

The central bank's dilemma, the inflation-deflation paradox and a new interpretation of the Kondratieff waves

*El dilema del Banco Central, la paradoja inflación-deflación
y una nueva interpretación de las ondas de Kondratieff*

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Abstract

The article tries to contribute to a new understanding of how money is created by commercial banks and to describe the dilemma, which after some time, every Central Bank within the fractional reserve banking system faces. This dilemma provides an explication for the politics of “cheap money” that has been applied by Central Banks of almost every industrialized economy during the last years, despite the fact that the money supply has reached unprecedented levels. This context is then used to describe what might be called the “Inflation-Deflation Paradox” and to offer a new interpretation of the long economic cycles, the so-called Kondratieff waves.

Key words: Fractional reserve banking; money multiplier; financial crisis; Kondratieff waves.

Resumen

El artículo tiene como objetivo proponer una nueva comprensión de cómo el dinero es creado por bancos comerciales y describir el dilema que, después de algún tiempo, todo Banco Central en el sistema bancario de reserva fraccional enfrentará. Este dilema ofrece una explicación de la política de “dinero barato” que ha sido aplicada por los bancos centrales de casi todas las economías industrializadas durante los últimos años, a pesar del hecho de que la oferta de dinero ha llegado a niveles sin precedentes. Posteriormente, se utiliza este contexto para describir lo que podría llamarse la “paradoja inflación-deflación” y ofrecer una interpretación nueva de las ondas largas de Kondratieff.

Palabras clave: Banca de reserva fraccionaria; multiplicador de dinero; crisis financiera; ondas Kondratieff.

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1. Introduction

The US Federal Reserve Bank and the European Central Bank (ECB) have been criticized for their policies of “cheap money” in the last decade. Recently, the ECB once again has lowered its key interest rates and announced measures to support lending to the real economy. Why do central banks of most industrialized countries have historical low interest rates despite the fact that money supply is growing on a faster rhythm than production in their respective economies? Why do central banks fear deflation even when money supply reaches unprecedented levels? Is there a connection between the sub-prime crisis of 2008 and the actual European debt crisis? Is the situation on financial markets today comparable to what happened during the Great Depression of 1929? How can we explain that price bubbles in investment markets go hand by hand with deflationary tendencies in consumption goods markets? Why are high interest rates usually seen during periods of economic boom, although the IS/LM model predicts the contrary correlation? To answer these questions and the question of what effects the money interest rate has on money supply, we must first understand what money is and how it is created. Milton Friedman once pointed out that the creation of money is not fully understood by many including experts (Friedman, 1971) and this seems to be true until today (for the discussion *e.g.* Löhr, 2011). Many experts do not recognize that financial crises, which on regular basis strike the economies, are a direct consequence of how the financial system is designed and this is most probably due to this misunderstanding.

The article first describes how money is created in the so-called fractional reserve banking system and highlights some problems associated with this form of money creation. The understanding of what money is and how it is created will offer a new understanding of how interest rates affect money supply, which in turn will contribute to understand financial crises and economic cycles.

The paper is organized into six sections. Section 1 introduces the paper and its premise while section 2 discusses the fractional reserve banking system, debt and financial crisis. Section 3 summarizes the

effects of the money rate of interest on money creation. In section 4 we describe the inflation-deflation-misunderstanding and provide some theoretical explanations. Section 5 looks at the 1929 economic depression, the sub-prime crisis of 2007-2008, and the euro crisis. The final and last section 6 highlights the main conclusions of the paper.

2. Problems associated with fractional reserve banking

2.1. Money is created by debt

Most people are virtually convinced that money is created by the Central Bank. This is only true for a very small amount of the total money supply in the so-called fractional reserve financial banking system. Under this system, most of the money supply is created by commercial banks through lending. How money is created in the fractional reserve banking system will briefly be explained, since it is necessary to understand the inherent problems in the financial system, which is dominated by fractional reserve banking. Let us suppose that someone who possesses 100 € puts this money as deposit in a bank, henceforth referred to as “First Bank”. The bank will then lend this money to its customers, holding back just a fraction of the original amount as a reserve. Banks cannot lend all of their obligations, but rather have to hold some cash because there will always be customers who want to withdraw their money. Let us suppose that First Bank decides to hold a reverse ratio of 10%, meaning that it will lend 90 € to one of its other customers, while the original 100 € are still available in the cash account at First Bank. The borrower of the 90 € will spend the money somewhere, maybe he will buy a new cell phone. The vendor of the cell phone takes the money and puts it in the cash account of her bank, henceforth referred to as “Second Bank”. At this point, the original amount of 100 € has grown to 190 € (see Figure 1). The Second Bank will probably do the same as First Bank did: it will lend the money to its clients holding back just a small reserve, which makes the money supply (the monetary base, deposits and other debt titles) grow further. And the process continuous in the same way until there is no more money to lend. This mechanism of money creation

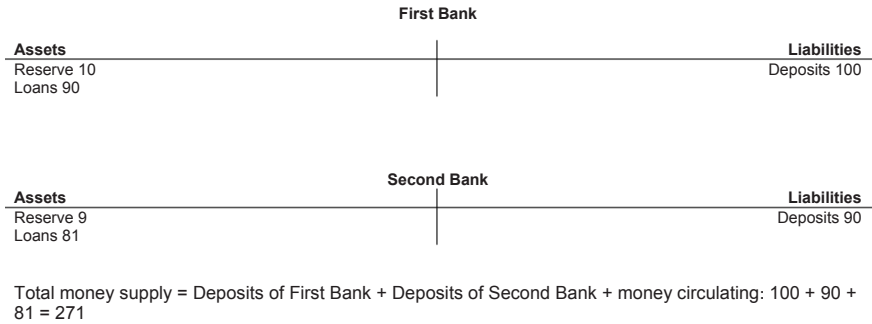


Figure 1. Bank accounts (Under the Fractional Reserve Banking)

in the fractional reserve financial system is called the *money multiplier* (Mankiw, 1998; Stiglitz, 1998; Larroulet and Mochón, 2003). Less known are the implications of this form of money creation.

2.2. Financial crisis

In the simplified description above, interest was kept apart. Taking into consideration that loans are not free of charge we can understand why the fractional reserve financial system, which is the prevailing financial system in almost all economies in the world, destroys itself at regular intervals. The fact that the fractional reserve banking system leads to crisis was recognized by Irving Fisher and Nobel laureate Frederick Soddy who proposed a financial system with a 100% reserve (Fisher, 1935, 1936; Daly/Farley, 2004)¹ and this idea is becoming famous again (Huber, 1998). Financial assets double themselves in accordance with interest rates through interest and compound interest in approximately 10-15 years,² following an exponential function (see Figures 2 and 3). This means that even the fastest calculator in the world will someday no longer be able to keep up with the resulting interest burden for lack of zeroes. This is the logic of an exponential function (Kennedy, 1990; Creutz, 1993; Müller, 2009; Fuders, 2010; Azkarraga *et al.*, 2011; and Lietaer *et al.*, 2012).³ Less can an economic system in the long run achieve enough economic performance to satisfy the demands of compounding interest (Daly/Farley, 2004).

