Eurasian Journal of Economics and Finance, 2(3), 2014, 1-25
DOI: 10.15604/ejef.2014.02.03.001

EURASIAN JOURNAL OF ECONOMICS AND FINANCE

http://www.eurasianpublications.com

THE OPTIMAL INTEREST RATES AND THE CURRENT INTEREST RATE SYSTEM

Ioannis N. Kallianiotis
University of Scranton, USA. E-Mail: ioannis.kallianiotis@scranton.edu

Abstract

The paper discusses the current target interest rate, which is closed to zero with the new experiment of quantitative easing since 2009 and has reduced the rate of return and the income and has made the real savings rate negative. This target rate has not reduced unemployment and has not improved growth (it is not optimal), but has increased the debt of individuals and the low taxes on businesses have magnified the budget deficits and the national debt. People were borrowing the present value of their uncertain future wealth and their high debt and low income raise the risk and this high risk premium heighten the interest rate on loans, especially on credit cards. The current monetary system needs to be changed and an interest rate floor on deposits (savings) and an interest rate ceiling on individuals' loans (borrowings) is necessary to improve social welfare, fairness, and justice in our society and not to support only disintermediation (financial markets). The middle class cannot work only to pay taxes and interest on its debt (redistribution of their wealth to government and banks) or worse to be in chronic unemployment. Many home owners defaulted on their loans payments and their homes are foreclosed. They will end up without property (real assets). The unconcern towards the middle class will affect negatively the entire socio-economic structure of the nation and after losing its productive power, it will start declining, as history has shown to us with so many empires that do not exist anymore. We hope the leaders (the democratic governments) to improve public policies, to regulate the financial market and institutions, and to satisfy their policy ultimate objective, which is citizens' perfection and the nation's highest point of prosperity.

Keywords: Estimation, Time-Series Models, Forecasting and Other Model Applications, Consumption; Saving, Taxation, Government Expenditures, Interest Rates
JEL Classification: C13, C22, C53, E21, H20, H50, E43

1. Introduction

The latest consumption had exceeded any historic measures. People were spending the largest proportion of their life income and wealth by borrowing the present value of their uncertain future income. The Fed was keeping the federal funds rate low, too. The deregulated banks were offering without any restrictions or inspections any amount of money that individuals wanted to borrow by increasing the risk-premium for a high debt customer. As a result of this irrational behavior individuals and households ended up with loans, which might exceed their life-cycle income and their interest payment had become the largest component of their total expenses. Banks, with their enormous risk premia, their collateral on loans, and their corruption, are the only winners. The same behavior was followed by nations and their treasuries; so their debts and deficits have reached the enormous amounts that are impossible to be paid back even with

any austerities (enormous taxes and reductions in salaries, wages, and pensions) imposed on the citizens or with any privatizations (sell offs) of the public wealth of the nations. What a delusion that we were living for many years!

Up to now, all the benefits have gone to the banks and speculators (hedge funds), which are making tremendous revenues from interest income (with deposits' rate closed to zero and high loans' rate) and are threatening individuals (with foreclosures)[1] and nations (with sell offs, confiscations, and defaults)[2] that are unable to pay off their loans. With this irrational behavior of people and governments, banks are in control of them; the socio-economic system (the free market) is in a social cliff, which restricts the hope from humans. Regulators and policy makers continue with their distractive pro-market and anti-individuals policies. This crisis is unique in human history; thus, this could not have happened by mistake. Responsible for any social problem are the powerless governments that did not regulate the corrupted markets and institutions and the ignorant (controlled) people (voters), who did not prevent the current crisis of waste and of global catastrophe. Democracies are under extinction and globalization showed without any excuse its true face. The new socio-economic era has started and everything will be different from now on.

The U.S. economy, as a prototype of the "free-market", the predecessor of globalization, had long been characterized by international imbalances in its current and capital accounts because the country does not produce the goods needed for its consumption ($Y-E<0$). Large current account surpluses, denominated in U.S. dollars (Fed's liabilities), earned by Japan in the 1980s and by China in the 1990s and 2000s were recycled to the U.S. in the form of purchasing of U.S. government and private sector securities (debt instruments). It allows the U.S. to continue to run its twin deficits (current account[3] and budget deficit or national debt[4]). The low price of Chinese products kept inflation low in the U.S. and because of this low inflation premium, an unexpected low risk (low risk premium), and a quantitative easing by the Fed (Kallianiotis, 2014b), the U.S. interest rate remained low (it was kept low to improve the financial market). With this low cost of capital, consumers were encouraged to finance their consumption and investment by increasing their indebtedness. It also caused many bubbles in all the assets (financial and real). When these bubbles burst, the losses were enormous, following by recessions and high unemployment in the U.S. and in 2007 a global financial crisis began and destroyed the Euro-zone economies, due to their enormous debts and other socio-political problems that European governments did not prevent them, due to their corruption, common currency,[5] and direct commanding from the controlled Brussels (just to mention a name).

Unfortunately, the deregulation, the housing market, and the financial innovations helped to build up this enormous debt that eventually collapsed and changed the entire global financial system. The total debt in the U.S. (government +private) was $183.1 trillion (December

---

[1] As it happened in ancient times, by enslaving the debtors. "When he began the reckoning, one who owed him ten thousand talents was brought to him; and, as he could not pay, his lord ordered him to be sold, together with his wife and children and all his possessions, and payment to be made. So the slave fell on his knees before him, saying, 'Have patience with me, and I will pay you everything.' And out of pity for him, the lord of that slave released him and forgave him the debt." (Matthew 18: 24-27). Consequently, there is no improvement in our socio-economic system after 2,000 years, rather it is deterioration because in those days the debt could be forgiven, but not in our times; today, the lender (bank) will take your home and any other assets if someone is unable to pay his debt.

[2] As it happened with Argentina on August 7, 2014. See, RT, 2014. Who is to blame for Argentina's default? [online] Available at: <http://rt.com/op-edge/178400-blame-for-argentina-default/> [Accessed 06 August 2014].

[3] See, *BEA*, U.S. Department of Commerce, <http://www.bea.gov/international/index.htm> [Accessed 04 November 2014].

[4] See, *Treasury Direct*, <http://www.treasurydirect.gov/govt/reports/pd/mspd/2012/2012.htm> [Accessed 04 January 2013].

[5] In 1973, the fixed exchange system was abandoned because it was inefficient and the flexible exchange rate regime was adopted. Then, how is it possible and rational for Europeans to go back to an even worse regime than the fixed exchange rate, to the common currency? Something is wrong with this anti-humane "innovation".

31, 2011) and the real GDP was $13.638 trillion (2012:Q3); which is 1,342.56% of the GDP. On February 25, 2014, it was $185.322 trillion and the real GDP was $15.966 trillion (12/31/2013), which was 1,160.73% of the GDP. The ND is 109% of the GDP and the total public debt is 885.5% of the GDP. [6] The question is here: Is this debt sustainable? And if the answer is "Yes"; for how long? Loan officers tried to maximize their fees, their salaries, and their bonuses by avoiding the consideration of any prudent underwriting standard. Rating firms are also very subjective in their evaluations. Regulatory authorities tried to propagate and prove with alchemies that this is the proper way to prosperity. Speculators and usurers (the backbone of the "free-market") are thriving. At the same time, a lot of fraud, corruption, and greed increase the risk even further. Of course, authorities and regulatory agents and above all the U.S. government and the Fed are responsible for these crises. Now, we know that even small events (mistakes) can have an enormous impact on the international financial system because of its high correlation. The world could not become the same anymore. These latest crises were a new phenomenon for the average naïve person, but not for the well informed individuals,[7] who were expected them and are waiting for the coming ones.

Before the current crisis, there were no crises in Europe and national central banks (domestic monetary policy) and independent governments (domestic fiscal policy) had learned to prevent them. The creation of the Fed and the extensive regulations of the financial system were prevented financial crises in the U.S., too. In Europe, financial regulations went even farther. Governments controlled the allocation of capital to different industries through state-owned banks and enterprises and were putting interest rate ceilings on loans. This extensive regulation might be the reason that there were no crises in financial institutions from 1944 to 1971 (Allen and Gale, 2009). After that period, the "dark powers" took over completely the global financial system and we see the first results, today; of course, it will continue and will become worse with the passing of time. The U.S. did a very big mistake with deregulations that started in 1980s and it lost completely the control of the market.

Financial innovations and new instruments even "toxic" ones became the pride of those having a large "brain-spread".[8] Bank notes are used, today, very little in our transactions. People are using electronic money (credit, debit, and other cards) in their payment system and there is no need to print currency anymore.[9] Authorities, without money, can control directly all transactions and those involved in these transactions, because they will know all spending, who is the spender, and from where this purchase took place. Individuals' liberties are shrinking and soon there will be zero. This is the trend the last years and globalization is very successful in satisfying that "social" objective (global control of people).[10]

The Fed keeps the interest rate closed to zero lower bound ($\bar{i}_{FF} = 0.25\%$) since December 2008 and on September 13, 2012 in a statement, it said, "exceptionally low levels for the federal funds rate are likely to be warranted at least through mid-2015". Many economists have argued whether using Rules in framing monetary policies is better than the discretion of

---

[6] See, *Grandfather Economic Report Series* <http://grandfather-economic-report.com/debt-summary-table.htm> [Accessed 01 January 2012]

[7] The well informed individual has in fact full information, which is Π (from the Greek word: Πληροφορίαι); information I is a proper subset of Π ($I \subset \Pi$). The public information provided by the media is only at the level I; thus, the public is misinformed. The 21st century must be called as "the century of miss-information" and the new millennium as "the millennium of ignorance and deception".

[8] One trader told me that the "brain-spread" between those, who work for the Wall Street and those, who work for the Main Street and the government is enormous, thousands of basis points. This is their wild egotism and derogation against everybody and everything else. How can it be possible to depend our economic well-being on them?

