accounts

Financial investors will have millions or billions at one disposal. The little saver will receive much less money for savings at probably lower interest rates and in contrast to the big money holder he will be forced to consume parts or the complete returns

and savings. Usually the little saver will not be able to keep his savings long enough to become a rich money holder.

Economy is a system of antagonism, meaning that the investments or savings need the counterpart of debtors. As the savings increase also the debts will increase. Subsequently not only the savings of little savers will not grow also the debts distribute themselves into the society and grow like the big investments. It is an automatism caused by the mathematical legality of interest compound.

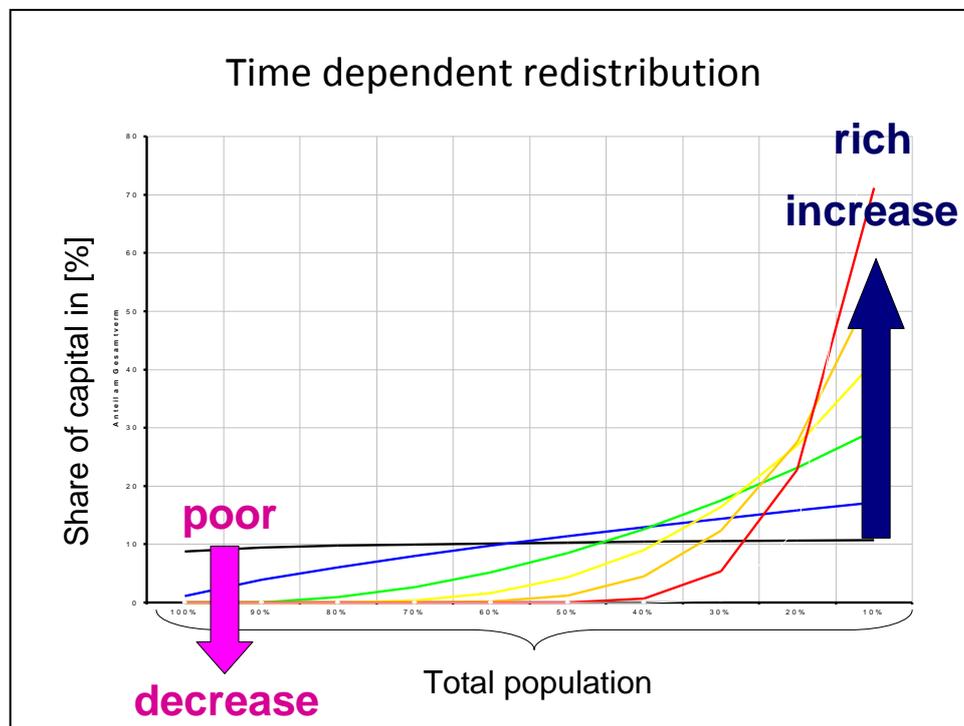


Figure 5 – time dependent movement of money capital caused by interest compound

Without counter measures it leads inevitably to strong inequality of wealth. European history is a succession of wars, civil wars and revolutions. Investigation of causes for these outbreaks of violence would always lead to causal chains where at the beginning can be found receivables, liabilities, someone who want to have or doesn't want to repay something or will be excluded from wealth or even from the means to survive will be found.

It is self-evident that a concentration of money capital will subsequently lead to an accelerated concentration of productive capital. Business cycles shift more and more from local to global dimensions and local business cycles will be eliminated. These changes can be observed very well in current time. From a perspective of entrepreneurs is the concentration of productive equipment is driven by cost reduction based on automation. The increase of productivity based on technological progress replaces handwork, which leads to an oversupply of manpower. This oversupply brings down the income of workers and makes workers increasingly unnecessary. Nobody wants to miss the technical progress but social progress cannot follow in the way that unemployment is an increasing phenomenon of modern times and global dimensions. Unemployment or low incomes exclude from wealth and can be seen as a modern form of exploitation, which likewise accelerates the concentration of wealth.

- **Coercion of growth**

As already mentioned and seen from a perspective of aggregates, the demand for credits respectively new money is always higher than the available and lendable savings. This leads to a never ending demand for new credits and a never ending growth of the monetary helix. The debtors must be productive to get earnings to redeem the receivables. This transmits the coercion of growth to the tangible real economy. If money is neutral it changes only the prices but not the productivity. Productivity remains on a constant level. But if money is not neutral productivity must increase.

Rich money owners must spend only a small part of their money for consumption. Parts of the money remain in the speculative space. Speculative space means the trading of proprietary rights with less to no impact onto the demand of tangible goods and services. In the times of the theory of "Freigeld" it was called "hoarding of money". This speculative money is not disposable for demand in the real economy and narrows the possibility of earnings for the side of debtors. Debtors must increase their efforts to redeem the receivables. If debtors don't want get insolvent they are coerced to increase their supply, because a decline of demand leads inevitably to insolvencies. It corresponds with the experience of companies, if they don't grow in a long term view, they can't survive. As more money flees in the speculative space as less is money neutral. The less money is neutral as more necessary becomes the growth of economy.

