

Monetary Policy: Is the Dual Mandate of the Fed Maximizing the Social Welfare?

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Abstract

In this work we deal mostly with the recent (2008-present) Federal Reserve operated monetary policies, which are two unprecedented and distinct monetary policy regimes. The Zero Interest Rate Regime (2008:12-2015:11) and the New Regime (2015:12-2018:12). These different monetary policy regimes provided various outcomes for inflation, interest rates, financial markets, personal consumption, personal savings, real economic growth, and social welfare. Some of the important results are that monetary policy appears to be able to affect long-term real interest rates, risk, the prices of the financial assets, and very little the real personal consumption, personal savings, and the real economic growth during the recent period of extreme monetary policy, in which the Fed held short-term interest rates abnormally low for an extended period (2008-2015) and the present time, which keeps the federal funds rate below the inflation rate. The Fed's interest rate target was set during those seven years at 0% to 0.25%. On December 16, 2015, the Fed started increasing the target rate by 25 basis points approximately in each FOMC meeting, from 0.25% to 0.50% to 0.75%, and presently to 2.50%. We want to explain the low level of long-term interest rates and the real rate of interest (cost of capital) in the economy. The evidence suggests that it is the Fed the main cause of the low (negative) real interest rate following the 2007-2008 financial crisis. This monetary policy was not very effective (the zero interest rate target of the Fed). It has created a new bubble in the financial market, future inflation, and a redistribution of wealth from risk-averse savers to banks and risk-taker speculators. In addition, it has increased the risk (RP) by making the real risk-free rate of interest negative. The effects on growth, prices, and employment were gradual and very small, due to outsourcing and unfair trade policies, which have affected negatively the social welfare. The dual mandate (price stability and maximum employment) of the Fed is not sufficient to maximize the social welfare of the country.

Keywords: Monetary policy; Money and interest rates; Financial markets and the macro-economy; Production; Loss function; Social welfare.

JEL Classification: E52, E4, E44, E23, D69, D6.



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1. Introduction

What are the U.S. Federal Reserve's objectives in conducting monetary policy during the different eras?¹ Is the country's social welfare maximized with these objectives? The idea of a monetary policy regime is somewhat vague. It is related to the state of the economy, to Fed's experience, to the idea of a monetary standard, and to other distrustful "ideals". This article examines the two latest U.S. policy regimes that were adopted to manage the recent financial crisis and recession and tests the effectiveness of the Fed. These regimes are defined by the different goals for policy and by the different procedures; the zero interest rate regime (ZIRR), December 16, 2008-December 15, 2015² (quantitative easing, QE) and the new regime (NR), December 16, 2015-present,³ which are used to implement monetary policy decisions (Bindseil, 2016; Bullard, 2018b; Gavin, 2018).

Social welfare⁴ is the well-being of the entire society (a sovereign nation). The monetary policy ought to improve the well-being of all individuals inside the country by minimizing a social loss function and not only a

¹ The Congress established the statutory objectives for monetary policy--maximum employment, stable prices, and moderate long-term interest rates--in the Federal Reserve Act. See, "What are the Federal Reserve's objectives in conducting monetary policy?" https://www.federalreserve.gov/faqs/money_12848.htm. Also, "Breaking Down the Federal Reserve's Dual Mandate", <https://www.investopedia.com/articles/investing/100715/breaking-down-federal-reserves-dual-mandate.asp>

² Chairman of the Board of Governors of the Fed: Ben Bernanke (2/1/2006-1/31/2014) and U.S. President: George W. Bush (2001-2009). Then, Janet Yellen (2/3/2014-2/3/2018) and U.S. President: Barack H. Obama (2009-2017).

³ Chairman of the Board of Governors of the Fed: Janet Yellen (2/3/2014-2/3/2018) and U.S. President Barack H. Obama (2009-2017) and Donald Trump (2017-present). Then, Jerome Powell (2/5/2018-present) and U.S. President Donald Trump (2017-present). See also, <https://tradingeconomics.com/united-states/interest-rate>. Further, "Yellen Says Trump Doesn't Understand Economic Policy", Former Fed chief says she worries president's criticisms of the Fed could undermine confidence in it. (*sic*). See, <https://www.wsj.com/articles/yellen-says-trump-doesnt-understand-economic-policy-11551122834?tpl=centralbanking>. Also, <https://www.wsj.com/articles/yellen-says-trump-doesnt-understand-economic-policy-11551122834>

⁴ Social welfare is not only an economic function, as we measure it, here, it is a very complex one; it includes the standard of living, but it is more concerned with the quality of life, the well-being of every citizen, his quality of life (wealth, income, utility,

group, a market, or sector of the economy. The social welfare must satisfy Pareto efficiency, which holds if all alternatives have been exhausted to put at least one person in a more preferred position with no one been put in a less preferred position. A *Pareto improvement* is a change to a different allocation that makes at least one individual or preference criterion better off without making any other individual or preference criterion worse off, given a certain initial allocation of “goods” (income, employment, inflation, real rate of interest, interest rates, stock markets, consumption, interest rate on deposits, savings, risk, etc.) among all the individuals of the country. An allocation is defined as “Pareto efficient” or “Pareto optimal” when no further Pareto improvements can be made, in which case we are assumed to have reached *Pareto optimality*.

The Fed has since 1977 a dual mandate, to promote price stability and maximum sustainable employment.⁵ In practice, price stability is defined as 2% inflation rate. Achieving the maximum (and not the full) employment goal is more problematic because the concept of full employment is not measured directly. This part of the dual mandate is implemented by following a countercyclical policy, easy (expansionary) policy when the economy is thought to be below its potential and tight (contractionary) policy when the economy is estimated to be growing above its sustainable long-run trend. In making decisions at Federal Open Market Committee (FOMC) meetings, the participants look at everything, but the two most important economic indicators are inflation and real gross domestic product (GDP) growth (Kallianiotis, 2017a; Taylor, 1993). Also, the Taylor rule had been considered by monetary policy circles and in Neo-Keynesian economics that it incorporates another element of conventional central banking wisdom, the Phillips curve (Bank of Canada, 2017; Summers, 2017; Williamson, 2018; Woodford, 2003; Yellen, 2017) and a “modernized” version of the Taylor rule, the Bullard rule, (Kliesen, 2019) are used, too. The potential monetary targets are the federal funds rate, the monetary base, and the money supply. But, here, we want to examine the efficiency and effectiveness of this QE monetary policy. The objectives (ultimate policy goals) are always the same, reasonable price stability ($\pi = 2\%$), maximum employment, sustainable economic growth, moderate L-T interest rates, balance in the current account, which will affect employment, personal income, personal consumption, personal savings, risk, and social welfare.

2. Intermediate and Ultimate Effects of Monetary Policy

Different monetary policy regimes lead to different equilibrium levels of real interest rates, risk, consumption, savings, financial market, real GDP, and social (loss function) welfare. Our most basic theories of money assume the classical dichotomy: real variables are determined by real factors and nominal variables are determined by monetary policy (money illusion). Even Keynesian models with sticky prices assume that the real effects are short-lived, a few quarters at most. For monetary policy to have persistent real effects, we have to consider extreme policies or extend the models to include more realistic features.

The latest monetary policy regime from 2008 to 2015 was an extreme policy⁶ because the interest rate policy is not consistent with the 2% inflation objective.⁷ This policy had led to persistently low (negative), real rates on bank reserves ($r_{ER} < 0$), on deposits ($r_D < 0$), and other safe assets ($r_{RF}^* < 0$). It had also led to a low level of real economic activity ($g_{RGDP} \downarrow$),⁸ real personal consumption expenditures ($g_{RPCE} \downarrow$), lower savings, high risk, with a new bubble in the financial markets,⁹ and consequently, in reduction of social welfare. If some factor (easy money policy) keeps the interest rate below the equilibrium level, then the amount that people want to borrow will exceed the amount that people want to save (because this negative real rate of interest is a disincentive to save,

environment, democracy, security and safety, crime, health, education, social services, value system of the country, culture, civilization, faith, tradition, morality and ethics, independence, sovereignty, and many other aspects of life).

⁵ For the Federal Reserve’s Dual Mandate, See, <https://www.chicagofed.org/research/dual-mandate/dual-mandate>.

⁶ For example, it was as follows: $y = q + \pi \Rightarrow q = y - \pi < 0$ because $\pi > y$ and $i = r + \pi \Rightarrow r = i - \pi < 0$ because $\pi > i$. Also, during peace periods, hyperinflations rarely persist for too long because the effects are so bad that they bring down governments (more responsible for this state of the economy is the central bank and not the government) because they are not willing or able to bring about reforms and control the price level. Inflation is a monetary phenomenon: $MV = QP \Rightarrow m = p$ (because V and Q are constant). The data show (1995:01-2008:11): $\rho_{M2,CPI} = +0.993$ and $MB \Rightarrow CPI$, $g_{MB} \Rightarrow \pi$, and $M2 \Rightarrow \pi$. The direction of causality is from the monetary instruments (MB , g_{MB} , and $M2$) to the ultimate objective variable (CPI and π). And for the period (2008:12-2015:12), we have: $\rho_{M2,CPI} = +0.963$ and $CPI \Rightarrow mb$, $cpi \Rightarrow mb$, $CPI \Rightarrow M2$, $cpi \Rightarrow m2$, $\pi \Rightarrow M2$, $\pi \Rightarrow g_{M2}$; where ρ = correlation coefficient, \Rightarrow = causality, cpi = ln of CPI. The direction of causality is different, here; it goes from the objective variable (CPI , cpi , and π) to the instruments (mb , $M2$, $m2$, and g_{M2}).

⁷ Official inflation 2.8% with May 2018; but 6.5% (1990-based) or 11% (1980-based) from the SGS. Source: http://www.shadowstats.com/alternate_data/inflation-charts. Now (March 2019), the official inflation is 1.6%. The SGS gives 9% inflation rate.

⁸ The g_{RGDP} was: -0.3% (2008), -2.8% (2009), 2.5% (2010), 1.6% (2011), 2.2% (2012), 1.7% (2013), 2.6% (2014), and 2.9% (2015). (Source: *Economagic.com*). Gavin et al. (2015) use a nonlinear solution to a standard New Keynesian model to show that a persistently low interest rate can lead to a path for output that is persistently below the model’s equilibrium steady state.

⁹ The DJIA from 6,547.05 (March 2009) reached 17,719.92 (December 2015); a growth of 11,172.87 points or 170.66% (24.38% p.a.).

$\bar{r}_D = -1.502\%$).¹⁰ If the interest rate cannot adjust upward to achieve equilibrium in the market for loanable funds, then investment will fall until the amount people want to borrow equals the amount people want to save. Thus, income will fall and unemployment will rise. This negative real rate of interest is a deliberate and suspicious policy to take away the wealth of simple people and has increased their risk, too.¹¹

The anxiety has become enormous with the passing of time because the current monetary policy (2015-2019) continuous to generate similar results with the previous one, since the federal funds rate is still very low, 2.50% (closed to the official core inflation rate for January 2019, $\pi = 2.2\%$)¹² and the dangerous bubble in the financial market is growing.¹³ The DJIA picked on October 3, 2018 at the level of 26,828.39, it decline to 21,792.20 in December 24, 2018 and finished the year, December 31, 2018 at the level of 23,327.46. A growth until 2018 of 16,780.41 points since its trough (thanks to the Fed) or 256.30% (29.29% p.a.). Now (March 11, 2019), DJIA was 25,621.78.

Monetary policy can affect the real return to saving (which must be at least, $r_s > 1\%$);¹⁴ the latest and current stubbornly low interest rate policy leads to persistently subpar economic activity and social loss (low economic well-being). The optimal level of economic activity can be achieved only when the real interest rate returns to a normal level making the real return positive. Caggese and Perez-Orive (2017) A significant anomaly in the post-crisis period of a continuous low interest rate policy has been the very low levels of turnover, levels typically associated with being in a recession with low productivity growth. Old inefficient firms tend to go out of business during recessions and are replaced during the recovery by new firms using more efficient technology. The problem with U.S. is the destruction of the small cities and towns, due to loss of manufacturing, high unemployment, low quality of life, reduction of welfare, and creation of ghost towns (Kallianiotis, 2018). Foster *et al.* (2016), find that since the 2007-2008 financial crisis and 2007-2009 recession, measures of turnover have yet to fully recover from the recession levels. After 2017, the U.S. economy started growing and there is hope to continue at this approximately level.¹⁵ They suggest that inefficiencies in credit markets may be part of the problem. In any case, it seems possible that the low productivity growth rate and the reduced turnover of jobs with many part time jobs, without health insurance, social security contribution and with minimum wages, and firms that are not exogenous with respect to a monetary policy, which pegged the interest rate near zero (from December 16, 2008 to December 16, 2015, for 7 years)¹⁶ caused all these problems. The real cost of capital must be positive, the real economic growth at the full employment level, and the financial market to grow at a level that minimizes investors' risk, personal savings to grow, social loss function to go towards zero, and social welfare to improve. All these objectives could be satisfied with an efficient and effective monetary policy.

3. Theory: The Latest and the Current Monetary Policy Regimes

A monetary regime (Gavin, 2018) is characterized by two properties: (i) the weight policymakers put on price stability relative to their concern about output stabilization and (ii) the day-to-day procedures used to implement policy. This paper deals with the latest and current regimes implemented by the Federal Reserve since 2008. The first is the Zero Interest Rate Regime (December 16, 2008-December 15, 2015) and the second is the current New Regime (December 16, 2015-present).¹⁷ Each regime is an experiment that is associated with different policy

¹⁰ The $\bar{r}_{FF}^{eff} = -1.458\%$ and the $\bar{r}_{RF}^* = -1.508\%$ during the ZIR Era.

¹¹ During the zero interest rate regime (ZIRR) the risk was; i.e., $i_{10YTB} = r^* + IP + RP \Rightarrow i_{10YTB} = 2.586\% = -1.508\% + 1.586\% + RP \Rightarrow RP = 2.508\%$. Now, with the new regime (NR), the risk for the same instrument has become (1.371%). These are indications of an ineffective policy, with artificiality everywhere, strange mysticism, and anti-social actions and results. (Sic).

¹² See, *The Wall Street Journal*, March 5, 2019, p. B8. Also, <https://www.usinflationcalculator.com/inflation/current-inflation-rates/>. And 6.50% below the 1980-based inflation rate; then, $r_{FF} = -6.50\%$. The SGS was giving a U.S. inflation of 9% (December 2018 and January 2019). See, http://www.shadowstats.com/alternate_data/inflation-charts

¹³ The DJIA from 6,547.05 (March 9, 2009), it reached 26,828.39 (October 3, 2018); a growth by 20,281.34 points or 309.78% (36.44% p.a.). This bubble can cause a global destruction with its burst because the "economic elites" can use it to pursue their global control without any interruption. These globalists want to terrorize people and to prove to some populist politicians, which have the illusion that they can lead the world that they (these dark powers) are in control of everything since the British Revolution (1640). See, Kallianiotis (2017b). On December 24, 2018 the DJIA fell to 21,792.20 (it lost in 3.5 months -5,036.19 points, or -18.77%) and the excuse was that "the oil slide scuttled a move by stock indexes". (*Wall Street Journal*, November 14, 2018). The price of oil was \$30.32/barrel (2016:M02), it reached \$70.98 (2018:M07) and fell to \$55.69 (November 13, 2018), then still it is very high. Also, they said that the federal funds rate went up in December 2018. But, their excuses do not stand.

¹⁴ By making (in November 2018) the nominal (target) federal funds rate over: $\bar{i}_{FF} = r + \pi$. i.e., above 3.3% $\bar{i}_{FF} = 3.3\% = 1\% + 2.3\%$, we have a positive \bar{r}_{FF} , but it is only $\bar{i}_{FF} = 2.25\%$, which makes the $r_{FF} = -0.05\%$. See, <https://fred.stlouisfed.org/series/DFEDTARU>

¹⁵ The U.S. growth was: (2017:Q1) 1.7850%, (2017:Q2) 2.9917%, (2017:Q3) 2.8233%, (2017:Q4) 2.2912%, (2018:Q1) 2.2176%, (2018:Q2) 4.1588%, (2018:Q3) 3.3560%, and (2018:Q4) 2.60%. See, *Economagic.com*.

¹⁶ See, http://www.fedprimerate.com/fedfundsrate/federal_funds_rate_history.htm

¹⁷ See, Federal Funds Data. <https://apps.newyorkfed.org/markets/autorates/fed%20funds>

objectives, different operating procedures, different statistical patterns in the data, different effectiveness, and consequently, different social loss and welfare outcome.

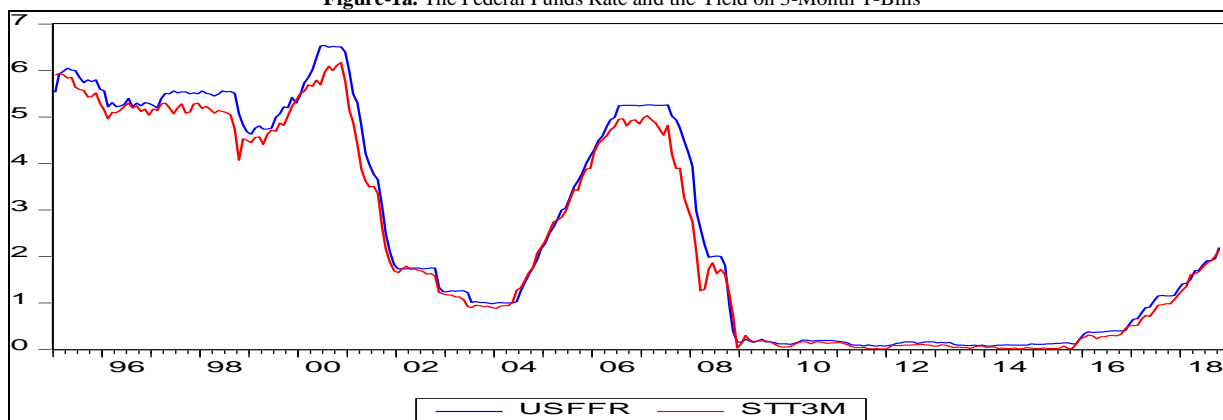
3.1. The Zero Interest Rate Regime (ZIRR)

The Zero Interest Rate Regime (ZIRR) was from December 16, 2008 to December 15, 2015, a seven-year period, in which the target range for the federal funds rate was pegged between zero and 0.25% ($\bar{i}_{FF} = 0\% - 0.25\%$). The market was flooded with trillions of dollars of excess reserves ($R_E = \$2.7$ trillion in August 2014)¹⁸ as banks earned 0.25% on reserve balances at the Fed and an enormous monetary base (MB = \$4.17 trillion on September 16, 2015, the highest in Fed's history),¹⁹ which generated (endogenously) a money supply ($M^s = \$12.31$ trillion on December 12, 2015).²⁰ The main concern was output stabilization, as output appeared to grow along a path that was considered to be well below the potential for GDP, Figure 4, (the real GDP growth was $g_{RGDP_t} = -2.703\%$ in 2008:Q1, -1.903% (2008:Q3), -8.188% (2008:Q4), -5.428% (2009:Q1), -0.540% (2009:Q2), -1.536% (2011:Q1), -1.0033% in (2014:Q1), 0.9639% (2015:Q2), and 0.4002% (2015:Q3).²¹ Official inflation ($\bar{\pi} = 1.586\%$) tended to remain below the Fed's 2% long-term objective Table 1 and the Fed was anxious for a possible deflation ($-\pi$), which would increase the real cost of capital [$r = i - \pi$; and then, $r = i - (-\pi) \Rightarrow r = i + \pi$]. The Federal Reserve recently was troubled how it would set short-term interest rates in an effort to keep them from drifting too high; but an increase in its benchmark raises questions about its ability to keep borrowing costs in check.²²

Figures 1a and 1b, and Table 1 show that the level and volatility of federal funds rate ($\sigma_{i_{FF}} = \pm 0.040\%$) continued to drop. The FOMC had adopted a risk-management approach to monetary policy. Greenspan (2004) The financial crisis raised awareness of another downside of the federal funds rate. The abuses in the mortgage market were due to many factors, but many attributed the bad debt to low interest rates (Kallianiotis, 2015; 2017a; Taylor, 1993). Today, the Federal Reserve takes responsibility for financial stability, but, as a practical matter, interest rate policy is aimed at stabilizing output and targeting inflation, but we do not see any significant improvement on social welfare by minimizing the loss function [eq. (12)]. Although the FOMC regularly monitors financial markets for evidence of financial instability, it has emphasized the use of macro-prudential policies to promote financial stability in an era of low interest rates.