[9] Sweden is planning to abandon the use of bank notes and coins for transactions because only 3% of the total transactions in the country are taking place with notes. See, *Dailynews24.gr*, September 12, 2012. Hackers are going to be very busy stealing cards' numbers and usurp their balances; then, new safety measures will be necessary and they are already working on them. (*sic*).

[10] In Greece, the racial against Greeks puppet government (especially, its Prime Minister) passed a new anti-constitutional ("anti-racial") Bill (Law), which nullifies even the freedom of speech for Greeks, the begetters of democracy (sic). See, Natsios (2014).

the policy maker. The rules vs. discretion debate was the mainstream argument of monetary policy framing in the 1960s to the 1980s and there is still no single opinion on what is better. However, some economists (i.e., John Taylor) are inclined towards using rules rather than discretion. Taylor said: "You do not prevent bailouts by giving the government more power to intervene in a discretionary manner. You prevent bailouts by requiring adequate capital based on simple, enforceable rules and by making it possible for failing firms to go through bankruptcy without causing disruption to the financial system and the economy." He is indicating a clear preference over rules rather than discretion in monetary policies. The objective is that we need monetary policies to be effective and improve the social welfare. The Federal Reserve holds trillion of dollars' worth of government securities to keep the interest rate low. The monetary base from (8/2008) $877 billion reached (8/2014) $4,125 billion.[11] The U.S. Treasury pays interest to the Fed on the securities held by the central bank. The Fed is receiving the proceeds of printing money (seigniorage), too. This specific inflation target policy, the payment of interest on reserves, the use of forward guidance, and the quantitative easing have changed the dual mandate (inflation and unemployment) that comes from the U.S. Congress. Even Fed's chairman, Benjamin Bernanke, said, "…the problem with QE is it works in practice, but it doesn't work in theory". (Williamson, 2014, p.118). Unfortunately, it does not work in practice, too; the economy cannot recover since 2009 and the unemployment is very high. This is obvious that the public policy is determined by the Fed and not by the Treasury (the government) and the results prove that it is not very effective.[12]

The pure monetary policy without using any fiscal one or using anti-growth fiscal policies as the Euro-zone, cannot improve growth and employment. All the jobs that have been created during this period are low income (minimum wages without health insurance) jobs. Monetary policy is not sufficient for the economies to recover from the latest systemic crisis. The unemployment is high and prices are going up. There are no gains for the labor-market. Also, many jobs are only part-time or half-time. This low income cannot generate any demand, growth or production; it just increases the expenses of the government for its welfare programs. The quantitative easing is a neo-classical monetarist theory that does not work for the people and the society. The pace of growth has slowed globally and it seems that the world is going towards a second crisis. The inflation is still low in many economies, due to the slackening demand. The Euro-zone growth is closed to zero, in U.S. and other advanced economies is closed to 2%, in the emerging developing economies the growth is about 5%, in the emerging developing Asian economies the growth is about 7%, and the world growth is in the area of 3%.[13]

Interest charges[14] are like a strongly "regressive tax" that the poor pay to the rich (banks and usurers). The poorer pays higher "tax rates" (high risk premium) because of his higher credit risk. The risk premium in the U.S. on credit is up to the unfair and unethical rate of 40%. Thus, there is a redistribution of wealth from the poor (Main Street) to banks (Wall Street). Governments have to intervene and put a cup on the interest rate (i.e., 5% above the prime rate) and a floor on the deposit rate (i.e., 1% above the inflation rate) and to regulate the greediness of the market. The current monetary policy with its interest rate system is unfair and not effective and the economy cannot recover. The real GDP growth and the unemployment rate were lately, as follows: 2007: 1.8% and 5%, 2008: -0.03% and 7.3%, 2009: -2.8% and 10%, 2010: 2.5% and 9.7%, 2011: 1.6% and 9%, 2012: 2.3% and 8%, 2013: 2.2% and 7.4%, and in

[11] A growth of 370.35% in six years or 61.73% per annum. Something seems very wrong, here. This quantitative easing policy does not work. We have just flooded the world with dollars! See, New York Post, 2014. Obama's $4 trillion gift to the rich. [online] Available at: <http://nypost.com/2014/10/12/obamas-4-trillion-gift-to-the-rich/> [Accessed 12 October 2014]

[12] Central bankers gathering in Jackson Hole, Wyoming, U.S.A., confront a global economy that has again disappointed, leaving them reluctant in some places and unable to turn off spigots of easy money employed since 2008 to boost growth. (*The Wall Street Journal*, August 22, 2014, pp. A1 and A2).

[13] These forecasting data are coming from IMF. The inflation data seems that are understated globally.

[14] Interest is a very old cost of capital or return on investment. Even the Holy Bible mentions it. "Then you ought to have invested my money with the bankers, and on my return I would have received what was my own with interest." (Matthew 25: 27).

2014Q1: -2.11% and 6.7%, in 2014Q2: 3.95% and 6.2%, and in 2014Q3: 3.5% and 5.9%. (*Economagic.com)*. Also, IMF is revising downward its forecasting for the growth of the world economies.

Lately, there is a dollar crisis in the world, together with all the global crises, due to the enormous level of the U.S. deficits and debt: [Federal debt=$17.913 trillion, social security liability=$20.5 trillion, Medicare and Medicaid contingent liabilities=$98 trillion, state and local governments=$5.71 trillion, business sector debt=$11.63 trillion, financial sector debt=$13.6 trillion, total personal debt=$13.22 trillion, financial sector bail-out=$2.5 trillion, other debts=$2.74 trillion: Total debt (public and private)= $185.813 trillion]. The GDP (2014:Q2) was $16.0104 trillion. Then, the total debt is 1,160.58% of the GDP. The Federal Reserve Bank tries to keep the interest rate low (quantitative easing) to affect positively the financial markets, but this policy did not help so much the real economy because we have reached a liquidity trap.[15] This Fed's policy is only pro-market and not pro-social. Thus, the social benefits of this zero target rate monetary policy, are insignificant. Also, this policy of enormous liquidity caused the bubbles in the financial market and in the housing market and finally, it will induce inflation,[16] when the unemployment will reach the natural level. The U.S. dollar has declined from its pick point USXRI=138 (1985:M03) until now USXRI=81.0257 (2014:M10) by more than -41.29% with respect the major currencies.[17] With respect to the euro, the dollar has declined from 0.8530 $/€ (2001:M06) to 1.6001 $/€ (2008:M04), which was -87.76%. Now (10/21/2014), it is 1.2737 $/€, a loss of -49.32% since its pick value. All these problems keep the interest rate in the economy far from its optimal level. Also, except the ineffectiveness of the monetary, fiscal, and trade policy, the foreign policy is even less effective and without any benefit for the Americans.

These global debt crises and bubbles in almost every market are becoming cleverly and skillfully "political crises", like Syria, Iraq, Ukraine, etc. "The Ukraine crisis sparked a global stock selloff and drove up oil, gold and wheat prices. U.S. stocks fell. The DJIA slid 153.68 to 16,168.03 on March 3, 2014".[18] The West tries to externalize its domestic crises by going against the other nations and especially, against the Orthodox ones (Yugoslavia, Greece, Cyprus, Russia, etc.) because they do not accept the delusion of the apostate West. Now, Iraq and Syria are again back in the picture, due to the fanatic extremists, ISIS, who are assassinating all Christians in the region.[19] Kallianiotis (2011) used a Social Distress Index (SDI) to measure the U.S. social distress. Thus, for the beginning of 2012, the Social Distress Index (SDI=unemployment rate + inflation rate + total debt as the percentage of GDP) for the U.S. was: $SDI = u + \pi + d = 8.3\% + 3.58\% + 1{,}350.03\% = 1{,}361.91\%$; at the end of March 2013, the SDI fell to: $SDI = u + \pi + d = 7.6\% + 3.12\% + 1{,}343.1\% = 1{,}353.82\%$; in March 2014 it became: $SDI = u + \pi + d = 6.6\% + 1.6\% + 1{,}163.5\% = 1{,}171.7\%$; and for the month of September 2014 became officially: $SDI = u + \pi + d = 5.9\% + 1.7\% + 1{,}160.58\% = 1{,}168.18\%$, which show that the country is improving a little, but it is still extremely distressful (risky). But by taking into consideration the data from the *Shadow Government Statistics (SGS)*, it becomes: $SDI = u + \pi + d = 23.2\% + 10\% + 1{,}160.58\% = 1{,}193.78\%$. The U.S. needs 12 years to pay off its debt, if all the other spending would be zero. Then, it is impossible! Thus, the U.S. debt is unsustainable.

Some of the extensive literature on this subject is the following. Keynes (1964) gives an excellent analysis of monetary policy, which changed our public policy thinking. Friedman (1969) discusses the optimal quantity of money in our economy to keep the inflation low. Levin

---

[15] The liquidity trap, in Keynesian Economics, is a situation where Monetary Policy is unable to stimulate the economy, either through lowering interest rates or increasing the money supply. Liquidity traps typically occur when expectations of adverse events (e.g., deflation, insufficient aggregate demand, low confidence, high risk or civil or international war or global chaos, as today) make persons with liquid assets unwilling to invest and banks reluctant to lend.

[16] The official inflation rate in the month of July 2011 was, $\pi = 6.22\%$ per annum. (*Economagic.com*). Now (September 2014), it is 1.7%.

[17] USXRI is the Trade Weighted U.S. Exchange Rate Index of Major Currencies (*Economagic.com*).

[18] See, *The Wall Street Journal*, March 4, 2014, pp. A1 and C1.

[19] See, *The Wall Street Journal*, June 12, 2014, p. A1.

