SMOOTHING OUT THE CREDIT CYCLE UNDER THE CONDITIONS OF CURRENT CREDIT ECONOMY

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Abstract

The paper focuses on government policies as means to smoothing out the business cycles (driven by credit cycles) under the conditions of current credit economy (CCE). This concept is based on realistic elements such as endogenous money, fallacy of composition and information asymmetry. The real aspects suggest that any CCE needs a constantly positive credit growth (minimal level) in order to avoid recessions. The subjects of the empirical analysis are the real monetary, credit and other aggregates and their influence on the cycles with an emphasis on deep recessions. Subsequently, the economic policy tools which help mitigate the cycles and protect the economy from the deep crisis are implemented. The evidence suggests that the main causes of the credit cycle are money hoarding, insufficient credit growth, deleveraging of private sector and unregulated financial markets. The effective ex ante remedy for deep crisis is progressive taxation and regulation of financial markets whereas a strong fiscal stimulus and quantitative easing have to be applied in order to shorten and relieve the deep crisis ex post. The entire study is based on real US data.

Key words: *Heterodox economics, post-Keynesian model, Business and credit cycles, Money supply and credit, Fiscal and Monetary stabilization policy*

1. INTRODUCTION

The main purpose of this article is to provide a general summary, evaluation and explanation of usage of such economic policy tools which help to mitigate[1] cyclical development of an economy under the realistic assumptions of current credit economy (hereinafter 'CCE') concept in a long run. The secondary goal is to explain the principles of the CCE and describe it via a dynamic model including the main realistic assumption - the inability to reach the equilibrium even in the long run - and verify it through application on the US data.

The motivation of the analysis is primarily the fact that the global economy is naturally subject to altering phases of shallow or even deep recessions with significantly negative impacts on the economic growth, 'cyclical' component of employment and related social exclusion which inherently cannot be solved by any active or passive labour market policy.

A lot of literature is focused on business and credit cycles (Burns, Mitchell,, 1946; Lown, Morgan, 2006; Edge, Hancock, 2009 and many other authors) and the methods of its smoothing (Haldane, 2010; FRBC, 1990). But the author's effort is to put emphasis on smoothing of these cycles under the conditions of CCE concept which is explained in the first part of this study.

The second part is devoted to demonstration of cyclical behaviour within CCE with the use of real US data. Subsequently the author seeks to remedy it by identifying the economic tools for smoothing of business cycles in both 'ex-ante' and 'ex-post' bust phase of the cycle.

The last part of the study offers a summary and conclusions. If we had to represent the summary as a matrix it should be as shown in the following table (Table 1). The '?' represents the measurements we will try to discover for different CCE issues in periods of ex-ante shallow crisis, ex-ante deep crisis, ex-post shallow crisis and finally ex-post deep crisis.

[1] Total elimination is not possible in author's opinion.

Table 1. Unsolved matrix; Source: Own

Period	**Ex ante**		**Ex post**	
Solution **Measurement / Remedy**	*Shallow crisis*	*Deep crisis*	*Shallow crisis*	*Deep crisis*
CCE *Issue 1*	?	?	?	?
CCE *Issue n*	?	?	?	?

The entire work is based on the post-Keynesian major methodological framework – that is methodological realism (see Dow 2001; or Jespersen 2011). Within the economic field of study and particularly the examination of CCE it means that we have to take the following three crucial real world aspects into account: *Endogenous money supply and monetary theory of production (see, Rochon, Rossi 2003); Fallacy of composition theorem (see Wray, 2006); Asymmetric information and irrational individuals (see Marinescu, 2012).*

Unfortunately, the modern mainstream economics is primarily based on imagination of the perfect harmony of equilibrium. This equilibrium brings some kind of hopes and beliefs in an uncertain world. The essence of the equilibrium idea lies in a dreamboat of a persistent steady state which is sometimes (or according to some theories constantly) disturbed by exogenous 'shocks' just for a limited time (short run). However, in the long run, the economy tends to return to the state of equilibrium through the impersonal free market forces.

Mainstream economists often use sophisticated mathematical models in order to seek and describe the above stated desired equilibrium. Their quest seems similar to a search for the Holy Grail. Once they reach the conditions for equilibrium (usually via a couple of logic but often unrealistic axioms) another examination follows. More and more 'walrasian' models are being developed in order to describe the omnipresent steady state. The 'fetish' of equilibrium is, nonetheless, subject to the criticism of some economic schools (especially for post-Keynesians; see Kaldor 1972)

According to the author's opinion, it is futile to endeavour to search for all what is described in the previous two paragraphs. As long as economic subjects live in a dynamic world it is much more fruitful to search for the necessary or approximate minimum growth rate of real aggregates rather than to glorify phantom equilibrium. Therefore, besides the basic mathematical apparatus we employ double-entry accounting principles in order to get more proper explanatory power of our CCE view and its dynamics.

2. THEORETICAL AND EMPIRICAL BACKGROUND – THE ARCHITECTURE OF CCE

2.1 Theoretical background

Generally, we can define CCE as an economy where money is represented as liabilities of commercial banks to non-bank institutions. Hence, the money is backed[1] by granted bank loans, debt securities in the banks' assets and expenses of commercial banks. The economic growth is strongly dependent on constant positive credit growth in the banking sector's balance sheet. The main role of a central bank is the regulation of especially the short-end (possibly medium- and long-end) risk-free yield curve. Now, we may transfer ourselves from general definition to a detailed analysis.

[1] In the mainstream economic literature we may find the statement that current 'fiat' money is backed by nothing in contrast to commodity money. Nonetheless, the essence of the money creation in CCE tells us that current money is backed especially by debt; that is somebody's unpleasant obligation to pay a principal plus interest in the future.

The concept of CCE is built upon three known pillars which we use to establish a basic theoretical model: *Wicksellian (1962), Schumpeterian (1934) or post Keynesian (Rochon, 1999) credit circulation theory; Marx's (1990) classification of ownership class and labour force; Minsky's (1992) financial instability hypothesis.*

To refresh the reader's mind, the basic known Wicksellian (or Schumpeterian) macroeconomic model of monetary theory of production may be described by the following equations.

$$C = L \,.\, \overline{w} \tag{1}$$

$$D = C$$

$$\pi = (1 - s) \,.\, D$$

$$\delta = s \,.\, D$$

Where C is the total outstanding amount of bank credit, L is the total labour force, $\overline{w}$ is the average wage, D is the total outstanding amount of deposits (money supply), π is the total revenue of firms, s is the saving rate, δ is the total outstanding amount of firms' obligations

Commercial banks			
Credit		Deposits	
1) C			1) D
	5)π + δ	5)π + δ	

Non-financial firms			
Deposits		Credit	
1) D			1) C
	2) L . w		
3) D(1-s)			
4) s . D			4) δ
	5)π + δ	5) C	
Expenses		Revenues	
2) L . w			3) π

Labor force (Households)			
Deposits		Capital	
2) L . w			2) L . w
	3) D(1-s)	3) D(1-s)	
	4) s . D		
Expenses			
4) s . D			

Fig. 1. Money creation and extinction within CCE; Source: own elaboration based on accounting principles

The brief description of the above mentioned model may be provided by accounting entries (AE) with respect to its simplicity (Figure 1).

In order to begin with the production cycle, the commercial banking sector must provide bank loans to non-financial firms (AE 1). It implies the money creation through the process of initial financing which is, in fact, a flagship of the endogenous money and monetary production theories (Rochon, 1999).

In the second phase (AE 2), non-financial firms use the obtained deposits to finance production by paying wages to labour force (Households). Thereafter, labour force buys the production from non-financial firms (AE 3) with the 'unsaved' money. At the end of the production cycle, the firms issue commercial debt papers and sell them to the labour force (AE 4) in order to obtain enough deposits to pay off the debt exposure (AE 5).

We may say that the above described model is the model of credit economy but rather with the 'primitive' instead of 'current' adjective. Since the Wicksell and Schumpeter times, a couple of macroeconomists sought to build an optimal and complex model which would connect all aspects of the entire economy and related theories (especially growth theories and production functions). The good instance is the model of MacKinnon's pure credit economy (MacKinnon 1999) which includes flexible price production economy, overlapping generations, endogenous money, production function in steady state and positively sloped long-run Phillips curve.

We, however, focus on real aspects and disruption in credit circulation. The above stated model is just theoretical and does not contain the following important aspects of reality:

- In the real world, money never becomes extinct at once. Conversely, significant amount of money is created and becomes extinct on daily basis. If the amount of created money is higher than the amount of 'destroyed' money the money supply grows and vice versa.
- In the real world, bank loans are not granted only to non-financial firms but to the households, governments and other sectors as well (for instance: mortgage loans, student and consumer loans…)
- Commercial banks charge an interest on loans and pay an interest on deposits. If the sum of the interest charged (plus banking sector's sales to non-banks subject) is higher than interest paid (plus banking sector's purchases from non-bank subject) then money supply is insufficient to repay all the debts.[2]
- Non-financial firms do not pay all money as wages to labour force, but also pay dividends to its owners and buy other factors of production. Corporations sometimes hoard cash. Nonetheless the sector as a whole is usually a net debtor.
- Households (comprising of owners of enterprises and labour force in Marxian sense) do not spend all their wages and other capital/debt income on products and services. Households do save and hoard[3] money on their deposit and saving accounts for precautionary, purposeful[4] and other reasons. Despite the significant amount of indebted households the sector as a whole is usually a net creditor.