With the onset of the global financial crisis, the Fed abruptly switched to this infamous new monetary policy regime, the Zero Interest Rate Policy regime. In response to the financial crisis, in September 2008, the Fed flooded the market with about \$600 billion in excess bank reserves and drove federal funds rate toward zero. On December 16, 2008, the FOMC voted to set the bottom of the 0.25% target range for federal funds rate at zero. It also adopted unconventional policies known as *quantitative easing* (QE) and *forward guidance* that were intended to keep money market interest rates near zero ($\bar{i}_{RF} = 0.078\%$), Table 1, for an extended period. Fawley and Neely (2013)

Figure-1a. The Federal Funds Rate and the Yield on 3-Month T-Bills



Note: USFFR = U.S. federal funds rate and STT3M = U.S. 3-month Treasury Bills rate. ZIRR: $\rho_{i_{FF}, i_{RF}} = +0.821$, $i_{FF} \Rightarrow i_{RF}$ ($F = 20.581$). NR: $\rho_{i_{FF}, i_{RF}} = +0.996$, $i_{RF} \Rightarrow i_{FF}$ ($F = 15.103$); where ρ = correlation coefficient, \Rightarrow = causes, and F = F-statistic.

Source: Economagic.com

¹⁸ See, <https://fred.stlouisfed.org/series/EXCSRESNS>

¹⁹ See, <https://fred.stlouisfed.org/series/BASE/>

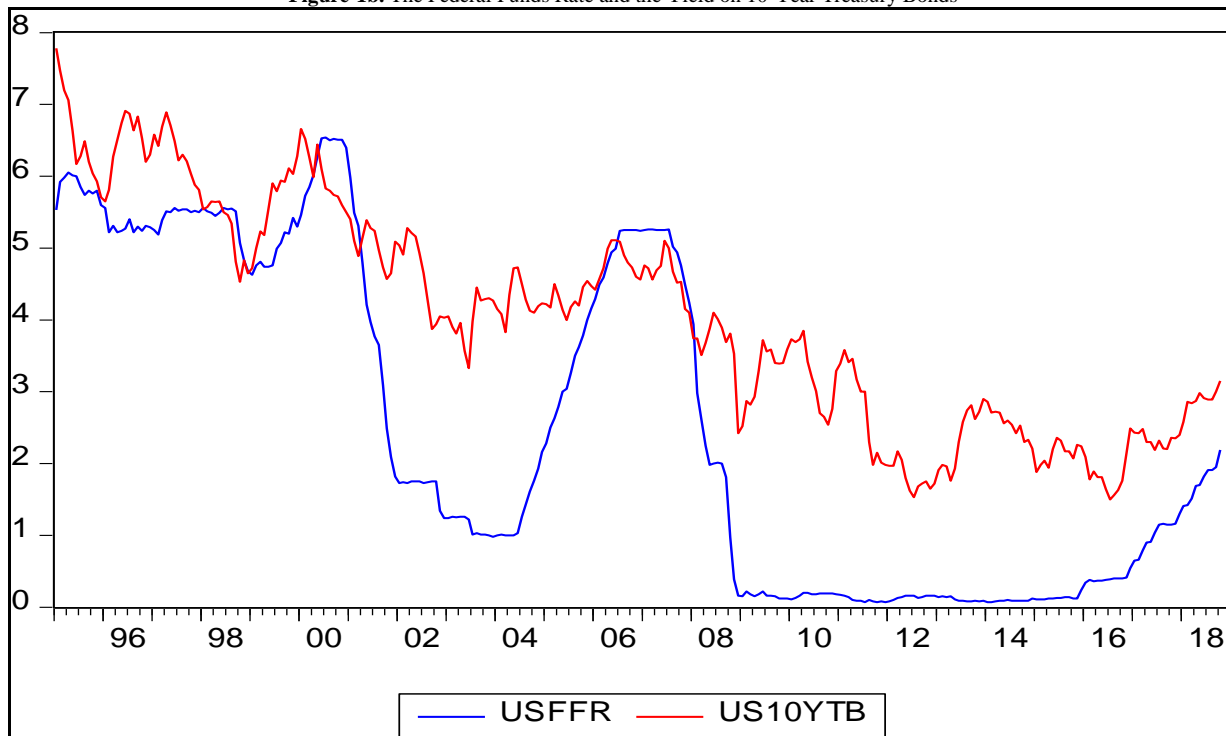
²⁰ Lately, it is worse, with January 14, 2019, the M2 was \$15.52 trillion and with February 25, 2019 declined to \$14.480 trillion. See, <https://fred.stlouisfed.org/series/M2>

²¹ See, <https://tradingeconomics.com/united-states/gdp-growth>. Also, <https://fred.stlouisfed.org/series/A191RL1Q225SBEA> and <https://fred.stlouisfed.org/series/GDPC1/>

²² See, "The Fed's Latest Challenge: Keeping Benchmark Rate in Check", *The Wall Street Journal*, June 27, 2018. <https://www.wsj.com/articles/the-feds-latest-challenge-keeping-benchmark-rate-in-check-1530091800>

Although the Fed has a target range for federal funds, the actual policy rate set by the Fed is the interest rate on reserves (i_{IOR}). As it turns out, the period with the IOR set at the top of the target range for federal funds (0.25%) extended for exactly seven years. Gagnon and Sack (2014) Both the level and the volatility of the federal funds went close to zero in September 2008 as the Fed flooded the money market with bank reserves Figures 2a, 2b, 2c, and Table 1. Initially, the Fed supplied about \$600 billion in reserves, as it was mentioned above, mainly by making loans of 180 days or less. The Fed justified this action as insurance against the worldwide collapse of financial markets (the 1st global crisis of the 21st century) and a replay of the Great Depression. Generally, the Fed had shown an aversion to reversing interest rate movements within a short time span.

Figure-1b. The Federal Funds Rate and the Yield on 10-Year Treasury Bonds



Note: USFFR = U.S. federal funds rate and US10YTB = U.S. 10-year Treasury bonds rate. ZIRR: $\rho_{i_{FF}, i_{10YTB}} = +0.224$,

$i_{FF} \Rightarrow i_{10YTB}$ ($F = 5.055$). NR: $\rho_{i_{FF}, i_{10YTB}} = +0.885$, $i_{10YTB} \Rightarrow i_{FF}$ ($F = 7.760$)

Source: Economagic.com

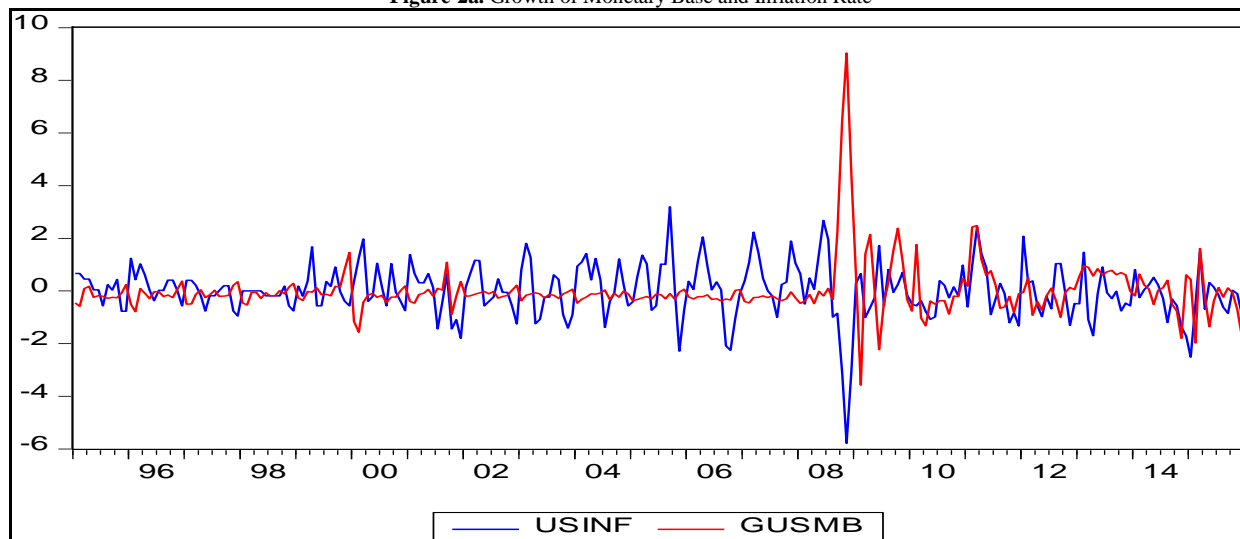
The rescue (bailout) of financial institutions (D'Erasmus, 2018; Kallianiotis, 2018) was funded by the U.S. Treasury (the taxpayers) with the Emergency Economic Stabilization Act of 2008²³ and with Fed loans and asset purchases with terms to maturity of 6 months or less. Thus, QE was an attempt to extend the expected time that the interest rate would stay near zero and an attempt to stimulate the economy by lowering longer-term interest rates.

But, this too easy money kept the interest rate on deposits at zero [$i_D = 0.05\%$, with an average official inflation ($\bar{\pi} = 1.586\%$) was making the $r_D = -1.536\%$ ²⁴ and later, with $\pi = 2.9\%$, the $r_D = -2.85\%$], which continues for ten years. This policy is forcing risk averse savers to withdraw their deposits and buy securities that their growth was enormous ($g_{DJIA} = 9.952\%$ p.a.), but their risk was immense ($\sigma_{DJIA} = \pm 55.692\%$),²⁵ as Table 1 shows. Thus, this extreme monetary policy created a new bigger bubble the last years (DJIA reached 26,828.39 on October 3, 2018).

²³ The *Emergency Economic Stabilization Act of 2008* (Division A of Pub.L. 110–343, 122 Stat. 3765, enacted October 3, 2008), commonly referred to as a *bailout of the U.S. financial system*, is a law enacted subsequently to the subprime mortgage crisis authorizing the U.S. Secretary of the Treasury to spend up to \$700 billion to purchase distressed assets, especially mortgage-backed securities, and supply cash directly to banks. The funds for purchase of distressed assets were mostly redirected to inject capital into banks and other financial institutions while the Treasury continued to examine the usefulness of targeted asset purchases. Both foreign and domestic banks are included in the program. (sic). The Act was proposed by Treasury Secretary Henry Paulson (who was in the past Chairman and CEO of Goldman Sachs) during the global financial crisis of 2008 and signed into law by President George W. Bush on October 3, 2008.

²⁴ By using the SGS, the average consumer inflation was ($\bar{\pi} = 10\%$) and the $r_D = -9.95\%$ (an amazing inflationary finance of banks, which is an inflationary tax; an unethical robbery of poor depositors, bail in, as ECB did in Cyprus).

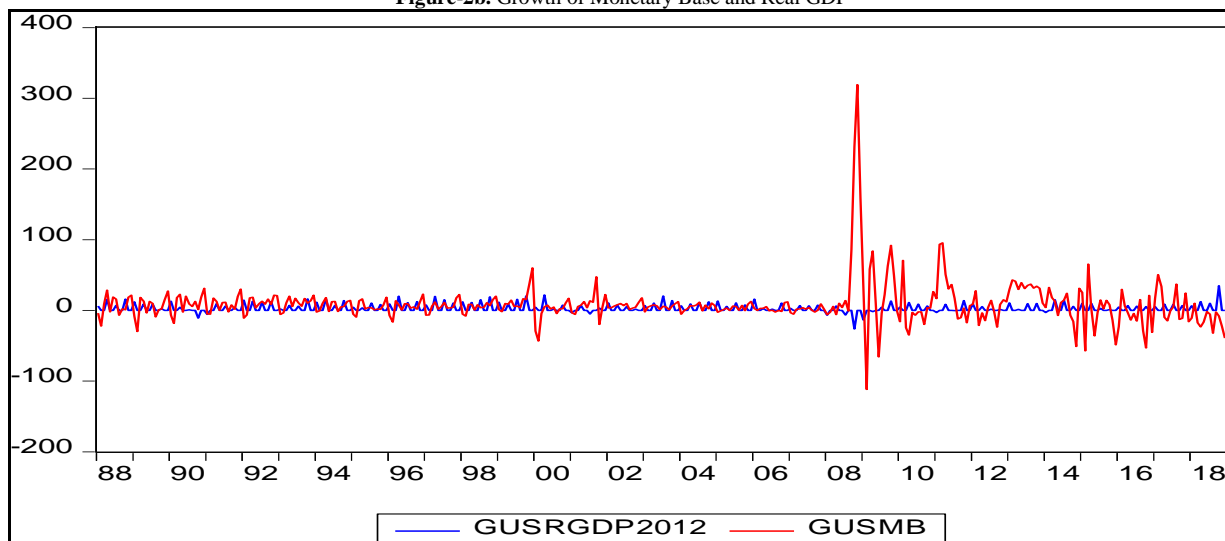
²⁵ These markets have become riskier than casinos because the risk in casino falls on the person that made the mistake to bid money there; but simple investors that believe to a decent return from this “efficient” (out of control) market, they lose their money (wealth) and the economy is going to a recession. The financial crises have to be prevented and not corrected with a public policy after their appearance. Thus, the current system is ineffective and inefficient.

Figure-2a. Growth of Monetary Base and Inflation Rate

Note: USINF = U.S. inflation (π_t) and GUSMB = growth of the U.S. monetary base (g_{MB_t}). ZIRR: $\rho_{g_{MB}, \pi} = -0.061$ and $\rho_{g_{MB}, \pi} = +0.007$
 NR:
Source: *Economagic.com*

Later, the average maturity of assets on the Fed's balance sheet²⁶ also rose as the FOMC rebalanced the portfolio, substituting long-term assets for short-term ones. Interest rates were also expected to stay low because this was the goal of policy suggested in FOMC post-meeting statements, policymaker speeches, and Congressional testimony. [Potter \(2017\)](#) In October 2008, the Federal Reserve had begun to pay interest on reserves. The IOR was set at the top of the federal funds target range and remained about 20 basis points above the discount rate on 3-month Treasury bills

($i_{IOR} = i_{RF} + 0.20\%$).²⁷ This was a factor that increased banks' willingness to hold a large stock of excess reserves. Paying interest on excess reserves and supplying a large stock meant that the FOMC had switched from direct federal funds targeting to a floor system. [Bindseil \(2016\)](#)

Figure-2b. Growth of Monetary Base and Real GDP

Note: GUSRGDP2012 = growth of the U.S. RGDP (2012 base) (g_{RGDP_t}) and GUSMB = growth of the U.S. monetary base (g_{MB_t}). ZIRR: $\rho_{g_{MB}, g_{RGDP}} = +0.007$, $g_{MB} \Rightarrow g_{RGDP}$ ($F = 5.261$); NR: $\rho_{g_{MB}, g_{RGDP}} = -0.101$ and no causality at all.
Source: *Economagic.com*

²⁶ The Fed's balance sheet has gotten huge. Quantitative easing (or QE) has increased the size of the Fed's balance sheet almost eightfold since the turn of the century. The Fed's balance sheet had just over \$500 billion in assets in 2000 and \$925.725 billion on September 10, 2008, it reached over \$4.5 trillion in 2015. On January 24, 2019, it held \$4.047 trillion and on March 6, 2019, it fell to \$3.969 trillion. See, <https://fred.stlouisfed.org/series/WALCL>

²⁷ On the average this i_{IOR} was: $\bar{i}_{IOR} = \bar{i}_{RF} + 0.20\% = 0.078\% + 0.20\% = 0.278\%$. Then, if banks are receiving interest from the Fed, why to pay interest on deposits? They do not need more funds from depositors as long as the Fed provides this enormous liquidity (R_E). Another proof that the Fed has failed to maximize the depositors' interest income and consequently, their welfare.

An important feature of the ZIRP regime, which began with a big two-quarter decline in Consumption Figure 3a and Table 1, is the failure of the economy to return to the trend in potential GDP Figure 4 that had been estimated by both the Fed staff and the Congressional Budget Office. The Fed and private forecasters incorrectly forecasted a return to trend over the next seven years. One response was to lower estimates of the level and growth rate of potential GDP. In the policy response, the Fed turned to QE twice more, taking the balance sheet over \$4.5 trillion by the end of 2014.²⁸ The end of the ZIRP regime occurred when the FOMC voted to raise the federal funds rate target range by 0.25% on December 16, 2015 and reached 0.50%.²⁹

Now, according to Taylor's original version of the rule, the nominal interest rate should respond to divergences of actual inflation rates from target inflation rates and of actual GDP from potential GDP: (Kliesen, 2019)

$$\bar{i}_{FF_t} = \pi_t + r_t^* + \alpha_\pi(\pi_t - \pi_t^*) + \alpha_q(q_t - \bar{q}_t) \quad (1)$$

where, \bar{i}_{FF_t} = the target short-term nominal interest rate (the federal funds rate), 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, q_t = the logarithm of real GDP, and \bar{q}_t = the logarithm of potential output, as determined by a linear trend Figure 4.