(1998) talks about the simple monetary policy rule under conditions of uncertainty. Orphanides (1998) makes a very good evaluation of monetary policy under noisy information. Sack (1998) presents a VAR analysis showing how the Fed acts during an economic event. Sack and Wieland (1999) argue that interest-rate smoothing may well represent optimal behavior on the part of central banks whose only objectives are to stabilize output and inflation. Giannoni and Woodford (2002) offer general conditions under which optimal policy can be represented by a "super-inertial" interest rate and it can be represented by a pure "targeting rule". Woodford (2002) discusses an optimal interest rate smoothing for the Fed's policy. Faia and Monacelli (2007) use a welfare-maximizing interest rate rule and found that monetary policy should respond to increases in asset prices by lowering interest rates, but when monetary policy responds strongly to inflation, the marginal welfare gain of responding to asset prices vanishes. Gahvari (2007) presents the Friedman rule of optimum amount of money. Singh and Nikolaou (2013) derive Taylor-like rules from central bank interest rates bounded below by zero with the use of a multi-parametric model predictive control (mpMPC) framework. Kallianiotis (2014b) talks about the Fed's and ECB's monetary policy during the latest financial crisis. Williamson (2014) discusses the Fed's current policy and says that it has no effect on labor force participation and employment, as the theory and the empirical evidence show.

2. A Theoretical Model

In our economy, today, that we have made debt a virtue and saving a vice, individuals and households are just paying interest for their entire life, which is socially and economically wrong and unproductive. (Kallianiotis, 2014a, Appendix, pp.136-138). Interest payments comprise the following components,

$$I_t = I_{SL_t} + I_{AL_t} + I_{M_t} + I_{CC_t} + I_{HEL_t} \tag{1}$$

where, I_t = total interest payment, I_{SL_t} = interest on student loan, I_{AL_t} = interest on auto loan, I_{M_t} = interest on mortgage, I_{CC_t} = interest on credit cards, and I_{HEL_t} = interest on home equity loans.

The loans of individuals can be functions of the following variables:

$$\begin{aligned} &L_t = f(Y_t, u_t, C_t, T_t, i_t, \sigma_t) \\ &f_Y > 0,\ f_u < 0,\ f_C > 0,\ f_T > 0,\ f_i < 0,\ f_\sigma < 0 \end{aligned} \tag{2}$$

where, L_t = loans, Y_t = personal income, u_t = unemployment rate, C_t = personal consumption expenditures, T_t = taxes, i_t = interest rate, and σ_t = uncertainty.

Banks can generate loans from "thin air" (from nothing), by having 10% of these loans as equity to cover the reserve requirements; but monetary policy can affect drastically their excess reserves (borrowing from the discount window or non-borrowing by selling government securities to the Fed). Fed tried to encourage the discount window borrowing by avoiding to report the name of the banks that borrow and thus, they escape the "stigma" attached to the discount window (Haltom, 2011). These excess reserves are available for loans.

The Federal Reserve interest-rate smoothing (change the federal funds rate only infrequently) is a change of the target rate ($\bar{i}_{FF_t}$) in sequences of small steps. This policy has very little and sometimes late responses to macroeconomic events and becomes ineffective. Table 1 shows the drastic changes of the Fed target rate from 1982 to 2008. The objective of the Central Bank is stabilization of output (employment) and prices and not minimization of interest rate volatility. Thus, the current policy considered by many economists as sub-optimal. Central Bank's behavior (reaction to macroeconomic variables: inflation and output-

employment) can be presented with an interest rate reaction function (Sack and Wieland, 1999, p. 4), eq. (3), which consecutively, is modified to include unemployment rate, eq. (4). The Taylor rule is a specific case of eq. (3) that puts $\rho = 0$ and becomes eq. (6).

$$\bar{i}_t = \rho\,\bar{i}_{t-1} + (1-\rho)(\pi_t + r_t^*) + \alpha_\pi(\pi_t - \pi_t^*) + \alpha_y(y_t - \bar{y}_t) \tag{3}$$

where, $\bar{i}_t$ = the target short-term nominal interest rate (e.g. the federal funds rate in the U.S.), π_t = the rate of inflation as measured by the GDP deflator, π_t^* = the desired rate of inflation, r_t^* = the assumed equilibrium real interest rate, y_t = the logarithm of real GDP or the unemployment rate (u_t), $\bar{y}_t$ = the logarithm of potential output, as determined by a linear trend or the natural level of unemployment (u_t^N), and ρ = the weight put on the past federal funds rate setting. The Fed ultimately stated explicitly that its target was a 2% per year increase in the raw personal consumption expenditures deflator (Williamson, 2014, p.112). Here, we forecast the inflation, as follows:

$$\begin{aligned} \pi_t^e = \pi_t^* &= \underset{(0.943)}{3.859^{***}} + \underset{(0.017)}{0.964^{***}}\pi_{t-2} + \underset{(0.037)}{0.367^{***}}\varepsilon_{t-1} - \underset{(0.043)}{0.729^{***}}\varepsilon_{t-2} - \underset{(0.041)}{0.251^{***}}\varepsilon_{t-3} - \underset{(0.038)}{0.122^{***}}\varepsilon_{t-4} \\ R^2 &= 0.368, SER = 3.280, F = 83.175, D-W = 2.010, N = 719 \end{aligned} \tag{3'}$$

If output (employment) and inflation fluctuations are persistent, the systematic policy response will impact changes in federal funds rate. The degree of change of the $\bar{i}_t$ will be influenced by the characteristics of the interest rate reaction function, eq. (4). We can run a regression of eq. (4), which is eq. (5) and from it, we can determine $\rho \equiv \alpha_1$, $\alpha_\pi \equiv \alpha_2$, and $\alpha_u \equiv \alpha_3$. The target interest rate will follow the changes in inflation and unemployment based on the coefficients estimated in eq. (5). This interest rate measured by the interest rate reaction function, eq. (5) must be the target federal funds rate.

By considering eq. (3) and using unemployment rate we get:

$$\bar{i}_t = \rho\,\bar{i}_{t-1} + (1-\rho)(\pi_t + r_t^*) + \alpha_\pi(\pi_t - \pi_t^*) - \alpha_u(u_t - u_t^N) \tag{4}$$

and running a regression of the above eq. (4), we can determine the coefficients for the target policy rate as follow:

$$\bar{i}_t = \alpha_0 + \alpha_1\,\bar{i}_{t-1} + \alpha_2\pi_t + \alpha_3 u_t^{GAP} + \alpha_4 u_{t-1}^{GAP} + \varepsilon_t \tag{5}$$

where, $u_t^{GAP} = u_t - u_t^N$.

Using monthly data for the U.S. economy (1954:M07-2014:05), we have:

$$\begin{aligned} \bar{i}_t &= \underset{(0.078)}{0.199^{**}} + \underset{(0.006)}{0.984^{***}}\,\bar{i}_{t-1} + \underset{(0.005)}{0.016^{***}}\pi_t - \underset{(0.098)}{0.578^{***}}u_t^{GAP} + \underset{(0.098)}{0.548^{***}}u_{t-1}^{GAP} \\ R^2 &= 0.980, \quad SER = 0.503, \quad F = 8{,}741.536, \quad D-W = 1.396, \quad N = 718 \end{aligned} \tag{5'}$$

The size of the partial adjustment, coefficient α_1, which is 0.984 provides direct evidence that the observed degree of persistence in federal funds rates is greater than can be attributed to systematic policy responses to persistent inflation and unemployment (output)

fluctuations. All the coefficients of regression (5) are statistically significant at 1% level. Also, we see that the federal funds rate must respond significantly to an increase in inflation, but less aggressively to induce an increase in real rates and a tightening monetary policy. The federal funds rate must respond sufficiently aggressively to an increase in unemployment to induce a reduction in interest rate and an effective easing monetary policy. Table 1 show the effectiveness of monetary policy by using the two rules (Taylor and Sack-Wieland).

According to Taylor's original version of the rule,[20] the nominal interest rate should respond to divergences of actual inflation rates from *target* inflation rates and of actual gross domestic product (GDP) from *potential* GDP:

$$\bar{i}_t = \pi_t + r_t^* + \alpha_\pi(\pi_t - \pi_t^*) + \alpha_y(y_t - \bar{y}_t) \tag{6}$$

In eq. (6), both α_π and α_y should be positive (as a rough rule of thumb, Taylor (1993)'s paper proposed setting $\alpha_\pi = \alpha_y$ = 0.5 and α_u negative (α_u = -0.5). That is, the rule "recommends" a relatively high interest rate (a "tight" monetary policy) when inflation is above its target or when output is above its full-employment level, in order to reduce inflationary pressure. It recommends a relatively low interest rate ("easy" monetary policy) in the opposite situation, to stimulate output. Sometimes monetary policy goals may conflict, as in the case of stagflation, when inflation is above its target while output is below full employment. In such a situation, a Taylor rule specifies the relative weights given to reducing inflation versus increasing output.