If we consider the above mentioned aspects of reality the impact on the 'smoothness' of credit circulation resulting from the initial Wicksellian model may be strongly negative. Especially the last point (saving and hoarding) implies disruption in smooth flows of money (required for repayment) back to the primary debtors (in the initial model it regards to non-financial firms). For proper demonstration, we can build the CCE model with the following assumptions: *Only non-financial firms receive loans; Non-financial firms transfer all the new money in form of wages, resp. dividends to labour force, resp. owners; The volume of income is constant; Households (consisting of labour force and owners) save part of their income ($\varsigma+\eta$) and spend the rest for products and services. At the end of the period, part of the savings is reinvested through the purchase of corporate bonds (ς) – final finance. Households intend to hold the rest of savings (η - hoardings) indefinitely; At the end of the period, non-financial firms receive new bank loans and repay the old. In order to keep circulation smooth without any disruption, the amount of new granted loans must be greater than the previous amount of granted loans by at least η.*

We can use the book entries again to make the circulation flow including saving and hoarding clear. It is not necessary to include commercial banks in the example. The only role of the banking sector is to provide (additional) amount of loans. Money supply can be measured by liabilities of non-financial subjects to commercial banks. The example performs following operations:

- 1a) Banks grant a loan of 1,000 $ to non-financial firms;
- 1b) Non-financial firms pay wages and dividends (1,000 $) to households;
- 1c) Households buy products and services (900 $) from non-financial firms;
- 1d) Households reinvest only 60 $ (S) out of residual 100 $ ($\varsigma+\eta$) through the purchase of corporate bonds and therefore intend to hoard 40 $ (η).

[2] Intensive discussion exists among post Keynesians themselves. For instance, Rochon states that *"… not only are firms unable to create profits, they also cannot raise sufficient funds to cover the payment of interest. In other words, how can M become M'?*" (Rochon, 2005, p. 125). This approach is however not acceptable for Keen (2011) who blames Rochon for confusing stock and flow.

[3] Money hoarding is a serious economic term. Unlike the term 'saving' it is usually used in order to highlight some difficulties related to excess money concentration. We may define it by a declining money velocity (Robertson, 1933), idle balances held under the conditions of uncertainty (Fellner, 1943) or by the most specific definition: "*Hoarding is the voluntary failure of any sector in the circular flow of income to pass on to another sector as much money as it receives from it.*" (Emmer 1959, p. 162)

[4] By purposeful reason the author means the natural human desire to hoard money for itself despite the very low, zero or even negative yield in comparison to other assets. That natural human desire was a subject of satiric literature for centuries. One of the most famous examples is the Moliere's comedy 'The Miser'. The author does not judge this human character from the ethical point of view but it is necessary to point out the relevant macroeconomic consequences.

Apparently, at the end of the first production cycle, non-financial firms collected insufficient revenues (960 $) for repaying the bank loans (1,000 $). Thus, the commercial bank sector must provide additional amount of loans greater or at least equal to 1,040 $ in order to keep production cycle smoothly going. Figure 2 performs also second and third production cycle.

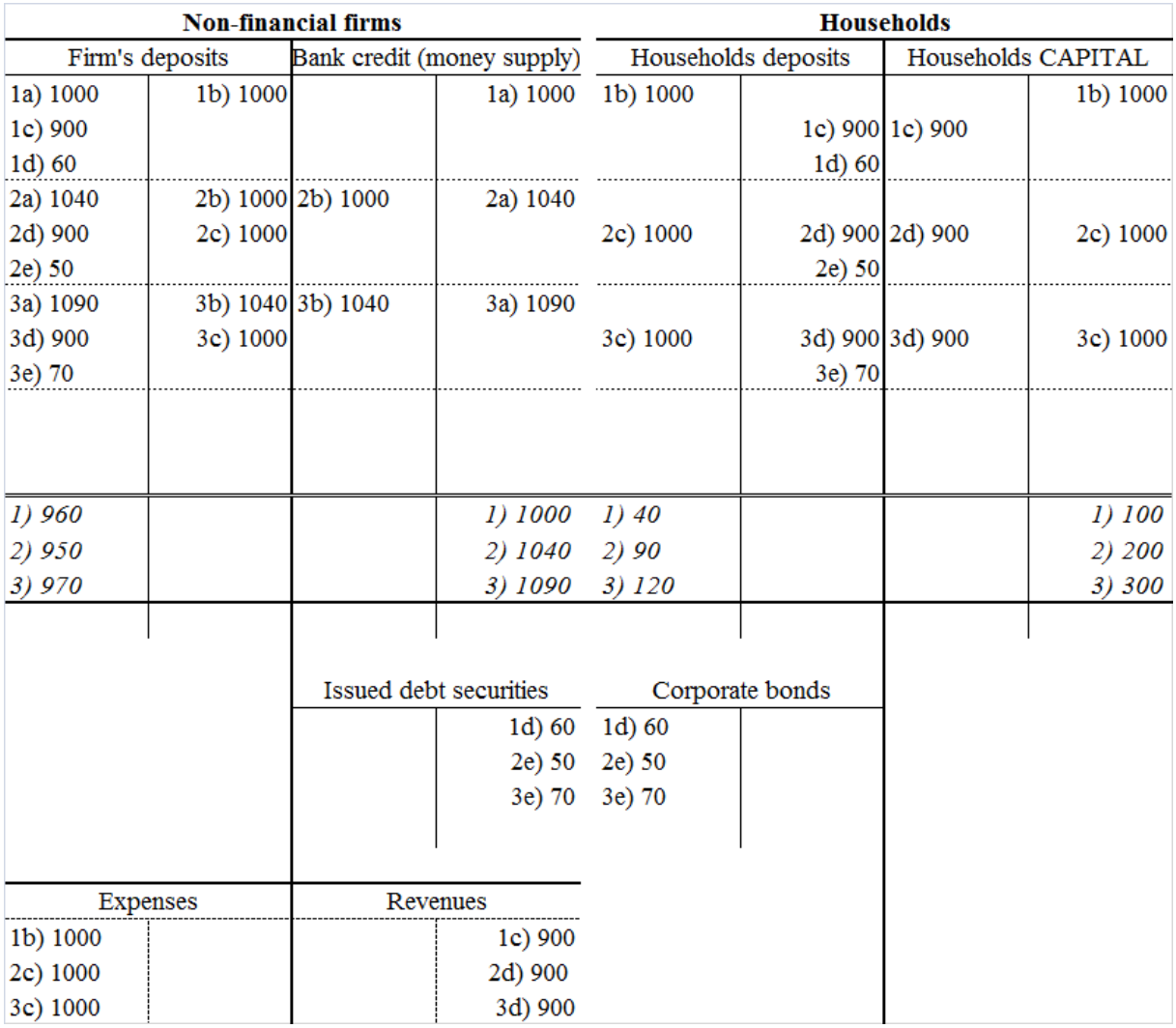


Fig. 2. Smooth credit circulation within CCE; Source: own elaboration based on accounting principles

We may derive the following condition of smooth credit circulation from the above performed model.

$$\Delta\gamma_t \geq \Delta(\varsigma + \eta)_{t-1} - \Delta\varsigma_{t-1} \quad (2)$$

Where γ is the amount of outstanding bank credit;
ς are reinvested savings of households;
η are hoardings of households.

By modifying the initial equation, we get a simple condition. In other words, the necessary credit growth is primarily given by hoardings of households (or potentially hoardings of other non-bank sectors).

$$\Delta\gamma_t \geq \Delta\eta_{t-1} \quad (3)$$

2.2 Empirical background

The heart of every CCE is undoubtedly its banking sector. Money is created and become extinct in it and thus it makes decisions about what will be produced. Practically, the banking sector in capitalist economy does partly what a central planner does in a central planned economy. It influences not only economic indicators but the lives of millions as well.