- **Coercion of capitalization**

To earn profit now is better than to get the same profit in the future, because in the meantime the earned money will generate additional profit through interests. This leads to a rather short term thinking and trading, as we can observe it obviously on the behaviour of financial markets. The focus shifts from the utility of real goods and services rather to the extent of accounts. Thereby it strongly influences economical and subsequently also political decisions and assist the coercion to growth in the way to accelerate all kind of business and transactions.

From the viewpoint of a peaceful respectively sustainable society interest is a strong burden. From the viewpoint of return on investments it is a sainthood or sanctuary. It is almost impossible to question interest, because interest possesses absolute compliance in most societies. On the other hand it would be a missed opportunity to bypass thoughts on the issue of interest. One method of resolution the effect of reconciliation which will be given in the interaction of the FOREX and a protected and neutralised currency area, described in the essay model of a neutralised currency and exchange system for central banks<sup>1)</sup> can be seen. It allows a transaction between interest based and interest free national currencies, as it would be especially helpful for heavily indebted poor countries.

## The nature of financial crisis

We can assume that problems can occur on the right end of the monetary time beam as we have seen in the recent financial crisis. The continuous growth will lead inevitably to boundaries. Boundaries in the financial system are reached, if debtors can't follow any longer the claims of the creditors.

If the system would aspire to avoid crises, we would have a self-regulating monetary system which always gets into equilibrium between supply and demand, means the interest rate should move towards zero if we reach boundaries of growth. It would be the shift into a monetary system of "Freigeld". However the shift of aggregated interest rates to zero for non banks cannot be observed in real life!

The targets of the financial markets are not to reach always equilibrium between supply and demand. The targets are to get the maximum of return on investment. It is the philosophy of the market, the philosophy of the so called "homo economicus". These two elements, equilibrium of supply and demand and the maximum return on investment are not contradistinctions but they are also no complements on another.

Corporations of the private sector which are only active in the financial markets, not producing goods or services but only trading money and non tangible assets doing at last nothing else than lend and borrow money. The returns will be created by the spread between the interest rates of the borrowed and the lent capital. As these companies manage most parts of world money, as also referring to the monetary helix of growth, they do nothing else than creating new money and debts. Maybe they do it unconsciously, but the trading processes of the recent financial crisis and current Euro crisis show that the financial markets are very creative in finding ever and again new ways to use the means of leveraging for money creation out of public control, strongly supported by the possibilities of off-shore financial places. Spoken in a more abstract sense, they constrain the shift of the boundaries of growth to higher values and increase thus the pressure onto the aggregated side of debtors. We had to learn that the financial markets use their capital in order to dominate public and political opinions and thus they will be enabled to influence decisions of the society strongly. But at last reality of boundaries cannot be outfoxed.

The economy of money is only indirectly connected with the tangible economy by prices and credits. Thus the demand for money might grow differently to the demand for goods and services. The philosophy of homo economicus, the perspective of individuals to invest in the best returns is rational and social consensus. But both aspects together override the effect or theory that economy always aspires equilibrium. Accordingly the growth of money stock will be determined by the coercion to refund the debts including the surplus of interest, but trade in the real economy is determined by supply and demand. It does not allow for a direct correlation between the demands of money and tangible economy.

Productivity on debtors side respectively the coercion to earn money in a saturated economy is mainly determined by demand and available purchasing power. Money in real business is more likely to run short, since it always is a narrow good. Indeed there is money enough on the market, but it is unequally distributed. It cannot find its way to the demand in real economy, because it remains in the speculative space of financial markets as a result of its concentration. On the contrary, in a long term

consideration this concentration leads to a movement of the boundaries to lower levels. Boundaries will be reached, if debtors can't follow the claims of the creditors any longer. To exceed boundaries means to have a strong increase of insolvencies on the aggregated side of debtor. Accommodation of loans might come to a halt. Subsequently it further narrows money supply and will aggravate the pressure onto the aggregated side of debtor. A downhill helix of insolvencies arises. Bottom is reached if most of the insolvencies are transacted. Part of the debtors must move into poverty. These are lost as supporters of economical demand which subsequently leads to this shift of boundaries to lower levels. We call this a crisis.