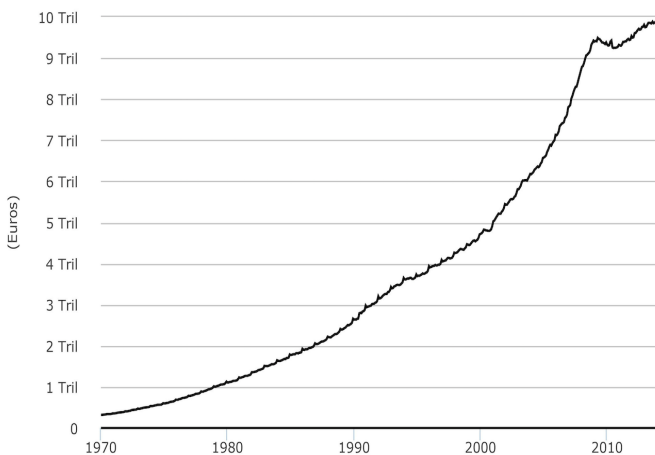


Figure 2. M3 Euro. Source: International Monetary Fund and OECD.

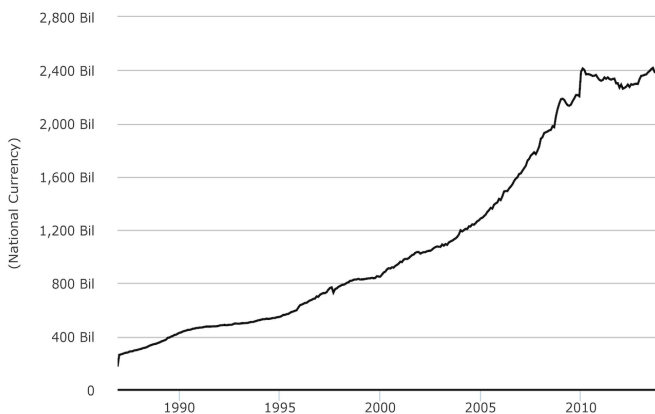


Figure 3. M3 British Pound. Source: International Monetary Fund and OECD.

It is the debtors taking loans who yield the interest banks pay on deposits held in the bank. Banks therefore do not only struggle to again lend out amortized loans as soon as possible to new customers in order to keep the volume of money loaned out and thus the payment of interest upright. They must also steadily expand the volume loaned out because the interest-bearing deposits grow too. The longer a financial

system exists and the greater the total debt volume already is, *i.e.* the more households, businesses and government already are saturated with debts, the more difficult it is for banks to continue to expand the debt volume. In their struggle to find new debtors, banks therefore begin to lend money even to those borrowers with questionable solvency and at low interest rates, as was happening in the U.S. until 2008 in the mortgage loan market and as is still happening up to this day in Europe with loans to governments, loans which are most recently backed up by “rescue funds”. Here we can already divine why the so-called sub-prime crisis and the Euro-crisis are not two different, but one and the same crisis: the financial system is once again close to its collapse.⁴ The system collapses when banks do not find enough solvent debtors to be able to yield the interest banks are obliged to pay on deposits. The last time this happened on a greater scale was 1929 and it might be repeated soon.

Figures 2 and 3 plot the growth of money supply in the UK and the Euro area. It is clearly recognizable that both seem to follow an exponential function until 2008. The reason why in both cases from 2008 forth the growth slowed down is most probably due to the fact that prime rates were put close to zero %. Section 3 will provide a more detailed discussion of this phenomenon.

2.3. Debts, inflation, and speculation

Growing bank deposits on one side oblige banks to grant more loans on the other side. Since, as was described above, money in the financial system is created through lending, money supply will grow accordingly to the sum of total debt. The US Federal Reserve Bank has not been making the money supply (M3)⁵ public since 2006 (Federal Reserve, 2006), and for a good reason. People otherwise might notice that the money supply is growing considerably more quickly than the productivity of the US or even of the world economy (Hamer, 2004).⁶ However, if the money supply grows faster than the production of real goods, according to Irving Fisher’s famous equation of exchange (Fisher, 1963) inflation will be caused, even though at first only partially, namely in the investment markets. Here, it is possible to find the cause of the stock –and real estate– bubbles, and of the resulting financial crisis of

2008. However, these price bubbles are not recognized as inflation since, the main measure of inflation, the Consumer Price Index is measured solely by consumer goods and food markets. Price bubbles in capital markets could therefore be described as a form of “partial inflation” (Fuders 2010; Fuders and Max-Neef, 2012; and Azkarraga *et al.*, 2011). Prices do not grow because of speculation itself; instead speculation is a symptom of an ever-growing money supply seeking to be invested. This point will be discussed later.

2.4. Economic growth constraint

Now we can understand why all industrialized nations, as well as those wishing to become so, are striving for economic growth (Hankel 1972; Teichmann, 1983; Kennedy, 1990; Creutz 1993; Fernández *et al.*, 2006; Cuadrado *et al.*, 2006). Production must increase every year in order to pay for the growing bank interest. Consequently, the ever expanding (credit) money supply results in the growing percentage of borrowed capital in the balance sheets of most businesses as well as in the growing national debt and the increasing indebtedness of households. The fact that many companies work harder to serve the borrowed capital than for their own benefits was pointed out by Suhr (1988). Even companies not financed through foreign capital are not free from being forced to achieve a return as high as the interest on borrowed capital. Otherwise, the opportunity costs make production maintenance appear senseless (Suhr, 1988). This is probably the reason why some groups earn huge parts of their annual profits through financial investments rather than production of goods.⁷ Also households, which are not indebted, are held to increase their income steadily, because prices of consumer and capital goods continue to grow by inflation and by the portion of interest contained in prices. This is not a small sum. It was asserted that prices compound 30-50% of interest (Kennedy, 1990) and this proportion increases with the increasing proportion of debt in the balance sheets of companies. Hence, neo-liberal greed is inherent in the system. In this sense John Maynard Keynes remarked that the various objectionable features of capitalism could be overcome by reducing the marginal efficiency of capital to zero (Keynes, 1936).⁸ The problem is that demand

and production cannot be increased indefinitely, because there is no unlimited growth due to *limited resources* in nature, a fact that *Aristotle* also pointed out long ago (Aristotle, 1995, 1256b).

3. The effect of the money rate of interest on money creation

3.1. Checkbook money creation vs. interest money creation

Many are hardly aware that it is the money-interest rate that obligates banks to steadily increase the amount of loans, causing the money supply to also expand steadily and, above all, independently of the performance of the economy or the real productivity level of the economy. Therefore, it is not recognized that financial crisis, inflation, speculation, and also GDP-growth-imperative are secondary phenomena of the financial system (Kennedy, 1990, 2011; Azkarraga *et al.*, 2011; Creutz, 1993; Fuders, 2009, 2010; Fuders and Max-Neef, 2012).