The main purpose of this section is to improve the theoretical model of CCE by inclusion of the selected monetary and credit aggregates. First of all, it is necessary to define the money supply which would be appropriate to work with within our subsequent CCE analysis. Prevalently, money supply is usually empirically measured by monetary aggregates. Nonetheless, we need to measure all the money created in the economy irrespective of the degree of liquidity.[5] For that purpose we may define the entire money supply with the asset side of commercial banks (knowing that every bank deposit is made by bank loan):

$$M = LOANINV + \sigma \tag{4}$$

*Where **M** is the overall money supply;*
***LOANINV** is the Bank credit at All Commercial Banks (asset side)*
***σ** is the net amount of money created (or 'destroyed') by Commercial Bank without providing loans (or debt repayment).*

We may say that σ is a more or less negligible part of commercial banks' balance sheet and therefore we can work with an approximate relationship expressed by the following equation:

$$M \doteq LOANINV \tag{5}$$

This equation essentially tells us that CCE is characterised by bank credit as a money supply because apparently all the money is the product of the commercial banks' lending activity and the natural need for credit. As Lavoie noticed: "*There is no difference between the outstanding amount of loans and the stock of money*." (Lavoie 1992, p. 156). Unfortunately, the definition is not entirely accurate. It is much more precise to say that the stock of money is equal to outstanding bank credit discounted by interest spread between the rates from aggregate loans and deposits:

$$M \doteq \frac{LOANINV}{(1 + r_s)} \tag{6}$$

Where $\boldsymbol{r_s}$ is an interest spread between the interest rates on loans and deposits as well as profit of commercial banks.

The realistic assumption $r_s > 0$ implies that:

$$\mathrm{M} < LOANINV \tag{7}$$

And therefore it is obvious that there is no possibility to repay all debts at once. Notwithstanding, we may dare to neglect the interest problem as far as theoretically $r_s = 0$ may supervene.

Total credit at commercial banks (LOANINV) does not consist primarily of loans to non-financial firms as it is supposed in the theoretical 'version' of CCE. In fact, industrial loans are in minority. The composition of the total bank credit in US is following (Figure 3):

[5] For instance, the Federal Reserve does not include large-time deposits into the broadest money aggregate it measures since 2006 – M2. Large-time deposits are, however, the 'rightful' money which are owed and must be repaid someday.

$$LOANINV = \sum USGSEC + \sum OTHSEC + \sum BUSLOANS + \sum REALLN + \sum CONSUMER + \sum OLLACBM027SBOG \quad (8)$$

Where USGSEC are Treasury and agency securities;
OTHSEC are Other securities;
BUSLOANS are Commercial and industrial loans;
REALLN are Real estate loans;
CONSUMER are Consumer loans, all commercial banks;
OLLACBM027SBOG are Other loans and leases.

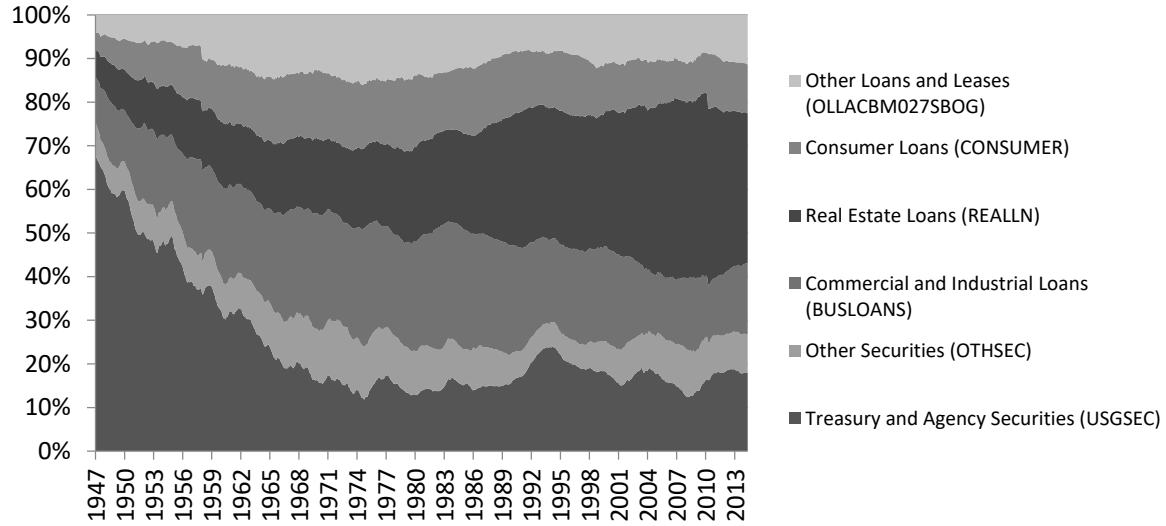


Fig. 3. Structure of bank credit in US – Asset side definition of money supply; Source: own elaboration based on data from Federal Reserve Bank of St. Louis (hereinafter "FRED"), 2015

We may define M as the total sum of deposits created by the loans at the liability side of the banking sector's balance sheet. As far as it is necessary to include all the deposits created by the loans into the total money supply we are obliged to add large-time deposits and institutional money market funds to M2. Thus (Figure 4):

$$M = M2NS + \sum LTDNS + \sum IMFSL \quad (9)$$

$$M = \sum CURRNS + \sum TVCKSNS + \sum DEMDEPNS + \sum OCDNS + \sum SAVINGNS + \sum RMFNS + \sum STDNS + \sum LTDNS \quad (10)$$

$$MZMSL = M2NS - \sum STDNS \quad (11)$$

Where M2NS is M2 money stock; MZMSL is money zero maturity. CURRNS is currency in circulation; TVCKSNS are Travelers Checks; DEMDEPNS are Demand Deposits; OCDNS are Other Checkable Deposits; SAVINGNS are Saving Deposits; RMFNS are Retail Money Funds; RMFNS are Institutional Money Funds; STDNS are Small Time Deposits; LTDNS are Large Time Deposits.

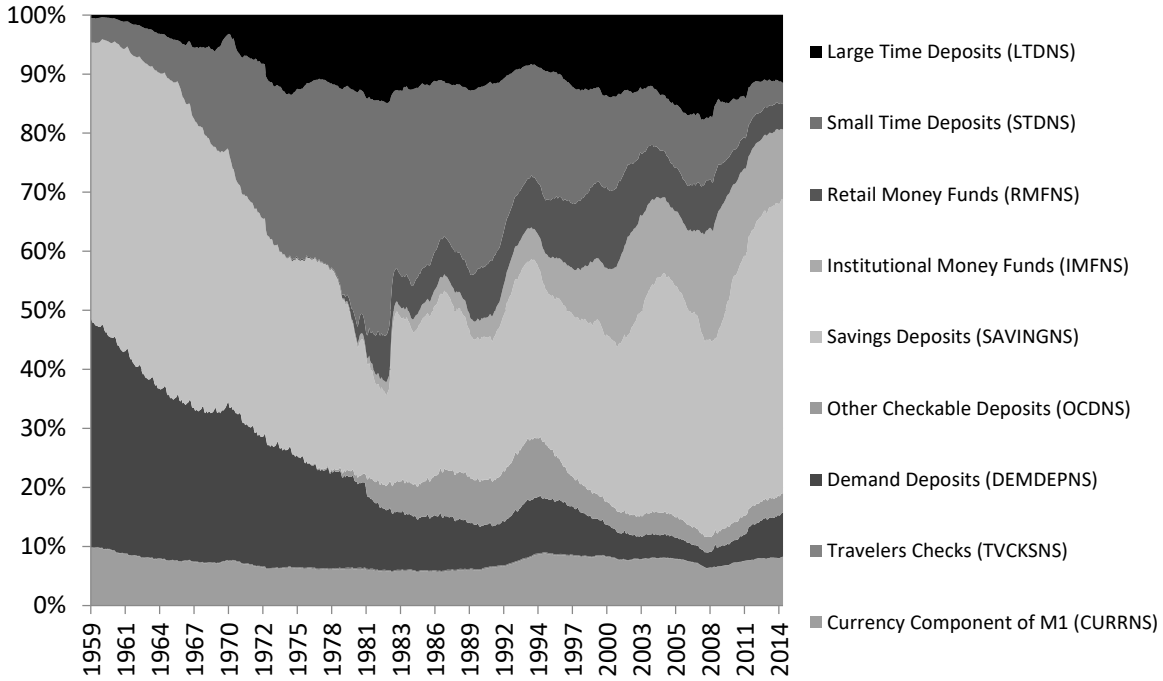


Fig. 4. Structure of bank deposits in US – Liability side definition of money supply; Source: own elaboration based on data from FRED, 2015

For the maximal accurate approximation of money supply, we will use both the asset side and liability side definition of money supply and their structures.

3. THE CAUSES OF THE CYCLICAL ECONOMIC DEVELOPMENT AND ITS SMOOTHING

The determination of an appropriate economic policy tools for smoothing out the business cycle must go hand in hand with the analysis of causes (and consequences) of the credit cycle. Before we start with a more detailed analysis, we may define the main cause of a credit cycle in a very general form. The author's general definition is as follows:

The main cause of a credit cycle is the existence of uncertainty related to dependence of current credit economy on sufficient credit growth.