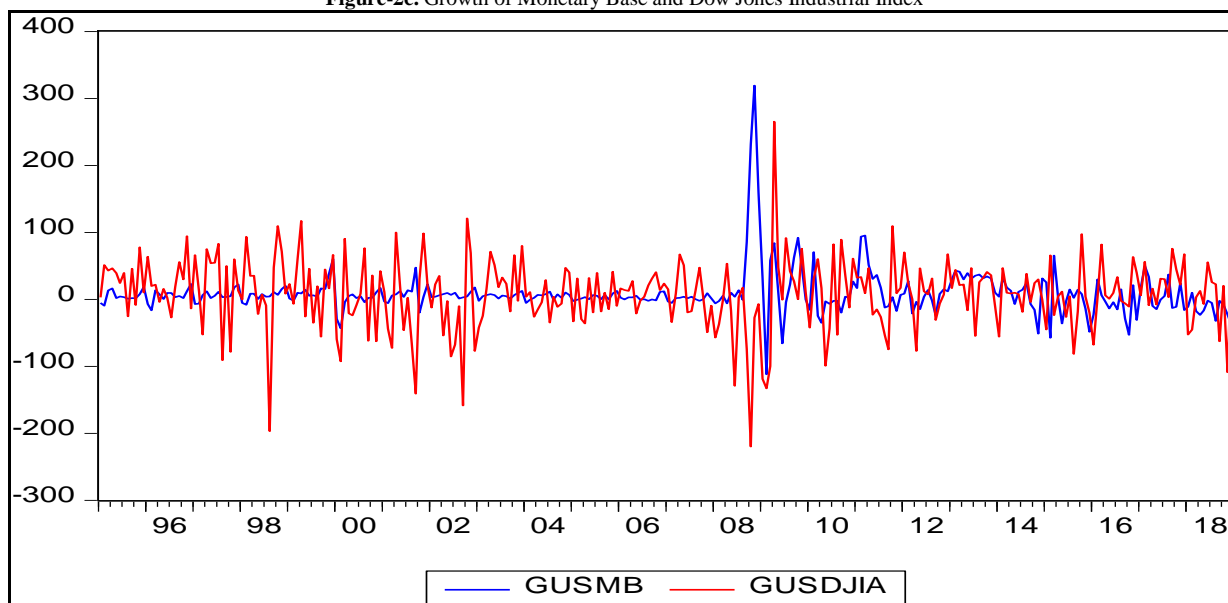
In this equation, both α_π and α_q should be positive (as a rough rule of thumb, Taylor's 1993 paper proposed setting $\alpha_\pi = \alpha_q = 0.5$). That is, the rule "recommends" a relatively high interest rate (a "tight" monetary policy) when inflation is above its target or when output is above its 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.

Taylor's rule can be modified by using unemployment (u_t) instead of GDP:

$$\bar{i}_{FF_t} = \pi_t + r_t^* + \alpha_\pi(\pi_t - \pi_t^*) - \alpha_u(u_t - u_t^N) \quad (2)$$

If inflation rate is above target, the central bank raises the federal funds rate, which encourages financial institutions to increase interest rates on their loans and mortgages. But the higher loans rates discourage borrowing and spending and thereby easing the upward pressure on prices. If the unemployment rate is above the natural level (u_t^N), the Fed reduces the federal funds rate to lower the cost of capital and might increase investment, which will affect positively output and employment.

Figure-2c. Growth of Monetary Base and Dow Jones Industrial Index



Note: GUSMB = growth of the U.S. monetary base and GUSDJIA = growth of the U.S. DJIA. ZIRR: $\rho_{g_{MB}, g_{DJIA}} = +0.189$,
 $g_{MB} \Rightarrow g_{DJIA} (F = 14.464)$; NR: $\rho_{g_{MB}, g_{DJIA}} = +0.149$, $g_{MB} \Rightarrow g_{DJIA} (F = 3.356)$.
Source: Economagic.com

²⁸ Fed's Balance Sheet was \$4.513 trillion on January 21, 2015. See, <https://fred.stlouisfed.org/series/WALCL>

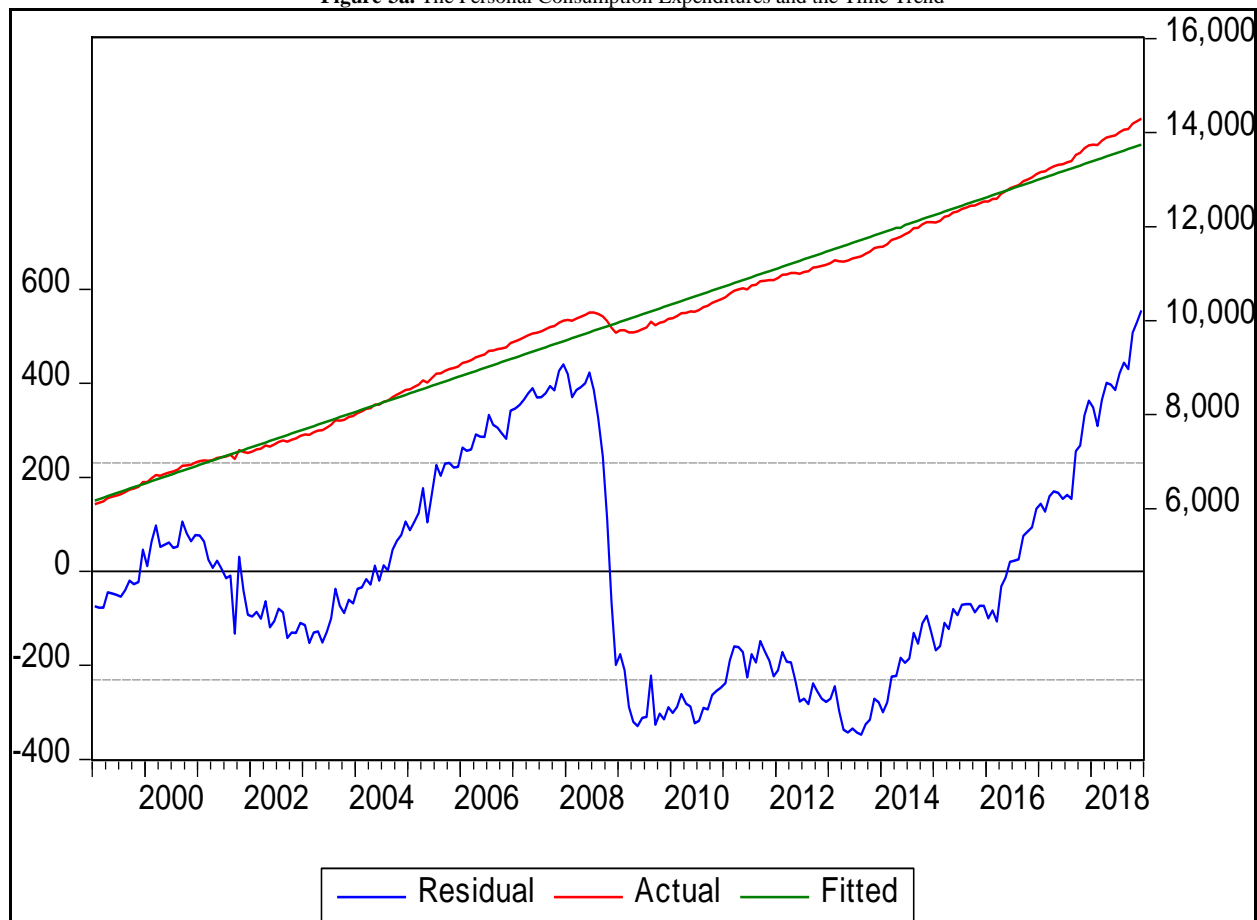
²⁹ See, http://www.fedprimerate.com/fedfundsrate/federal_funds_rate_history.htm

In addition, James Bullard proposes an alternative formula that he terms it as a “modernized” version of the Taylor rule:

$$\bar{i}_{FF_t} = \rho i_{FF_{t-1}} + (1 - \rho)(r_t^* + \pi^* + \phi_\pi \pi_t^{GAP} + \phi_q q_t^{GAP}) \quad (3)$$

where, \bar{i}_{FF_t} = the recommended value of the nominal policy rate, $r_t^* = 1$ is the natural real interest rate, also called “r-star”, $\pi^* = 2$ denotes the FOMC’s inflation target, π_t^{GAP} and q_t^{GAP} denote the inflation gap (measured as the difference between a market-based measure of inflation expectations and the Fed’s inflation target) and the output gap [the output gap can be measured as the difference between the current unemployment rate (u_t) and the Congressional Budget Office’s natural rate of unemployment (u^N)], respectively, and $\phi_\pi = 1.5$, $\phi_q = 1$, and $\rho = 0.85$ are parameters. Bullard (2018a)

Figure-3a. The Personal Consumption Expenditures and the Time Trend



Note: Actual = USPCE and Fitted = the L-T time trend

Source: Economagic.com

Further, the Phillips curve can be written as follows:

$$\pi_t = \pi_t^e + \varphi(q_{t-1} - q_t^N) \quad (4)$$

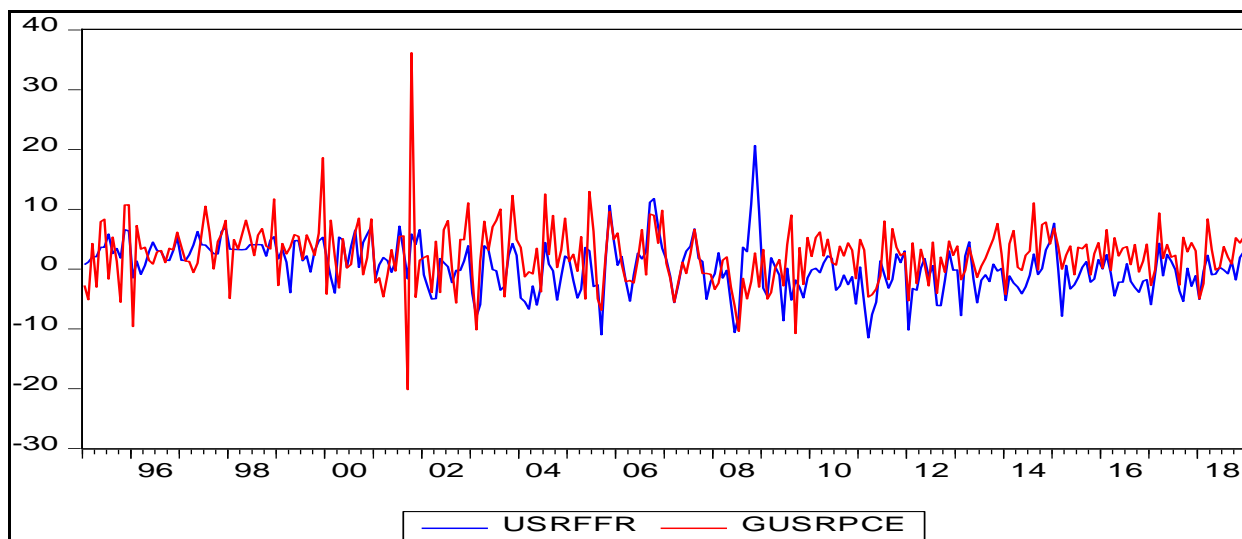
or

$$\pi_t = \pi_t^e - \psi(u_{t-1} - u_t^N) \quad (5)$$

and we want to test empirically this Phillips curve during the last two monetary policy regimes because many policy makers insist that Phillips curve does not hold anymore.³⁰

Figure-3b. The Real Federal Funds Rate and the Growth of the Real Personal Consumption Expenditures

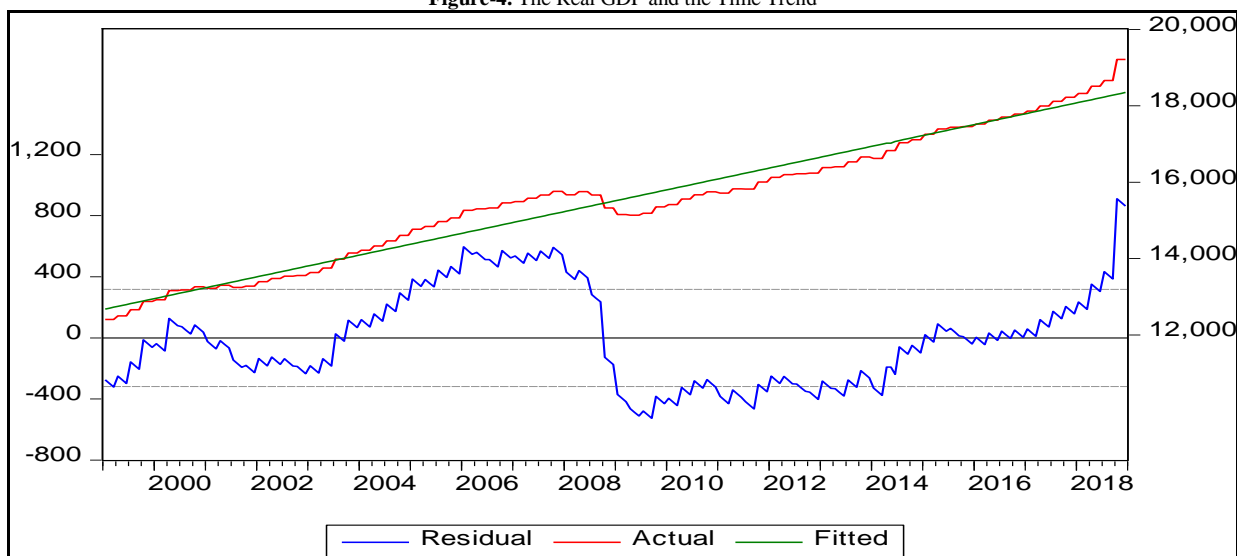
³⁰ This is possible because the structure of our economy has changed from capitalism ($u \uparrow \Rightarrow Y \downarrow \Rightarrow AD \downarrow \Rightarrow P \downarrow$) it became debtism ($u \uparrow \Rightarrow Y \downarrow \Rightarrow \text{Borrowing} \uparrow \Rightarrow AD \uparrow \Rightarrow P \uparrow \text{ or } \bar{P}$). Also, they changed the way of measuring unemployment and inflation. See, http://www.shadowstats.com/alternate_data/inflation-charts and http://www.shadowstats.com/alternate_data/unemployment-charts



Note: $USRFFR = r_{FF}^{eff}$ = U.S. Real federal funds rate and $GUSRPC = g_{RPCE}$ = growth of the U.S. real personal consumption expenditures. ZIRR: $\rho_{r_{FF}^{eff}, g_{RPCE}} = +0.436$, $r_{FF}^{eff} \Rightarrow g_{RPCE} (F = 3.102)$; NR: $\rho_{r_{FF}^{eff}, g_{RPCE}} = +0.499$ and no causality.
Source: *Economagic.com*

Undoubtedly, monetary policy during the ZIRR (2008:12-2015:11) was an experimental one by policymakers. It had a relatively low volatility in both output ($\sigma_{RGDP} = \pm 4.532\%$) and inflation ($\sigma_{\pi} = \pm 3.571\%$), as Table 1 and Figure 4 reveal, but their mean values were also very low ($\bar{g}_{RGDP} = 1.857\%$ and $\bar{\pi} = 1.586\%$). Figures 1a and 1b and Table 1 show that the volatility of the federal funds continued to decline throughout the Zero Interest Rate Era ($\sigma_{FFR} = \pm 0.040\%$). Trends in interest rates were declining throughout much of the ZIRR Figure 5. When the economy went into recession (2008), the FOMC lowered the federal funds rate target to 0% to stimulate the economy. The FOMC expected this to lead to higher inflation, but it did not. (*Sic*). The official inflation was $\bar{\pi} = 1.586\%$ during the Zero Interest Rate Era (ZIRR),³¹ which cannot be explained with our economic theory and practice.

Figure-4. The Real GDP and the Time Trend



Note: Actual = USRGDP2012 (U.S. real GDP, 2012 base-year) and Fitted = the L-T time trend.

Source: *Economagic.com*

³¹ Alternative measure of inflation rate from 1981 to 2018 gives the following results. The CPI chart of the SGS reflects the estimate of inflation for today as if it were calculated using the methodologies in place in 1980. Today's methodology is very suspicious. (*sic*). The actual inflation during the ZIRR was about 10%. See, http://www.shadowstats.com/alternate_data/inflation-charts. A naïve practical inflation measure can be the following: In 1982, a family was spending \$20 per week in supermarket; in 2018, the same family was spending \$200, due to inflation. Thus, prices have been risen by 1000% in 36 years or 27.78% per annum. This is a true inflation for a household.

The recoveries were not as vigorous as those during the previous eras. As the economy was going to a deeper recession, the FOMC continued to keep the federal funds rate target to zero [Figures 1a](#) and [1b](#). By the time that USFFR was approximately level with STT3M (3-month T-Bill), inflation and inflation expectations had moderated and the Fed was worrying for deflation, but SGS, footnote 47, shows an official inflation over 5% and 13%. So the policy during the ZIR period was asymmetric: The FOMC eased aggressively when the economy was weak, but did not raise rates during expansions. The result was that the average USFFR ($\bar{i}_{FF}^{eff} = 0.129\%$) was 0.051% higher than the average STT3M ($\bar{i}_{RF} = 0.078\%$) and 2.457% lower than the US10YTB ($\bar{i}_{10YTB} = 2.586\%$).³²

Thus, the signature characteristic of the ZIR Era was the reduced volatility of inflation and output, as it was mentioned above. [Table 1](#) shows that the standard deviation (σ) of the growth of real personal consumption expenditures (GUSRPCE) was $\sigma_{g_{RPCE}} = \pm 3.788\%$. Also, the volatility of the growth of the real gross domestic product (GUSRGDP2012) was $\sigma_{g_{RGDP}} = \pm 4.532\%$, but we had a big reduction of average growth of the GUSRGDP2012 to $\bar{g}_{RGDP} = 1.857\%$. The volatility had increased for the growth of the stock market (GUSDJIA) to the dangerous of $\sigma_{g_{DJIA}} = \pm 55.692\%$ and the growth of the DJIA increased to the artificial level of $\bar{g}_{DJIA} = 9.952\%$ per annum, which keeps pace with the growth of monetary base (GUSMB) of $\bar{g}_{MB} = 14.289\%$ and $\sigma_{MB} = \pm 37.538\%$, as [Table 1](#) and [Figure 2c](#) show. This growth in the stock market has created a new bubble.³³ This is an indication of an extreme and inefficient (risky) monetary policy.

The biggest “surprise” for the Fed (and even bigger for us because inflation is a monetary phenomenon) was that inflation did not accelerate in response to lower interest rates and to enormous money supply during this extended period of low interest rates. The official inflation from 2008 to 2015 was ($\bar{\pi} = 1.586\%$) because the unemployment was high (official average $\bar{u} = 7.838\%$) and this high unemployment causes reduction in personal income and aggregate demand, which affect negatively the price level.³⁴ But, it seems that there was a need to invert the yield curve, raising federal funds rate above US10YTB ($i_{FF} > i_{10YTB}$), to keep inflation under control and reduce the bubble that was creating in the financial market; [Figure 1b](#) shows that i_{FF} was kept not only below i_{10YTB} , but closed to zero after 2008. Another surprise was the rebound of more-rapid economic growth in the 2000s and the recession after 2008, [Figure 4](#).