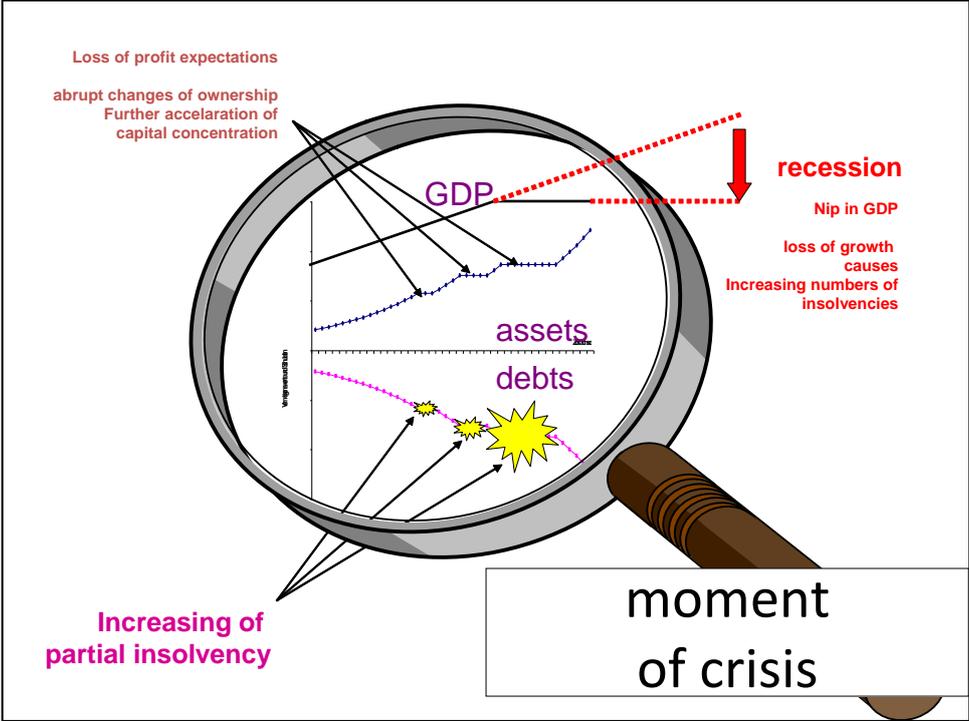


Figure 6 – effect of deflationary crisis onto the curves of the monetary time beam

Gross domestic product decreases and money supply comes to a halt, because creditors fear to lose their investments. This should be visible on the monetary time beam as a movement into a horizontal line on the side of assets. It might lead to violence, if these events threaten the existence of a large proportion of society. Many wars, civil wars and revolutions in world history testify that this happens again and again. But in contrary to former times, due to modern weapons, we have the capability to redevelop back into a civilisation of stone ages. Thus it should be advised to take care of our monetary system in a more human sense.

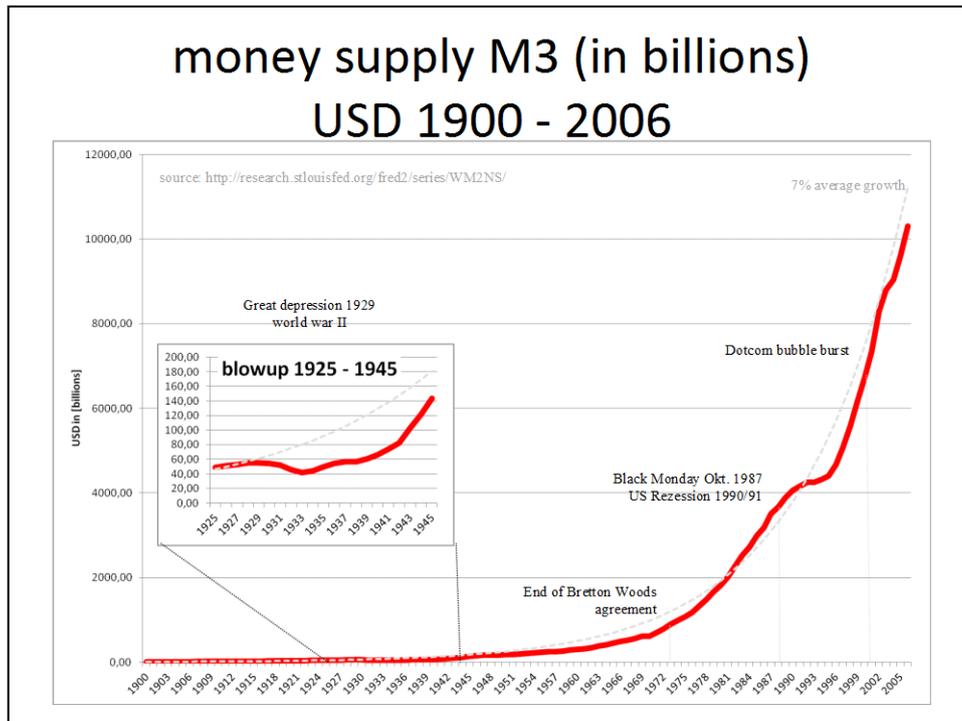


Figure 7 – money supply M3 of currency US Dollar from 1900 to 2006

Figure 7 shows money supply of aggregate M3 of the US Dollar. The drawn line shows the real money supply of the US Dollar. The dotted line shows a hypothetic exponential curve with 7% growth per year. It is astonishing how the growth of US-Dollar corresponds to the exponential curve. This line is interrupted by horizontal steps in times of crisis, like great depression 1929 followed by world war 2, US Recession of 1990/91 and Dot Com crisis in 2000. The record stops in March 2006, so we have to switch onto the EURO