It means that the necessity of a sufficiently positive credit growth (which is described primarily as a consequence of money hoarding above) cannot be fulfilled at the moment when some kind of sectoral bubble bursts. At a moment like this, commercial banks stop granting additional loans and therefore cut off the indebted sectors from additional credit necessary for paying down previous debt. In other words, fallacy of composition within the CCE means that Minsky's[6] speculative and Ponzi debt financing (Minsky 1992) is unavoidable at the moment when first hoarded money occurs. The sectors possessing high net financial assets (especially sector of high-net worth individuals – hereinafter "HNWI"[7])

[6] Application of Minsky's credit cycle theory on last deep crisis (2008) is provided by Whalen (2008)
[7] HNWI means: "*the world's high net worth individuals (HNWIs)—those with US$1 million or more in investable assets.*

interrupt (or at least curtail) the riskier investments and prefer holding of cash (savings and large time deposits), which strengthen the financial troubles of indebted sectors.

The relentless dependence on additional credit causes that effective demand does play a crucial role in the whole economic process. When effective demand declines, marginal firms and therefore marginal individuals find themselves in financial troubles because they are unable to meet their credit obligations. Limited credit conditions are followed by all the symptoms of a sagging economy; that is deflation, low or negative growth of real product, high unemployment, high insolvency and negative capital of commercial banks.

Figure 5 justifies why we can use the adjective 'current credit' economy. GDP growth (as a generally accepted measure of economic performance) is strongly related to the credit growth. Figure 5 depicts the filtered cyclical component of logarithmised and seasonally adjusted quarterly time series of bank credit (total bank credit measure by LOANINV) and gross domestic product (GDPC1). To decomposition and obtain cyclical component of the time series, the author used the simple HP filter technique with parameter $\lambda = 1600$.

$$min\{\sum_{t=1}^{T}(ln\ Y_t - ln\ Y^*_t)^2 + \sum_{t=2}^{T-1}[(ln\ Y^*_{t+1} - ln\ Y^*_t) - (ln\ Y^*_t - ln\ Y^*_{t-1})]\} \quad (12)$$

Where Y is gross domestic product (or bank loans);

Y^* is the trend component of gross domestic product (or bank loans);

λ is the parameter of trend smoothing.

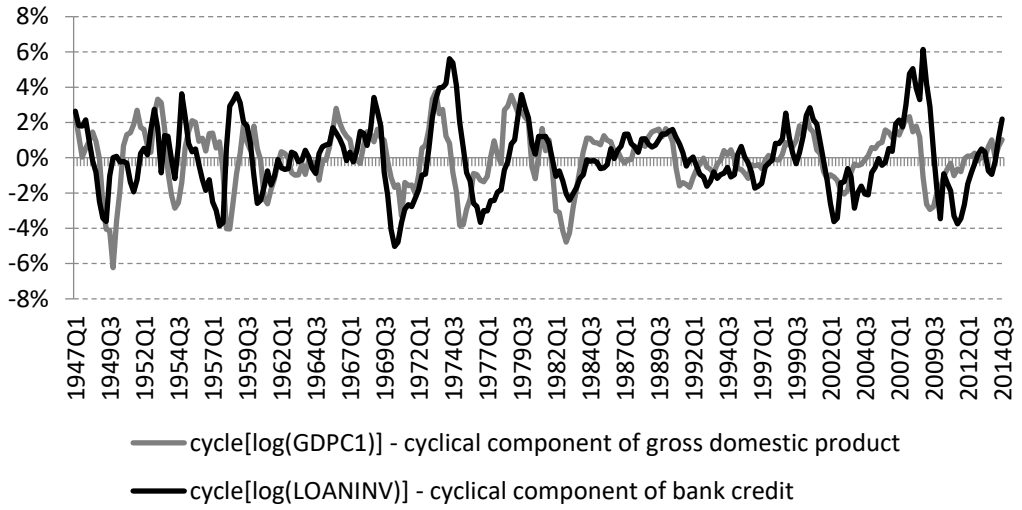


Fig. 5. Relation of credit and GDP growth within a current credit economy; Source: own elaboration based on data from FRED, 2015

Now, we will try to interpret some empirical characteristics of CCE which could be supportive for the above stated hypothesis of general causes of a credit cycle.

Investable wealth does not include the value of personal assets and property such as primary residences, collectibles, consumables, and consumer durables." (Capgemini, RBC WH 2013)

3.1 Money hoarding and decreasing velocity

3.1.1 The issue

The crucial problem of indebted sectors within their effort to repaying debt is the creditors' concentration of cash assets on deposit accounts. This cash hoarding implicitly does not only deepen the insolvency rate of debtors but also increases the amount of low-quality loans in commercial banks' assets and therefore makes the capital of the bank sector more negative.

Nonetheless, in practice, it is sometimes quite difficult to distinguish between hoarded money and temporary cash balances. Hoarded money could be measured only approximately. For instance, we can measure it by the amount of time deposits (especially large ones) or by extra cash balances of subjects which do not need additionally money for common transactions (that is diminishing propensity to consumption) or by the general macroeconomic indicators such as the velocity of money.

Figure 4 shows the growing ratio of large time deposits to the total money supply defined by the liability side of the banking sector. Figure 6 demonstrates a dynamic performance of money hoarding measured by a ratio of HNWI's monetary assets plus Corporations' idle cash balances[8] to money supply defined by the asset side of the banking sector. Finally, figure 7 presents a declining velocity ($LOANVEL$, M_VEL, $MZMSL_VEL$) of money defined by $LOANINV$ (asset side definition), M (liability side definition) and $MZMNS$ (money with zero maturity).

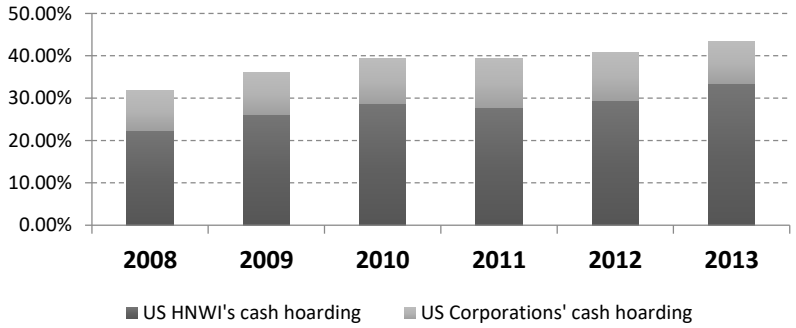


Fig. 6. Ratio of HNWI's and Corporations' cash balances to total money supply (measured by outstanding credit – asset side definition); Source: own elaboration based on data from FRED, 2015, Capgemini, 2014

[8] The reasons for corporations' cash hoarding are to be found in Sanchéz, Yurdagul, 2013.

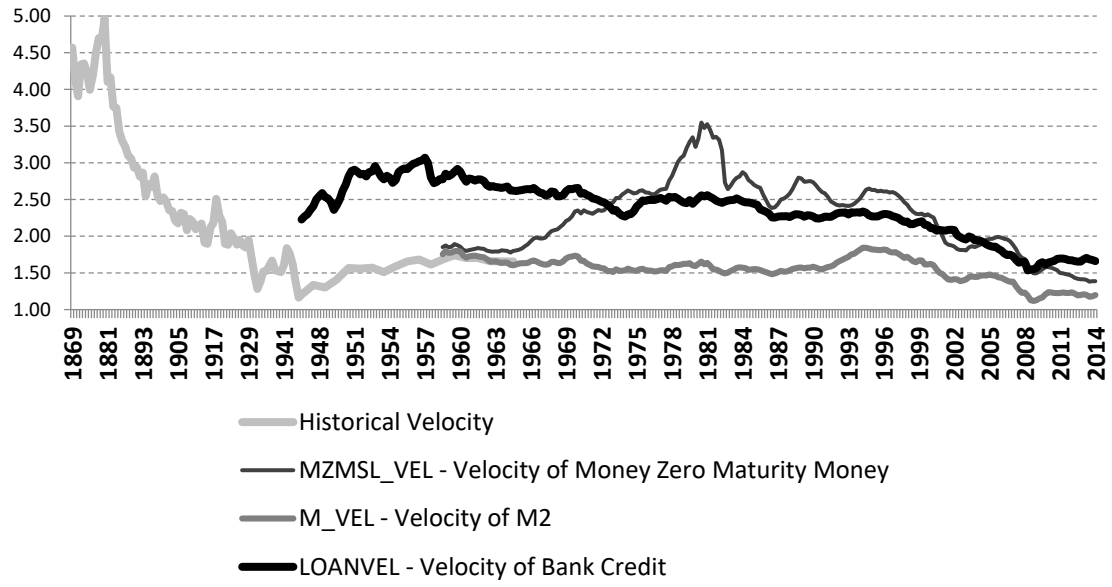


Fig. 7. Velocity of money measured by both the asset and liability side of the banking sector; Source: own elaboration based on data from FRED, 2015

In all mentioned cases, we may observe increasing tendency to money hoarding. Conclusively, we may introduce the monetary assets allocation of HNWI in some other significant continents (countries). As it is shown in Figure 8, Cash and Cash Equivalents dominate in Japan. This fact could be probably one of the crucial explanations of the critical condition of the Japanese banking sector[9] – that is HNWIs hold too much cash and thus debtors are unable to collect enough money to meet their obligations. This also leads to negative capital of the banking sector. Moreover, Japanese money velocity shows a constantly straight declining trend (Sudo 2011). In contrast with Japan and Europe, North American HNWIs hold more fixed income and equity financial instruments, which is probably caused by a relatively more properly working capital market and a higher ratio of 'final financing' there. It seems that the housing bubble has not burst yet in Australia because of the extraordinary high ratio of real estate among the assets of HNWIs there.