Indeed, there are two factors that cause the money supply expansion: the *money multiplier* factor –the *checkbook money creation*– and the *interest rate* factor. That is to say, even if all loans in an economy were to be paid back, the money supply would not completely decrease to its original level of pure central bank money since deposits would have grown from interest. This second, less-known effect could be called *interest money creation* and goes along with the first one. One might ask where does the extra money used to pay interest come from if the amount of central bank money did not increase. The answer is that it can only come from a new loan, which in itself brings along the obligation to pay interest. Thus, it is impossible that everyone in an economy based on the current financial system amortizes his or her loans. Someone always has to be indebted and this is why both effects go hand by hand. In other words, the interest paid on one side must lead to debt on the other, since there is no interest without debt and vice versa (Lietaer *et al.*, 2012).⁹

As simple and compound interest make deposits grow exponentially, meaning slowly at first but ever faster with time, the problem is not recognized at the beginning and that might be the reason why it is quite regularly not mentioned in textbooks explaining the checkbook money

creation (Mankiw, 1998; Larroulet and Mochón, 2003). The longer a fractional reserve banking system exists, however, the stronger seems to be the effect of the *interest money creation rule* because, as mentioned earlier, the money supply increases through interest in an exponential manner, *i.e.* first slowly and then ever faster.

To clarify, the money-multiplier effect that expands the money supply through lending is not the reason for the exponential growth of money supply (see also, Creutz, 1993). The reason for the continuous and exponentially growing amount of money in circulation is the compounding interest, which compels to ever expand the credit volume and thus the creation of money (see also, Lietaer *et al.*, 2012). The higher an interest rate is, the faster bank deposits grow. As a result, banks are forced to lend more, since they must earn money to pay for the interest. This is why the interest-earnings on one hand must automatically lead to a rise in total debt on the other hand. Here, ancient *Aristotle* had recognized that the sum of all interest earnings in an economy has to be exactly equal to the interest obligation of the debtors (Van Suntum, 2005).

3.2. The Central Bank's dilemma: An explanation for the low interest rates in developed countries

Every Central Bank within a fractional reserve banking system sooner or later will face a dilemma: the interest money creation rule comes into drive, the higher the interest rate is. However, the money multiplier effect (checkbook money creation) is slower, the higher the interest rate, because expensive loans sell less well than cheaper ones. Thus, increasing the interest rate has a *precisely opposite* effect on the interest-money creation than on the money multiplier. It can be assumed that in the medium to long-term, the interest money creation effect *outweighs* that of the checkbook money creation, *i.e.* the rate at which the money supply grows is then directly proportionate to the interest rates. Therefore, in the long run, low interest rates slow down the growth of the money supply while high interest rates speed it up. In the case that money supply reaches unprecedented levels, as is the case in most western economies right now, textbooks teach us that the Central Bank

must raise the prime rate to slow down lending. But higher interest rates mean that banks pay more interest on deposits and are therefore forced to lend out even more, *i.e.* to increase the amount of loans, which is even more difficult if loans are expensive.

This leads us to interpret the low interest rates in most western economies in a new way. The Federal Reserve Bank (the Fed) and the ECB have been criticized for their politics of “cheap money” in the last decade. It is likely that the dilemma described above is the true reason for the low interest rate policy of Central Banks in most industrialized countries during the last 15 years, not (only) the avoidance of a credit crunch.¹⁰ Low interest rates attenuate the problem which faces every bank in a fractional reserve financial system in the long run: the difficulties to find debtors who earn and pay for the interest which have to be provided on ever-growing deposit accounts. That is to say, on one hand the duty to pay interest on bank deposits does not grow quite as fast if interest rates are low, which gives banks some leeway in finding new debtors to pay for the interest. On the other hand, it is easier to find new debtors if loans are cheaper.

The closer the financial system gets to the inevitable collapse, the fate which faces every fractional reserve financial system sooner or later, the lower the interest rate must be adjusted (Bichlmaier, 2010). Since prime rates in most developed countries are approaching the zero-percent mark, the growth of money supply of those countries has actually slowed down. Statistics show that, for example, the money supply of the Euro or the British Pound show a moderate growth since 2008 (see Figures 4 and 5).¹¹ This is contrary to what many textbooks teach us and it verifies the explanation above. According to textbooks, low interest rates expand the money supply (*e.g.* Mankiw, 1998; Dornbusch *et al.*, 2009). Officially, the low interest rates are certainly justified as any textbook does: the money supply is supposed to expand through low interest rates, in order to prevent a credit crunch (Obertreis, 2009; Boehringer and Öchsner, 2009; Atkins and Jenkins, 2012).

However, owing to the fact that money supply not only grows by loans granted by commercial banks but also because the Central Bank can augment arbitrarily the monetary base (*i.e.* print money

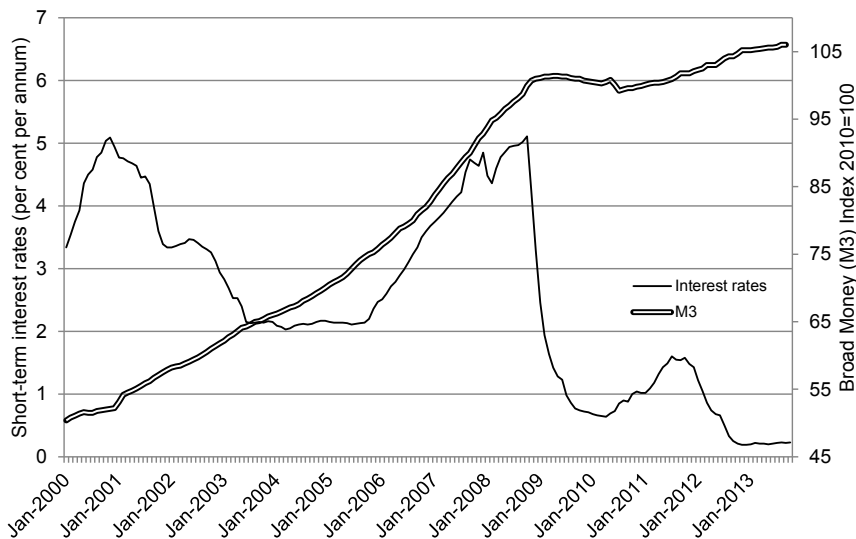


Figure 4. M3 and Interest Rates (Euro). Source: Based on data provided by OECD (<http://stats.oecd.org>)