[Figure 3a](#) [Table 1](#) show that after 2008, it was a period with low personal consumption expenditures ($\bar{g}_{PCE} = 3.407\%$ and $\bar{g}_{RPCE} = 1.821\%$). If there was no inflation, then interest rates probably were not too low, but the problem was the wrong measurement of inflation and unemployment. The actual inflation after 1988 is over 5% (between 5%-13%), as we can see this in footnote 47 and the unemployment over 12% (between 10%-23%). The financial crisis raised awareness of another downside to low interest rates. The abuses in the mortgage market were due to many factors, but many observers attributed the sheer volume of bad debt to low interest rates, the enormous bank deregulations since 1980s, greediness, risk transferring to tax payers (bail outs), and the corruption in the banking industry.³⁵

³² As follows: $[\bar{i}_{FF} (= 0.129\%) - \bar{i}_{RF} (= 0.078\%) = 0.051\%]$ and $[\bar{i}_{FF} (= 0.129\%) - \bar{i}_{10YTB} (= 2.586\%) = -2.457\%]$.

³³ From 2009:03 (6,547.05) to 2015:02 (12,132.07), the growth was 176.95% (29.5% p.a.). The hard working middle class, who is risk-averse is afraid that globalists will burst it to terrorize people again (for a second time) in this wrong appearing 21st century of the 8th millennium.

³⁴ The SGS give an inflation for these two periods from 7% to 14% and an unemployment from 14% to 23%. **The ShadowStats Alternate Unemployment Rate for 2015 had reached 24%. See,**

http://www.shadowstats.com/alternate_data/unemployment-charts

³⁵ Money has corrupted the entire world. « Εὐκοπώτερον γάρ ἐστι κάμηλον διὰ τρυμαλιᾶς ραφίδος εἰσελθεῖν ἢ πλούσιον εἰς τὴν βασιλείαν τοῦ Θεοῦ εἰσελθεῖν. » (Λουκ. 18, 25).

3.2. The New Monetary Policy Regime (NMPR)

The New Monetary Policy Regime (NMPR) starts on December 16, 2015, when the Fed abandoned the ZIRP ($\bar{i}_{FF} = 0\% - 0.25\%$) and began to raise the \bar{i}_{FF} to 0.50% and continues, which has reached 2.50% now.³⁶ This is also a period in which the Federal Reserve used interest rate targeting procedures to maintain the credibility for low inflation. The FOMC tried to maintain a 2% inflation target. Bullard (2018a) Actually, the method used to implement interest rate (\bar{i}_{FF}) targeting started in October 1982 and became more explicit after 1987 when Alan Greenspan replaced Paul Volcker as head of the Fed. The current Fed's Chairman, Jerome Powell, said in November 2018 that interest rates are just below estimates of neutral, which means that we will see some increases in the federal funds rate.³⁷ Fed minutes also reveal how officials view the economy and potential risks.³⁸ The target interest rate has to increase further because the real rates are still negative and the deposit rates close to zero ($i_D = 0.05\%$) for more than ten years, which makes the $r_D = -2\%$ or more accurate to $r_D = -10\%$. This is a redistribution of wealth from depositors to stock market speculators. Table 1 shows also all the mean values and standard deviations of our variables in question from 2015:12 to 2018:12 (during the NMPR).

Our next step is to test econometrically the effectiveness of the monetary policy during these two regimes; a VAR model and five OLS equations are constructed. We use a vector autoregression (VAR) model for the interrelated objective variables of the monetary policy ($djia_t$, $rgdp_t$, i_{10YTB_t} , p_t , and u_t)³⁹ as endogenous variables (dependents) of a function of the lagged values of all the endogenous variables in the system and the policy instruments ($i_{FF_t}^{eff}$, mb_t , and m_t) as exogenous variables (independents). The mathematical representation is as follows:

$$\begin{aligned} djia_t &= \alpha_{11}djia_{t-j} + \beta_{11}rgdp_{t-j} + \gamma_{11}i_{10YTB_{t-j}} + \delta_{11}p_{t-j} + \zeta_{11}u_{t-j} + c_o + \theta_{11}i_{FF_t}^{eff} + \kappa_{12}mb_t + \lambda_{13}m_t + \varepsilon_{1t} \\ rgdp_t &= \alpha_{21}djia_{t-j} + \beta_{21}rgdp_{t-j} + \gamma_{21}i_{10YTB_{t-j}} + \delta_{21}p_{t-j} + \zeta_{21}u_{t-j} + c_o + \theta_{21}i_{FF_t}^{eff} + \kappa_{22}mb_t + \lambda_{23}m_t + \varepsilon_{2t} \\ i_{10YTB_t} &= \alpha_{31}djia_{t-j} + \beta_{31}rgdp_{t-j} + \gamma_{31}i_{10YTB_{t-j}} + \delta_{31}p_{t-j} + \zeta_{31}u_{t-j} + c_o + \theta_{31}i_{FF_t}^{eff} + \kappa_{32}mb_t + \lambda_{33}m_t + \varepsilon_{3t} \end{aligned} \quad (6)$$

$$\begin{aligned} p_t &= \alpha_{41}djia_{t-j} + \beta_{41}rgdp_{t-j} + \gamma_{41}i_{10YTB_{t-j}} + \delta_{41}p_{t-j} + \zeta_{41}u_{t-j} + c_o + \theta_{41}i_{FF_t}^{eff} + \kappa_{42}mb_t + \lambda_{43}m_t + \varepsilon_{4t} \\ u_t &= \alpha_{51}djia_{t-j} + \beta_{51}rgdp_{t-j} + \gamma_{51}i_{10YTB_{t-j}} + \delta_{51}p_{t-j} + \zeta_{51}u_{t-j} + c_o + \theta_{51}i_{FF_t}^{eff} + \kappa_{52}mb_t + \lambda_{53}m_t + \varepsilon_{5t} \end{aligned}$$

Then, we use an OLS equation to test the effectiveness of the instruments of monetary policy on the goal variables by taking them one by one as dependent variables and also to see the interaction of the objective variables among themselves.

$$djia_t = \alpha_0 + \alpha_1djia_{t-1} + \alpha_2rgdp_{t-1} + \alpha_3i_{10YTB_{t-1}} + \alpha_4p_{t-1} + \alpha_5u_{t-1} + \alpha_6i_{FF_t}^{eff} + \alpha_7mb_t + \alpha_8m_t + \varepsilon_t \quad (7)$$

$$rgdp_t = \beta_0 + \beta_1djia_{t-1} + \beta_2rgdp_{t-1} + \beta_3i_{10YTB_{t-1}} + \beta_4p_{t-1} + \beta_5u_{t-1} + \beta_6i_{FF_t}^{eff} + \beta_7mb_t + \beta_8m_t + \varepsilon_t \quad (8)$$

$$i_{10YTB_t} = \gamma_0 + \gamma_1djia_{t-1} + \gamma_2rgdp_{t-1} + \gamma_3i_{10YTB_{t-1}} + \gamma_4p_{t-1} + \gamma_5u_{t-1} + \gamma_6i_{FF_t}^{eff} + \gamma_7mb_t + \gamma_8m_t + \varepsilon_t \quad (9)$$

$$p_t = \delta_0 + \delta_1djia_{t-1} + \delta_2rgdp_{t-1} + \delta_3i_{10YTB_{t-1}} + \delta_4p_{t-1} + \delta_5u_{t-1} + \delta_6i_{FF_t}^{eff} + \delta_7mb_t + \delta_8m_t + \varepsilon_t \quad (10)$$

³⁶ But, "Fed Tracking World Growth Worries, Chairman Powell Says". Central banker finds slowdown 'concerning,' but U.S. economy still strong. See, <https://www.wsj.com/articles/fed-tracking-world-growth-worries-chairman-powell-says-1542242914>. Also, "Donald Trump Complained About Fed Interest-Rate Increases at Fundraiser", Trump worried higher interest rates could cool off the economy, August 20, 2018.

<https://www.wsj.com/articles/trump-complained-about-fed-interest-rate-increases-at-fundraiser-1534782859>. But, "Fed's George Calls for More Rate Increases", The Federal Reserve Bank of Kansas City leader was speaking on the sidelines of her bank's annual research conference in Jackson Hole, Wyo. <https://www.wsj.com/articles/feds-george-calls-for-more-rate-increases-1535026744>. Further, "Fed Signals Rate Increase Next Month", The central bankers also express more fear about prolonged trade disputes. https://www.wsj.com/articles/fed-signals-rate-increase-at-next-month-1534961014?mod=article_inline&mod=article_inline. Also, "Fed Shifts to a Less-Predictable Approach to Policy Making", Officials on uncertain path, likely tying decisions to short-term economic data. <https://www.wsj.com/articles/wide-open-outlook-for-fed-rate-policy-in-2019-1543314600>

³⁷ Fed Chairman Says Interest Rates Are Just Below Estimates of Neutral. "There is no preset policy", says Jerome Powell, noting central bank will pay close attention to economic data. <https://www.wsj.com/articles/fed-chairman-flags-rising-indebtedness-of-some-u-s-businesses-1543424400>

³⁸ Here's what to watch when minutes from the Fed's November 7-8, 2018 meeting are revealed. https://www.wsj.com/articles/fed-minutes-to-reveal-how-officials-view-economy-and-potential-risks-1543487400?mod=hp_lead_pos2

³⁹ Which are: ln of DJIA, ln of RGDP, yield on 10YTB, ln of CPI, and USU rate.

$$u_t = \lambda_0 + \lambda_1 djia_{t-1} + \lambda_2 rgdp_{t-1} + \lambda_3 i_{10YTB_{t-1}} + \lambda_4 p_{t-1} + \lambda_5 u_{t-1} + \lambda_6 i_{FF_t}^{eff} + \lambda_7 mb_t + \lambda_8 m_t + \varepsilon_t \quad (11)$$

where, $djia_t$ = USDJIA = U.S. Dow Jones Industrial Average Index, $rgdp_t$ = USRGDP2012 = U.S. real GDP, i_{10YTB_t} = US10YTB = U.S. 10-Year Treasury Bonds Rate, p_t = LUSCPI = ln of U.S. CPI, u_t = USU = U.S. unemployment rate, $i_{FF_t}^{eff}$ = USFFR = U.S. effective federal funds rate, mb_t = LUSMB = ln of U.S. monetary base, m_t = LUSM2 = ln of U.S. money supply (M2).

Lastly, we construct a loss function (L) by using nine (9) macro-variables and their deviation from their optimal value; these are the most important variables, as they are shown in eq. (12), and by minimizing the social loss, we maximize the index of social welfare (ISW).

$$L = (\pi - 2\%) + (1\% - r^*) + (3\% - g_{RPCE}) + (g_{DJIA} - 6\%) + (4\% - g_{RGDP}) + (u - 4\%) + (10\% - psr) + (RP_{10YTB} - 1\%) + [(\pi + 1\%) - i_D] \quad (12)$$

where, $(\pi - 2\%)$ = the inflation gap (actual minus the target or its optimal value).

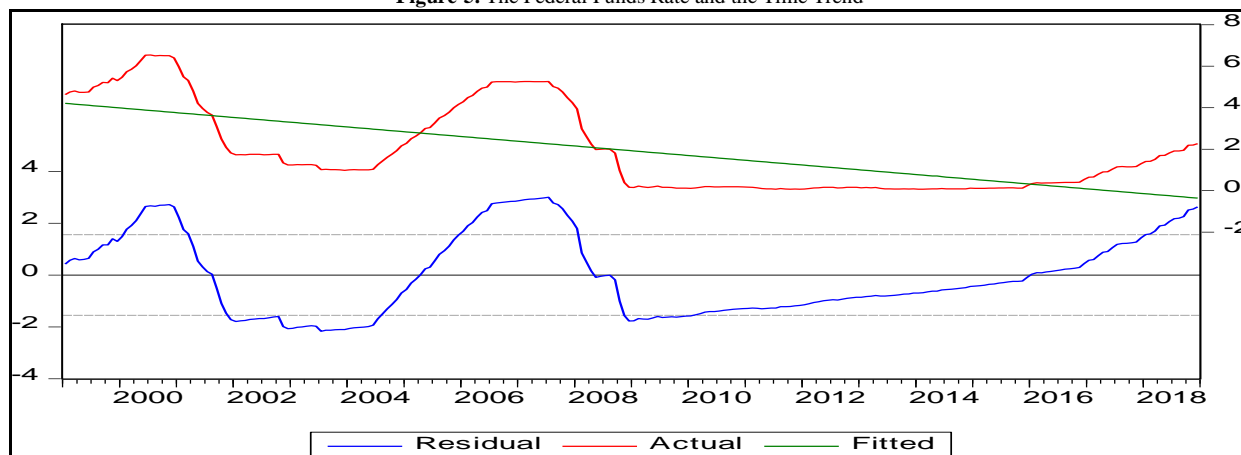
The optimal solution will be $L=0$, which maximizes the ISW. Negative losses are benefits.

4. Data and Empirical Results

This study uses six monthly economic indicators over the period December 2008-December 2018. They include the effective federal funds rate (i_{FF}^{eff}), the yield on 10-year government bonds (i_{10YTB}), year-over-year inflation (π) in the consumer price index (CPI), the growth rate of real GDP (g_{RGDP}), and the growth of the DJIA (g_{DJIA}). The fundamental policy goals involve inflation and real economic activity (unemployment); hence, the inclusion of CPI and GDP (u), the dual mandate. The basic policy instrument is i_{FF}^{eff} . Once i_{FF}^{eff} hits the zero lower bound, the FOMC uses balance-sheet policies to lower rates on long-term assets represented, here, by the 10-year government bonds rate (i_{10YTB}). In addition, the personal consumption expenditures (PCE), the real personal consumption expenditures ($RPCE$), the monetary base (MB), the money supply ($M2$), the yield on 3-month T-Bills (i_{3MTB}), the personal savings rate (psr), the spread between the effective federal funds rate and the yield on the 10-year government bonds [$spread (= i_{FF}^{eff} - i_{10YTB})$], the gap between the real effective federal funds rate and the growth of the real personal consumption expenditures [$GAP (= r_{FF}^{eff} - g_{RPCE})$], and the real risk-free rate of interest (r^*). The nominal (i) and the real (r) interest rates; the natural logarithms of variable X ($\ln X$) and the rate of growth (g^X) of the variables, their mean values (\bar{X}), standard deviations (σ^X), correlation coefficients ($\rho^{X,Y}$), and causality ($X \Rightarrow Y$) of all these variables are also measured and tested.

The ZIRR shows that the slope of the federal funds tread is flat (horizontal) and then, the NR shows positive slope, but the overall trend is negative Figure 5. As it was mentioned above, in October 1982, the Fed abandoned the M1 targeting procedure and adopted an indirect form of interest rate targeting. Monetary policy during this policy regime was praised by policymakers, business leaders, and academic researchers because of the low volatility in both output and inflation, (Bernanke, 2004; Cochrane, 2001; Stock and Watson, 2003) as it was also during the ZIRR ($\sigma = \pm 4.532\%$) and ($\sigma = \pm 3.571\%$). The average values (\bar{R}) and the standard deviations (σ_R) of all our variables for the last two regimes are given in Table 1.

Figure-5. The Federal Funds Rate and the Time Trend



Note: Actual = Effective federal funds rate and Fitted = L-T time trend.

Source: Economagic.com

Table-1. Average Values and Standard Deviations

Zero Interest Rate Regime (2008:12-2015:11)			New Regime (2015:12-2018:12)	
	\bar{R}	σ_R	\bar{R}	σ_R
USFFR	0.129%	0.040%	1.054%	0.638%
USRFFR	-1.458%	3.570%	-0.853%	2.441%
USMB	2866.094	833.296	3757.755	140.920
LUSMB	7.918	0.298	8.231	0.038
GUSMB	14.289%	37.538%	-5.845%	23.333%
M2	9987.648	1301.828	13472.13	595.869
LUSM2	9.201	0.130	9.507	0.045
GUSM2	6.163%	6.395%	5.326%	3.718%
USCPI	227.366	8.464	245.215	4.922
LUSCPI	5.426	0.038	5.502	0.020
USINF	1.586%	3.571%	1.906%	2.371%
US10YTB	2.586%	0.628%	2.357%	0.474%
USR10YTB	1.000%	3.493%	0.451%	2.439%
SPREAD1	-2.457%	0.620%	-1.304%	0.311%
STT3M	0.078%	0.058%	0.986%	0.665%
RRFRI	-1.508%	3.561%	-0.920%	2.481%
USPCE	11029.96	817.193	13380.31	532.171
LUSPCE	9.306	0.074	9.501	0.040
GUSPCE	3.407%	3.907%	4.365%	2.767%
GUSRPCE	1.821%	3.788%	2.459%	3.058%
GAPI	-3.279%	3.913%	-3.312%	2.803%
USDJIA	13361.00	3104.75	21596.05	3180.336
LUSDJIA	9.471	0.247	9.969	0.150
GUSDJIA	9.952%	55.692%	10.780	41.747
USRDJIA	5835.631	1166.922	8786.433	1134.105
LUSRDJIA	8.651	0.211	9.073	0.131
GUSRDJIA	8.366%	55.666%	8.873%	41.599%
USRGDP2012	16207.12	709.469	18111.24	484.100
LUSRGDP2012	9.692	0.044	9.804	0.026
GUSRGDP2012	1.857%	4.532%	3.110%	6.431%
USU	7.838%	1.544%	4.389%	0.441%
USPSR	5.264%	1.169%	3.805%	1.045%
RPUS10YTB (Risk)	2.508%	0.606%	1.371%	0.321%

Note: USFFR = U.S. effective federal funds rate, USRFFR = U.S. real effective federal funds rate, USMB = U.S. monetary base, LUSMB = ln of U.S. monetary base, GUSMB = growth of U.S. monetary base, M2 = money supply (M2), LUSM2 = ln of money supply (M2), GUSM2 = growth of money supply (M2), USCPI = U.S. consumer price index, LUSCPI = ln of USCPI, USINF = U.S. inflation rate, US10YTB = U.S. 10-year Treasury bonds rate, USR10YTB = U.S. real 10-year Treasury bonds rate, SPREAD1 = spread between the effective federal funds rate and the yield on 10-year Treasury bonds (normal, positive; flat; inverted yield curve, negative), STT3M= short-term Treasury bill 3-month maturity, RRFRI = real risk-free rate of interest ($i_{RF} - \pi$), USPCE = U.S. personal consumption expenditures, LUSPCE = ln of USPCE, GUSPCE = growth of the USPCE, GUSRPCE = growth of the U.S. real PCE, GAPI = the gap between the real effective federal funds rate and the growth of the real PCE (=USRFFR-GUSRPCE), USDJIA = the U.S. Dow Jones Industrial Average, LUSDJIA = ln of the DJIA, GUSDJIA = growth of the DJIA, USRDJIA = U.S. real DJIA, LUSRDJIA = ln of the real DJIA, GUSRDJIA = growth of the real DJIA, USRGDP2012 = U.S. real GDP (2012 base year), LUSRGDP2012 = ln of the U.S. real GDP (2012 base year), GUSRGDP2012 = growth of the U.S. real GDP (2012 base year), USU = U.S. unemployment rate, USPSR = U.S. personal savings rate, RPUS10YTB = risk premium on 10-year Treasury bonds (=US10YTB-STT3M), \bar{R} = the average value of the variable, and σ_R = the standard deviation of the variable.