[9] For better imagination about the Japanese bank condition the author suggests Fujii, Kawai 2010.

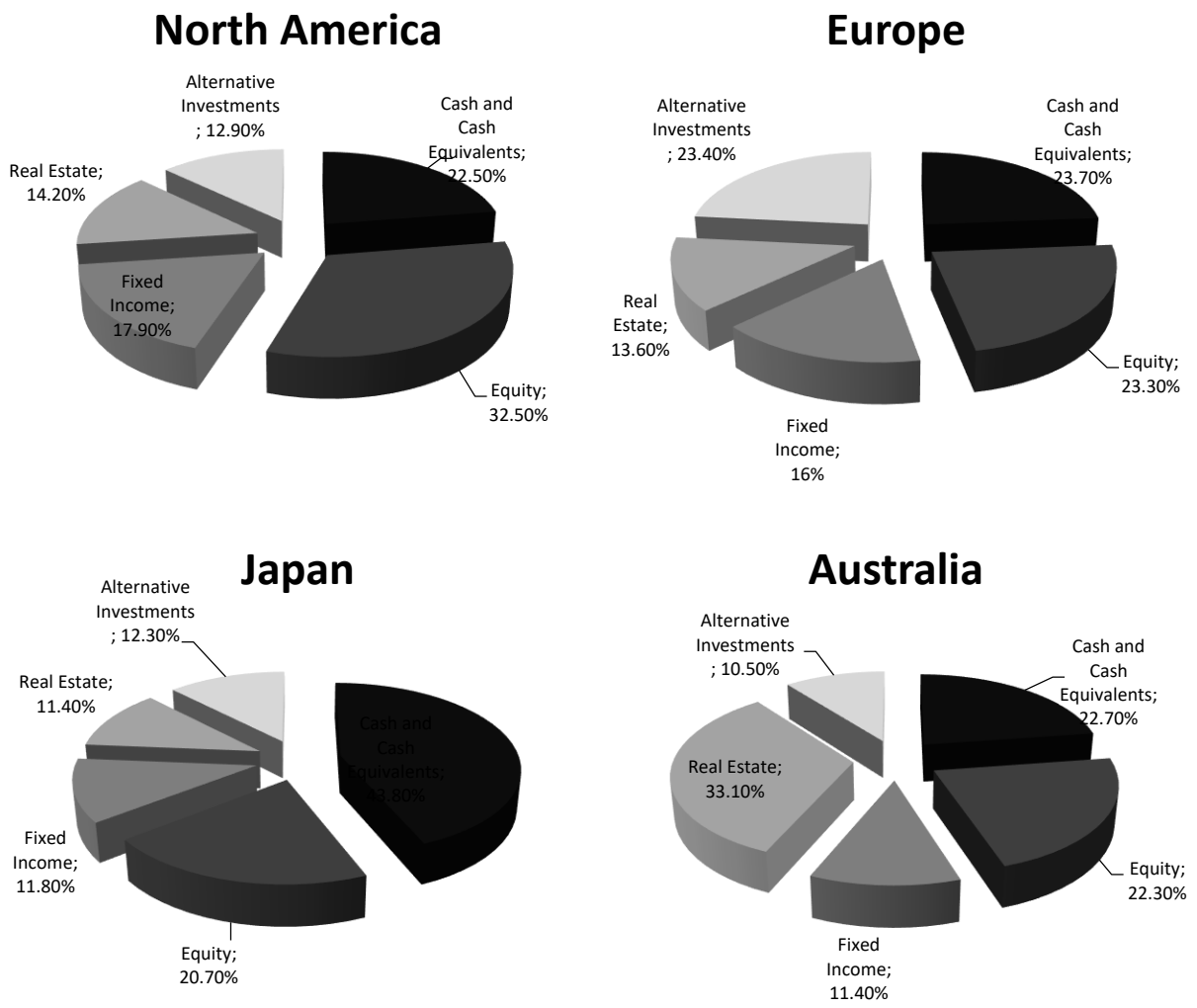


Fig. 8. Asset allocation of HNWI in different regions; Source: own elaboration based on data from Capgemini, 2014

3.1.2 The Solution

Strongly progressive taxation is probably one of the most effective (but not absolutely effective) solutions of the money hoarding trouble within CCE. Transfers must be, however, addressed to the debtors (usually middle-class) instead of 'just working class' or even back to HNWIs. In other words, we have to measure poverty by indebtedness instead of income or social weakness (however it often goes hand in hand).

It is, of course, not so simple to measure the exact rate of progressivity due to the variable tax base, tax exemptions, etc. Historically, the overall Indexes of Tax Progressivity have been constructed since the 1970s (see Suits 1977). Nevertheless, for our purposes we may use a top individual tax rate as a measurement of average tax progressivity. The approximate demonstration of progressivity and its influence on money hoarding is shown in Figure 9. From that historical point of view, the relationship seems to be negative – that is lower progressivity increases money hoarding (defined by velocity and large time deposits in the graph). In case of money zero maturity, the velocity had a growing tendency until the sharp fall in the eighties due to the strong high income tax cuts during Reagan's administration era.

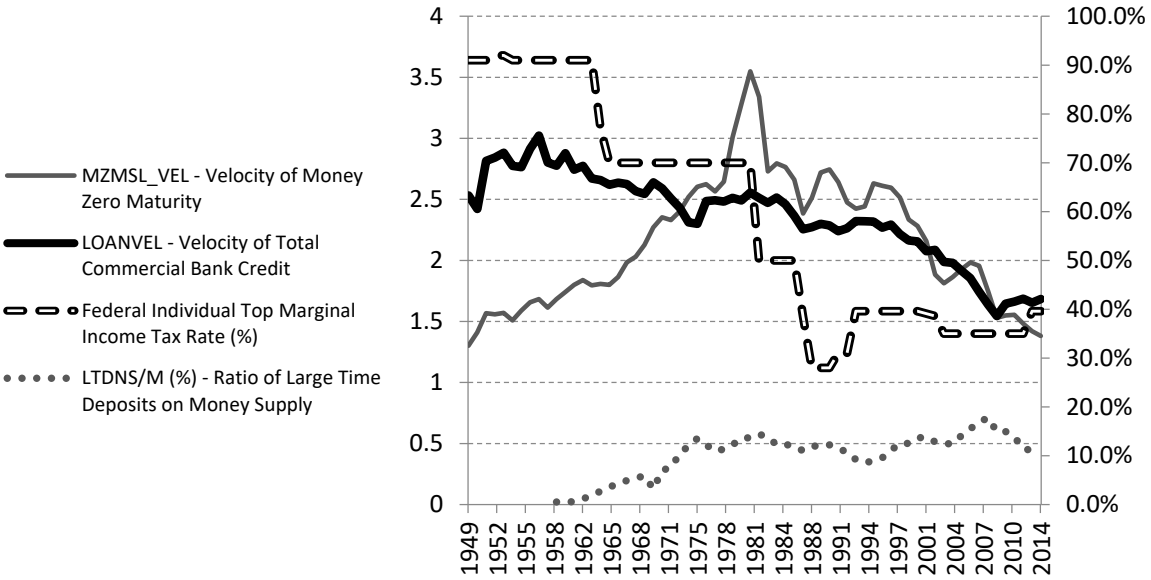


Fig. 9. Ratio of HNWI's and Corporations' cash balances to total money supply (measured by outstanding credit – asset side definition); Source: own elaboration based on data from FRED, 2015, Capgemini, 2014

The essence of income tax implies that it protects CCE from money hoarding (which boost credit cycle) ex ante whereas property tax reduces cycle variability ex post.

3.2 Insufficient credit (money supply) growth

3.2.1. The issue

Insufficient credit growth is strongly related to the money hoarding problem. As it is described in the theoretical part of this article, the outstanding credit cannot be repaid at once due to the hoarded balances. If credit growth is insufficient then the debtors are unable to use neither newly created money nor old hoarded money to repay their debts. At least temporary cash balances and a little hoarding will exist even with the strongest progressive taxation. Thus, the only option is a stimulation of additional credit growth.

Let the debtors' ability to repay debts be measured by the volume of bankruptcies (BT) measured by insolvencies statistics (both the consumer and business one) of American bankruptcy Institute (ABI). We may observe countercyclical development of the cyclical components of credit and bankruptcies in figure 10. First of all, we stationarised the given seasonally adjusted time series by eliminating the trend component (via HP filter with accordance to equation 12) and subsequently verified the stationarity by the ADF unit root test (table 2). It allowed us to determine the correlation coefficient between the examined time series and the Granger causality. The statistical results show that the time series are negatively correlated. Moreover, the result of the Granger test implies mutual causality. It seems that the extraordinary growth in bankruptcies stimulates commercial banks to restrict their lending activity in a short run. On the contrary, the restrictions put on credit growth cause (in combination with money hoarding) insufficient funds for repayments in a long run (table 2) which is in accordance with the minimal credit growth condition (equation 3).