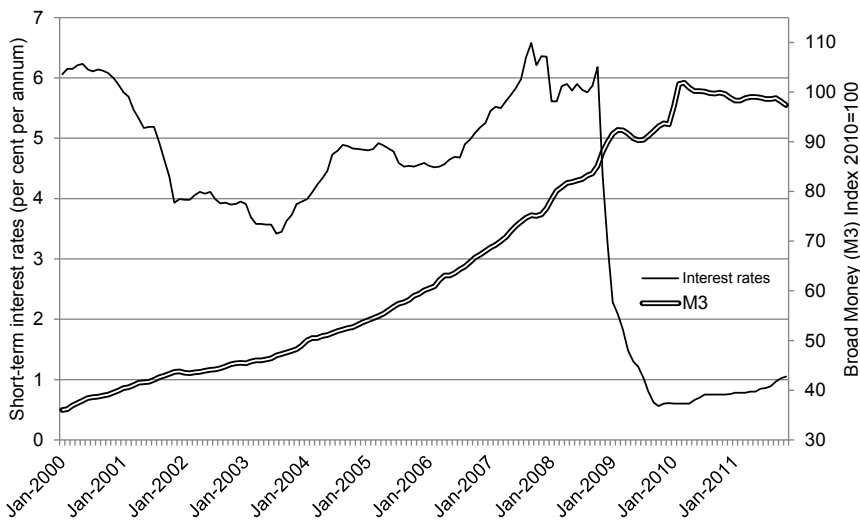


Figure 5. M3 and Interest Rates UK. Source: Based on data provided by OECD (<http://stats.oecd.org>)

buying government bonds), it is difficult to define an exact rule in what proportion money creation slows down if interest rate falls 1%.

3.3. Low interest rates do not necessarily stimulate investments and economic growth

According to the IS/LM model production will increase if interest rates fall (*e.g.* Stiglitz, 1998; Larroulet and Mochón, 2003; Cuadrado *et al.*, 2006; Fernández *et al.*, 2006; Dornbusch *et al.*, 2009). This widely accepted correlation between low interest rate and GDP growth is based on the idea that low interest rates would stimulate investments (see *e.g.* Stiglitz, 1998; Dornbusch *et al.*, 2009). But do low interest rates really stimulate and high interest rates disincentive investments? If interest rates are high people are encouraged to deposit money in a bank instead of spending or investing it. That is true. But what does the bank do with this money? Most probably, the bank will lend this money out. Banks have to do this; otherwise the bank would go bankrupt fast since it has to pay interest on deposits. Hence, with the exception of the fraction corresponding to the reserve requirement, deposits in a bank will most probably be lent out for the bank to be able to pay the interest on deposits. This is why most of the money deposited in banks *will keep on circulating in the economy*. Increased interest rates will therefore not automatically slow down economic growth. It can be assumed that things even go the other way around such that high interest rates foster economic growth instead of slowing it down. This is because money deposited in a bank not just keeps circulating in the economy by means of loans, but also with every loan granted the money multiplier makes money supply (of the sum of the base money as well as deposits and other debt titles) increase. In the previous section, it was concluded that increased interest rates would, in the long run, increase money supply. And since growing money supply means that the aggregate demand curve shifts to the right, production will be stimulated.

Following this idea, high interest rates that encourage saving up money at a bank will stimulate the economy and not slow it down. This interpretation, although being the contrary of what the IS/LM model teaches us, can be given evidence taking a look on empirical data of

most countries where a positive correlation between the development of interest rates and GDP growth can be identified (for the case of the US economy see Figure 6). Phases of economic upturns regularly go hand in hand with elevated interest rates and vice versa. Since, as explained above, increased interest rates in the long run blow up money supply and an increased money supply in the long run is related to higher inflation (see e.g. Dornbusch *et al.*, 2009, p. 471), we can now understand why interest rate, GDP growth and inflation are all together positively correlated, as the following figure 6 shows using data of the US economy. This tendency, although being a contradiction of what the IS/LM model predicts, can be found in any country: high interest rates will be observed in times of economic boom, and those go along with higher inflation rates.

Economics literature usually justifies high interest rates in times of economic boom –although being a contradiction to the outcome of the IS/LM model– with the fact that economic boom goes along with

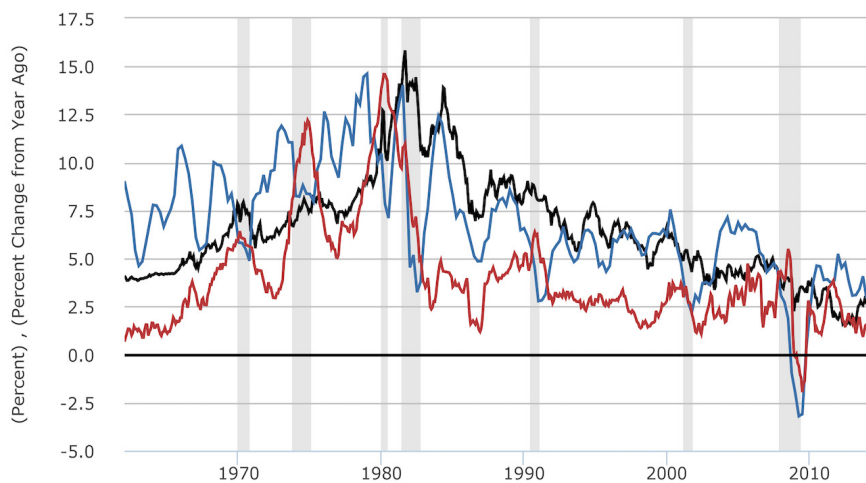


Figure 6. US inflation, 10-Year Treasury Constant Maturity Rate and GDP growth
 Source: Federal Reserve Bank St. Louis (research.stlouisfed.org). Black: 10-Year Treasury Constant Maturity Rate; blue: GDP growth (in percentage from year ago); red: Consumer Price Index; shaded areas indicate smaller us recessions.

increased inflationary tendencies. This makes Central Banks raise prime rates to cool down the economy and the risk of inflation. In times of economic downturns with low risk of inflation, Central Banks will, however, lower interest rates to incentivize investments. Here, we argue the other way around: in a financially system with low rates of over-indebtedness and far away from collapse, high interest rates will be charged. This leads people to deposit money at banks, which in turn increases the volume lent out. The growing money supply stimulates demand and production. The economy booms and companies as well as households are, because they find themselves in the boom phase, able to pay high interest rates. With falling interest rates, money supply increases at lower rhythm and so does economic activity. In the long run, as we can observe from figure 6, interest rates, inflation and GDP growth rates seem to develop in a synchronized manner. Section 5 is dedicated to explain why the long economic waves firstly described by Nicolai Kondratieff could be used to interpret the fluctuations of the financial system.

3.4. The destruction of real capital serves the financial sector

It has been comprehensibly demonstrated that many wars seem to be connected with the steadily growing duty to pay interest. The interest burden of the State Department is to be paid for with captured capital and resources (Gesell, 1949; Creutz, 1993). On the other hand, war is the most effective method for destroying valuables, which in turn makes new economic growth and interest payments possible (Creutz, 1993), while at the same time it increases the demand for loans. Not only there is a need to rebuild destroyed homes and replace destroyed goods, but also, since war is expensive, it leads to the governments of nations at war to increase their level of national debt. Of course, what applies to the destruction of real capital by war, also applies to the destruction that natural disasters wreak. That is to say, wars and natural disasters, in theory, have the power to delay the collapse of the financial system by enabling further economic growth on the one hand and on the other hand by providing an incentive to borrow.