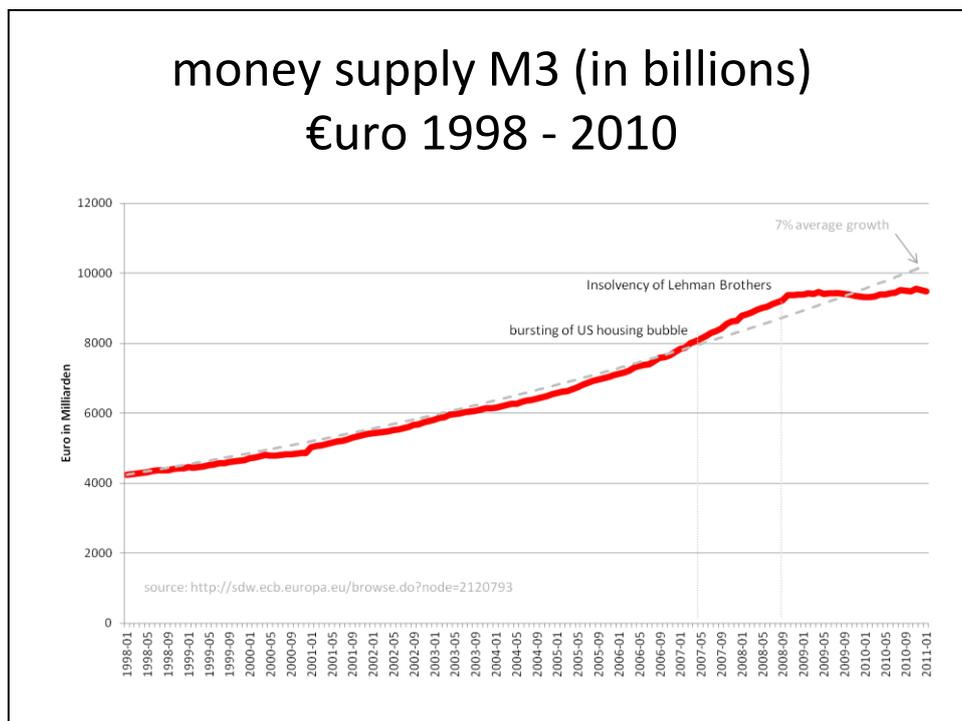


Figure 8 – money supply of currency EURO from 1998 to 2010

Figure 8 shows the money supply of aggregate M3 of the Euro currency. Again the drawn line shows the recorded money supply and the dotted line a hypothetic exponential curve with 7% growth per year. Also the currency Euro grows equally to an exponential curve and becomes a horizontal line as the recent crisis in 2008 started.

Both figures shows, that money supply growths astonishingly like an exponential curve, meaning the growth is strongly forced by something like an aggregated interest rate. This aggregated interest rate respectively return on investment, is somewhere around 7% per year for developed and saturated countries like USA and countries of Western Europe. It seems to be the maximum gain which can be taken out of developed economies without causing a quick breakdown of these economies. But the horizontal steps in these curves confirm that this monetary system is not fully stable and might lead to bigger events on the right side of the monetary time beam. At times of deflationary crisis the curve of money supply shifts into a horizontal line, which means that the growth of money supply stagnates. This is comprehensive because creditors stop to lend money as a result of unsafe times. If creditors don't lend money, they can't earn money by interest and the growth of money supply must shift close to zero. Contrary to the statement of many orthodox economists, low interest rates do not inevitably lead to a higher demand of money respectively growth of money supply. It seems to be that this tenet is not applicable during deflationary crisis like the last one.

Definition of deflation as above described means that the growth of money supply does not benefit purchasing power of a large proportion of society as a result of capital concentration. The more people must move into poverty the more purchasing power decreases. Decreasing purchasing power also means decreasing demand and decreasing demands leads to decreasing prices. We can assume deflationary tendencies in a long term consideration, if inflation of prices increases slower than money supply grows.

In an economy with an interest based legal tender the optimum of stability is achieved, if inflation grows equal to money supply. In this case it can be assumed that money will become neutral.

Hyperinflation occurs if money creation is bypassed by credit creation on a much higher level of growth as it take place by common credit creation in the private sector of the considered economy. For example if central banks start to directly finance new public indebtedness on a level which is continually much higher than the growth of money supply.

Unique is the superneutralised currency and exchange system of ANNA which is free of inflation and deflation<sup>4)</sup>.