Also, there is a Phillips curve in our economy: $\pi_t = \pi_t^e - \phi(u_t - u_t^N) + \varepsilon_t$, which gives the following regression:

$$\pi_t = \underset{(0.043)}{1.068^{***}}\pi_t^e - \underset{(0.056)}{0.115^{**}}(u_t - 3)$$

$$R^2 = 0.372, SER = 3.262, D-W = 2.071, N = 719$$

Now, considering the unemployment rate and a $r_t^* = 1\%$, a $\pi_t^* = 1\%$, and a $u_t^N = 3\%$, eq. (6) cab be written as follows,

$$\bar{i}_t = \pi_t + r_t^* + \alpha_\pi(\pi_t - \pi_t^*) - \alpha_u(u_t - u_t^N) \tag{7}$$

or

$$\bar{i}_t = \pi_t + 1\% + 0.5(\pi_t - 1\%) - 0.5(u_t - 3\%) \tag{8}$$

Based on the current state of the economy, the Fed's target (federal funds) rate, ($\bar{i}_t \equiv \bar{i}_{FF_t}$) can be determined. Assuming that the economy is at full employment, the inflation rate is equal to the target ($\pi_t = \pi_t^* = 1\%$) and the unemployment rate at the natural level ($u_t = u_t^N = 3\%$); the target rate ($\bar{i}_t$) must be:

$$\bar{i}_t = 1\% + 1\% + 0.5(1\% - 1\%) - 0.5(3\% - 3\%) = 2\%$$

But, If (1) the economy is in a *recession* with low or negative growth and high unemployment rate ($u_t = 10\%$); an *easy monetary policy* with a target rate, based on eq. (7), can

[20] There are many other interesting models trying to determine the optimal interest rate rule (Giannoni, 2010).

be used, which gives the following results for the Fed's target rate: $\bar{i}_t = 1\% + 1\% + 0.5(1\% - 1\%) - 0.5(10\% - 3\%) = -1.5\% \cong 0\%$. (2) In case that the economy is *overheated* by experiencing a high inflation ($\pi_t = 5\%$), a *tight monetary policy* is needed to reduce prices, as follows: $\bar{i}_t = 5\% + 1\% + 0.5(5\% - 1\%) - 0.5(3\% - 3\%) = 8\%$. (3) Finally, if the economy experiences a *stagflation*, it has high inflation ($\pi_t = 5\%$) and high unemployment ($u_t = 10\%$), the coefficient can change to $\alpha_\pi = 0.25$ and $\alpha_u = -0.75$ because unemployment is worse than inflation for the unemployed person, his family, and the society. The target interest rate can be: $\bar{i}_t = 5\% + 1\% + 0.25(5\% - 1\%) - 0.75(10\% - 3\%) = 1.75\%$ (a *relatively easy monetary policy*).

According to eq. (7), the target rates from the Fed are most of the times high (to reduce inflation) and became too low for the American economy after 2008 (but unemployment has not been reduced). The target rates with November 2011 data must have been: (1) In Euro-zone: 0.2% = 1+1.5(3%)-1(10.3%-5%), but it was 1.25% (high). (2) In Germany: 1.7% = 1+1.5(2.4%)-1(6.9%-4%), but it was 1.25% (low). (3) In Greece: -7.75% = 1+1.5(3.1%)-1(18.4%-5%), but it was 1.25% (very high). (4) In Spain: -11.15% = 1+1.5(2.9%)-1(21.5%-5%), but it was 1.25% (very high). And (5) in U.S.: 1.65% = 1+1.5(3.5%)-1(8.6%-4%), but it was 0.25% (very low). The ECB key interest rate was 1.25% during the two years of 2010 and 2011. These results (with November 2011) show that this common policy rule in Euro-zone was only in favor of Germany; for the other countries the overnight rate was very high (ineffective policy tool). The U.S. federal funds rate is 0.25% since December 2008, which is very low according to Taylor's rule. Table 1 and Table 2 show inflation, unemployment, target rate, and recommended rate (from Taylor's rule). Then, the current interest rate system is not optimal.

Further, the interest rate on loans (i_L) can depend on the following variables:

$$\begin{aligned} & i_{L_t} = f(i_{FF_t}, i_{P_t}, i^*_{L_t}, Y_{B_t}, \pi^e_t, u_t, \sigma_t) \\ & f_{i_{FF}} > 0,\ f_{i_P} > 0,\ f_{i^*_L} > 0,\ f_{Y_B} < 0,\ f_{\pi^e} > 0,\ f_u < 0,\ f_\sigma > 0 \end{aligned} \tag{9}$$

where, i_{FF_t} = federal funds rate (monetary policy instrument), i_{P_t} = prime rate, $i^*_{L_t}$ = interest rate ceiling with a RP = 5% above the prime rate: ($i_{P_t} + 5\%$), Y_{B_t} = income of borrower, π^e_t = expected inflation, and σ_t = risk (uncertainty) of the borrower.

In addition, the interest on deposits (i_D) or savings (i_S) depends on the variables:

$$\begin{aligned} & i_{Dt} = f(i_{FF_t}, i_{P_t}, i^*_{D_t}, \pi^e_t, u_t, \sigma_t) \\ & f_{i_{FF}} > 0,\ f_{i_P} > 0,\ f_{i^*_D} > 0,\ f_{\pi^e} > 0,\ f_u > 0,\ f_\sigma > 0 \end{aligned} \tag{10}$$

where, $i^*_{D_t}$ = interest rate floor with an incentive to save, at least 1%, above the expected inflation rate ($\pi^e_t + 1\%$).

Table 1. Inflation, Unemployment, Target Rates, and Recommended Rates (Taylor's and Sack-Wieland Rule)[21]

Month	Inflation	Unemployment	Fed's Target Rate		Recommended Rates		Differences	
Year			$\bar{i}_{FF}$	i_{FF}^{eff}	TR	SWR	TR	SWR
10/82	3.7%	10.4%	9.5%	9.71%	2.31%	10.02%	7.19%	-0.52%
12/82	-4.91%	10.8%	8.5%	8.95%	-10.76%	8.94%	19.26%	-0.44%
7/84	4.62%	7.5%	11.5%	11.23%	5.18%	10.86%	6.32%	0.64%
8/86	2.19%	6.9%	5.9%	6.17%	1.83%	6.63%	4.07%	-0.73%
9/87	6.28%	5.9%	7.3%	7.22%	8.47%	6.89%	-1.17%	0.41%
2/88	3.11%	5.7%	6.5%	6.58%	3.81%	6.89%	2.69%	-0.39%
5/89	6.8%	5.2%	9.8%	9.81%	9.61%	9.92%	0.19%	-0.12%
9/92	3.4%	7.6%	3%	3.22%	3.30%	3.36%	-0.30%	-0.36%
2/95	4.78%	5.4%	6%	5.92%	6.47%	5.75%	-0.47%	0.25%
1/96	7.02%	5.6%	5.3%	5.56%	9.72%	5.74%	-4.42%	-0.44%
11/98	0.0%	4.4%	4.8%	4.83%	-0.2%	5.2%	5%	-0.4%
5/00	1.4%	4.1%	6.5%	6.27%	2.05%	6.06%	4.45%	0.44%
6/03	1.31%	6.3%	1%	1.22%	0.81%	1.25%	0.19%	-0.25%
6/06	2.37%	4.6%	5.3%	4.99%	3.25%	5.05%	2.05%	0.25%
10/08	-9.86%	6.6%	1%	0.97%	-16.09%	1.44%	17.09%	-0.44%
12/08	-9.49%	7.2%	0.25%	0.16%	-15.83%	0.09%	16.08%	0.16%
10/09	3.17%	10.2%	0.25%	0.12%	1.65%	-0.04%	-1.4%	0.29%
7/10	3.7%	9.5%	0.25%	0.18%	2.8%	0.24%	-2.55%	0.01%
3/11	11.64%	9%	0.25%	0.14%	14.97%	0.36%	-14.72%	-0.11%
1/12	10.26%	8.2%	0.25%	0.08%	13.29%	0.44%	-13.04%	-0.19%
9/12	6.24%	7.8%	0.25%	0.14%	7.47%	0.45%	-7.22%	-0.2%
9/13	2.16%	7.2%	0.25%	0.08%	1.63%	0.19%	-1.38%	0.06%
1/14	5.32%	6.6%	0.25%	0.07%	6.69%	0.32%	-6.44%	-0.07%
5/14	4.21%	6.3%	0.25%	0.09%	5.16%	0.26%	-4.91%	-0.01%

Source: *Economagic.com.* **Notes:** TR = Taylor Rule and SWR = Sack-Wieland Rule.

[21] The data show the following correlation and causality between the policy rates and the economic goals (u *and* π): (1) $\rho_{\bar{i}_{FF},u} = +0.009$ and $\bar{i}_{FF} \Rightarrow u\ (F = 8.649^{***})$; $\rho_{\bar{i}_{FF},\pi} = +0.499$ and $\bar{i}_{FF} \Rightarrow \pi\ (F = 29.870^{***})$. (2) $\rho_{i_{FFTR},u} = -0.121$ and $i_{FFTR} \Rightarrow u\ (F = 4.910^{***})$; $\rho_{\bar{i}_{FFTR},\pi} = +0.992$ and $i_{FFTR} \Rightarrow does\ not \Rightarrow \pi\ (F = 0.127)$. (3) $\rho_{i_{FFSW},u} = +0.009$ and $i_{FFSW} \Rightarrow u\ (F = 6.963^{***})$; $\rho_{\bar{i}_{FFSW},\pi} = +0.504$ and $i_{FFSW} \Rightarrow \pi\ (F = 25.467^{***})$.

Table 2. Inflation, Unemployment, Target Rates, and Recommended Rates (Taylor's Rule)

Year	Inflation	Unemployment	Fed's Target Rate	Recommended Rates	Differences
1970[1]	5.57%	6.1%	9%	7.305%	1.695%
1979[1]	13.26%	6%	14%	18.89%	-4.89%
1982[1]	3.83%	10.8%	15%	2.345%	12.655%
1989[1]	4.64%	5%	10%	6.46%	3.54%
1992[1]	2.97%	7.8%	4%	2.555%	1.445%
1998[1]	1.61%	4.3%	5.5%	2.265%	3.235%
2000[1]	3.44%	4.0%	6.25%	5.16%	1.09%
2002[1]	2.48%	6.0%	1.75%	2.72%	-0.97%
2006[1]	2.53%	4.4%	5.75%	3.595%	2.155%
2009[1]	2.82%	10.0%	0.25%	1.23%	-0.98%
2011[1]	3.02%	9.0%	0.25%	2.03%	-1.78%
7/2014[1]	3.13%	6.2%	0.25%	3.595%	-3.345%
7/2014[2]	3.13%	6.2%	0.25%	2.263%	-2.013%

Source: *Economagic.com*

Notes: [1] the coefficients are: $\alpha_\pi = 0.5$ and $\alpha_u = -0.5$,

[2] the coefficients are: $\alpha_\pi = 0.25$ and $\alpha_u = -0.75$.