Although the statistical results may be satisfactory, it is perhaps better to make an economic explanation derived from the essence of CCE. Statistical apparatus is only an imperfect support for our initial theory. We may conclude that sufficient and smooth credit growth is one of the main conditions for smoothing out the business cycle. The higher the money hoarding the greater the minimal credit growth and vice versa.

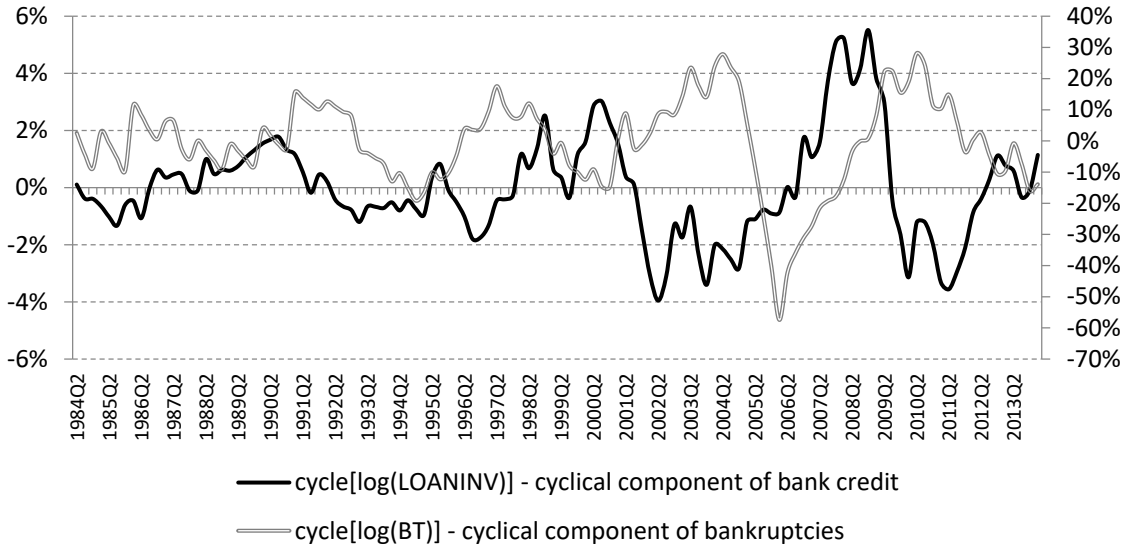


Fig. 10. Countercyclical development of cyclical components of amount of credit and volume of bankruptcies; Source: own elaboration based on data from FRED, 2015

Table 2. Correlation and causality between credit and bankruptcies; Source: own elaboration based on data from FRED, 2015

ADF unit root test***

Null hypothesis	Lag	t-static.	Prob.
cycle[log(LOANINV)] ↛ cycle[log(BT)]	2	-3,28	0,07**
cycle[log(BT)] ↛ cycle[log(LOANINV)]	2	-6,00	0,00*

**; ** rejected on 1%, resp. 10% level of significance*

**** Constant, Linear Trend*

Correlation coefficient	**-0,32**

Granger test causality

Null hypothesis	Lags	F-Statistic	Prob.
cycle[log(LOANINV)] ↛ cycle[log(BT)]	2	1,63	0,20
cycle[log(BT)] ↛ cycle[log(LOANINV)]	2	4,89	0,01*
cycle[log(LOANINV)] ↛ cycle[log(BT)]	4	1,07	0,37
cycle[log(BT)] ↛ cycle[log(LOANINV)]	4	2,65	0,04**
cycle[log(LOANINV)] ↛ cycle[log(BT)]	6	1,98	0,08***
cycle[log(BT)] ↛ cycle[log(LOANINV)]	6	1,55	0,17
cycle[log(LOANINV)] ↛ cycle[log(BT)]	8	1,74	0,09***
cycle[log(BT)] ↛ cycle[log(LOANINV)]	8	1,07	0,39
cycle[log(LOANINV)] ↛ cycle[log(BT)]	10	1,85	0,06***
cycle[log(BT)] ↛ cycle[log(LOANINV)]	10	0,83	0,60

** ;**;*** rejected on 1%, resp. 5%, resp. 10% level of significance*

3.2.2 The solution

In relatively normal times, a central bank is capable of stimulating credit growth via decreasing the nominal interest rate. On the opposite, according to Wray's interpretation of Minsky's opinion on interest rate policy, "*raising rates in boom would increase finance costs and hasten the transition to speculative and Ponzi financial position; lowering rates in a collapse would do little to encourage borrowing and spending if expectations were devastated*" (Wray, 2011). In other words, conventional setting of a short-term interest rate may work only in the 'optimistic' phase of the cycle and therefore may also prevent the economy from a shallow crisis by protecting the credit growth from a fall below its minimal level which is given by the rate of hoarding. On the contrary, a high short-term interest rate may deepen the deep crisis in a long run.

Figure 11 performs the approximation of a basic short-term interest (3M T-Bills yield) and its relation to the year-to-year change of credit growth (LOANINV_YoY). Note that whenever credit growth fell toward its minimal level, the FED lowered the basic interest rate in order to avoid the insufficient credit growth. It seems to be working in every shallow crisis, but it did not work during both deep crises (1929 and 2008) when interest rates reached a zero level and alternative economic policy tools had to take place.

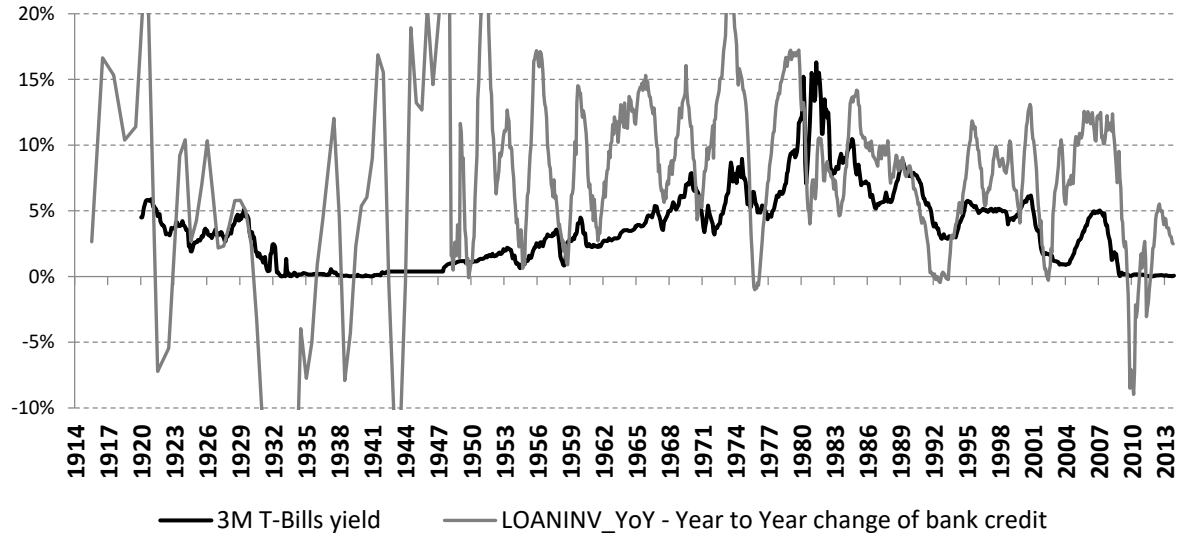


Fig. 11. Federal effective fund rate (3M T-Bills approximation) and credit growth; Source: own elaboration based on data from FRED, 2015

Unfortunately, conventional monetary policy does certainly not apply to a deep economic crisis. When economy once finds itself in a deep recession and the interest rate reaches zero level (see Iwata 2010), the only option remaining to a central bank is to play the role of the 'lender of last resort to both the banking sector and the government'. Within its new role, the central bank practices the large scale purchases, primarily of government bonds or other financial assets (Bernanke, 2009). This policy has, in fact, three objectives: *To provide a liquidity injection to the shrinking banking sector; Reduction of Long-term and Medium-term part of the yield curve to facilitate the financing of government deficit; Pushing the asset prices up in order to avoid the deflationary spiral.*

Even such economic liberal as Milton Friedman criticised FED for doing nothing and letting the credit crunch ruin the banking sector. FED should play its role of lender of last resort properly. In his own words (Friedman, Friedman, 1990):

"*The System could have provided a far better solution by engaging in large-scale open market purchases of government bonds. That would have provided banks with additional cash to meet the demands of their*

depositors. That would have ended—or at least sharply reduced—the stream of bank failures and have prevented the public's attempted conversion of deposits into currency from reducing the quantity of money. Unfortunately, the Fed's actions were hesitant and small. In the main, it stood idly by and let the crisis take its course—a pattern of behaviour that was to be repeated again and again during the next two years."