## **Aggregated total debts as the reflection of money supply**

Total debts consist of public debts and debts of the private sector. The private sector is distinguished in debts of enterprises and debts of private persons. All money with interest must be lent to get returns. The return must be paid back by the debtors, which have to work for it, described with the idiom “money must work”. Thus the growth of money supply and the growth of debts are directly connected. As money supply grows in an exponential shape also the aggregate of total debts must follow inevitably this growth and shape.

In this context, public debts have an exceptional position. Since centuries it is common practice that maturing liabilities will be replaced through new indebtedness. This leads to a visible exponential growth of public debts. This is contrary to debts of the private sector where the debts of individuals accrue and disappear. It deceives, because the aggregated debts of the private sector grow also like public debts.

The current mainstream paradoxically discusses only public debts. Theoretically it is possible to separate public debts from the total debts in order to reduce particular public debts. But if society wants to have a growth of capital assets and growth of money supply is unsolvably connected with the growth of debts, parts of the public debts must be taken over by private sector.

In an interest based monetary system we don't have the choice to reduce the aggregate of total debt, but we have the choice between public sector and private sector to generate the debts. Depending on the grade of public evolution, rather for a highly sophisticated and democratically controlled administration than for a corrupt administration of undemocratic character, the public sector will try to return all revenues of taxes and indebtedness into public services which support the efforts to keep the social classes in equilibrium of prosperity.

From the perspective of a highly sophisticated public administration indebtedness is in the sphere of an interest based monetary system an important part of public revenues. A reduction of public debts leads to a reduction of public services. Consequently two options are given, to renounce on parts of the public services or private sector must take these parts over. But certainly the private sector will only take over in cases of profitability. Thus unprofitable services must be done by voluntary work and charity as it is common for informal or non profit oriented economical systems. For example non profit oriented behaviour ensures survival of large parts of population in strongly underdeveloped economies. Underdeveloped economies can also be seen as an equivalent for underdeveloped public administrations.

The financial markets are keen on the profits which can be generated as a result of the shift from public to private debts, but public should be aware that these debts must also be refunded if they shift to structures of private ownership. This refunding happens through payment of the particular use of now private services.

One advantage of refinancing public mutual liabilities by new indebtedness on the financial markets is that these are investments of money holders into their own returns. Advantages for the investors are that they spend their money in save bonds. Thus they invest directly and will use indirectly the benefits of a functional

respectively better public infrastructure. Advantage for the public is beneath the better public infrastructure that parts of the speculative money move temporarily back into the circulation of the real economy.

It is neutral in costs for the public, if growth of new indebtedness is equal or higher than the aggregated interest rates for the payable public debts. Contrary to this, if public debts will be reduced it is a shift of debts into the private sector which after all must also be paid back, only the distribution of payments is different and probably more inequitable.

If the refinancing of new indebtedness includes besides the aggregated interest rates of the payable public debts also the inflation rates then the public revenues are neutral for money circulation. The growth of new public indebtedness will be close or equal to the growth of money supply. A temporary increase of new public indebtedness above the increase of money supply should be possible without dangers for the stability of the value of money, but a continuous increase of indebtedness would inevitably lead to hyperinflation.

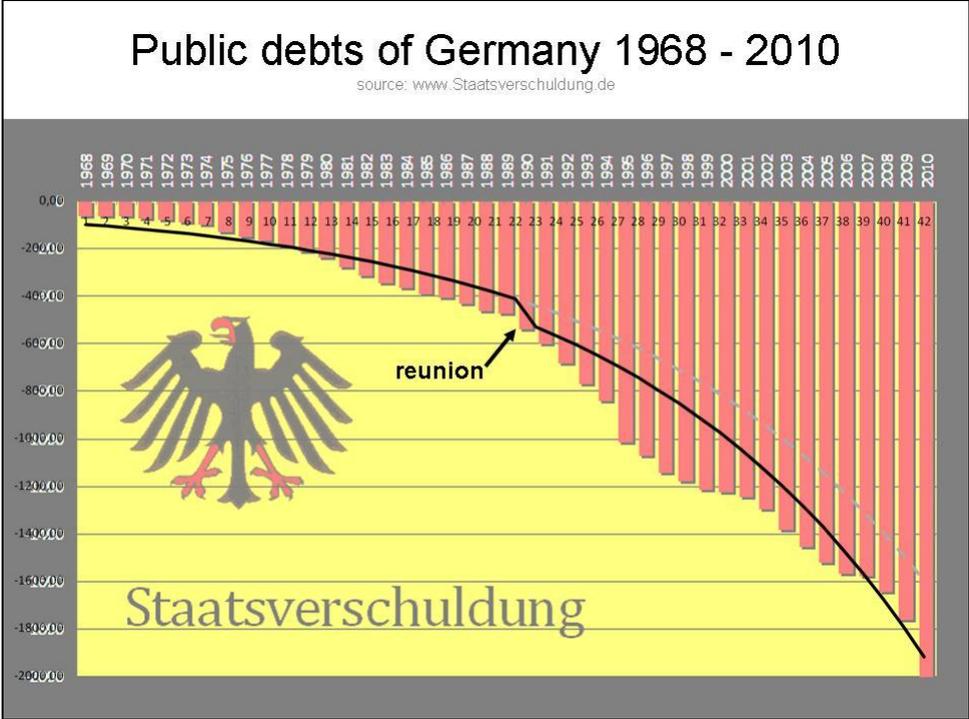


Figure 9 - public debts of Germany from 1968 to 2010.