Source: Economagic.com and Yahoo/Finance

Policymakers place a large value on models that “fit the data” (Gavin and Kydland, 1999;2000). Econometric methods extract information from the dynamic variance-covariance structure of data. There were statistically significant changes in the variance-covariance structure of datasets that include nominal indicators. It was also generally true that there did not appear to be significant changes in the variance-covariance structure of datasets that included only real quantities such as consumption, investment, or labor (unemployment). Here, we measure the correlation coefficients between our variables Tables 2 and 2b⁴⁰ during the two regimes (2008:12-2015:11 and 2015:12-2018:12). Also, we performed the causality tests for the two regimes⁴¹ and Tables 3a and 3b reveal these results. The federal funds rate (FFR) is negatively correlated with CPI (inflation), real GDP, personal consumption expenditures (PCE), and DJIA. Then, the reduction of the federal funds increased these variables (causes inflation

⁴⁰ These Tables 2a and 2b are omitted from the paper, due to space limitations, but are available from the author upon request.

⁴¹ The same with Tables 3a and 3b; they are omitted, too.

and bubbles in financial markets). The reduction of the federal funds ($\bar{i}_{FF} \downarrow$) was reducing unemployment ($u \downarrow$), too. Further, federal funds cause personal consumption expenditures $FFR \Rightarrow PCE$; also, $FFR \Rightarrow GUSRGDP2012$, and $FFR \Rightarrow USU$. The monetary base (MB) and the money supply (M2) have positive effect on PCE, DJIA, LUSRGDP2012, and negative effect with USU. Furthermore, $MB \Rightarrow PCE$, $MB \Rightarrow DJIA$, $MB \Rightarrow LUSRGDP2012$, and $MB \Rightarrow USU$; $M2 \Rightarrow DJIA$, $M2 \Rightarrow LUSRGDP2012$, $M2 \Rightarrow USU$. In addition, $FFR \downarrow$ is positively correlated with GAP1 ($GAP1 \downarrow = r_{FF}^{eff} - g_{RPCE} \uparrow$) and negatively with SPREAD1 ($SPREAD1 \uparrow = i_{FF}^{eff} - i_{10YTB} \downarrow$); $FFR \Rightarrow GAP1$ and $FFR \Rightarrow SPREAD1$.

The loss function (L) [eq. (12)] during the last two monetary policy regimes was as follows by using the data from Table 1:

(1) The Zero Interest Rate Regime (2008:12-2015:11):

$$L = (1.586\% - 2\%) + [1\% - (-1.508\%)] + (3\% - 1.821\%) + (9.952\% - 6\%) + (4\% - 1.857\%) \\ + (7.838\% - 4\%) + (10\% - 5.264\%) + (2.508\% - 1\%) + [(1.586\% + 1\%) - 0.05\%] = 21.986\%$$

$$L = (-0.414\%) + (2.508\%) + (1.179\%) + (3.952\%) + (2.143\%) \\ + (3.838\%) + (4.736\%) + (1.508\%) + (2.536\%) = 21.986\%$$

(2) The New Regime (2015:12-2018:12):

$$L = (1.906\% - 2\%) + [1\% - (-0.920\%)] + (3\% - 2.459\%) + (10.780\% - 6\%) + (4\% - 3.110\%) \\ + (4.389\% - 4\%) + (10\% - 3.805\%) + (1.371\% - 1\%) + [(1.906\% + 1\%) - 0.05\%] = 17.848\%$$

$$L = (-0.094\%) + (1.920\%) + (0.541\%) + (4.780\%) + (0.890\%) \\ + (0.389\%) + (6.195\%) + (0.371\%) + (2.856\%) = 17.848\%$$

During ZIRR the loss was enormous $L=21.986\%$, which means the social welfare was very small. Thus, this monetary policy was ineffective. With the New Regime, there is so far an improvement ($L=17.848\%$), then the social welfare has increased. There is improvement (the loss has declined) in most of the Macro-variables: [r^* ($2.508\% \rightarrow 1.920\%$), g_{RPCE} ($1.179\% \rightarrow 0.541\%$), g_{RGDP} ($2.143\% \rightarrow 0.890\%$), u ($3.838\% \rightarrow 0.389\%$), and RP_{10YTB} ($1.508\% \rightarrow 0.371\%$)]; except: for the inflation [π ($-0.414\% \rightarrow -0.094\%$)], the financial market [g_{DJIA} ($3.952\% \rightarrow 4.780\%$)] (where its bubble is growing), the savings [psr ($4.736\% \rightarrow 6.195\%$)], and the deposit rate [i_D ($2.536\% \rightarrow 2.856\%$)], which have become worse with the New Regime.

The VAR results for the period 2008:12-2015:11 appeared in Table 4 and for the period from 2015:12 to 2018:12 are shown in Table 5 below. During the period of Zero Interest Rate, the Fed monetary policy had some positive significant effects only on unemployment. For the New Regime, the Fed had an effect only on (DJIA) the financial markets (the bubble was increasing), on RGDP (deterioration), and CPI (inflation). The impulse responses for the two eras are shown on Figures 8 and 9,⁴² where the response of our endogenous variables (LUSDJIA, LUSRGDP2012, US10YTB, LUSCPI, and USU) to Cholesky are given, too.

Table-2. Vector Autoregression Estimates (2008:12-2015:11)

Variables	$djia_t$	$rgdp_t$	i_{10YTB_t}	p_t	u_t
$djia_{t-1}$	0.678*** (0.119)	-0.002 (0.011)	0.823 (0.554)	0.016** (0.008)	0.347 (0.357)
$djia_{t-2}$	-0.206* (0.117)	-0.001 (0.011)	-0.640 (0.542)	0.001 (0.007)	-0.723** (0.350)
$rgdp_{t-1}$	0.604 (1.305)	0.660*** (0.119)	-5.781 (6.044)	-0.034 (0.083)	-3.833 (3.895)
$rgdp_{t-2}$	1.505 (1.364)	0.121 (0.124)	11.026* (6.319)	-0.038 (0.087)	-6.948* (4.072)
$i_{10YTB_{t-1}}$	0.021 (0.024)	0.002 (0.002)	0.990*** (0.110)	-0.001 (0.002)	-0.233*** (0.071)
$i_{10YTB_{t-2}}$	-0.005 (0.024)	-0.002 (0.002)	-0.211* (0.110)	-0.001 (0.002)	0.176** (0.071)

⁴² These Figures 8 and 9 are available from the author upon request.

	(0.026)	(0.002)	(0.119)	(0.002)	(0.077)
p_{t-1}	-1.393 (1.728)	0.096 (0.157)	0.891 (8.005)	1.074*** (0.110)	8.692* (5.158)
p_{t-2}	1.615 (1.579)	-0.023 (0.144)	-17.882*** (7.315)	-0.307*** (0.101)	-5.925 (4.714)
u_{t-1}	0.024 (0.035)	0.001 (0.003)	0.382*** (0.163)	0.001 (0.002)	0.659*** (0.105)
u_{t-2}	0.017 (0.031)	0.001 (0.003)	-0.260* (0.146)	-0.001 (0.002)	0.117 (0.093)
c_0	-21.567** (9.876)	1.334 (0.899)	15.625 (45.755)	1.503** (0.630)	100.804*** (29.484)
$i_{FF_t}^{eff}$	-0.102 (0.262)	0.035 (0.024)	-0.989 (1.214)	-0.006 (0.017)	1.963*** (0.782)
mb_t	0.102 (0.178)	0.021 (0.016)	0.641 (0.826)	0.013 (0.011)	0.952* (0.532)
m_t	0.422 (0.419)	0.026 (0.038)	2.056 (1.943)	0.021 (0.027)	-1.552 (1.252)
R^2	0.976	0.994	0.920	0.996	0.995
SEE	0.042	0.004	0.193	0.003	0.125
F	218.563	807.381	61.995	1263.581	975.740
N	84	84	84	84	84

Note: $djia_t$ = USDJIA = U.S. Dow Jones Industrial Average Index, $rgdp_t$ = USRGDP2009 = U.S. real GDP, i_{10YTB_t} = US10YTB = U.S. 10-Year Treasury Bonds Rate, p_t = LUSCPI = ln of U.S. CPI, u_t = USU = U.S. unemployment rate, c_0 = constant term, $i_{FF_t}^{eff}$ = USFFR = U.S. effective federal funds rate, mb_t = LUSMB = ln of U.S. monetary base, m_t = LUSM2 = ln of U.S. money supply (M2), *** = significant at the 1% level, ** = significant at the 5% level, * = significant at the 10% level, R^2 = R-squared, SEE = S.E. equation, F = F-statistic, and N = number of observations.

Source: See, Table 1.

Table-2a. Correlation Coefficient (1995:01-2008:11)

	USFFR	USRFFR	USMB	LUSMB	GUSMB	M2	LUSM2	GUSM2	USCPI	LUSCPI	USINF	US10YTB	USR10YTB	RRFRI
USFFR	1.000													
USRFFR	0.329	1.000												
USMB	-0.571	-0.096	1.000											
LUSMB	-0.593	-0.165	0.987	1.000										
GUSMB	-0.223	0.415	0.424	0.308	1.000									
M2	-0.543	-0.227	0.956	0.976	0.190	1.000								
LUSM2	-0.570	-0.243	0.952	0.983	0.166	0.995	1.000							
GUSM2	0.006	0.120	0.053	0.048	0.255	0.028	0.035	1.000						
USCPI	-0.469	-0.215	0.941	0.957	0.185	0.993	0.982	0.018	1.000					
LUSCPI	-0.486	-0.223	0.944	0.965	0.176	0.995	0.989	0.021	0.999	1.000				
USINF	0.105	-0.905	-0.157	-0.094	-0.537	-0.006	-0.002	-0.124	0.015	0.015	1.000			
US10YTB	0.741	0.258	-0.798	-0.833	-0.172	-0.824	-0.843	-0.133	-0.783	-0.795	0.063	1.000		
USR10YTB	0.075	0.954	-0.038	-0.108	0.489	-0.193	-0.201	0.089	-0.203	-0.206	-0.971	0.179	1.000	
RRFRI	0.303	0.998	-0.095	-0.165	0.429	-0.235	-0.249	0.109	-0.226	-0.233	-0.914	0.263	0.964	1.000

	USFFR	USRFFR	USMB	LUSMB	GUSMB	M2	LUSM2	GUSM2	USCPI	LUSCPI	USINF	US10YTB	USR10YTB	RRFRI
USPCE	-0.469	-0.221	0.942	0.965	0.151	0.995	0.989	0.014	0.996	0.998	0.021	-0.790	-0.211	-0.231
LUSPCE	-0.502	-0.232	0.942	0.975	0.139	0.992	0.996	0.022	0.987	0.993	0.018	-0.812	-0.213	-0.241
GUSPCE	0.130	-0.216	-0.247	-0.194	-0.418	-0.173	-0.152	-0.098	-0.182	-0.173	0.286	0.121	-0.253	-0.218
GUSRPCE	0.052	0.416	-0.127	-0.119	-0.027	-0.160	-0.143	-0.009	-0.184	-0.175	-0.415	0.071	0.427	0.422
GAPI	0.194	0.320	0.060	-0.001	0.342	-0.005	-0.034	0.099	0.029	0.014	-0.249	0.120	0.275	0.313
USDJIA	-0.202	-0.167	0.709	0.774	-0.026	0.785	0.811	0.043	0.795	0.809	0.084	-0.587	-0.224	-0.190
LUSDJIA	-0.258	-0.162	0.697	0.768	-0.004	0.757	0.794	0.064	0.764	0.783	0.054	-0.617	-0.202	-0.182
GUSDJIA	0.163	0.092	-0.233	-0.228	-0.222	-0.206	-0.207	-0.022	-0.217	-0.217	-0.023	0.157	0.061	0.089
USRDJIA	-0.045	-0.097	0.445	0.528	-0.105	0.506	0.554	0.065	0.513	0.536	0.082	-0.382	-0.173	-0.120
USRGDP2009														
LUSRGDP2009	-0.490	-0.233	0.925	0.968	0.110	0.973	0.987	0.023	0.965	0.976	0.024	-0.808	-0.218	-0.242
GUSRGDP2009	0.087	-0.034	-0.221	-0.204	-0.247	-0.201	-0.188	-0.048	-0.215	-0.208	0.075	0.141	-0.040	-0.032
USU	-0.706	-0.139	0.202	0.153	0.285	0.144	0.121	-0.065	0.089	0.081	-0.172	-0.301	0.097	-0.108
SPREAD1	0.863	0.270	-0.208	-0.215	-0.189	-0.148	-0.173	0.104	-0.075	-0.089	0.104	0.308	-0.030	0.229

	USPCE	LUSPCE	GUSPCE	GUSRPCE	GAPI	USDJIA	LUSDJIA	GUSDJIA	USRDJIA	LUSRGDP2009	GUSRGDP2009	USU	SPREAD1
USPCE	1.000												
LUSPCE	0.995	1.000											
GUSPCE	-0.147	-0.132	1.000										
GUSRPCE	-0.154	-0.138	0.753	1.000									
GAPI	-0.006	-0.031	-0.947	-0.728	1.000								
USDJIA	0.818	0.841	-0.001	-0.058	-0.065	1.000							
LUSDJIA	0.786	0.821	0.004	-0.034	-0.087	0.986	1.000						
GUSDJIA	-0.201	-0.204	0.188	0.195	-0.133	-0.080	-0.097	1.000					
USRDJIA	0.546	0.591	0.097	0.035	-0.110	0.925	0.939	-0.003	1.000				
LUSRGDP2009	0.979	0.993	-0.111	-0.122	-0.049	0.878	0.867	-0.195	0.660	1.000			
GUSRGDP2009	-0.199	-0.189	0.111	0.054	-0.082	-0.094	-0.082	0.252	-0.009	-0.151	1.000		
USU	0.062	0.046	-0.183	-0.055	0.047	-0.398	-0.386	-0.061	-0.597	-0.021	-0.078	1.000	
SPREAD1	-0.068	-0.099	0.090	0.013	0.190	0.155	0.096	0.111	0.221	-0.088	0.017	-0.775	1.000

Note: See, Table 1.

Source: Economagic.com and Yahoo.Finance

Table-2b. Correlation Coefficient (2008:12-2015:12)

	USFFR	USRFFR	USMB	LUSMB	GUSMB	M2	LUSM2	GUSM2	USCPI	LUSCPI	USINF	US10YTB	USR10YTB	RRFRI
USFFR	1.000													
USRFFR	0.023	1.000												
USMB	-0.565	0.116	1.000											
LUSMB	-0.597	0.102	0.993	1.000										
GUSMB	-0.184	0.042	-0.119	-0.110	1.000									
M2	-0.431	0.133	0.971	0.966	-0.176	1.000								
LUSM2	-0.450	0.128	0.970	0.971	-0.174	0.999	1.000							
GUSM2	-0.152	0.111	0.025	0.043	0.235	0.017	0.024	1.000						
USCPI	-0.539	0.054	0.954	0.975	-0.151	0.963	0.973	0.037	1.000					
LUSCPI	-0.542	0.052	0.951	0.974	-0.150	0.959	0.971	0.039	0.999	1.000				
USINF	-0.012	-0.999	-0.123	-0.109	-0.044	-0.138	-0.133	-0.113	-0.060	-0.058	1.000			
US10YTB	0.196	-0.212	-0.471	-0.510	0.129	-0.594	-0.613	-0.190	-0.613	-0.615	0.214	1.000		
USR10YTB	0.047	0.985	0.041	0.020	0.068	0.035	0.026	0.081	-0.048	-0.051	-0.985	-0.040	1.000	
RRFRI	0.026	0.999	0.112	0.098	0.040	0.129	0.123	0.109	0.050	0.047	-0.999	-0.208	0.985	1.000

	USFFR	USRFFR	USMB	LUSMB	GUSMB	M2	LUSM2	GUSM2	USCPI	LUSCPI	USINF	US10YTB	USR10YTB	RRFRI
USPCE	-0.435	0.106	0.969	0.970	-0.183	0.990	0.990	0.013	0.968	0.966	-0.111	-0.580	0.009	0.101
LUSPCE	-0.447	0.100	0.968	0.972	-0.181	0.988	0.989	0.017	0.975	0.973	-0.106	-0.589	-0.002	0.096
GUSPCE	-0.136	-0.490	0.131	0.138	-0.180	0.093	0.096	-0.234	0.139	0.140	0.489	0.151	-0.473	-0.490
GUSRPCE	-0.129	0.439	0.250	0.245	-0.144	0.226	0.224	-0.134	0.199	0.199	-0.441	-0.047	0.443	0.440
GAPI	0.147	0.490	-0.137	-0.144	0.178	-0.098	-0.101	0.232	-0.144	-0.146	-0.488	-0.149	0.473	0.489
USDJIA	-0.505	0.079	0.970	0.976	-0.113	0.962	0.965	0.002	0.963	0.961	-0.085	-0.493	-0.001	0.075
LUSDJIA	-0.523	0.060	0.945	0.964	-0.097	0.935	0.943	0.005	0.963	0.963	-0.066	-0.499	-0.022	0.055
GUSDJIA	-0.074	-0.045	-0.050	-0.040	0.196	-0.049	-0.046	-0.165	-0.042	-0.041	0.044	0.067	-0.033	-0.045
USRDJIA	-0.501	0.078	0.961	0.968	-0.103	0.950	0.953	-0.002	0.952	0.950	-0.084	-0.473	0.001	0.073
LUSRGDP2009	-0.442	0.145	0.971	0.972	-0.166	0.988	0.989	0.019	0.968	0.966	-0.150	-0.585	0.048	0.140
GUSRGDP2009	-0.118	-0.001	0.092	0.108	-0.004	0.067	0.073	-0.088	0.120	0.122	-0.001	0.022	0.005	-0.002
USU	0.340	-0.189	-0.907	-0.875	0.123	-0.940	-0.928	-0.068	-0.849	-0.842	0.193	0.552	-0.098	-0.186
SPREAD1	-0.132	0.216	0.438	0.476	-0.143	0.572	0.589	0.182	0.584	0.586	-0.218	-0.998	0.043	0.212

	USPCE	LUSPCE	GUSPCE	GUSRPCE	GAPI	USDJIA	LUSDJIA	GUSDJIA	USRDJIA	LUSRGDP2009	GUSRGDP2009	USU	SPREAD1
USPCE	1.000												
LUSPCE	0.999	1.000											
GUSPCE	0.131	0.136	1.000										
GUSRPCE	0.240	0.240	0.567	1.000									
GAPI	-0.136	-0.141	-0.999	-0.568	1.000								
USDJIA	0.971	0.974	0.159	0.244	-0.164	1.000							
LUSDJIA	0.953	0.959	0.179	0.247	-0.185	0.992	1.000						
GUSDJIA	-0.055	-0.053	0.068	0.028	-0.069	0.038	0.061	1.000					
USRDJIA	0.962	0.965	0.166	0.250	-0.171	0.999	0.993	0.055	1.000				
LUSRGDP2009	0.992	0.992	0.102	0.246	-0.106	0.975	0.957	-0.047	0.966	1.000			
GUSRGDP2009	0.076	0.081	0.030	0.032	-0.032	0.111	0.133	0.191	0.114	0.117	1.000		
USU	-0.917	-0.908	0.021	-0.161	-0.017	-0.867	-0.810	0.118	-0.851	-0.918	0.045	1.000	
SPREAD1	0.557	0.566	-0.162	0.039	0.160	0.465	0.470	-0.073	0.445	0.562	-0.030	-0.536	1.000

Note: See, Table 1.