This is precisely what can be observed after the devastating earthquake of February 27, 2010 in Chile. Contrary to the predictions of the Chilean Central Bank (BCCH, 2010, 2010b), whose experts had predicted a worse performance of economic growth than originally expected, the earthquake eventually provided for additional economic growth: the GDP growth in 2010 reached a level that has not been seen for years. While in 2009 Chile's economy had registered a GDP-growth rate of -1.0%, the GDP-growth-rate jumped to +6.1% in 2010 and +6% in 2011. The national income increased 13.6% and domestic demand even rose 20.5% from 2009 to 2010 (BCCH, 2012). Moreover, since the natural catastrophe, banks in Chile grant significantly more loans than before. While in the beginning of 2010 the loan-granting rate for all types of loans was as low as it had been since 1999, the approval rate of mortgage loans, commercial loans and consumer credits increased and kept high until today, and are constantly on the rise (Figure 7; BCCH, 2010c, 2012). In addition, the increased demand for loans allows interest rates in Chile to rise significantly. Banks can now afford to charge higher interest rates again. Accordingly, the Central Bank discount rate (*tasa de política monetaria*) rose from annually 0,5% in February 2010 to 5,25% (Figure 8; BCCH, 2010d, 2011, 2012).

Moneylenders are quite obviously the beneficiaries from the earthquake. In a saturated economy, however, in which there is hardly any economic growth possible, it is difficult for the banks to find borrowers. They must pay interest on deposits and are therefore forced to grant loans, if necessary to borrowers with poor solvency and low interest rates. This is a situation which could be seen in the mortgage loan market in the us until 2008 and in Spain until 2010 and which, since a couple of years ago, can be proved in the consumer credit market in Chile where even households with the poorest solvency are incentivized to borrow money to buy consumer goods and even food. Chile is one of the very few countries whose government acts responsibly and does almost not take loans; the State of Chile is not indebted. In most nations, however, the government is the best client of any bank. Since this is not the case in Chile, if it is not the State that is indebted so it has to be the people who are indebted because, as was pointed

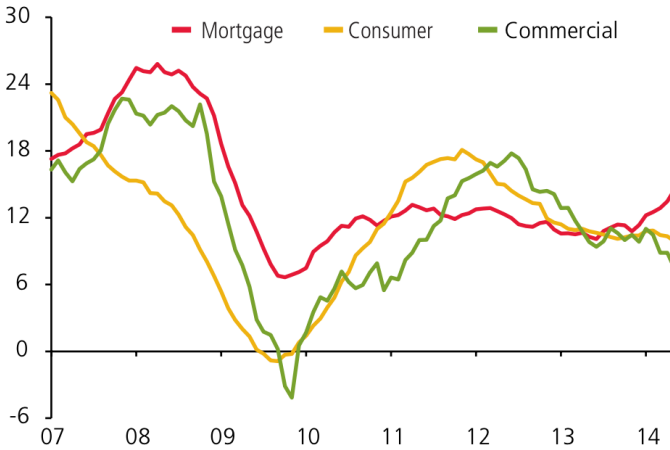


Figure 7. Nominal loans by type. Source: Banco Central de Chile and Superintendencia de Bancos de Instituciones Financieras

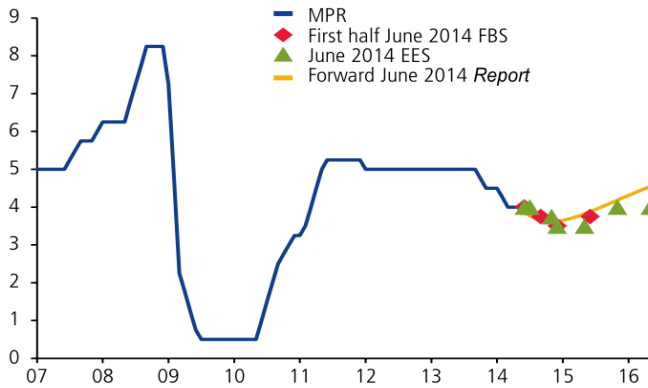


Figure 8. MPR and expectation. Source: Banco Central de Chile and Superintendencia de Bancos de Instituciones Financieras

out, banks have to ever increase the amount of money lent out to be able to pay the interest duty on deposits. This leads to the very special situation that in Chile rebates in the consumer goods market are not granted if the buyer pays with cash, but with credit card. All department stores and most car dealers encourage households to pay with credit

by offering a special rebate, which can be obtained only if the price is paid with credit card or signing a loan contract. This form of marketing to encourage consumers to take loans has even reached supermarkets and fast food restaurants. In such a situation, an earthquake with huge destructive potential to encourage households to take loans is obviously welcomed by the financial sector (see with further references, Fuders and Belloy, 2013).

4. The inflation-deflation-misunderstanding

4.1. Inflating the debt is a necessary trait of the financial system

Inflating the debt is a necessary trait of the financial system, a fact that is not well understood. If no one, neither the state nor households, demanded loans the economy would stand still. To be able to understand this, it is necessary, first, to understand why the money rate of interest exists. The reason why there is interest is related to an unnatural property of money. Money was invented to facilitate the exchange of goods. Money must therefore circulate as a medium of exchange (already, Aristotle, 1995, 1258b; Steiner, 1918). Due to the psychological penchant for saving, *i.e.* the *preference for liquidity*, as John Maynard Keynes called it (Keynes, 1936), people like to save money. But, hoarded money cannot fulfill its main purpose to circulate as a medium of exchange and does not serve the economy. It was probably Silvio Gesell, who was the first to recognize that the possibility to hoard money and thus to be used to store value results from a special property, a kind of monopoly-position of money. Different from real goods, it is not perishable. While everything in nature succumbs to the rhythmic alternation of growth and decay, only money seems to be free from all earthly transience (Gesell, 1949). Hoarding of food or other real goods would be possible only in a limited way due to their perishable character or technical obsolescence. This unnatural special property of money over real goods entices people to keep money for future times or to impose an interest for lending, where the interest rate is determined by the credit risk. The money rate of interest is therefore a reward not to hoard money at home, a *reward for*

parting with liquidity (Keynes, 1936). That hoarding is harmful is not to be questioned. Hoarding causes a downward trend, a deflation. If prices sink, households have an ever-stronger incentive for not spending the money. Soon no one will buy or sell anything, production stands still. If households can be prevented from hoarding only by offering the interest rate as reward, then this leads to the described adverse effects, particularly to the exponential increase of (credit) money and the associated inflation, asset price-bubbles and the growth constraint of the real economy. People must therefore be prevented from hoarding, without that the money interest rate is required, and this is what Silvio Gesell's solution –discussed in the next section– aims to achieve.