The German words for debt and to be guilty are very close in their meaning. Germany had very bad experience with the hyperinflation 1924, as well as with the great depression 1929, whereas the public meaning does not distinguish sharply between the two events and their causes. Sometimes this period will be considered as a time of hyperinflation. Thus inflation is strongly feared. Preferably the causes of inflation will be explained as an unthrifty receiving of public debts. So it is common for nearly all German politicians also from the very start after world war 2 to promise the reduction of public indebtedness. Thus it is improbable that the German public and government tend to accept irresponsible issuance of treasury bonds. From this perspective and considering the growth of German public debts form the very start of the records in picture 9 all German governments would have been failed. But if we also consider the dotted line which is a hypothetical curve of 7% growth with a step in

the period of reunion and assuming that it complies with the average growth of money supply at this period, German public debts grew correctly along the neutral line where the debts and money supply grows comparable. Accordingly the costs for debts were neutral and the revenues constant.

German parliament has put a law (Artikel 109, Absatz 3, Grundgesetz) into the basic constitution, called debt retardant which in sense is a commitment to reduce new indebtedness to zero. It can be doubted that Germany will fulfil this commitment without causing big trouble in German economy and society.

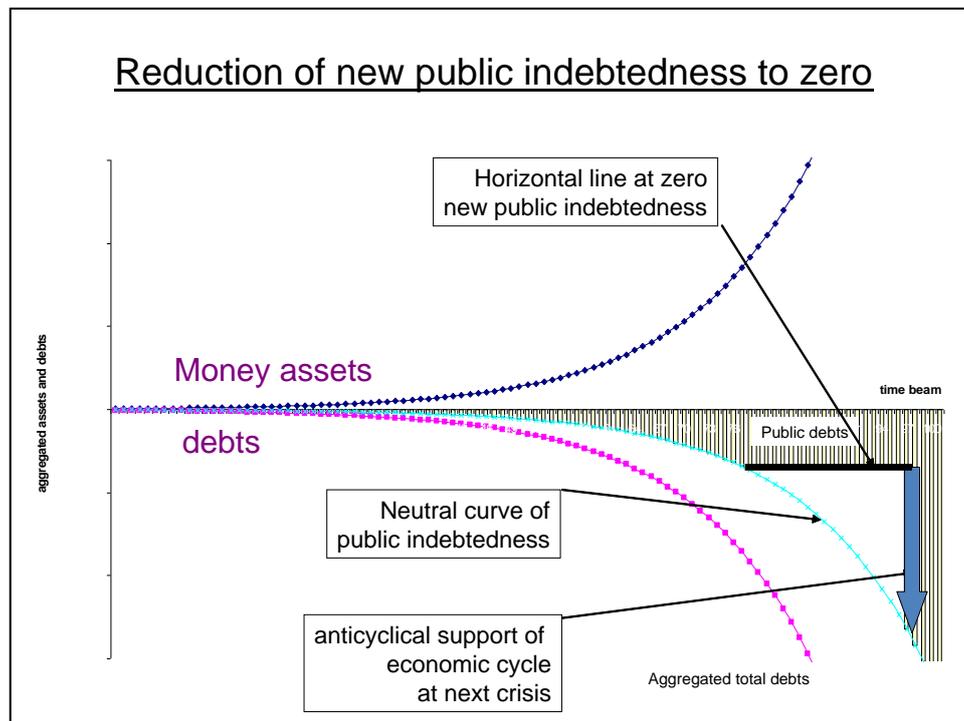


Figure 10 - zero new public debts, curve of public debts shift into horizontal line

In figure 10 is shown what would happen if German government abandon neutral debt curve in accordance to the “debt brake”. As already described a gap arises on the side of debts on the monetary time beam, which must be closed by privatization. We can assume as an experience of the last financial crisis that in a long term consideration the private sector is not able to keep equilibrium of payment stable between creditors and debtors. The public sector must support the private sector to avoid a chain reaction of insolvencies. Furthermore the public sector must substitute the dwindling demand of private sector and interbank transactions. For this private money is needed which subsequently leads to new indebtedness. It derives two possibilities. Either the public sector can try to keep the neutral debt line with the results of high indebtedness or it can try to avoid new public indebtedness on the expense of losing parts of public welfare at least on the same level of indebtedness.

The cause of declining business activities in private sector can be seen in a decline of money circulation as a result of declining trust in market solvency. It interrupts the continuity of lend and borrow money which is the foundation of market solvency.