Source: Economagic.com and Yahoo. Finance

Table-3. Vector Autoregression Estimates (2015:12-2018:12)

Variables	$djia_t$	$rgdp_t$	i_{10YTB_t}	p_t	u_t
$djia_{t-1}$	0.330* (0.207)	0.013 (0.065)	1.365 (1.006)	0.021* (0.013)	-1.542** (0.772)
$djia_{t-2}$	0.014 (0.215)	-0.015 (0.068)	-1.272 (1.044)	0.012 (0.013)	-0.096 (0.801)
$rgdp_{t-1}$	-1.627*** (0.619)	0.342* (0.195)	2.112 (3.007)	-0.007 (0.038)	-0.893 (2.307)
$rgdp_{t-2}$	1.509** (0.618)	-0.136 (0.194)	-3.763 (3.004)	0.037 (0.038)	0.373 (2.305)
$i_{10YTB_{t-1}}$	-0.024 (0.040)	-0.008 (0.013)	0.851*** (0.194)	0.004* (0.002)	0.210 (0.149)
$i_{10YTB_{t-2}}$	0.014 (0.047)	-0.023 (0.015)	-0.209 (0.227)	-0.005* (0.003)	-0.324** (0.174)
p_{t-1}	6.786* (3.664)	0.666 (1.153)	16.651 (17.811)	0.721*** (0.227)	-4.947 (13.665)
p_{t-2}	-3.540 (3.347)	1.712* (1.053)	1.139 (16.268)	-0.266 (0.207)	11.589 (12.481)
u_{t-1}	-0.075 (0.054)	0.029* (0.017)	-0.042 (0.263)	0.005 (0.003)	0.340* (0.202)
u_{t-2}	-0.056 (0.058)	-0.003 (0.018)	0.327 (0.282)	-0.001 (0.004)	-0.506*** (0.216)
c_0	-24.569** (11.343)	2.546 (3.570)	-54.405 (55.137)	1.604** (0.702)	14.350 (42.304)
$i_{FF_t}^{eff}$	-0.087 (0.085)	0.081*** (0.027)	0.144 (0.415)	0.004 (0.005)	-0.342 (0.319)
mb_t	0.520** (0.257)	-0.031 (0.081)	-0.454 (1.247)	-0.017 (0.016)	-0.039 (0.957)
m_t	1.138 (0.804)	-0.812*** (0.253)	-2.642 (3.907)	0.094** (0.050)	-2.460 (2.998)
R^2	0.979	0.982	0.951	0.996	0.967
SEE	0.027	0.008	0.131	0.002	0.101
F	83.468	99.266	34.322	397.687	51.276
N	37	37	37	37	37

Note: See, Table 4.

Source: See, Table 1.

Table-3a. Pairwise Granger Causality Tests (1995:01-2008:11)

	USINF	USRFR	US10YTB	USPCE	LUSPCE	GUSPCE	GUSRPC	GAPI	RRFRI	LUSMB	GUSMB	M2	LUSM2	GUSM2
	(+)	(-)	(+)	(-)	(-)	(+)	(+)	(+)	(+)	(-)	(+)	(-)	(-)	(+)
$i_{FF}^{eff} \Rightarrow X$	2.450*	6.949***	-	2.914*	2.757*	4.392**	-	6.884***	5.263***	-	-	3.171**	2.863*	7.960***
$X \Rightarrow i_{FF}^{eff}$	-	-	10.417***	3.988**	3.366**	6.367***	2.806*	6.397***	-	2.381*	3.162**	3.301**	3.617**	2.627*
	GUSDJIA	LUSRGDP2009	GUSRGDP2009	USU	SPREAD1									
	(+)	(-)	(+)	(-)	(+)									
$i_{FF}^{eff} \Rightarrow X$	2.911*	3.477**	-	8.173***	14.175***									
$X \Rightarrow i_{FF}^{eff}$	6.516***	3.441**	-	4.732**	4.232**									
	USCPI	LUSCPI	USINF	USRFR	US10YTB	USR10YTB	USPCE	LUSPCE	GUSRPC	GAPI	USMB	LUSMB	GUSMB	
	(-)	(-)	(-)	(+)	(+)	(+)	(-)	(-)	(+)	(+)	(-)	(-)	(+)	
$r_{FF}^{eff} \Rightarrow X$	6.686***	6.797***	-	-	-	-	-	-	12.058***	2.739*	-	-	-	
$X \Rightarrow r_{FF}^{eff}$	2.759*	5.397***	6.949***	6.949***	7.753***	3.601**	5.336***	4.504**	5.298***	5.298***	17.098***	15.846***	10.826***	
	M2	LUSM2	SPREAD1											
	(-)	(-)	(+)											
$r_{FF}^{eff} \Rightarrow X$	-	-	-											
$X \Rightarrow r_{FF}^{eff}$	2.602*	2.753*	3.601**											

	USCPI	LUSCPI	USINF	USRFFR	US10YTB	USR10YTB	USPCE	LUSPCE	GUSPCE	GUSRPCE	GAP1	RRFRI
	(+)	(+)	(-)	(-)	(-)	(-)	(+)	(+)	(-)	(-)	(+)	(-)
$MB \Rightarrow X$	24.331***	21.693***	23.109***	17.098***	4.225**	24.851***	26.047***	14.830***	17.941***	3.347**	7.370***	18.577***
$X \Rightarrow MB$	6.195***	4.473**	-	-	-	-	3.492**	-	3.759**	3.360**	3.002*	-
	LUSMB	GUSMB	M2	LUSM2	GUSM2	GUSDJIA	LUSRGDP2009	GUSRGDP2009	USU			
	(+)	(+)	(+)	(+)	(+)	(-)	(+)	(-)	(+)			
$MB \Rightarrow X$	30.721***	39.047***	-	-	-	5.084***	2.539*	13.037***	5.328***			
$X \Rightarrow MB$	28.206***	32.515***	4.801***	3.408**	6.399***	-	-	-	-			
	USCPI	LUSCPI	USINF	USFFR	USRFFR	US10YTB	USR10YTB	USPCE				
	(+)	(+)	(-)	(-)	(-)	(-)	(-)	(-)	(+)			
$LUSMB \Rightarrow X$	21.229***	18.950***	21.116***	2.381*	15.846***	4.207**	22.921***	21.275***				
$X \Rightarrow LUSMB$	6.946***	5.775***	-	-	-	-	-	4.408**				
	LUSPCE	GUSPCE	GRUSPCE	GAP1	RRFRI	USMB	M2	LUSM2				
	(+)	(-)	(-)	(-)	(-)	(+)	(+)	(+)				
$LUSMB \Rightarrow X$	14.337***	14.578***	3.209**	5.988***	17.238***	28.206***	-	-				
$X \Rightarrow LUSMB$	-	5.826***	4.695**	4.069**	-	30.721***	4.543**	4.952***				
	GUSM2	GUSDJIA	GUSRGDP2009	USU								
	(+)	(-)	(-)	(+)								
$LUSMB \Rightarrow X$	-	5.479***	10.754***	5.354***								
$X \Rightarrow LUSMB$	6.891***	-	-	-								
	USCPI	LUSCPI	USINF	USFFR	USRFFR	US10YTB	USPCE	LUSPCE				
	(+)	(+)	(-)	(-)	(+)	(+)	(+)	(+)				
$GUSMB \Rightarrow X$	20.618***	18.183***	20.879***	3.162**	10.826***	16.352***	15.957***	10.915***				
$X \Rightarrow GUSMB$	3.756**	2.778*	-	-	-	-	4.090**	-				
	GUSPCE	GAP1	RRFRI	USMB	M2	LUSM2	GUSM2	LUSRGDP2009				
	(-)	(+)	(+)	(+)	(+)	(+)	(+)	(+)				
$GUSMB \Rightarrow X$	12.026***	5.554***	11.584***	32.515***	6.890***	8.007***	4.582**	4.339**				
$X \Rightarrow GUSMB$	6.308***	3.057**	-	39.047***	4.122**	5.636***	6.604***	-				
	GUSRGDP2009	SPREAD1										
	(-)	(-)										
$GUSMB \Rightarrow X$	5.446***	3.059**										
$X \Rightarrow GUSMB$	-	-										
	USCPI	LUSCPI	USFFR	USRFFR	US10YTB	USR10YTB	USPCE	LUSPCE	GUSPCE			
	(+)	(+)	(-)	(-)	(-)	(-)	(+)	(+)	(-)			
$M2 \Rightarrow X$	6.668***	6.144***	3.301**	2.602*	5.521***	2.710*	-	3.473**	3.732**			
$X \Rightarrow M2$	4.142**	4.983***	3.171**	-	7.009***	-	3.097**	2.362*	2.482*			
	GUSRPCE	GAP1	RRFRI	USMB	LUSMB	GUSM2	USDJIA	GUSDJIA				
	(-)	(-)	(-)	(+)	(+)	(+)	(+)	(-)				
$M2 \Rightarrow X$	5.711***	-	2.733*	4.801***	4.543**	-	-	4.283**				
$X \Rightarrow M2$	-	2.816*	-	-	-	7.694***	2.501*	2.452*				
	LUSRGDP2009	GUSRGDP2009	USU	SPREAD1								
	(+)	(-)	(+)	(-)								
$M2 \Rightarrow X$	5.094***	11.096***	6.196***	8.080***								
$X \Rightarrow M2$	8.530***	7.629***	-	-								
	USCPI	LUSCPI	USFFR	USRFFR	US10YTB	USR10YTB	GUSPCE	GUSRPCE				
	(+)	(+)	(-)	(-)	(-)	(-)	(-)	(-)				
$LUSM2 \Rightarrow X$	3.944**	4.303**	3.617**	2.753*	5.900***	2.590*	3.057**	4.696**				
$X \Rightarrow LUSM2$	-	-	2.863*	-	7.865***	-	-	-				
	RRFRI	USMB	LUSMB	GUSMB	GUSDJIA	LUSRGDP2009	GUSRGDP2009	USU	SPREAD1			
	(-)	(+)	(+)	(+)	(-)	(+)	(-)	(+)	(-)			
$LUSM2 \Rightarrow X$	2.881*	3.408**	4.952***	5.636***	4.128**	5.975***	10.989***	5.165***	8.090***			
$X \Rightarrow LUSM2$	-	-	-	8.007***	-	10.858***	8.700***	-	-			
	USFFR	US10YTB	USMB	LUSMB	M2	LUSRGDP2009	GUSRGDP2009	USU	SPREAD1			
	(+)	(-)	(+)	(+)	(+)	(+)	(-)	(-)	(+)			
$GUSM2 \Rightarrow X$	2.627*	2.965*	6.399***	6.891***	7.694***	6.539***	3.343**	2.617*	8.484***			
$X \Rightarrow GUSM2$	7.960***	5.096***	-	-	-	5.303***	5.920***	3.105**	2.612*			

Note: See, Table 1. $i_{FF}^{eff} \Rightarrow X$ = the effective federal funds rate causes variable X, $X \Rightarrow i_{FF}^{eff}$ = variable X causes i_{FF}^{eff} , ** = significant at the 1% level, * = significant at the 5% level, and . = significant at the 10% level.

Source: See, table 1.

Table-3b. Pairwise Granger Causality Tests (2008:12-2015:12)

	USPCE	LUSPCE	GUSPCE	GUSRPCE	GAP1	GUSMB	M2	LUSM2	GUSM2			
$i_{FF}^{\Delta} \Rightarrow X$	(-)	(-)	(-)	(-)	(+)	(-)	(-)	(-)	(-)			
$X \Rightarrow i_{FF}^{\Delta}$	6.982***	7.786***	6.011***	-	6.086***	3.419**	5.714***	6.764***	7.406***			
$X \Rightarrow i_{FF}^{\Delta}$	-	-	7.339***	2.406*	7.339***	-	-	-	-			
	GUSDJIA	GUSRGDP2009	USU	SPREAD1								
$i_{FF}^{\Delta} \Rightarrow X$	(-)	(-)	(+)	(-)								
$X \Rightarrow i_{FF}^{\Delta}$	-	3.349**	4.523**	4.450**								
$X \Rightarrow i_{FF}^{\Delta}$	2.723*	-	-	-								
	LUSCPI	USPCE	GUSRPCE	M2	LUSM2	GUSM2	LUSDJIA	GUSDJIA	USRDJIA	LUSRGDP2009	GUSRGDP2009	
$r_{FF}^{\Delta} \Rightarrow X$	(+)	(+)	(+)	(+)	(+)	(+)	(+)	(-)	(+)	(+)	(-)	
$X \Rightarrow r_{FF}^{\Delta}$	2.565*	2.396*	3.087*	2.451*	2.685*	2.739*	3.577**	3.426**	2.390*	6.121***	7.980***	
$X \Rightarrow r_{FF}^{\Delta}$	2.895*	-	-	-	-	-	-	-	-	-	-	
	USPCE	LUSPCE	GUSRPCE	GUSMB	M2	LUSM2	GUSM2	USDJIA	LUSDJIA	USRDJIA	LUSRGDP2009	USU
$MB \Rightarrow X$	(+)	(+)	(+)	(-)	(+)	(+)	(+)	(+)	(+)	(+)	(+)	(-)
$X \Rightarrow MB$	2.950*	2.378*	3.304**	2.868*	2.885*	3.091**	2.935*	2.758*	-	3.342**	3.359**	21.333***
$X \Rightarrow MB$	-	-	-	2.814*	-	-	-	3.879**	2.437*	3.263**	-	-
	USCPI	LUSCPI	USPCE	LUSPCE	GUSPCE	GUSRPCE	GAP1	M2	LUSM2	GUSM2	USDJIA	
$LUSMB \Rightarrow X$	(+)	(+)	(+)	(+)	(+)	(+)	(-)	(+)	(+)	(+)	(+)	(+)
$X \Rightarrow LUSMB$	-	-	5.045***	5.200***	-	3.245**	-	5.502***	6.040***	5.472***	3.470**	3.987**
$X \Rightarrow LUSMB$	4.526**	4.508**	-	-	5.583***	2.415*	5.512***	-	-	-	-	-
	LUSDJIA	USRDJIA	LUSRGDP2009	GUSRGDP2009	USU							
$LUSMB \Rightarrow X$	(+)	(+)	(+)	(+)	(-)							
$X \Rightarrow LUSMB$	2.962*	3.935**	5.668***	-	21.864***							
$X \Rightarrow LUSMB$	3.029*	3.154**	-	3.328**	-							
	USFFR	USPCE	LUSPCE	GUSPCE	GUSRPCE	GAP1	USMB	M2				
$GUSMB \Rightarrow X$	(-)	(-)	(-)	(-)	(-)	(+)	(-)	(-)				
$X \Rightarrow GUSMB$	-	-	-	-	-	-	2.814*	4.587**				
$X \Rightarrow GUSMB$	3.419**	2.476*	2.649*	4.139**	3.454**	4.094**	2.868*	-				
	LUSM2	GUSM2	USDJIA	LUSDJIA	GUSDJIA	USRDJIA	LUSRGDP2009	GUSRGDP2009	USU			
$GUSMB \Rightarrow X$	(-)	(+)	(-)	(-)	(+)	(-)	(-)	(-)	(-)	(+)		
$X \Rightarrow GUSMB$	5.495***	5.380***	7.964***	16.879***	14.640***	9.538***	2.667*	3.773**	2.631*			
$X \Rightarrow GUSMB$	-	-	-	-	-	-	-	4.206**	-			
	USCPI	LUSCPI	USINF	USFFR	USRFFR	USPCE	LUSPCE	GUSPCE				
$M2 \Rightarrow X$	(+)	(+)	(-)	(-)	(+)	(+)	(+)	(+)				
$X \Rightarrow M2$	-	-	-	-	-	-	-	-				
$X \Rightarrow M2$	7.351***	7.445***	2.453*	5.714***	2.451*	7.850***	8.703***	4.548**				
	GAP1	RRFRI	USMB	LUSMB	GUSMB	USDJIA	LUSDJIA	GUSDJIA				
$M2 \Rightarrow X$	(-)	(+)	(+)	(+)	(-)	(+)	(+)	(-)				
$X \Rightarrow M2$	-	-	-	-	-	3.925**	3.032*	-				
$X \Rightarrow M2$	4.565**	2.502*	2.885*	5.502***	4.587**	3.794**	4.360**	3.105*				
	USRDJIA	LUSRGDP2009	GUSRGDP2009	USU								
$M2 \Rightarrow X$	(+)	(+)	(+)	(-)								
$X \Rightarrow M2$	4.385**	4.952***	2.882*	25.129***								
$X \Rightarrow M2$	3.102*	4.726**	2.578*	-								

USCPI	LUSCPI	USINF	USFFR	USRFFR	USR10YTB	USPCE	LUSPCE	
	(+)	(+)	(-)	(-)	(+)	(-)	(+)	(+)
$LUSM2 \Rightarrow X$	-	-	-	-	-	-	-	-
$X \Rightarrow LUSM2$	8.872***	8.940***	2.682*	6.764***	2.685*	2.587*	7.060***	8.794***
	GUSPCE	GAPI	RRFRI	USMB	LUSMB	GUSMB	USDJIA	LUSDJIA
	(+)	(-)	(+)	(+)	(+)	(+)	(+)	(+)
$LUSM2 \Rightarrow X$	-	-	-	-	-	-	4.865**	3.810**
$X \Rightarrow LUSM2$	4.943***	4.982***	2.749*	3.091*	6.040***	5.495***	3.774**	4.663**
	GUSDJIA	USDJIA	LUSRGDP2009	GUSRGDP2009	USU			
	(-)	(+)	(+)	(+)	(-)			
$LUSM2 \Rightarrow X$	-	5.165***	6.950***	3.317**	24.335***			
$X \Rightarrow LUSM2$	3.388**	3.084*	4.159**	2.884*	-			
	USCPI	LUSCPI	USINF	USFFR	USRFFR	USR10YTB	USPCE	LUSPCE
	(+)	(+)	(-)	(-)	(+)	(+)	(+)	(+)
$GUSM2 \Rightarrow X$	-	-	-	-	-	-	-	-
$X \Rightarrow GUSM2$	2.732*	2.893*	2.732*	7.406***	2.739*	2.627*	2.450*	2.647*
	GUSPCE	GAPI	RRFRI	USMB	LUSMB	GUSMB	LUSDJIA	GUSDJIA
	(-)	(+)	(+)	(+)	(+)	(+)	(+)	(-)
$GUSM2 \Rightarrow X$	-	-	-	-	-	-	2.445*	3.560**
$X \Rightarrow GUSM2$	4.971***	4.995***	2.807*	2.935*	5.472***	5.380***	-	3.637**
	LUSRGDP2009	GUSRGDP2009						
	(+)	(-)						
$GUSM2 \Rightarrow X$	2.374*	2.692*						
$X \Rightarrow GUSM2$	-	3.039*						

Note: See, Table 1 and 3a.

Source: See, table 1.