As it is obvious from Figure 12, FED did not repeat its mistake in 2008. The necessary credit growth has been recovered very quickly. However, unconventional monetary policy has only the necessary stabilising function. Necessary credit expansion has been primarily done via a fiscal stimulus (see next section).

In a pre-crisis period, a central bank mainly endeavours to satisfy the demand for cash (notes and coins) and other autonomous factors. Although the changes in the central bank's balance sheet are strongly related to the movement of autonomous factor (may be approximately measured by currency) before the crisis, it does not (or should not) apply in a deep recession (see Figure 13).

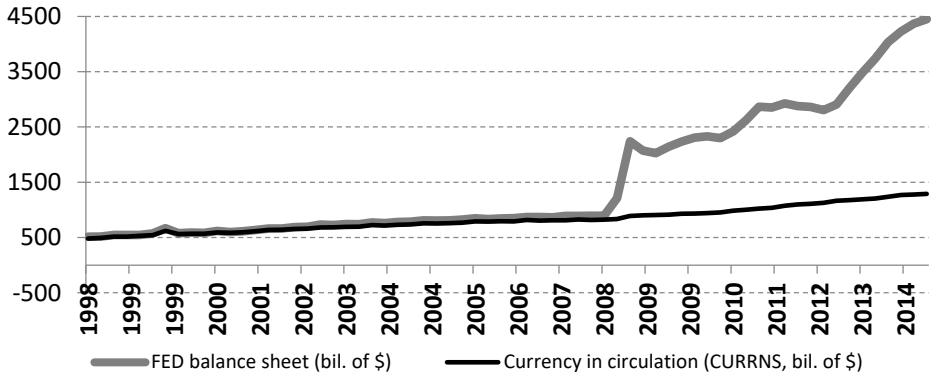


Fig. 12. Outright purchases of financial assets above the autonomous factors (QE) represented by currency; Source: own elaboration based on data from FRED, 2015

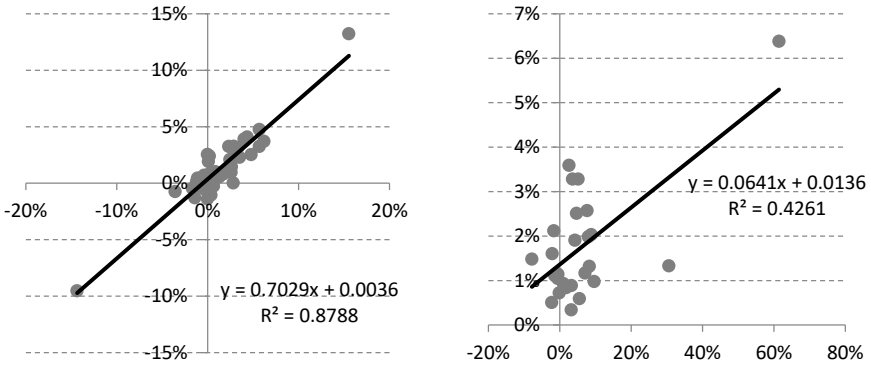


Fig. 13. Relation between FED's balance sheet and demand for currency in the pre-crisis (left graph) and post-crisis (right graph) period; Source: own elaboration based on data from FRED, 2015

To sum it up, conventional monetary policy may stabilise credit growth before or after a shallow crisis but unconventional monetary policy (called 'QE') must be used after deep crisis. The latter mainly helped to save the banking sector and indirectly contributed to stopping the process of deleveraging (negative credit growth). However, the main policy tool which can encourage a desired credit growth again, is slightly different.

4. CONCLUSIONS AND SUMMARY

The aim of this paper was to search for a remedy for business cycle volatility driven by the credit cycle. Contrary to one group of authors (Haldane, 2010) the author suggests that the business cycles are very strongly related to credit cycles. Unlike another group of authors (Ivanova, 2013), the author is heavily convinced that the origins of the shallow or deep crisis could be primarily explained by credit factors (endogenous money and monetary production) and imperfect financial institutions (asymmetric information) plus the related subjects (irrational individuals). However, the business cycles can be partly caused by real factors (like oil shocks for instance).

Table 3 offers the summarization of the above stated results and a solution of the initial matrix. Consider the fallacy of composition theorem, we may say that:

The higher the money hoarding the greater the minimal credit growth. The higher the credit growth the greater the systemic risk. The higher the systemic risk the greater the probability of deep crisis.

Therefore the high tax progressivity is necessary to maintain the minimal credit growth low enough to avoid the low quality loans. It applies to both the shallow and deep crisis in ex ante and ex post periods. Essentially, income taxes should be more effective ex ante whereas property taxes should be more effective ex post.

Conventional monetary policy – that is steering of short term interest rates – may be supportive for mitigating the volatility of the cycle in ex ante and ex post periods only in case of shallow crisis. Once the deep crisis occurs, there is no other way than to use unconventional monetary policy measures (especially QE). Nonetheless, unconventional monetary policy may serve only as an imperfect complement to fiscal expansion, only which may prevent the private sector from long-term deleveraging in the ex post crisis period.

The main 'Ex ante deep crisis' measurement is the regulation of the financial market, which protects the economy from bad loans (extension money hoarding) in a long run.

Table 3. Solved matrix: Overview of the economic policy tools for smoothing out the business cycle; Source: Own

Period	**Ex ante**		**Ex post**	
Solution **Measurement / Remedy**	*Shallow crisis*	*Deep crisis*	*Shallow crisis*	*Deep crisis*
Money hoarding	Progressive Taxation (Income taxes)	**Progressive Taxation (Income taxes)**	Progressive Taxation (Property taxes)	Progressive Taxation (Property taxes)
Insufficient credit growth	Short-term yield reduction (Traditional MP)	-	Short-term yield reduction (Traditional MP) + Fiscal stimulus (Government debt)	Long-term yield reduction (QE) + Fiscal Expansion (Government debt)
Deleveraging of private sector	-	-		
Unregulated financial market	-	**Regulation of financial market**	-	-

Figure 14 applies the above mentioned theory of smoothing out the business cycle on US economic development within historical time.

The first reporting period (1854–1929) is characterised by a high frequency of economic recessions which is a direct consequence of insufficient financial market regulation and no or low income tax progressivity (with the exemption of 1917–24 period). The Great Depression is the main inference of the previous insufficient economic policy. It took so long only because the laissez-faire doctrine was followed during Hoover's presidency and no ex post policy measurements were adopted.

The post war phase may be described as a period of sufficient financial market regulation and high tax progressivity. The result of this economic policy implies the slowly growing systemic risk and thus the low volatility of cycle and rare shallow crises except for the short period of stagflation in mid-70's caused primarily by oil shocks (1973 and 79).

The late 1970s may be represented by the start of the deregulation process and the first deregulation laws signed by Jimmy Carter. The worst decision which has been taken during Reagan's administration was the simultaneous significant cuts in tax progressivity with combination of financial market deregulation. In fact, it caused higher money hoarding and higher credit risk in the system which gradually (within the horizon of 30 years) led to a deep recession triggered by the mortgage bubble burst in 2008. Essentially, all ex-ante preventions for deep crisis were removed at the end of Clinton's era. It directly opened the way to another deep economic crisis. This way took almost 30 years only because the crisis was delayed by abnormal credit expansion. The crisis itself took, with comparison to great depression, so short only because all possible ex post measurements were adopted.

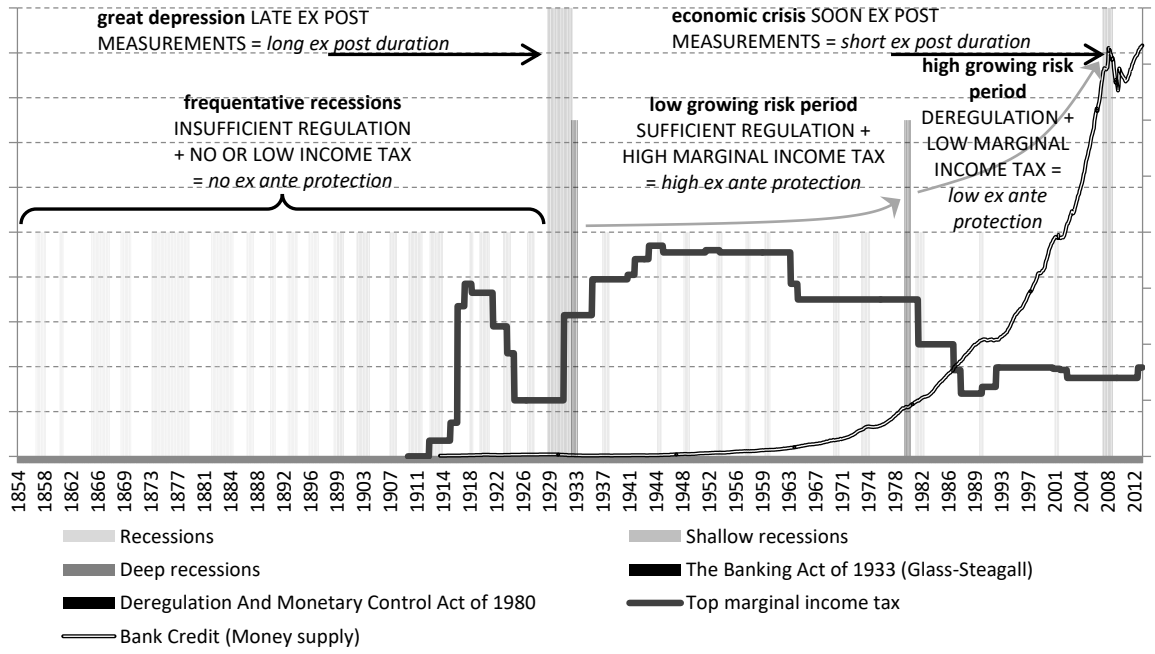


Fig. 14. Smoothing out the business and credit cycles in US history; Source: own elaboration based on data from FRED, 2015, Tax Foundation (2014)