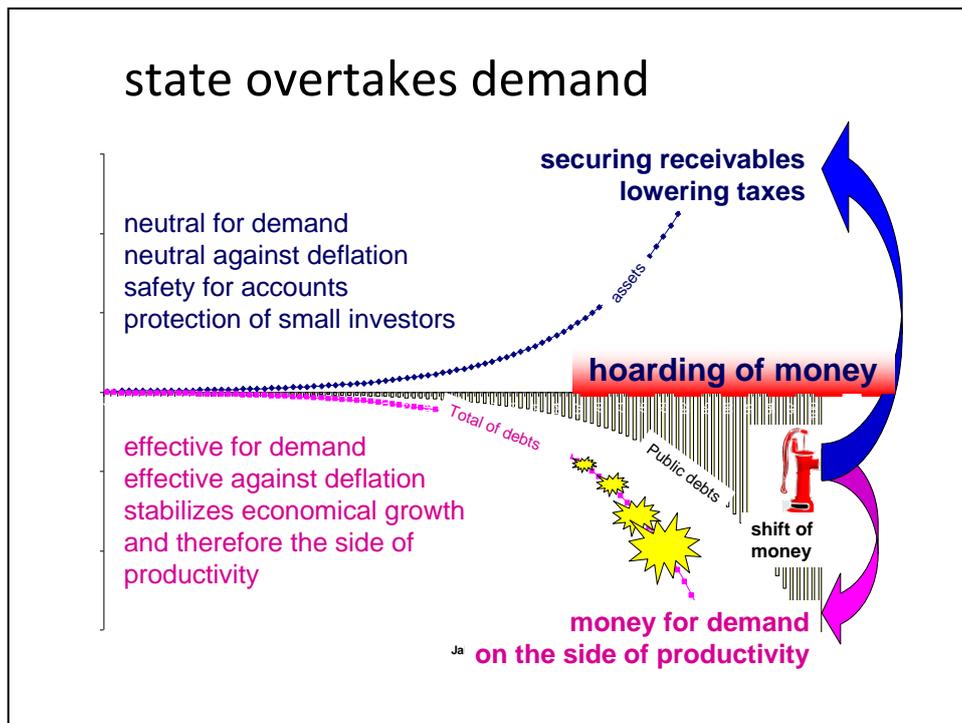


Figure 11 – anticyclical support of business activities

The anticyclical support of business activities by public administration in the way to increase public demand and to provide money for interbank transactions can be seen as an initiation trial to reanimate the circulation of money respectively credits in a deflationary crisis. In an environment of deregulated not indomitable financial markets it seems the only supporting measure which can help to keep the system fairly stable. If reanimation of financial transactions fail it leads to deletion of parts of economical and social order. Usually this is marked as an outstanding historical event.

# Conclusion

The future always allows all opportunities and will be more than ever before affected by human behaviour. Outstanding historical events might be insurrections, revolutions, civil wars, wars or even a next world war. Modern technologies lead to new weapons which endanger human society in a more global scale.