The OLS estimations are given in Tables 6 and 7. For the Zero Interest Rate Era, the Fed policy has affected RGDP (reduction), L-T interest rate, and unemployment (reduction) Table 6. For the New Era, the monetary policy has affected the DJIA (bubble), the RGDP (ambiguous effect), the 10YTB rate, and the CPI (inflation) Table 7.

Table-4. OLS Estimations of the Objective Variables (2008:12-2015:11)

Variables	$djia_t$	$rgdp_t$	i_{10YTB_t}	p_t	u_t
c_0	-16.117* (8.195)	1.601** (0.731)	76.791* (41.700)	1.499*** (0.551)	90.082*** (0.772)
$djia_{t-1}$	0.588*** (0.097)	-0.001 (0.009)	0.445 (0.493)	0.016** (0.007)	-0.155 (0.307)
$rgdp_{t-1}$	1.648* (0.922)	0.730*** (0.082)	-4.537 (4.692)	-0.113* (0.062)	-8.492*** (2.920)
$i_{10YTB_{t-1}}$	0.012 (0.014)	0.001 (0.001)	0.835*** (0.072)	-0.002* (0.001)	-0.089* (0.045)
p_{t-1}	-0.299 (0.905)	0.085 (0.081)	-16.399*** (4.606)	0.812*** (0.061)	1.856 (2.866)
u_{t-1}	0.038*** (0.010)	0.001 (0.001)	0.128** (0.049)	0.001 (0.001)	0.798*** (0.031)
$i_{FF_t}^{eff}$	-0.134 (0.251)	0.038* (0.022)	-0.057 (1.277)	-0.001 (0.017)	1.693** (0.795)
mb_t	0.069 (0.164)	0.017 (0.015)	0.486 (0.833)	0.010 (0.011)	1.089** (0.518)
m_t	0.532 (0.373)	0.043 (0.033)	5.134*** (1.899)	0.041 (0.025)	-2.594** (1.182)
R^2	0.974	0.993	0.897	0.995	0.993
SER	0.042	0.004	0.212	0.003	0.132
F	354.632	1369.523	81.429	1848.087	1408.594
$D-W$	1.846	2.235	1.344	1.465	2.252
N	84	84	84	84	84

Note: SER = S.E. regression, $D-W$ = Durbin-Watson statistic. See also, Table 4.

Source: See, Table 1.

Table-5. OLS Estimations of the Objective Variables (2015:12-2018:12)

Variables	$djia_t$	$rgdp_t$	i_{10YTB_t}	p_t	u_t
c_0	-22.609** (9.262)	5.309* (2.778)	-41.122 (42.634)	1.311** (0.565)	49.554 (35.424)
$djia_{t-1}$	0.268 (0.178)	0.062 (0.053)	1.326 (0.820)	0.034*** (0.011)	-0.480 (0.682)
$rgdp_{t-1}$	-1.058* (0.550)	0.404** (0.165)	1.647 (2.533)	0.031 (0.034)	1.116 (2.105)
$i_{10YTB_{t-1}}$	-0.030 (0.028)	-0.017* (0.008)	0.774*** (0.130)	-0.001 (0.002)	0.026 (0.108)
p_{t-1}	5.375* (2.783)	1.128 (0.835)	4.853 (12.813)	0.535*** (0.170)	-8.435 (10.646)
u_{t-1}	-0.062 (0.053)	0.019 (0.016)	-0.036 (0.246)	0.003 (0.003)	0.202 (0.205)
$i_{FF_t}^{eff}$	0.013 (0.058)	0.061*** (0.017)	-0.454* (0.267)	0.001 (0.004)	-0.295 (0.222)
mb_t	0.471** (0.212)	-0.088 (0.064)	-1.331 (0.976)	-0.028** (0.013)	-0.785 (0.811)
m_t	0.750 (0.697)	-0.598*** (0.209)	-0.286 (3.210)	0.086* (0.043)	0.098 (2.667)
R^2	0.972	0.979	0.941	0.994	0.953
SER	0.028	0.008	0.130	0.002	0.108
F	123.131	161.777	56.293	607.213	71.431
$D-W$	1.784	2.071	1.806	1.965	1.869
N	37	37	37	37	37

Note: SER = S.E. regression, $D-W$ = Durbin-Watson statistic. See, Table 4.

Source: See, Table 1.

Table-6. OLS Estimations of the Objective Variables (2008:12-2015:11)

Variables	$djia_t$	$rgdp_t$	i_{10YTB_t}	p_t	u_t
c_0	-16.117* (8.195)	1.601** (0.731)	76.791* (41.700)	1.499*** (0.551)	90.082*** (25.948)
$djia_{t-1}$	0.588*** (0.097)	-0.001 (0.009)	0.445 (0.493)	0.016** (0.007)	-0.155 (0.307)
$rgdp_{t-1}$	1.648* (0.922)	0.730*** (0.082)	-4.537 (4.692)	-0.113* (0.062)	-8.492*** (2.920)
$i_{10YTB_{t-1}}$	0.012 (0.014)	0.001 (0.001)	0.835*** (0.072)	-0.002* (0.001)	-0.089* (0.045)
p_{t-1}	-0.299 (0.905)	0.085 (0.081)	-16.399*** (4.606)	0.812*** (0.061)	1.856 (2.866)
u_{t-1}	0.038*** (0.010)	0.001 (0.001)	0.128** (0.049)	0.001 (0.001)	0.798*** (0.031)
$i_{FF_t}^{eff}$	-0.134 (0.251)	0.038* (0.022)	-0.057 (1.277)	-0.001 (0.017)	1.693** (0.795)
mb_t	0.069 (0.164)	0.017 (0.015)	0.486 (0.833)	0.010 (0.011)	1.089** (0.518)
m_t	0.532 (0.373)	0.043 (0.033)	5.134*** (1.899)	0.041 (0.025)	-2.594** (1.182)
R^2	0.974	0.993	0.897	0.995	0.993
SER	0.042	0.004	0.212	0.003	0.132
F	354.632	1369.523	81.429	1848.087	1408.594
$D-W$	1.846	2.235	1.344	1.465	2.252
N	84	84	84	84	84

Note: SER = S.E. regression, $D-W$ = Durbin-Watson statistic. See also, Table 4.

Source: See, Table 1.

Table-7. OLS Estimations of the Objective Variables (2015:12-2018:12)

Variables	$djia_t$	$rgdp_t$	i_{10YTS_t}	p_t	u_t
c_0	-22.609** (9.262)	5.309* (2.778)	-41.122 (42.634)	1.311** (0.565)	49.554 (35.424)
$djia_{t-1}$	0.268 (0.178)	0.062 (0.053)	1.326 (0.820)	0.034*** (0.011)	-0.480 (0.682)
$rgdp_{t-1}$	-1.058* (0.550)	0.404** (0.165)	1.647 (2.533)	0.031 (0.034)	1.116 (2.105)
$i_{10YTS_{t-1}}$	-0.030 (0.028)	-0.017* (0.008)	0.774*** (0.130)	-0.001 (0.002)	0.026 (0.108)
p_{t-1}	5.375* (2.783)	1.128 (0.835)	4.853 (12.813)	0.535*** (0.170)	-8.435 (10.646)
u_{t-1}	-0.062 (0.053)	0.019 (0.016)	-0.036 (0.246)	0.003 (0.003)	0.202 (0.205)
$i_{FF_t}^{eff}$	0.013 (0.058)	0.061*** (0.017)	-0.454* (0.267)	0.001 (0.004)	-0.295 (0.222)
mb_t	0.471** (0.212)	-0.088 (0.064)	-1.331 (0.976)	-0.028** (0.013)	-0.785 (0.811)
m_t	0.750 (0.697)	-0.598*** (0.209)	-0.286 (3.210)	0.086* (0.043)	0.098 (2.667)
R^2	0.972	0.979	0.941	0.994	0.953
SER	0.028	0.008	0.130	0.002	0.108
F	123.131	161.777	56.293	607.213	71.431
$D-W$	1.784	2.071	1.806	1.965	1.869
N	37	37	37	37	37

Note: SER = S.E. regression, $D-W$ = Durbin-Watson statistic. See, Table 4.

Source: See, Table 1.

We also test the Phillips curve for the two Eras. Low inflation together with high unemployment supported the conventional wisdom that there is a Phillips curve, here; but, the data discredited the Phillips curve as a policy framework, which is questionable. But, the only explanation can be that the high unemployment reduces personal income and affects negatively the aggregate demand ($AD \downarrow$), then prices are falling or something wrong with the official measurement of inflation and unemployment.

By testing the Phillips curve equation, eq. (5), we found as results:

(1) 1950:12-2018:12 (the last 68 years)

$$\pi_t = 1.015^{***} \pi_t^e - 0.074(u_{t-1} - u_t^N)$$

(0.036) (0.064)

$$R^2 = 0.349, SER = 3.351, D - W = 2.009, N = 817$$

(2) 2008:12-2015:11 (ZIRP Regime)

$$\pi_t = 0.849^{***} \pi_t^e + 0.101(u_{t-1} - u_t^N)$$

(0.264) (0.132)

$$R^2 = 0.145, SER = 3.322, D - W = 2.108, N = 84$$

(3) 2015:12-2018:12 (New Regime)

$$\pi_t = 1.127^{***} \pi_t^e - 1.198(u_{t-1} - u_t^N)$$

(0.235) (0.904)

$$R^2 = 0.169, SER = 2.191, D - W = 2.068, N = 37$$

The coefficient of unemployment (ψ), for the entire period (1950:12-2018:12), is negative ($\psi < 0$), but statistically insignificant. During the ZIRP period (2008:12-2015:11) the unemployment coefficient became positive ($\psi > 0$) but insignificant. Currently with the New Regime (2015:12-2018:12) the sign of unemployment coefficient became again negative ($\psi < 0$) but it is insignificant. Thus, these results show that the Phillips curve does not hold any more and especially, during the ZIRP regime (Summers, 2017; Williamson, 2018) (*sic*).

In addition, we use the Taylor's rule to see if the target federal funds rate was the appropriate according to the rule. Taylor's rule can be modified by using unemployment instead of GDP:

$$\bar{i}_{FF_t} = \pi_t + r_t^* + \alpha_\pi (\pi_t - \pi_t^*) - \alpha_u (u_t - u_t^N) \quad (2')$$

The coefficients are: $\alpha_\pi = 0.5$ and $\alpha_u = -0.5$, the other variables are $r_t^* = 1\%$, $\pi_t^* = 2\%$, and $u_t^N = 4\%$, π_t , and u_t are the averages of each period. The target federal funds rate was between (0.00%-0.25%) for the period 2008:12 to 2015:11.⁴³ Thus, \bar{i}_{FF} must have been:

$i_{FF} = 1.586\% + 1\% + 0.5(1.586\% - 2\%) - 0.5(7.838\% - 4\%) = 0.46\%$; but, it was between 0% and 0.25% (average $\bar{i}_{FF}^{eff} = 0.129\%$), which was low.

From 2015:12 to 2018:12 the \bar{i}_{FF} must have been:

$i_{FF} = 1.906\% + 1\% + 0.5(1.906\% - 2\%) - 0.5(4.389\% - 4\%) = 2.6645\%$; but it was between 0.25% and 2.50% (average $\bar{i}_{FF}^{eff} = 1.054\%$), which was too low.

Thus, Taylor's rule recommends higher federal funds rate.

Lastly, by using the Bullard rule, we have:

$$\bar{i}_{FF_t} = \rho i_{FF_{t-1}} + (1 - \rho)[r_t^* + \pi_t^* + \phi_\pi (\pi_t - 2\%) + \phi_u (u_t - 4\%)] \quad (13)$$

For the ZIRR (2008:12-2015:11) the \bar{i}_{FF} must have been:

$i_{FF} = 0.85(0.25\%) + 0.15[1\% + 2\% + 1.5(1.586\% - 2\%) + 1(7.838\% - 4\%)] = 1.14505\%$; but it was 0.129%, very low.

For the NR (2015:12-2018:12) the \bar{i}_{FF} must have been:

(i) When $\bar{i}_{FF} = 0.50\%$:

$i_{FF} = 0.85(0.25\%) + 0.15[1\% + 2\% + 1.5(1.906\% - 2\%) + 1(4.389\% - 4\%)] = 0.6997\%$, which was low.

(ii) When $\bar{i}_{FF} = 0.75\%$:

$i_{FF} = 0.85(0.50\%) + 0.15[1\% + 2\% + 1.5(1.906\% - 2\%) + 1(4.389\% - 4\%)] = 0.9122\%$, which was low.

(iii) When $\bar{i}_{FF} = 2.50\%$:

$i_{FF} = 0.85(2.25\%) + 0.15[1\% + 2\% + 1.5(1.906\% - 2\%) + 1(4.389\% - 4\%)] = 2.3997\%$, which is relatively good.

Even Bullard's rule shows that the target federal funds rate is relatively low.

5. Policy Implications of the Latest Monetary Regimes

Four important issues arose during the ZIRP regime; (1) controversy surrounding the use of the Fisher equation ($i = r + \pi^e$) to explain low inflation, (2) controversy over the cause of low real interest rates ($r = i - \pi^e$), (3) controversy over the discredited Phillips curve, and (4) controversy with the effectiveness of the dual mandate on social welfare. The correlation between USINF and USU was $\rho_{\pi,u} = +0.180$, but there is no any causality between the two variables. The regression equation gives a coefficient +0.101 and it is insignificant. The low real interest rate is due to inflation ($\pi = 1.586\%$), which gives a USR10YTB ($r_{10YTB} = 1.000\%$) and a RRFRI negative ($r_{RF}^* = -1.508\%$).⁴⁴ Of course, it is not reasonable to think that monetary policy⁴⁵ itself is the cause of the low natural rate estimated by Federal Reserve economists.

The Fisher equation (Williamson, 2012) is an equilibrium condition, which says that, no matter what policy regime is in effect, the market interest rate will be the sum of two components, a real return (r) and a premium for

⁴³ For federal funds target rate, see, http://www.fedprimerate.com/fedfundstrate/federal_funds_rate_history.htm

⁴⁴ Historically, the average real risk-free rate of interest for the U.S. economy is positive ($r^* = 0.4\%$). See, Ross, Westerfield, Jaffe, and Jordan (2019, p.311). Another measure of the real interest rate that is relatively independent of monetary policy is the ex post return to capital (see, Gomme, Ravikumar, and Rupert, 2011, 2015). Bullard (2017) uses Gomme, Ravikumar, and Rupert, (2011, 2015) data when explaining that it is the real interest rate on safe assets, not real returns to capital, that are abnormally low.

⁴⁵ Undoubtedly, except a good monetary policy, the country needs a good fiscal policy and a fair trade policy. The unfair free trade policies have destroyed the U.S. and the EU economies. See, Kallianiotis (2018). Unfortunately, lately, globalists' and ecumenists' "religion" is the Ecology (global warming); but this winter disappointed them with temperatures -50°F and heavy snow storms all over the north hemisphere. The rest of our "objectives" are all under their control even before the French Revolution (1789). See, <https://www.jacobinmag.com/2015/07/french-revolution-bastille-day-guide-jacobins-terror-bonaparte/>

expected inflation ($IP = \pi^e$). If the Fed pegs the interest rate at any level, including zero, then an increase in real returns will lead to a decline in inflation, ($0 = \bar{i}_{FF} = r \uparrow + \pi^e \downarrow$). If the policy rate is pegged at a higher level, the inflation rate will be higher. The equilibrium condition says nothing about what will happen in the short run if the Fed changes its policy rule. But, price inertia (\bar{P}) exists in the short run and inflation is increasing gradually; in the long run inflation increases (price effect) and the real interest rate is falling ($\bar{i}_{FF} = r \downarrow + \pi \uparrow$), as it happened during the ZIRP era. This is the reason that the unofficial inflation was ($\bar{\pi} \cong 10\%$) and expectations for inflation are high (footnote 47) among economists and non-economists, and the real interest rate negative. Depositors were and are paying the banks for keeping their deposits. (*sic*).

In theory, real interest rates matter for real economic activity because they influence consumption, investment, and savings decisions. Higher real interest rates reflect high returns to investment, and high returns to working now for consumption in the future. They are incentives for savings. They also reflect the opportunity cost of building capital. Periods with low expectations for the future are periods of low interest rates.⁴⁶ The trade balance of a country is also very important because it affects growth and employment for the country and the Fed's policy can contribute to its improvement through the value of the dollar (the exchange rate) Kallianiotis (2013). Of course, trade policies can be imposed by the government (tariffs, quota, import taxes, etc), too. The country faces an enormous unfair competition from China, which is becoming more severe and aggressive with the passing of time. The current administration's foreign policy is inclining towards improving relationships with Russia (if the establishment, the "Washington swamp", will allow it), (Kallianiotis, 2017b) which will be politically, economically, and socially beneficial for both countries.⁴⁷ The outsourcing, the free trade, and globalization have caused enormous problems and pains to the U.S. and EU economies and their citizens; and domestic public policies cannot improve the economic growth, income, and employment because the damage is structural, it has been planned and generated by an economic elite (the "dark powers") since the 18th century Kallianiotis (2017b).

As shown in Table 1, ex post real interest rates were extremely low (negative) during the Zero Interest Rate Era, the USRFFR averaged -1.458%, while the USR10YTB averaged 1.000% and the RRFRI was -1.508%. This was a period of slowing productivity growth. It was also a period when people were devoting many resources to protecting themselves from the damage done by inflation ($\pi_{SGS} \geq 10\%$), official $\bar{\pi} = 1.586\%$). Nevertheless, the GUSRPCE and the GUSRGDP2012 were relatively low, just slightly below 2% ($g_{RPCE} = 1.821\%$) and $g_{RGDP} = 1.857\%$). During the New Regime, following the crisis, USRFFR is -0.853%, while the return to holding a USR10YTB fell to 0.451% and the RRFRI remains negative ($r_{RF}^* = -0.920\%$); the GUSRPCE went up to 2.459% and the GUSRGDP increased to 3.110%. These are indications that the monetary policy was not very effective even though that the real cost of capital had become negative. But, unemployment is still high ($u_{SGS} = 21\%$ and the official $\bar{u} = 4.389\%$),⁴⁸ which reveals low personal income, reduction in aggregate demand, and low production and growth.

What would the real interest rate on federal funds and 10-year Treasury securities be if the Fed were not following the ZIRP regime, but a policy to keep RRFRI positive (i. e., the historic $\bar{r}_{RF}^* = 0.5\%$)? The 3-month T-Bill rate must be: $i_{RF} = \bar{r}_{RF}^* + \pi^e = 0.5\% + 1.586\% = 2.086\%$. Thus, the Fed must keep $\bar{i}_{FF} > 2.086\%$, because $\bar{i}_{FF} = i_{RF} + RP = 2.086\% + 0.25\% = 2.336\%$. The Federal Reserve, as a private bank, uses its monopoly on bank reserves to lower interest rates when it wants to lower the cost of capital and "improve" the financial market. Are real rates low because future growth is expected to be low or because the Fed is holding short-term rates on bank reserves low? But, this negative real rate of interest causes savings to fall, which affect negatively investment and the rate of interest will increase in the future. In other words, are low interest rates in the United States and around the world caused by Fed policy? The answer is YES; a zero federal funds rate with an increase in monetary base and money supply have increased inflation expectations and made real interest rates negative ($\bar{i}_{FF} = 0 = r \downarrow + \pi^e \uparrow$).