Meanwhile, money is easily storable; the only way to keep it circulating and to prevent deflation is to pay interest. Interest makes money deposits and debt grow in a likewise manner, since there is no interest without debt, as described above. That is to say, without expanding (credit) money supply, there will be deflation.¹² The only way to prevent this deflation is to keep the system running. This is why rescue funds are made up and why the ECB, the Fed, the Bank of England and the Central Bank of Japan decided to keep the financial markets liquid by printing money (Steltzner, 2009; Frühauf, 2009). The risk of even more price bubbles and inflation apparently is estimated to be less bad than a scenario containing deflation.¹³ But, of course, keeping a sick system artificially alive is not a solution to the underlying problem.

4.2. Irving Fisher's debt-deflation-theory: Right observation, but wrong conclusion

Unfortunately, few realize that the enormous national debt in most western economies is not just due to the irresponsibility of governments, but rather follow a mathematical regularity, as shown above. Since most of the money in the financial system is created by credit, money is the counterpart of debt. This means, *if there were no debt, there would be no money*, with the exception of the money originally created by the central bank. That is the reason why the wealthiest nations are also the most indebted ones (in absolute figures): U.S., UK, Japan, France and Germany (CIA, 2014). According to Irving Fisher's debt-deflation

theory, which was recognized for example by Hyman Minsky (Minsky, 1995), deflation is caused by over-indebtedness. Fisher observed a number of effects that will occur if the debt bubble bursts (Fisher, 1933):

- Debt liquidation and distress selling;
- contraction of money supply as bank loans are paid off;
- fall in the level of asset prices;
- fall in net worth of businesses precipitating bankruptcies;
- fall in profits;
- reduction of production and employment;
- loss of confidence;
- hoarding of money.

All these observations are true, but debt is not the cause of deflation but rather, just a *symptom* of the financial system, where money is created by debt. Irving Fisher's debt-deflation theory is a good example of misunderstanding the problem inherent in the financial system. Deposits grow by interest independently of the real performance of the economy, which is why total debt also grows independently of the real performance of the economy, since there is no interest paying without debt. Money supply therefore inflates until the system collapses. If the financial system collapses people would start hoarding money at home; it does not serve as medium to facilitate the exchange of goods anymore and deflation prevails. In this sense Dornbusch *et al.* (2009) are right in their conclusion that the Great Depression was caused by an increase in cash holdings in relation to bank deposits, which tore down the money multiplier. In the financial system, there is *either* inflation or deflation. *Stable money does not exist.* The fact that inflation is not always seen as a problem and appears relatively moderate is due to the fact that inflation is measured merely on prices of consumer goods, while households are likely to invest surpluses in stock or real estate markets, where steadily rising prices are observed. This effect, which could be called "inflation-deflation paradox" (see next paragraph), is maybe a major reason for the underlying problems of fractional reserve banking not being recognized by economists, (Fuders, 2011; Azkarraga *et al.*, 2011; Fuders and Belloy, 2013).

Fisher concluded that debt is the cause of deflation, although in reality debt is just the counterpart of the ever-increasing money supply. Even more interesting is Fisher's observation that agrees with our thesis in section 3.2. that the money rate of interest falls if an economy gets into a debt crisis (Fisher 1933; also Dornbusch *et al.*, 2009).

4.3. The inflation-deflation paradox

One might ask, why are not high inflation rates observed in industrialized nations in this time of history? The financial system is not yet broken, but the money supply in many industrialized countries reaches levels never seen before in history. Dornbusch *et al.* (2009) show that, for example in the case of the USA, inflation is positively correlated with the increase in money supply in the long run, but they are right in their observation that this seems not to be true since the 1990s. The ulterior can be explained with what might be called the inflation-deflation-paradox.

Since deposits in bank accounts claim incessantly and, above all, independently of the performance of the real economy the paying of interest, banks in a saturated industry are forced into risky businesses and lending. This is because the faster bank accounts grow by simple and compound interest, the faster the amount of loans to be granted has to grow. If more loans are granted, the money supply will grow, since in the fractional reserve banking system money is created by loans and the money supply grows with the amount of money lent out (the money multiplier principle, see for example: Mankiw, 1998; Larroulet and Mochón, 2003). This explains why money supply is steadily expanding, which in turn leads to the investment markets, like stocks or real estate markets, to steadily raise prices. To say it in other words, the increasing money supply seeks alternative forms of investment (Fuders, 2009; 2010b; Fuders and Max-Neef, 2012). Now, the opportunity costs of rising prices in stock and investment markets make *money flow from other markets, like the market for consumer goods into the stock and investment markets*. This is fueling the bull-market and leads to a situation where inflation initially might be limited to the investment markets and is not perceived as such, since the rate of

inflation is determined on the basis of prices of consumer goods.¹⁴ It is even possible that as much money will be drawn out of the consumer goods markets that deflationary tendencies will prevail, as was the case in Chile in 2009 (BCCH, 2010c). This situation can be described as an *inflation-deflation paradox* (Fuders, 2011; Azkarraga *et al.*, 2011). Price-bubbles, until now, have been limited to investment markets. If the wave of money one day swaps over to consumer and food markets, then there will be a hyperinflation. There are already signs that the next bubble could be found in the commodity markets (UNCTAD, 2011).

5. Great depression, sub-prime crisis and the Euro crisis

5.1. Sub-prime and Euro crisis have the same origin

Now, it is easier to understand the underlying reason for the actual financial crisis in Europe and the sub-prime crisis in the US in 2008, which are not two independent crises but one and the same: the world financial system is close to its collapse if new policies are not implemented. The exponentially growing indebtedness caused by simple and compound interest without recourse to the real performance of the economy as Nobel Prize laureate Frederick Soddy pointed out (Soddy, 1934)¹⁵ leads at some point to the bankruptcy of the whole economic system. This starts with the weakest debtors, who in 2008 were the private mortgage loan customers in the US and in Europe, it was the countries with the lowest economic productivity. The weakest ones are always the first to default in honoring their interest obligations.

Banks on the other hand, if they want to survive, have no chance than to ever-increase the amount loaned out because deposits grow by interest. However, it is suggested in the media and literature that the cause of the sub-prime crisis in 2008 in the US and the real estate bubble in Spain are the easily acquired loans, casino-like gambling at stock markets and the lack of bank supervision (Shiller, 2008; Krugman, 2009; Steltzner, 2009). This phenomenon is not new. After the crises of 1857 and 1929, banks and their practices of “easy money” and speculation had been identified as the culprits of the crises (Fisher,

1933)¹⁶ and the US government took measures to abate speculation (Dornbusch *et al.*, 2009). However, it was probably the money supply having previously expanded in an exorbitant manner that actually caused those crises (Rothbard, 2000).