Conclusively, we may observe several shallow and two deep crises (1929; 2008) in the last hundred years. The era before effective financial regulation was characterised by high variability of the credit cycle whereas the period after 'Glass-Steagall' was characterized by high stability of the credit cycle. Nonetheless, two kinds of stability must be distinguished. The permanent stability guided by slowly growing risk plus low money hoarding and the temporary (but maybe long lasting) stability accompanied by the significantly growing risk plus high money hoarding resulting in a deep crisis in the long run. In that sense, we must inevitably highlight the 1950s and 1960s as the era of the highest stability with only a slowly growing systemic risk in the US economic history.

REFERENCES

1. ABI. (2014): American Bankruptcy Institute, http://www.abiworld.org
2. Bernanke, B. S. 2009. The Crisis and the Policy Response. Speech. At the Stamp Lecture, London School of Economics, London, England, January 13, 2009
3. Burns, A. F., Mitchell, W. C. (1946): Measuring business cycles. National Bureau of Economic Research, New York.
4. Capgemini. (2014): World Wealth Report 2014. Capgemini, RBC Wealth Management.
5. Dow, S. C. (2001): Post Keynesian Methodology. In HOLT, R. P. F.; PRESSMAN, S. (Ed.). New Guide to Post-Keynesian Economics. Contemporary Political Economy Series – Series 6, Routledge Studies in Contemporary Political Economy Series, London: Routledge, p. 11 – 20
6. Edge, R., Hancock, D. (2009): U.S. Credit Cycles: Past and Present. Federal Reserve Board. Federal Reserve System.
7. Emmer, R. (1959): A Concept of Hoarding. The Review of Economics and Statistics, Vol. 41, No. 2, Part 1, p. 162 – 169.
8. Fellner, W. (1943): Monetary Policies and Hoarding in Periods of Stagnation. Journal of Political Economy, Vol. 51, No. 3, p. 191 – 205. The University of Chicago Press.
9. FRBB (1980): Depository Institutions Deregulation And Monetary Control Act of 1980. Federal Reserve Bank of Boston
10. FRBC. (1990): Smoothing out the business cycle. The Federal Reserve Bank of Chicago. Essays on Issues. No. 31.
11. FRBNY. (1933): The Glass-Steagall Act a.k.a. The Banking Act of 1933. Federal Reserve Bank of New York
12. Fujii, M., Kawai, M. (2010): Lessons from Japan's Banking Crisis, 1991 – 2005. ADBI Working Paper 222. Tokyo: Asian Development Bank Institute.
13. FRED – Federal Reserve Bank of St. Louis. (2015): [5.1.2015], http://research.stlouisfed.org/
14. Friedman, M., Friedman, R. (1990): Free to Choose: A personal statement. Hartcourt Brace Jovanovich.
15. Friedman, M., Schwartz, R. (1963): A monetary history of the United States 1867 – 1960. Princeton University Press.
16. Haldane, G. A. (2010): Curbing the credit cycle. Speech at Columbia University Center on Capitalism and Society Annual Conference, New York, 20 November 2010.
17. Ivanova, M. N. (2013): Marx, Minsky and the Great Recession. Review of Radical Political Economics. 45: 59.
18. Iwata, S. (2010): Monetary Policy and the Term Structure of Interest Rates When Short-Term Rates Are Close to Zero. MONETARY AND ECONOMIC STUDIES/NOVEMBER 2010, Monetary Affairs Department, Bank of Japan
19. Jespersen, J. (2011): Macroeconomic Methodology: A Post-Keynesian Perspective. Edward Elgar Publishing, 272 p.
20. Kaldor, N. (1972): The irrelevance of Equilibrium Economics. The Economic Journal, Vol. 82, No. 328, (December 1972), pp. 1237 – 1255
21. Keen, S. (2011): Debunking Economics: The Naked Emperor Dethroned? ZED Book. London/New York
22. Keynes, J. M. (1997): [1936]. The General Theory of Employment, Interest and Money. New York: Prometheus Books.

23. Koo, R. C. (2011a): The Holy Grail of Macroeconomics: Lessons from Japans Great Recession. John Wiley & Sons, 256 p.
24. Koo, R. C. (2011b): The world in balance sheet recession: causes, cure, and politics. Real-world economics review, issue no. 58, pp.19-37
25. Koo, R. C. (2013): Central Banks in Balance Sheet Recessions: A Search for Correct Response. Nomura Research Institute.
26. Lavoie, M. (1992): Foundations of Post-Keynesian Economic Analysis: New Directions in Modern Economics Series. Elgar Reference Collection, Edward Elgar Pub, 461 p.
27. Lown, C., Morgan, D. P. (2006): The Credit Cycle and the Business Cycle: New Findings Using the Loan Officer Opinion. Journal of Money, Credit and Banking, Vol. 38, No. 6. Pp. 1575-1579, Published by Ohio State University PressStable
28. MacKinnon, K. (1999): A Pure Credit Economy, Canadian Journal of Economics, Vol. 32, No. 5
29. Marinescu, C. (2012): The Limit between the Rational and Irrational Behaviour in the Economic Science. Theoretical and Applied Economics Volume XIX (2012), No. 6(571), p. 143-156
30. Marx, K. [1867] (1990): Capital: A critique of political economy, vol. I. London: Penguin Classics.
31. Minsky, H., P. (1986): "Stabilizing an Unstable Economy". Bard Digital Commons. Minsky Archive. Paper 144.
32. Minsky, H. (1992): The Financial Instability Hypothesis. The Jerome Levy Economics Institute of Bard College, Working Paper No. 74
33. Rappoport, P., White, E. N. (1994): Was the Crash of 1929 Expected? The American Economic Review. Vol. 84, No. 1, p. 271 – 281, Published by American Economic Association.
34. Robertson, D. H. (1933): Saving and Hoarding. The Economic Journal, Vol. 43, No. 171, p. 399 – 413; published by Wiley on behalf of the Royal Economic Society.
35. Rochon, L. P. (1999): The Creation and Circulation of Endogenous Money: A Circuit Dynamique Approach. Journal of Economic Issues; Vol. 33. No. 1; ProQuest Central
36. Rochon, L. P. (2005): The Existence of Monetary Profits within the Monetary Circuit. In Fontana and Realfonzo. The Monetary Theory of Production. Basingstoke: Palgrave Macmillan.
37. Rochon, L. P., Rossi, S. (2003) : Modern Theories of Money: The Nature and Role of Money in Capitalist Economy. Published by Edward Elgar Publishing.
38. Shin, S. H. (2008): Securitization and Financial Stability. The Economic Journal, 119 (March 2008), p. 309-322.
39. Sánchez, M., Yurdagul, E. (2013): Why Are Corporations Holding So Much Cash? The Regional Economist, Business Trends.
40. Schumpeter, J. A. (1934): The Theory of Economic Development. President and Fellows of Harvard College.
41. Suits, D. B. (1977): Measurement of Tax Progressivity. The American Economic Review. Pp 747-752
42. Taxfoundation.org. (2014): http://www.taxfoundation.org/
43. WEF, Wyman, O. (2012): Rethinking Financial Innovation Reducing Negative Outcomes While Retaining The Benefits. A World Economic Forum report in collaboration with Oliver Wyman.
44. Whalen, J. CH. (2008): The Credit Crunch: A Minsky Moment. Studi e Note di Economia. Anno XIII, n. 1-2008, p. 03-21
45. Wicksell, K. [1898] (1962): Interest and Prices. Sentry Press, New York, N. Y. 10019

46. Wray, R. L. (2006): Teaching the Fallacy of Composition: The Federal Budget Deficit. CEEPS. Policy Note No. 06/01
47. Wray, R. L. (2011): Minsky Crisis. Levy Economics Institute of Bard College, Working Paper No. 659