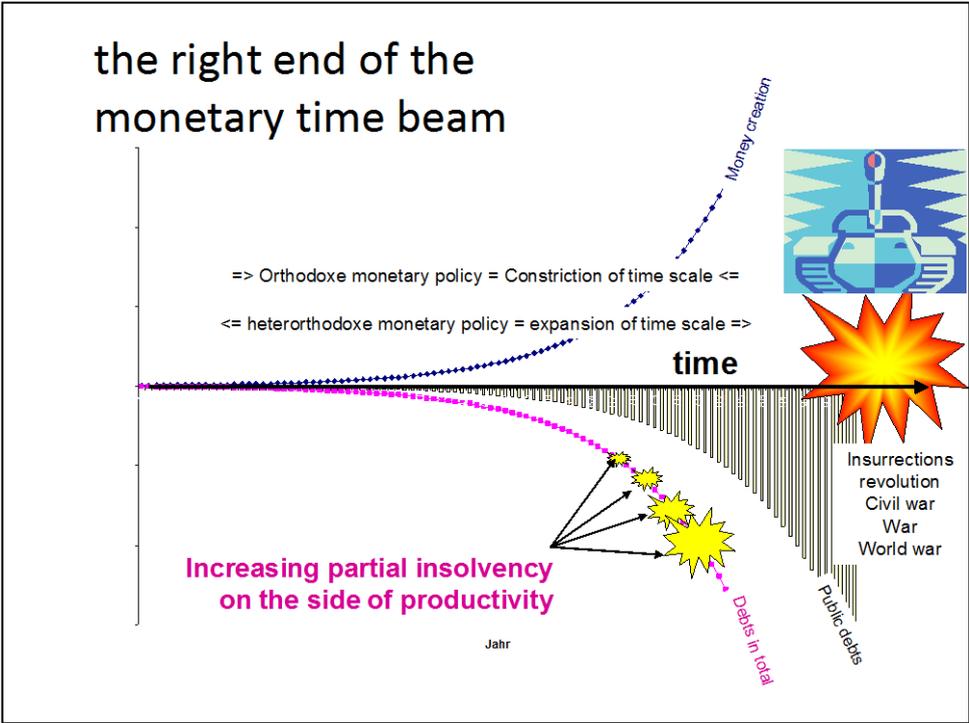


Figure 12 – usual events on the right end of the monetary time beam

Thus it is obviously that it would be extremely lucrative for all to spend some thoughts onto the consideration of our current monetary system and to reconsider the interrelation between each other in a way to reduce the behaviour of self interest and competition and instead consider the others even more as partners and friends. It is lucrative for all to enhance efforts to refine our current monetary system in a sense to serve human life, to domesticate capitalism.

One approach to reach this target is the idea of a neutralised currency and exchange system, a superneutralised global reference currency ANNA<sup>4)</sup> surrounded by complementary currencies of different tasks<sup>5)</sup>. This design would lead to the effect of reconciliation which balances discrepancies in monetary transactions and prosperity between currency areas. One further advantage of this approach is that it can be implemented parallel to the current FOREX. It allows the implementation of a preliminary currency area in a small scale to develop this deductive approach in advance through experience without disturbing the big business<sup>5)</sup>. It succeeds if this currency area based on this superneutralised global reference currency ANNA grows.

Nevertheless, the stabilisation of our monetary system in a more human sense does not solve all problems, but it is an important foundation that we can domesticate capitalism, to lead world society to a new substantial progress.

## Appendix

1. Silvio Gesell (\*1862 +1930): Die Natürliche Wirtschaftsordnung durch Freiland und Freigeld, (published by Gauke, Kiel SBN: 978-3-87998-421-3)  
<http://userpage.fu-berlin.de/~roehrigw/gesell/nwo/>  
Werner Onken: Silvio Gesell und die Natürliche Wirtschaftsordnung. Eine Einführung in Leben und Werk, ISBN 3-87998-439-5  
Margrit Kennedy: Interest and Inflation Free Money  
(Published by Seva International; ISBN 0-9643025-0-0;) or  
<http://userpage.fu-berlin.de/~roehrigw/kennedy/english/chap1.htm>
2. Geoffrey Ingham: The Nature of Money  
(published by Polity Press, Cambridge; ISBN 0-7456-0996-1)
3. Hans Christoph Binswanger. Die Wachstumsspirale  
(published by Metropolis-Verlag; ISBN 978-3-89518-783-4)
4. availability of the essay “model of a neutralised currency and exchange system for central banks - part I introduction “ at  
<http://www.slideshare.net/SehrGlobal/model-of-a-neutralised-currency-and-exchange-system-for-central-banks>
5. availability of the essay “model of a protected currency area for developing countries - part II application“ at  
<http://www.slideshare.net/SehrGlobal/model-of-a-protected-currency-area-for-developing-countries>
6. reference list of figures
  - a. Figure 2 – the helix of monetary growth  
(published by Arbeitsgruppe gerechte Wirtschaftsordnung /AG\_GWO)  
<http://ag-gwo.de>
  - b. Figure 7 – money supply M3 of currency US Dollar from 1900 to 2006  
datas of money supply M3 via  
[http://www.nowandfutures.com/articles/20060426M3b\\_repos\\_&\\_Fed\\_watching.html](http://www.nowandfutures.com/articles/20060426M3b_repos_&_Fed_watching.html) onto source  
<http://research.stlouisfed.org/fred2/series/WM2NS/>
  - c. Figure 8 – money supply of currency EURO from 1998 to 2010  
data of money supply on source:  
<http://sdw.ecb.europa.eu/browse.do?node=2120793>
  - d. Figure 9 - public debts of Germany from 1968 to 2010  
background picture respectively curve of public debt data for Germany:  
[www.Staatsverschuldung.de](http://www.Staatsverschuldung.de).

7. list of own created figures - see also  
<http://userpage.fu-berlin.de/~roehrigw/brass/Praesentation.pdf>  
<http://userpage.fu-berlin.de/~roehrigw/brass/Finanzmarktkrisen.pdf>
- a. figure 1 - fractional reserve banking; The finitely growth of money if reserve level is constant
  - b. Figure 3 – monetary time beam
  - c. Figure 4 – growth of accounts with different level of starting accounts
  - d. Figure 5 – time dependent movement of money capital caused by interest compound
  - e. Figure 6 – effect of deflationary crisis onto the curves of the monetary time beam
  - f. Figure 10 - zero new public debts, curve of public debts shift into horizontal line
  - g. Figure 11 – anticyclical support of business activities
  - h. Figure 12 – usual events on the right end of the monetary time beam
8. see also the following blog: <http://www.sehrglobal.blogspot.de/>

## Acknowledgment

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