Finally, the optimal interest rate is the one that maximizes social welfare. The individual's utility depends on interest rates (federal funds rate, deposits rate, and loans rate) and other factors (goods, services, and other values), too.

$$u_t^j = f(i_{FF_t}, i_{D_t}, i_{L_t}, G_{1_t}, G_{2_t}, ..., S_{1_t}, S_{2_t}, ..., V_1, V_2, ...) \tag{11}$$

where, u_t^J = utility of individual j in period t, i_{FF_t} = federal funds rate (monetary policy target rate), i_{D_t} = deposit rate, i_{L_t} = loans rate, G_{1_t} = good 1 consumed in period t, S_{1_t} = service 1 used in period t and $V_1, V_2, ...$= value 1, value 2, etc. (values do not depend on time; they were, are, and will be the same over time).[22]

Then, the social welfare is presented as follows,

$$\max \quad U_t = f(u_t^A, u_t^B, ... u_t^N) \tag{12}$$

where, U_t = social welfare function, and $u_t^A, u_t^B, ... u_t^N$ = utility of individual j (j = A, B, and N).

[22] Values represent "the Truth" and the truth does not evolve over time. Evolution exists only to things that we experiment and we change over time trying to improve them and through knowledge to reach a better secular level. Unfortunately, the human knowledge is incomplete and very poor and we cannot reach "the Truth". The proof is obvious by looking around and observes what is going on, today, in our ignorant world.

3. Empirical Results

It is important to do some more tests on the above equations by applying data from the U.S. economy. The data, taken from *economagic.com* are monthly from 1959:01 to 2013:12. They comprise, loans or consumer credit outstanding (USCCO), personal income (USPI), unemployment rate (USU),[23] personal consumption expenditure (USPCE), taxes or U.S. government current tax receipts (USGCTR), interest rate on loans or corporate bonds rate (BAA), TED rate for measuring the uncertainty (=LIBOR3M-STT3M), gold prices (GOLD) for measuring again uncertainty, federal funds rate (USFFR), consumer price index (USCPI), prime rate (USPR), real gross domestic product (2009 prices) (USRGDP2009), and certificate of deposit (1-month) secondary market rate (NSA) (USCD1MONTH).

We started using the Sack-Wieland (SWR) and the Taylor rule (TR), eqs. (4) and (7) to determine the target rate during different periods from 1982 to 2014 and a Taylor rule, eq. (7), from 1970-2014. The results appeared in Table 1, where it is obvious that most of the times the Fed's target rate is above the recommended rate (to help the financial market). In 1979 and lately, after 2009, the Fed rate is below the recommended by Taylor's rule to improve the economy, but unfortunately, it has been proved to be ineffective and it has created a new bubble in the financial market,[24] devaluation of the dollar, inflation in the economy, and negative real return to savers (redistribution of wealth from individuals to banks and speculators). Then, the correlation coefficients are measured and a Granger causality test is performed between all the above variables and are presented in Table 3 and Table 4. Borrowing or loans are very high and positively correlated with personal consumption expenditures (+0.994), personal income (+0.991), real gross domestic product (+0.990), consumer price index (+0.976), government tax receipts (+0.958), price of gold (+0.728), unemployment (+0.492), and risk-TED (+0.131). Also, loans are negatively correlated with federal funds rate (-0.697), prime rate (-0.693), CD rate-1 month (-0.648), and bonds rate-BAA (-0.666). Further, borrowing (loans) are caused by taxes (+6.311***),[25] real GDP (+4.269**), consumption (+3.845**), personal income (+3.273**), and unemployment rate (+3.163**). For example, when unemployment is increasing people are borrowing to live because their income has declined.

Furthermore, interest rate on loans (Baa) is positively correlated with CD rate (+0.520), prime rate (+0.504), federal funds rate (+0.497), and risk-TED (+0.266). Interest rate on loans (Baa) is negatively correlated with personal consumption expenditures (-0.691), real GDP (-0.686), CPI (-0.682), personal income (-0.676), borrowing (-0.666), taxes (-0.644), uncertainty-gold (-0.615), and unemployment (-0.418). Also, interest rate on loans (Baa) is caused by CPI (-15.928***), federal funds rate (+11.606***), CD rate (+11.519***), prime rate (+8.254***), risk TED (+6.597***), unemployment (-4.632**), personal consumption expenditures (-4.400**), taxes (-3.268**), and uncertainty-gold (-2.673*). Then, when the federal funds rate is falling, loans' rate is falling, too.

---

[23] The U.S. monthly data from 1954:07 to 2014:05 give an average inflation, $\bar{\pi} = 3.63\% \; and \; \sigma_{\pi} = \pm 4.113\%$ and an average unemployment rate, $\bar{u} = 6.02\% \; and \; \sigma_{u} = \pm 1.59\%$.

[24] The DJIA from 6,547.05 (3/9/2009) reached 17,138.20 (7/16/2014). A growth of 10,591.15 points or 161.77%, which is 29.41% per annum. This is a gigantic bubble.

[25] The signs (+) show positive effect and (-) negative effect. The ***, **, and * indicate the level of significance (1%, 5%, and 10%).

Table 3. Correlation Coefficients

	LUSCCO	LUSPI	USU	LUSPCE	LUSGCTR	BAA	TED	LGOLD	USFFR	LUSCPI	USPR	LUSRGDP	USCD
LUSCCO	1.000												
LUSPI	0.991	1.000											
USU	0.492	0.527	1.000										
LUSPCE	0.994	0.998	0.532	1.000									
LUSGCTR	0.958	0.973	0.362	0.967	1.000								
BAA	-0.666	-0.676	-0.418	-0.691	-0.644	1.000							
TED	0.131	0.156	-0.227	0.128	0.251	0.266	1.000						
LGOLD	0.728	0.784	0.781	0.779	0.717	-0.615	0.101	1.000					
USFFR	-0.697	-0.672	-0.804	-0.687	-0.499	0.497	0.193	-0.616	1.000				
LUSCPI	0.976	0.991	0.611	0.990	0.949	-0.682	0.142	0.850	-0.706	1.000			
USPR	-0.693	-0.666	-0.800	-0.682	-0.492	0.504	0.213	-0.608	0.999	-0.699	1.000		
LUSRGDP	0.990	0.987	0.422	0.989	0.975	-0.686	0.140	0.690	-0.633	0.961	-0.629	1.000	
USCD	-0.674	-0.648	-0.808	-0.664	-0.471	0.520	0.288	-0.597	0.991	-0.681	0.994	-0.611	1.000

Source: *Economagic.com*

Notes: LUSCCO = loans or consumer credit outstanding, LUSPI = ln of personal income, USU = unemployment rate, LUSPCE = ln of personal consumption expenditure, LUSGCTR = ln of taxes or U.S. government current tax receipts, BAA = interest rate or corporate bonds rate, TED = TED rate for measuring the uncertainty (=LIBOR3M-STT3M), LGOLD = gold prices (GOLD) for measuring again uncertainty, USFFR = U.S. Federal Funds Rate, LUSCPI = ln of U.S. Consumer Price Index, USPR = U.S. Prime Rate, LUSRGDP = U.S. real gross domestic product (2009 prices), and USCD = certificate of deposit (1-month) secondary market rate (NSA).

Table 4. Granger Causality Test

	LUSCCO	LUSPI	USU	LUSPCE	LUSGCTR	BAA	TED	LGOLD	USFFR	LUSCPI	USPR	LUSRGDP	USCD
LUSCCO	-	6.383***	14.529***	2.405*	-	-	-	3.529**	6.250***	-	4.483**	6.844***	6.315***
LUSPI	3.273**	-	-	29.477***	-	-	-	5.871***	-	3.721**	-	12.155***	2.928*
USU	3.163**	2.710*	-	-	8.094***	4.632**	3.229**	-	12.859***	-	14.102***	12.062***	14.919***
LUSPCE	3.845**	9.027***	7.564***	-	11.612***	4.400**	-	3.757**	3.307**	8.611***	3.411**	7.488***	3.497**
LUSGCTR	6.311***	9.067***	7.822***	15.868***	-	3.268**	-	-	-	9.310***	-	2.337*	4.207**
BAA	-	8.040***	6.561***	11.957***	-	-	-	-	7.867***	12.410***	23.340***	-	-
TED	-	2.998*	15.101***	8.118***	7.814***	6.597***	-	-	3.604**	8.149***	4.712***	10.422***	10.644***
LGOLD	-	-	-	-	-	2.673*	-	-	-	2.973*	-	2.821*	-
USFFR	-	12.629***	8.512***	10.174***	4.441**	11.606***	3.122**	-	-	31.855***	150.157***	6.735***	30.503***
LUSCPI	-	10.362***	3.325**	10.348***	-	15.928***	-	5.899***	3.521**	-	3.948**	-	5.149***
USPR	-	9.846***	9.816***	8.286***	3.621**	8.254***	3.259**	-	4.275**	25.042***	-	7.050***	11.657***
LUSRGDP	4.269**	-	10.707***	-	-	-	-	4.780***	7.197***	2.344*	2.937*	-	7.517***
USCD	-	10.298***	5.942***	-	5.610***	11.519***	3.588**	6.341***	6.933***	12.401***	112.984***	8.297***	-

Source: See Table 1.

Notes: See, Table 3, $\Rightarrow$ = causes, ***= significant at the 1% level, ** = significant at the 5% level, and * = significant at the 10% level.

Also, interest rate on deposits (CD rate) is positively correlated with prime rate (+0.994), federal funds rate (+0.991), corporate bonds rate-Baa (+0.520), and TED (+0.288). The deposit rate negatively correlated with unemployment rate (-0.808), consumer price index (-0.681), borrowing (-0.674), personal consumption expenditures (-0.664), personal income (-0.648), real GDP (-0.611), price of gold (-0.597), and taxes (-0.471). Further, deposit rate is caused by federal funds rate (+30.503***), unemployment rate (-14.919***), prime rate (+11.657***), real GDP (-7.517***), loans (-6.315***), consumer price index (-5.149***), taxes (-4.207**), personal consumption expenditures (-3.497**), and personal income (-2.928*). A reduction in federal funds rate, as closed as to zero that it is today, it nullifies the deposit rate.