The reason for the establishment of the rescue funds, particularly, the EFSF (European Financial Stability Facility) and ESM (European Stability Mechanism)¹⁷ is to back up new loans to insolvent countries, *i.e.* to assure that banks can keep on lending money. Additionally, the funds also serve to artificially inflate the total volume of debt by buying government bonds. Originally, this fund was supposed to secure loans to insolvent countries. In the meantime, it is becoming clear that also the purchase of government bonds will be one of the main purposes of this pan-European bailout fund. Buying back government bonds is a measure to artificially blow up credit volume and the money supply, which only postpones the crisis to a future date. The bailout and economic recovery funds of 2008 in the US had the same goal. In the period 2003-2011, the US government increased the current total debt more than all the debt accumulated through history in the country.¹⁸ The European countries did the same. Again, it is possible to see the logic of an exponential function. The total credit volume grows exponentially.

5.2. Financial crises follow a certain pattern

Many believe that the problem of the 1929 crisis was that money was borrowed for speculation, but then expectations “crashed”, (Galbraith, 1929; Fisher, 1932, 1933; Dornbusch *et al.*, 2009). The same happened in the so-called sub-prime crisis of 2008, with the difference that money was not borrowed to buy stocks but real estates (Krugman, 2009). In fact it is arguable that the interpretation should go the other way around. It is not that prices rise because of speculation itself; instead the ever-increasing money supply leads to speculation since the money available needs to be invested somewhere, as was explained above. Banks made use of the fact that prices grow to sell more loans, encouraging people to buy stocks on loans, which then made money supply grow even further and again fueled the bull market. This worked until the bubble burst. In today’s world, banks similarly encouraged clients to take loans and

to invest the money in the real estate market. Since prices seemed to grow forever, mortgage loans appeared to bear little risk. If the debtor were not able to come up with her payment obligation, the bank would just auction the property. This means prices in capital markets grow because an ever-increasing money supply seeks to be invested lucratively. Since money is created by debt, price bubbles go hand in hand with growing indebtedness.¹⁹ In fact, all financial crises seem to follow the same pattern: First money supply and debt increase. Then, the growing money supply seeks to be invested. People find the real estate sector or stocks as the next immediate profitable investment, which is why we find price bubbles in these markets. On the other hand, commercial banks find bubbling prices in capital markets as the perfect pretext in their struggle to find new debtors to encourage their clients to take loans to buy more of these assets. This is why credit boom, speculation and financial crisis go hand in hand.

5.3. Kondratieff waves

Perhaps the so-called Kondratieff waves (Kondratieff, 1926) are not only, as assumed, related to the invention of key technologies, but also to the cycles of the financial system. The Russian researcher Kondratieff observed a widely accepted supposed correlation between the invention of key technologies and what he considered to be the consequent long-lasting economic recovery (theory of long waves). According to his interpretation, investments in new technologies initially lead to a self-sustaining economic recovery. If innovation becomes old, no longer attracts investments and henceforth it comes to an economic downturn. The Kondratieff cycles thus last about 40-60 years.

But are those economic cycles really only connected to technological innovations? One might suspect that this cycle is closer to that of the cycles of financial crises described in section 2.2. The interpretation finds backing by the observation that the economic boom by a new technology always begin after the financial system had come straight into a severe crisis in 1825 (steam engine), 1875 (railway), 1930 (electronics and chemicals). The, then, newly established financial system allowed that inventions had a chance to be produced and marketed on

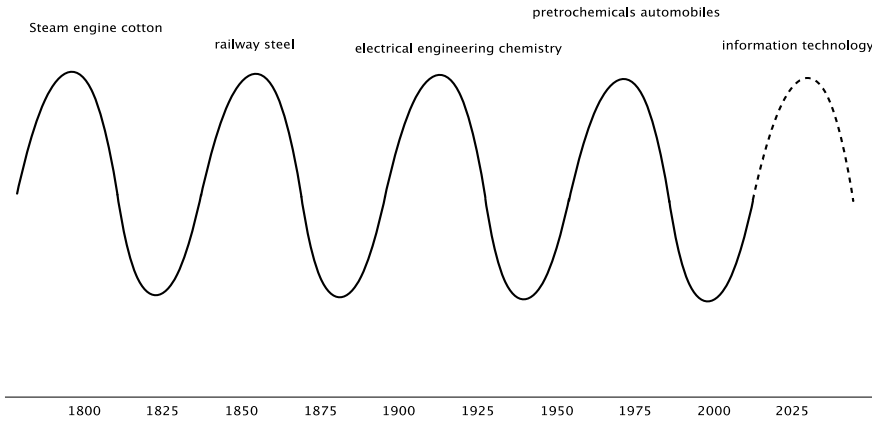


Figure 9. Kondratieff waves. Source: Kondratieff (1926)

a large scale and this is why we find the correlation with the production of key technologies. The fact that the light bulb and the steam engine have not been, as many believe, invented by Edison and Watt but instead both key technologies had been previously invented by today less well-known inventors supports this supposition: the first working steam engine had been invented already in 1712 by Thomas Newcomen (Wikipedia, 2014a). The light bulb had been invented by Heinrich Göbel in 1854 (Wikipedia, 2014b). Maybe it was because the economy faced a financial crisis at the time these technologies were invented, that these technologies could not be produced until later, when the financial system was reestablished, money flew again and investors were found to finance production of these inventions.

Within the time frame in which the system has not yet collapsed, smaller business fluctuations are also strongly linked to interest in connection to people's psychological situation (already Gesell, 1949). Money is supposed to facilitate the interchange of goods and therefore must flow. On the other hand, the hoarding of money, which leads to a recession of economic performance, can only be prevented by offering the money holder an incentive to lend it, which we call interest. But high interest rates also lead to recessions. Fear of a crisis in turn encourages

hoarding, which makes even higher interest rates necessary. A self-feeding process arises that is probably a considerable cause of business fluctuations. This interpretation goes along with the observation of Kondratieff that the ascendant economic phase is characterized by an increase in prices and low interest rates, while the other phase consists of a decrease in prices and high interest rates (Kondratieff, 1926).

6. Conclusions

The key conclusions of this paper could be summarized as:

- A fractional reserve banking system, which is the prevailing financial system in almost every economy in the world, gets into serious crisis at set intervals.
- In addition to the well-known money multiplier effect, *i.e.* the expansion of money supply by lending (checkbook money creation), the interest rate itself increases money supply. Even if all loans in an economy were to be paid back, the money supply would not completely decrease to its original level of pure central bank money since deposits would have grown from interest. This means that it is impossible that everyone in an economy based on the current financial system amortizes her loans.
- The Central Bank's dilemma gives an explanation for the low interest rates in developed countries.
- Empirical evidence seems to confirm the conclusion that in the long run GDP growth, inflation and interest rates develop in a synchronized manner.
- An earthquake with huge destructive potential like the Chilean quake from 2/27/2010 is welcomed by the financial sector, because on the one hand it enables further economic growth that makes interest payments, even in an otherwise saturated economy, possible, and on the other hand because it provides an incentive to borrow. Accordingly, in 2010 the Chilean GDP growth rate reached a level, which has not been seen for years; banks in Chile grant significantly more loans than before and the increased demand for loans has allowed interest rates to rise significantly.