Besides, Table 5 shows the estimates of loans by using eq. (2). Personal income has a significant effect on loans; consumption, loans' rate, and taxes have also significant positive effect on loans. Unemployment rate has significant negative effect on loans, risk (uncertainty) has negative effect, too. Table 6 gives the estimation of eq. (9). Interest rate on loans (on consumer credit outstanding) is affected positively by prime rate and uncertainty (TED rate); it is negatively affected by federal funds rate, price level, and price of gold (uncertainty). Table 7 presents the estimate of interest rate on deposits of eq. (10). Deposit rate is affected positively by federal funds rate, prime rate, and risk (TED rate); it is affected negatively by the price level and unemployment. Figure 1 presents the federal funds rate (effective) and the recommended rates by the Taylor rule and the Sack-Wieland rule. Lastly, Figure 2 shows the target federal funds rate.

4. Social Implications of High Debt, Current Interest Rates, and Optimal Interest Rates

The results show that monetary policy is not optimal, but biased towards inflation (price stability) and not towards output and employment. The response to output and unemployment is too little and too late, which does not satisfy the policy objectives. The two goals, maximum employment and stable prices cannot be attained through low inflation, since a low inflation means high unemployment (the Phillips curve still holds for the economy). The only benefits are towards the financial market because low inflation means low long-term interest rate and positive effect on the prices of financial assets. This is obvious with the current monetary policy (quantitative easing), which has caused a new bubble in the stock market and no significant effect on output and employment. A vector auto-regression (VAR) shows that the current i_{FF_t} has a highly significant negative effect on employment; the last period $i_{FF_{t-1}}$ has a significant positive effect on employment. Also, the i_{FF_t} has a marginal positive effect on inflation and the $i_{FF_{t-2}}$ has a significant negative effect; a reduction in federal funds rate (easy monetary policy) will increase prices in two periods from now. The Vector Auto-regression estimates are:

$$u_t = 0.030 + 1.074^{***} u_{t-1} - 0.084^{***} u_{t-2} + 0.004^{**} \pi_{t-1} + 0.001 \pi_{t-2} - 0.068^{***} i_{FF_t} + 0.054^{**} i_{FF_{t-1}} + 0.018 i_{FF_{t-2}}$$
$$(0.029) \quad (0.038) \quad (0.038) \quad (0.002) \quad (0.002) \quad (0.015) \quad (0.024) \quad (0.015)$$

$$\pi_t = 0.426 + 0.729 u_{t-1} - 0.721 u_{t-2} + 0.349^{***} \pi_{t-1} + 0.088^{**} \pi_{t-2} + 0.443^{*} i_{FF_t} + 0.385 i_{FF_{t-1}} - 0.520^{**} i_{FF_{t-2}}$$
$$(0.514) \quad (0.673) \quad (0.671) \quad (0.037) \quad (0.038) \quad (0.263) \quad (0.426) \quad (0.260)$$

$$u: R^2 = 0.986, SER = 0.186, F = 7400.846, N = 717; \quad \pi: R^2 = 0.368, SER = 3.287, F = 58.985, N = 717$$

Also, the data show that there is, (1) a high correlation between federal funds target rate (i_{FF}) and inflation (π) and a highly significant causality between i_{FF} and π, but zero

correlation between federal funds rate (i_{FF}) and unemployment (u) and smaller F-statistic in the causality test. Besides, there is, (3) a high correlation between the recommended rate by Sack-Wieland rule (i_{FFSW}) and inflation (π) and highly significant causal relationship, but the correlation between i_{FFSW} and u is zero and the causality small. The best rule for reduction in unemployment is, (2) the Taylor rule, where the correlation between i_{FFTR} and u is negative and has a significant causal effect on unemployment. The i_{FFTR} does not cause inflation. These results appear in footnote 22 in Table 1.

Of course, there are problems with any policy rules, too. The results from the regression of eq. (5) show that the policy exhibits a small change in interest rate because the previous interest rate ($\bar{i}_{t-1}$) has a high coefficient. Then, the forward-looking market participants will expect a small interest rate change, based on the current inflation and output (unemployment). Another problem is that there are errors in measuring output (unemployment) and inflation. The potential output and the natural level of unemployment are also revised years later from the specific policy that is taken by the Fed. Lastly, the estimates of the parameters of eq. (5) are uncertain. Thus, it is difficult to pursue any specific policy rule, but "moderation" and maximization of the social welfare must be the objectives of every policy rules.

A budget deficit just pushes the cost of government spending onto a future generation of taxpayers, who will inherit a government with greater debts. But, by reducing the unwanted national defense expenditures the budget deficit will decline drastically and this spending can go for Social Security, Medicare, Medicaid, Health, and Education. People during their working years must save a relatively large proportion of their disposable income, but the interest rate (the incentive to save) must be higher and not $i_S \cong 0$ and $r_S < 0$. Taxes on individuals must be lower to increase disposable income and consequently, consumption and saving. Taxes must increase for businesses and monetary policy with $i_{FF} \cong 0$ affects positively businesses and markets; but, people are paying interest on their savings instead of receiving interest. The monetary policy and the current interest rate system are against people's interest and their future well-being.

Table 5. Estimates of Loans: Eq. (2)

Variables	$\ln L_t$	$\ln L_t$	$\ln L_t$	$\ln L_t$	$\ln L_t$	$\ln L_t$
C	2.892***	3.437***	1.463***	2.660***	0.140***	0.124***
	(0.113)	(0.180)	(0.181)	(0.146)	(0.029)	(0.021)
Y_t	0.324**	0.363***	1.098***	0.382***	-0.012	-
	(0.140)	(0.065)	(0.222)	(0.062)	(0.033)	
u_t	-0.011***	-0.005**	-0.036***	-0.010***	-0.002***	-0.002***
	(0.002)	(0.002)	(0.002)	(0.002)	(0.001)	(0.001)
C_t	1.376***	0.857***	0.977***	0.874***	0.060**	0.052***
	(0.112)	(0.061)	(0.178)	(0.058)	(0.027)	(0.009)
T_t	-0.424***	0.007	-0.714***	0.062**	-0.001	-
	(0.537)	(0.033)	(0.085)	(0.033)	(0.014)	
$i_{Baa\ t}$	0.008***	0.003	0.026***	0.003	-0.001	-
	(0.002)	(0.002)	(0.004)	(0.002)	(0.001)	
$\ln P_{Gold\ t}$	-0.045***	-0.003	-	-	-	-
	(0.006)	(0.008)				
TED_t	-	-	-0.028***	-0.001	-0.002*	-0.003***
			(0.008)	(0.002)	(0.001)	(0.001)
$\ln L_{t-1}$	-	-	-	-	0.962***	0.961***
					(0.009)	(0.007)
$MA(1)$	-	1.110***	-	1.346***	0.175***	0.173***
		(0.061)		(0.052)	(0.059)	(0.059)
R^2	0.996	0.999	0.994	0.999	0.999	0.999
SSR	0.089	0.011	0.358	0.017	0.006	0.004
F	9104.328	33537.71	7959.708	74711.02	370426.1	597468.7
$D-W$	0.266	1.778	0.185	1.754	1.922	1.923
N	228	228	292	292	292	292

Source: See, Table 1.

Notes: See, Tables 3 and 4. $\ln L_t$ = LUSCCO, loans or consumer credit outstanding, Y_t = USPI, u_t = USU, C_t = USPCE, T_t = USGCTR, i_{Baa_t} = BAA bonds rate, TED_t = TED rate (LIBOR3M-STT3M), P_{Gold_t} = price of gold (uncertainty).

Table 6. Estimates of Interest Rate on Loans: Eq. (9)

Variables	i_{BAA_t}	i_{BAA_t}	i_{BAA_t}	i_{BAA_t}
C	24.065***	30.461**	32.987***	35.790***
	(6.389)	(13.341)	(12.436)	(12.673)
i_{FF_t}	-0.992*	-0.476**	-0.494**	-0.194**
	(0.597)	(0.232)	(0.230)	(0.076)
i_{P_t}	1.092***	0.317	0.337	-
	(0.600)	(0.245)	(0.242)	
$\ln WS_t$	-0.157	1.121	-	-
	(2.156)	(1.587)		
$\ln P_t$	-2.736	-5.749*	-4.426*	-4.701*
	(4.820)	(3.200)	(2.469)	(2.528)
u_t	0.333***	-0.017	-	-
	(0.067)	(0.083)		
TED_t	1.122***	0.121*	0.120*	0.145**
	(0.145)	(0.069)	(0.069)	(0.062)
$\ln P_{Gold_t}$	-1.196***	-0.549**	-0.552**	-0.589**
	(0.326)	(0.271)	(0.268)	(0.264)
$AR(1)$	-	0.935***	0.935***	0.936***
		(0.027)	(0.026)	(0.026)
$MA(1)$	-	0.229***	0.228***	0.261***
		(0.075)	(0.074)	(0.072)
R^2	0.684	0.953	0.953	0.953
SSR	54.356	7.879	7.903	7.977
F	60.523	436.342	565.043	656.101
$D-W$	0.354	2.019	2.018	2.025
N	204	203	203	203

Source: See, Table 1.

Notes: See, Tables 3, 4, and 5. $i_{L_t} = i_{BAA_t}$ = corporate bonds rate (Baa), i_{FF_t} = USFFR, and i_{P_t} = USPR= U.S. Prime rate.