- Inflating the debt is a necessary trait of the financial system. If no one, neither the state nor households demanded loans, the economy would stand still.
- In the financial system we see *either* inflation or deflation. Stable money does not exist.
- The inflation-deflation paradox offers an explanation for smaller deflationary tendencies that occur despite the fact that money supply grows on a faster rhythm than production.
- The actual financial crisis in Europe and the sub-prime crisis in the US in 2008 have the same origin: the world financial system is close to its collapse. The exponentially growing indebtedness caused by simple and compound interest without recourse to the real performance of the economy leads at some point to the bankruptcy of the whole economic system. This starts with the weakest debtors, who in 2008 were the private mortgage loan customers in the US and who today in Europe are those countries with the lowest economic productivity such as Greece.
- Financial crises follow a certain pattern. First money supply and debt increase. Then the growing money supply seeks to be invested causing price bubbles in the real estate sector or stock exchange markets. Commercial banks find bubbling prices in these markets as the perfect pretext in their struggle to find new debtors to encourage their clients to take loans to buy more of these assets. This could be the reason why credit booms; speculation and financial crisis go hand in hand.
- The Kondratieff waves could be used to explain the long economic cycles of our financial system.

7. Notes

- 1 Fisher and Soddy were influenced by the so-called *Chicago Plan* suggested by the University of Chicago economists in the wake of the Great Depression. The plan was supported, amongst others, by Frank H. Knight, Lloyd W. Mints, Henry Schultz, Henry C. Simons, Garfield V. Cox, and Albert G. Hart.

- 2 The most recent big financial crises occurred in: 1837, 1873, 1929 and 2008. According to World Bank and IMF data there were 425 smaller financial crises just in the period between 1970 and 2010 (Lietaer *et al.*, 2012).
- 3 The fact that money growth, due to compound interest, follows an exponential function can be proved using the compound interest formula. Banks use the exponential growth of deposits (or other financial products) as an argument to gain clients (*cf.* <https://www.wuensche-gesichert.de/finanzlexikon/Zinseszinsseffekt>).
- 4 This point will be discussed in detail in chapter 5.
- 5 M1: Cash (bills and coins) and deposits in checking accounts; M2: M1 + all time-related deposits, saving deposits, non-institutional money-market funds; M3: M1 + M2 + large and long-term deposits (up to 2 years), institutional money-market funds, repurchase agreements, along with other larger liquid assets (see *e.g.* Stiglitz, 1998, p. 302).
- 6 The dollar money supply, M3 is developing exponentially is even pointed out by the free encyclopedia, wikipedia, see: en.wikipedia.org/wiki/Money_supply. For the moderate evolution of the growth of world productivity see publications of IMF and OECD (IMF 2012, p. 5; IMF 2006, p. 1; OECD 2008, p. 6, 12, 15).
- 7 The German electronics company Siemens was therefore called a “bank with attached production of electronic devices” (Höpner, 2010).
- 8 For a more detailed analysis of these problems and with further references see: Fuders, 2009, 2010; Fuders and Max-Neef, 2012; and Azkarraga *et al.*, 2011, p. 46.
- 9 This is, by the way, the reason why austerity is no solution to the current financial crisis. It is simply impossible that everyone amortizes her debt.
- 10 It even has been suspected a worldwide concerted action by Central Banks (Bichlmaier, 2010). The most severe form of a credit crunch is John Maynard Keynes' liquidity trap.
- 11 But also a very low interest rate will cause an increase in the money supply following an exponential function (being the flat part of the exponential curve longer). Only an interest rate of zero would not allow the money supply to further expand. However, an interest rate of zero would have devastating consequences: people would hoard money under their pillow.

- Money would not flow (we will come back to this later, in section 4). This would result in a deflation, just as occurred in 1929.
- 12 Deflation is understood here as a decrease in the general price level of goods and services. It occurs when the inflation rate falls below 0. Deflation increases the real value of money, thereby allowing people to buy more goods with the same amount of money. Under the current system deflation is feared because it could increase the real value of debt, and aggravate recessions on a deflationary spiral.
 - 13 This is most probably based on the widely accepted recommendations of Irving Fisher to reflate in case that the risk of debt-deflation occurs (Fisher, 1933, p. 349).
 - 14 It has been asserted that we might be deceived about the true rate of inflation (Bichlmaier 2010).
 - 15 “Money is a credit-debt relation from which none can effectually escape”, (Soddy, 1934, p. 25).
 - 16 Short positions and speculation were also the supposed causes in the old time, *cf.* “Efforts to cut Short Selling and Peg Key Stocks among Day’s development on the Exchange”, in: New York Times, 11/14/1929, p. 1; “Short Sales stir conflicting views; some hold practice helpful, others harmful to the Stock Market”, in: New York Times, 11/17/1929, p. N7; ‘Asks state inquiry on stock recession - senator Hastings wants the Governor to name Committee of Business Leaders’, in: New York Times, 11/ 25/1029, p. 18. As today, a transactions fee was proposed to defeat speculation and speculators were denominated as parasites, *cf.* “Asks house to vote Tax on Stock Sales, Representative Sabath introduces Bill for 5% Levyon ‘Shorts’. Penalty for Non-Payment Illinois Man denounces ‘Wall Street Gamblers’ as ‘Rapacious Parasites’”, in: New York Times, 12/10/1929, p. 54.
 - 17 The European Financial Stability Facility (EFSF) was created by the euro Member States. The EFSF’s mandate is to safeguard financial stability in Europe by providing financial assistance to euro area member states. EFSF is authorized to use the following instruments linked to appropriate conditionality: 1. Provide loans to countries facing financial difficulties; 2. Intervene in the primary and secondary debt markets. Intervention in the secondary market will be permitted only on the basis of analysis by the European Central Bank; 3. Act on the basis of a precautionary

- programme; 4. Finance recapitalization of financial institutions through loans to governments. To fulfill its mission, the EFSF issues bonds or other debt instruments on the capital markets. The EFSF is backed by guarantee commitments from the euro area Member States for a total of 780 billion euros, and has a lending capacity of 440 billion euros. The EFSF was replaced by the ESM (European Stability Mechanism), which has the same functions but practically unlimited funding (Art. 9(1) ESM Treaty).
- 18 The total US public debt (debt held by public + in intragovernmental holdings) at 1/09/2012 reached USD 15,236,506,139,986.86 (USD 15.2 trillion) according to the US Bureau of Public Debt. In 2003 the total public debt was 6.8 trillion (US GAO, 2004).
- 19 In this sense it is worth mentioning that a study conducted by members of the University of California at Berkeley and the Booth School concluded that increased mortgage availability pushed home prices only around 4,8 % (The Economist, 2011, p. 84), which was a small fraction of the rise in prices during the boom.

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