Table 7. Estimates of Interest Rate on Deposits: Eq. (10)

Variables	i_{CD_t}	i_{CD_t}	i_{CD_t}	i_{CD_t}
C	-1.481	-2.344	1.701*	2.097**
	(1.302)	(1.813)	(0.950)	(0.842)
i_{FF_t}	-0.513***	-0.450**	0.602***	0.618***
	(0.192)	(0.221)	(0.079)	(0.077)
i_{P_t}	1.461***	1.406***	0.372***	0.346***
	(0.193)	(0.222)	(0.084)	(0.080)
$\ln P_t$	-0.576**	-0.322	-0.565***	-0.601***
	(0.274)	(0.390)	(0.172)	(0.166)
u_t	-0.057***	-0.042	0.015	-
	(0.021)	(0.028)	(0.017)	
TED_t	0.425***	0.440***	0.519***	0.520***
	(0.047)	(0.055)	(0.050)	(0.050)
$\ln P_{Gold_t}$	0.079	0.012	-	-
	(0.071)	(0.097)		
$AR(1)$	-	0.361***	0.392***	0.388***
		(0.072)	(0.058)	(0.058)
R^2	0.994	0.995	0.994	0.994
SSR	5.709	4.901	8.361	8.387
F	5634.544	5540.779	7085.384	8507.660
$D-W$	1.275	1.930	1.995	1.992
N	204	203	267	267

Source: See, Table 1.

Notes: See, Tables 3, 4, and 5. $i_{D_t} \equiv i_{CD_t}$ = USCD1MONTH, Certificate of deposit (1-month maturity), i_{FF_t} = USFFR, and i_{P_t} = USPR= U.S. Prime rate.

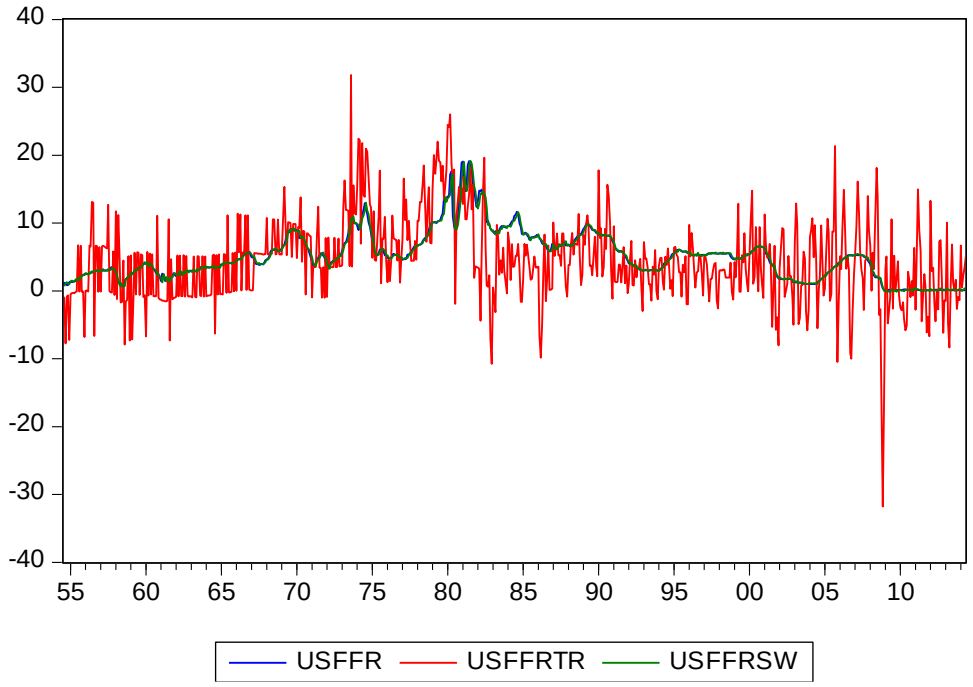

Figure 1. U.S. Federal Funds Rate and Recommended (Taylor's Rule) and (Sack-Wieland) Rates

Source: See, Table 1.
Notes: USFFR = U.S. federal funds rate, USFFRTR = U.S. federal funds recommended (Taylor's Rule) rate, and USFFRSW= U.S. federal funds recommended (Sack-Wieland Rule) rate.

The current economic system has created a vicious cycle and it is impossible for a middle class individual to recover. The taxes and the interest (cost of the enormous debt) are very high, the real wages and salaries are low; then, disposable income is low, consumption and savings are low, aggregate demand is low and affects the aggregate supply (low production), which reduces the revenue of our firms. In this case, they have to reduce the labor cost (reduction in wages and layoffs) to increase their profit (firms' objective). Then, income is falling and unemployment is increasing. The government revenue (taxes) is falling and the government has to increase the tax rates to cover the government expenditures and the national debt is going up and taxes are increased; the cycle continuous. Also, the interest rate will increase and will crowd out private investment and consumption.[26] Higher marginal tax rates discourage some work effort, reduce disposable income, and affect negatively private savings and reduce output.

[26] When the government runs persistent deficits and taxes are increasing, disposable income is falling, so consumption and savings are falling, too; a growing portion of these low consumers' savings is devoted to purchase government securities rather than private sector's goods and securities ("crowding out" of investment).

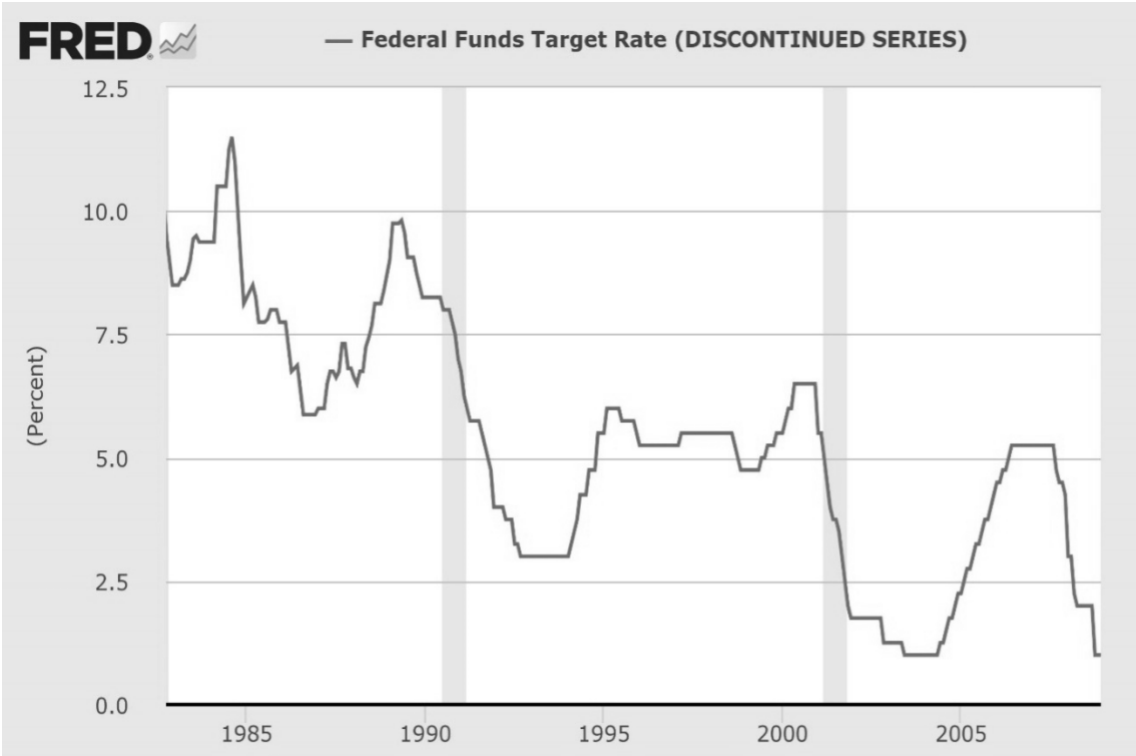

Figure 2. Federal Funds Target Rate
Source: Board of Governors of the Federal Reserve System
Notes: Shaded areas indicate US recessions – 2014 research.stlouisfed.org

$$T\uparrow, I\uparrow \quad and \quad \frac{w}{P}\downarrow, \frac{salaries}{P}\downarrow \Rightarrow Y^D\downarrow \Rightarrow C\downarrow, S\downarrow \Rightarrow AD\downarrow \Rightarrow AS\downarrow \Rightarrow Q\downarrow \Rightarrow R_F\downarrow \Rightarrow w\downarrow, L\downarrow$$
$$\Rightarrow \pi\uparrow \Rightarrow Y\downarrow, u\uparrow \Rightarrow T\downarrow and\ G\uparrow \Rightarrow ND\uparrow \Rightarrow t\uparrow \Rightarrow T\uparrow$$

where, T = taxes, I = interest, w = wages, P = price level, Y^D = disposable income, C = consumption, S = saving, AD = aggregate demand, AS = aggregate supply, Q = output (production), $R_F = PQ$ = revenue of the firms, L = labor, π = profit, t = tax rate, Y = income, u = unemployment rate, G = government spending, and ND = national debt.

Furthermore, the optimal interest rate is the one that maximizes savings, investment, growth, production, and employment and not the one that maximizes only the market value of the financial assets. The nominal interest rate on savings (incentive to save) must exceed the inflation rate and make the real rate on savings positive.

$$i_S = r_S + \pi^e \tag{13}$$

and

$$r_S = i_S - \pi^e > 0 \tag{14}$$

where, i_S = nominal interest rate on savings, r_S = real interest rate on savings, and π^e = expected inflation.

The savers cannot pay a fee for depositing their money to banks (negative real saving rate of interest). This monetary policy, which makes the nominal rate of interest to fall below the inflation rate,[27] is anti-social and against savings.

$$i_S \geq \pi^e + 1\% \tag{15}$$

Today's monetary policy and the current interest rate system are against savings and against intermediation and cannot improve employment and social welfare. Of course, it is in favor of borrowing and spending, and in support of disintermediation and the financial market. The objective of any public policy must be the social welfare of the citizens and not the well-being of the legal entities, corporations, financial markets, and institutions. An indisputable and necessary public policy must be a mixed policy, monetary and fiscal simultaneously. The current pure monetary policy is completely ineffective (Kallianiotis, 2014b).

5. Some Concluding Remarks

The conclusion is obvious, here; the current monetary policy with its interest rate system is ineffective or it is not sufficient to correct a business cycle. Monetary policy is implemented in the presence of uncertainty for the economy, with structural models that are not correct, and estimations of their parameters that vary unpredictably, the natural rate of unemployment and the policy multiplier cannot be determined in advance, even the variables are not correctly measured. With these difficulties the choice of a target rate cannot have an optimal effect on output (employment) and inflation. A mixed policy (fiscal and monetary) is necessary for smoothing the current output and income (and its fair distribution) for a nation and to create jobs for its citizens. Banks, the financial markets, and all the greedy businesses have to be regulated for their own benefits and the benefits of the entire nation. Countries have to protect their individuals, businesses, and markets. The objective and priority of every nation must be the welfare and the interest of its citizens and not of its "allies".

The data and the analysis show that the latest monetary policy (easy money, $\bar{i}_{FF} \cong 0$) affects (causes) directly all the other interest rates. The prime rate has declined, but due to high unemployment, high risk, and high debts, individuals and businesses do not borrow to invest, produce, and employ more workers because the aggregate demand is very low. Also, this policy has caused the deposit rates to fall closed to zero, which affects negatively the interest income of depositors; actually, depositors are paying interest to the banks instead of receiving ($r_S < 0$), disincentive to save. The interest rate on bonds (i.e., Baa) has been affected and the return to investors has declined. The only ones that are favored from this policy are the stockholders (encouraging speculators). Other negative effects of the current monetary policy are on employment; the Fed funds rate is falling and causes the unemployment rate to go up. In addition, the reduction of the Fed's target rate has caused inflation. There are some smaller positive effects from the current monetary policy on personal income (but this income can be the capital gain of the wealthy because the low federal funds rate increased the stock prices

[27] Even the data on inflation (consumer price index) are very suspicious. They understate the true growth of prices. The SGS Alternative CPI, 1980-Based is showing a consumer inflation of 10% and an unemployment rate of 24%, today (July 2014). See, John Williams' *Shadow Government Statistics*. <http://www.shadowstats.com/alternate_data/inflation-charts> [Accessed 22 October 2014]

drastically). Also, personal consumption expenditures and real GDP have been affected positively from the low interest rate (but again the distribution is a problem for our "free-market" economy). Another negative effect of this monetary policy is that it has caused taxes to go up, which deteriorate even more the economy during a recession or a low growth, as we are the last five years. The federal funds rate has no effect on loans (borrowing), but has negatively affected uncertainty (the $i_{FF} \downarrow \Rightarrow TED\ rate \uparrow$).

The optimal interest rate must satisfy three objectives: Efficiency, fairness, and prosperity. The zero interest rate on deposits and 40% on loans contribute to the reduction in economic well-being of people and all this excess of the amount of interest revenue goes to banks.[28] The enormous interest rate spread ($i_{L_t} - i_{D_t}$) is the inefficiency that a monetary system creates as people allocate resources according to the interest rate incentive rather than the true costs and benefits of the goods and services that they buy and sell and their investment decisions. A high loans rate is very unfair, it falls on poor people. Wealthy people have a very good credit score,[29] which reduces their risk premium. This unethical and unfair behavior is "legal" discrimination, which is similar to the illegal prejudice against low income people. This is a criminal act against the poor citizens. These laws have to be corrected. The complexity of our economic system results from the political process as various interest groups with their own special interests lobby for their causes and determine the public policies. The system is completely unfair and sub-optimal. There is no privacy anymore; all personal information and data are publically available, like this poor individual is a criminal.

Lastly, the U.S. growth for the first quarter of 2014 was -2.93%, which means that the economy has not recovered yet and an optimal monetary and fiscal policy is necessary for the economy to grow and the country to prosper. The growth of an economy is coming from the growth of its aggregate demand (AD) and this demand depends on people's income, employment, taxes, consumption, and savings (and exports, but not imports). Also, people's confidence is an important factor, too. People have lost their hope, globally; they have been terrorized with all these wrong (domestic and foreign) policies and the global uncertainty, which has been created ("planned") and not by mistake. The world leaders have to say NO to this socio-politico-economic "hurricane".

---

[28] In the second quarter of 2014, U.S. banks posted $40.24 billion in net income, which means that they are lending and this is increasing the industry's profit. (*The Wall Street Journal*, August 12, 2014, pp. A1 and A2).

[29] A *credit score* is a numerical expression based on a level analysis of a person's credit files, to represent the creditworthiness of that person. A credit score is primarily based on credit report information typically sourced from credit bureaus. Lenders, such as banks and credit card companies, use credit scores to evaluate the potential risk posed by lending money to consumers and to mitigate losses due to bad debt. Lenders use credit scores to determine who qualifies for a loan, at what interest rate, and what credit limits. Lenders also use credit scores to determine which customers are likely to bring in the most revenue. The use of credit or identity scoring prior to authorizing access or granting credit is an implementation of a trusted system. Credit scoring is not limited to banks. Other organizations, such as mobile phone companies, insurance companies, landlords, and government departments employ the same techniques. Credit scoring also has much overlap with data mining, which uses many similar techniques. These techniques combine thousands of factors but are similar or identical. There are several types of FICO credit score: classic or generic, bankcard, personal finance, mortgage, installment loan, auto, and NextGen score. The generic or classic FICO score is between 300 and 850, and 37.2% of people had between 750 and 850 in 2012. According to FICO, the median FICO score in 2006 was 723, and 711 in 2011. The FICO bankcard score and FICO auto-enhanced score are between 250 and 900. The FICO mortgage score is between 300 and 850. Higher scores indicate lower credit risk.

References

Allen, F. and Gale, D., 2009. *Understanding financial crises.* Clarendon Lecture in Finance, New York, N.Y.: Oxford University Press.

Faia, E. and Monacelli, T., 2007. Optimal Interest rate rules, asset prices, and credit frictions. Journal of Economic Dynamics and Control, 31(10), pp. 3228-3254.

Friedman, M., 1969. *The optimum quantity of money.* New York and London: Macmillan.

Gahvari, F., 2007. The Friedman rule: Old and new. *Journal of Monetary Economics*, 54, pp.581–589. http://dx.doi.org/10.1016/j.jmoneco.2006.06.008

Giannoni, M.P. and Woodford, M., 2002. Optimal interest-rate rules: I. general theory. *NBER Working Paper*, 9419, pp.1-69.

Giannoni, M.P., 2010. Optimal interest-rate rules in a forward-looking model, and inflation stabilization versus price-level stabilization. *NBER Working Paper,* 15986. [pdf] Available at: <http://www.nber.org/papers/w15986.pdf?new_window=1> [Accessed 31 June 2010].

Kallianiotis, I.N., 2011. Is the imposed global 'Laissez-faire' socio-economic system responsible for the latest financial crisis? *Journal of Business and Economics*, 2(5), pp.325-353.

Kallianiotis, I.N., 2014a. Debts, taxation, their cost, and social welfare. *Archives of Business Research*, 2(4), pp.107-138. http://dx.doi.org/10.14738/abr.24.377

Kallianiotis, I.N., 2014b. Fed and ECB with dollar and euro as international currency reserves: Some socio-politico-economic considerations. *Journal of Business and Economics*, 5(5), pp. 605-625.

Keynes, J.M., 1964. *The general theory of employment, interest, and money*. New York and London: A Harvest/HBJ Book.

Levin, A., Wieland, V., and Williams, J., 1998. The robustness of simple monetary policy rules under model uncertainty. In: J.B. Taylor ed, *Monetary policy rules*. Chicago: Chicago Press.

Natsios, D., 2014. Ολεθριες Φιλιες Και… Ξενιες [Disastrous friendships and … hospitalities]. *Christian Vivliografia,* August 25, pp. 1-2. [online] Available at: <https://christianvivliografia.wordpress.com/2014/08/25/%E1%BD%80%CE%BB%CE%AD%CE%B8%CF%81%CE%B9%CE%B5%CF%82-%CF%86%CE%B9%CE%BB%CE%AF%CE%B5%CF%82-%CE%BA%CE%B1%E1%BD%B6-%CE%BE%CE%B5%CE%BD%CE%AF%CE%B5%CF%82/> [Accessed 25 August 2014].

Orphanides, A., 1998. Monetary policy evaluation with noisy information. *Finance and Economics Discussion Series*, 1998-50.

Sack, B. and Wieland, V., 1999. Interest-rate smoothing and optimal monetary policy: A review of recent empirical evidence. *Board of Governors of the Federal Reserve System*. [pdf] Available at: <http://www.federalreserve.gov/pubs/feds/1999/199939/199939pap.pdf> [Accessed 31 August 1999].

Sack, B., 1998. Does the fed act gradually? A VAR analysis. Board of Governors of the Federal Reserve System - *Finance and Economics Discussion Series*, 1998-17.

See, Haltom, R.C., 2011. Stigma and the discount window, *Federal Reserve Bank of Richmond.* [pdf] Available at: <http://www.richmondfed.org/publications/research/region_focus/2011/q1/pdf/federal_reserve.pdf> [Accessed 31 March 2011]

Singh, A.P. and Nikolaou, M., 2013. Optimal rules for central bank interest rates subject to zero lower bound. *Economics,* 2013-49, September 18, pp.1-87.

Taylor, J.B., 1993. Discretion versus policy rules in practice. *Carnegie-Rochester Conference Series on Public Policy*, 39, pp.195-214. http://dx.doi.org/10.1016/0167-2231(93)90009-L

Williamson, S.D., 2014. Monetary policy in the United States: A brave new world? *Federal Reserve Bank of St. Louis Review, 96(2), pp.111-121.*

Woodford, M., 2002. Optimal interest-rate smoothing. *Columbia University* [pdf] Available at: <http://www.columbia.edu/~mw2230/smoothing-RES.pdf> [Accessed 30 June 2002].