The discredited Phillips curve is suspicious because the high unemployment must keep the prices low (demand-pull or demand side inflation) except if people substitute their low income with high debts (debtism) and continue to buy the same goods and services as before when they were working. Then, this positive relationship between

⁴⁶ Many have argued that exogenous factors have kept the economy operating below trend, inflation low, and real interest rates low. Very stranger!... See, Summers (2016) and Williams (2017).

⁴⁷ See, "Donald Trump, Vladimir Putin Expect to Hold July Summit", Agreement reached after Putin, U.S. national security adviser John Bolton met in Moscow, https://www.wsj.com/articles/donald-trump-vladimir-putin-to-hold-summit-kremlin-official-says-1530113119?mod=hp_lead_pos3. Also, "Trump Says He Holds 'Both Countries' Responsible for Deterioration of U.S.-Russia Ties", <http://asiacruisenews.com/news/Trump-Says-He-Holds-'Both-Countries'-Responsible-for-Deterioration-of-U.S.-Russia-Ties/>. Further, "Trump Questions Finding of Russia's 2016 Meddling as He Appears With Putin", https://www.wsj.com/articles/trump-blames-u-s-for-poor-relations-with-moscow-1531732220?mod=trending_now. Furthermore, "Trump and Putin Met in Helsinki's Hall of Mirrors. Here Are the Highlights", <https://theintercept.com/2018/07/16/live-trump-and-putin-meet-in-helsinki-hall-of-mirrors/>.

⁴⁸ The unemployment according to the SGS during the ZIR Era was between 15% and 23%. See, footnote 50.

unemployment and inflation proves that our system from “capitalism” became “debtism”. The loss functions show a high loss, which makes the social welfare low. The dual mandate of the Fed is questionable.

As shown, here, the ZIRP regime was an extreme policy setting, given the Fed’s inflation and maximum employment objectives. This experimental regime resulted in abnormal levels of the ex post real interest rate; the

Fed was the cause of low real interest rates in the ZIRP era. Table 1 shows that the GAP1 ($= r_{FF}^{eff} - g_{RPCE}$) has been negative in both periods of easy monetary policy. It was -3.279% during the ZIRP era and -3.312% during the New regime. Public policy must be a mixed policy, a combination of monetary and fiscal, otherwise cannot be very effective. Lately, liberalism has become a serious social and political problem for the country, which affects negatively the administration, the public policy, the economy, the foreign relationships, and the wellbeing of the citizens.⁴⁹ The Federal Reserve identified elevated asset prices, historically high debt owed by U.S. businesses and rising issuances of risky debt as top vulnerabilities facing the U.S. financial system, according to an inaugural financial stability report released at the end of November 2018,⁵⁰ but the Fed is the major contributor to these asset prices with its easy policy. A month later, Federal Reserve officials were considering whether to signal a new wait-and-see approach after a likely interest-rate increase at their meeting on December 19, 2018 to 2.50% ,⁵¹ which could slow down the pace of rate increases next year.⁵² Jerome Powell has taken a conversational tone the last three months, but his communications have not always been understood by the market.⁵³ Lately, markets have cheered the Federal Reserve’s imminent announcement that it will stop shrinking its asset portfolio later this year. They are turning to the arguably more sensitive task of determining the composition of the Treasury securities the central bank will hold.⁵⁴

Figure 3b plots r_{FF}^{eff} and g_{RPCE} throughout the two regimes. During the ZIRP era, the average rates had a difference (GAP1) of -3.279% ; the r_{FF}^{eff} was lower than g_{RPCE} . Then, during the New era the difference (GAP1) became -3.312% ; the r_{FF}^{eff} was very low compared to the g_{RPCE} . The Fed tried to prevent deflation, as they were saying. Another question arises now; how we had this high growth of the real PCE with a high unemployment and low income in the country. Then, people were borrowing more money (debts were going up). Capitalism was turning to debtism. Thus, these low (negative real) interest rates have contributed to higher debts and higher future risks of financial distress, personal and business bankruptcies, and new bailouts. These extreme policies conserve the business cycles and do not prevent them. Even Boston Fed’s Rosengren was warning that “without more interest-rate increases the central bank risks a buildup of unsustainable pressures that lead to excessive inflation or financial bubbles and, ultimately, another downturn”.⁵⁵ U.S. Economy grew at 2.2176% rate in the First Quarter of 2018 and at 4.1588% Rate in Second Quarter of 2018, at 3.3569% in the Third Quarter and 2.59% in the Fourth Quarter of 2018.⁵⁶ China warns of protectionism at BRICS Summit in Johannesburg on July 26, 2018.⁵⁷ There is a Chinese economic warfare against the U.S., the EU, and other countries. We need to change our philosophical thinking and to

⁴⁹ See, “Trump Warns Maxine Waters Over Call to Harass Administration Officials”, *The Wall Street Journal*, June 27, 2018. https://www.wsj.com/articles/trump-warns-maxine-waters-over-call-to-harass-administration-officials-1529964098?mod=cx_picks&cx_navSource=cx_picks&cx_tag=video&cx_artPos=1#cxrecs_s Also, “In the twenty-first century, there has so far been little improvement in economic well-being for most US households. This is true for the middle of the distribution as well as for the bottom and, to a lesser extent, the top of the distribution. In addition, the high levels of inequality seen at the end of the last century have not diminished at all, with minor improvements in the early 2000s wiped out since the end of the Great Recession.” See, Zacharias, Masterson, and Rios-Avila (2018). http://www.levyinstitute.org/pubs/ppb_146.pdf

⁵⁰ “Fed Identifies Top Vulnerabilities Facing U.S. Financial System”, In inaugural financial stability report, officials cite elevated asset prices and historically high business debt https://www.wsj.com/articles/fed-identifies-top-vulnerabilities-facing-u-s-financial-system-1543417179?mod=article_inline

⁵¹ Fed officials [voted unanimously Wednesday on the increase](https://www.wsj.com/articles/fed-raises-rates-but-signals-slightly-milder-path-of-future-increases-11545246216), which will bring the benchmark federal-funds rate to a range between 2.25% and 2.5% , the ninth such rise since December 2015. They also indicated they think they won’t need to raise rates as much next year as they had anticipated three months ago. Fed Raises Rates and the DJIA fell by 351.98 points to 23,323.66. <https://www.wsj.com/articles/fed-raises-rates-but-signals-slightly-milder-path-of-future-increases-11545246216> (*Wall Street Journal*, December 20, 2018).

⁵² See, “Restrained Inflation Reduces Urgency for Quarterly Rate-Increase Pattern”. Under an evolving “data dependent” strategy, the Fed could step back from the predictable path of quarterly raises. <https://www.wsj.com/articles/restrained-inflation-reduces-urgency-for-quarterly-rate-increase-pattern-1544127856>

⁵³ See, “Plain-Spoken Fed Chairman Sometimes Leaves Markets Confused”, *The Wall Street Journal*, January 29, 2019. <https://www.wsj.com/articles/plain-spoken-fed-chairman-sometimes-leaves-markets-confused-11548757801>

⁵⁴ See, “Fed Faces Crucial Decision on Mix of Treasuries in Its Portfolio”. *The Wall Street Journal*, March 19, 2019. <https://www.wsj.com/articles/fed-faces-crucial-decision-on-mix-of-treasuries-in-its-portfolio-11552987920>

⁵⁵ See, “Boston Fed’s Rosengren Says It’s Time to Take Away Monetary-Policy Punch Bowl”, *The Wall Street Journal*, June 28, 2018. <https://www.wsj.com/articles/boston-feds-rosengren-says-its-time-to-take-away-monetary-policy-punch-bowl-1530192388>. Also, “Federal Reserve’s Eric Rosengren Discusses Economic Outlook and Risks”, *The Wall Street Journal*, June 29, 2018. <https://www.wsj.com/articles/federal-reserves-eric-rosengren-discusses-economic-outlook-and-risks-1530264601>

⁵⁶ See, <http://sub1.economagic.com/popular.htm>

⁵⁷ See, “China’s Xi Warns of Globalization Backlash at BRICS Summit”. The Editor of Technocracy News & Trends said: “Globalists everywhere, and especially China, are sweating over the rise in populism around the world. The New International Economic Order as originally specified by the Trilateral Commission, is clearly in jeopardy.” <https://www.technocracy.news/chinas-xi-warns-of-globalisation-backlash-at-brics-summit/>. Also, see, Εν αρχή ην ο Σπόρος - La semence dans tous ses états (Βίττω). <http://metemorphosis.blogspot.com/2018/10/la-semence-dans-tous-ses-etats.html>

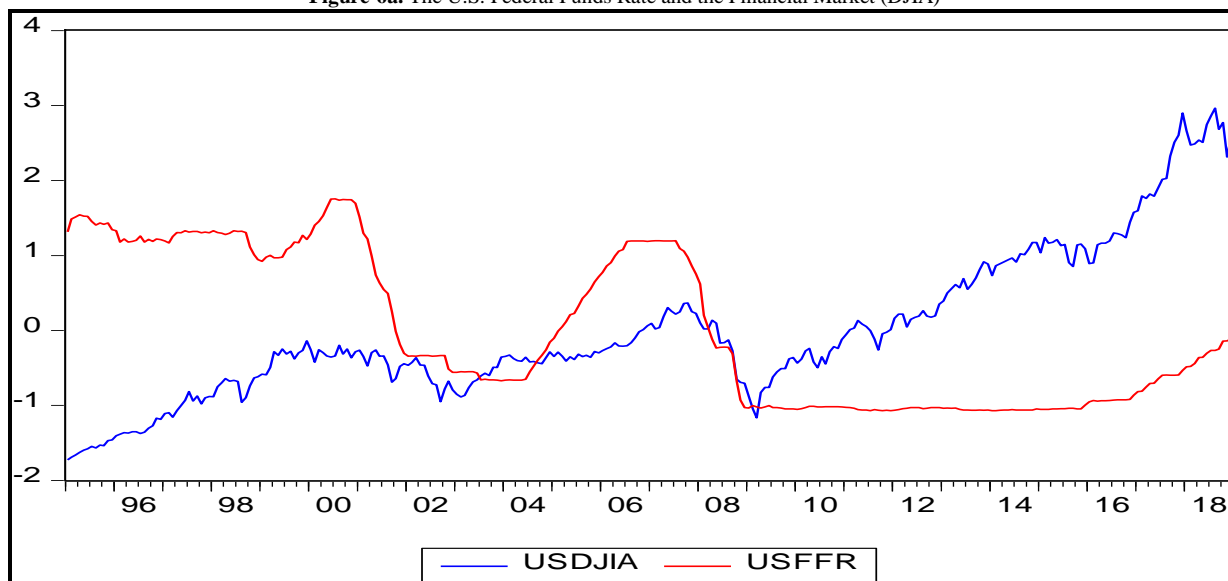
understand that the best public policy is a mixed policy (a combination of monetary, fiscal, and trade policy), which could become very effective with one only objective in the mind of policymakers, the wellbeing of the citizens of the country.

6. Conclusion

The current article discusses the theory and empirical implications of the latest two alternative monetary policy regimes that have been in place since the 2008 [here, we take the ZIRP Era (2008:12-2015:11) and the New Era (2015:12-2018:12)]. Clearly, the alternative monetary policy regimes have had important effects on the level, variance, standard deviation, covariance, correlation coefficient, and causality of datasets including measures of inflation (π), real risk-free rate of interest (r^*), real personal consumption expenditures ($RPCE$), growth of $RGDP$, financial markets ($DJIA$), unemployment rate (u), nominal interest rates (short term and long term), personal saving rate (psr), deposit rate (i_D), and social welfare. In periods of extreme policy settings (that is, setting the interest rate well above or well below a normal level), it appears that the Fed has influenced the level of real interest rates on safe assets, including ex post real returns on long-term Treasury securities, real risk-free rate of interest, and real deposit rates. During the ZIRP Era, the result was a very low real interest rate (negative) and below-trend growth in the economy. During the seven years following the 2007-2008 financial crisis, the ZIRP regime caused the low real interest rate on safe assets and subpar real consumption and real GDP growth, and high unemployment Figure 7. But, the bubble in the financial market was growing ($\bar{g}_{DJIA} = 9.952\%$ p.a. and $\sigma_{g_{DJIA}} = \pm 55.692\%$) artificially and its risk is very high for the global economic system; it can cause an enormous systemic risk. The results show the ineffectiveness of monetary policy. Figures 6a and 6b reveal the bubble of the nominal $DJIA$ that the latest “over-easy” monetary policies have caused.

After this experiment of Quantitative Easing (QE), the FOMC has begun a transition to a new policy regime (NPR) or perhaps a return to an old one. As it has begun to raise the federal funds rate target (from 0% to 2.50% today), it is merely taking a rate that is well below normal to one that is closer to normal. Incoming data show that the real economy has not been damaged by slightly higher interest rates.⁵⁸ However, the economy remained during this ZIR period below the trend that was predicted for potential GDP in 2007 (Summers, 2016). The rate of return on safe assets must be above the expected inflation ($\pi = 1.6\%$, today)⁵⁹ and the growth of the financial market (DJIA)

Figure-6a. The U.S. Federal Funds Rate and the Financial Market (DJIA)



Note: USFFR = i_{FF}^{eff} = U.S. federal funds rate and USDJIA = the U.S. DJIA Index.

ZIRP: $\rho_{r_{FF}^{eff}, DJIA} = -0.577$, $DJIA \Rightarrow i_{FF}^{eff} (F = 3.800)$

New Era: $\rho_{r_{FF}^{eff}, DJIA} = +0.910$, $i_{FF}^{eff} \Rightarrow DJIA (F = 4.586)$

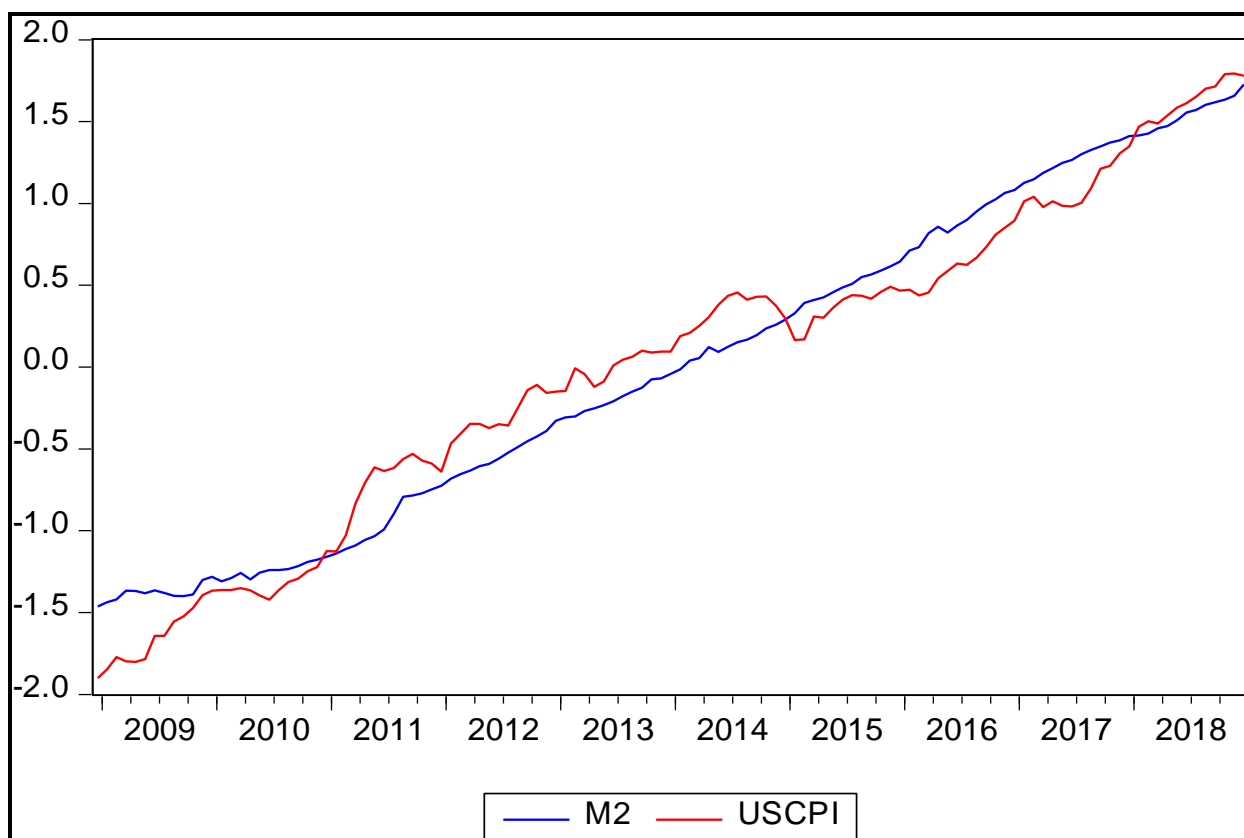
Source: Economagic.com

⁵⁸ The Gross Domestic Product (GDP) in the United States expanded 2.80% in the first quarter of 2018 over the same quarter of the previous year, the GDP grew 4.1% in the second quarter, 3.4% in the third, and 2.6% in the fourth quarter of 2018. GDP Annual Growth Rate in the United States averaged 3.19% from 1948 until 2018, reaching an all-time high of 16.6718% in the first quarter of 1950 and a record low of -8.3784% in the fourth quarter of 2008. See, <http://sub1.economagic.com/em-cgi/data.exe/var/rgdp-qtrchg> and <https://tradingeconomics.com/united-states/gdp-growth-annual>. Also, see, the Annual RGDP growth. <https://www.statista.com/statistics/188165/annual-gdp-growth-of-the-united-states-since-1990/>

⁵⁹ See, *Wall Street Journal*, March 8, 2019, p. B8.

must be above the prime rate ($i_P = 5.50\%$, today) to cover the risk, but not very high to generate new bubbles. Then, the federal funds rate must be further increased. There, are other that believe “the Fed does not have to be so aggressive”, as Federal Reserve Bank of St. Louis President James Bullard said.⁶⁰

In theory, we expect the monetary policy regime to have important effects on inflation,⁶¹ interest rates, growth, unemployment, financial markets, and of course, on the social welfare. The growth of the RGDP must exceed the growth of the RPCE and the difference must be the growth of the personal savings ($g_{RGDP} = g_{RPCE} + g_{RS}$), otherwise households' debt will go up, their interest cost will increase,⁶² and their bankruptcies will follow up. During the ZIRP Era it was: $\bar{g}_{RGDP} = 1.731\%$, $\bar{g}_{RPCE} = 1.821\%$, then, \bar{g}_{RS} was -0.09% (dissaving, borrowing). But, during the New Era it is: $\bar{g}_{RGDP} = 3.110\%$, $\bar{g}_{RPCE} = 2.459\%$, then, \bar{g}_{RS} is 0.651% (very low). The Lucas critique⁶³ is important when deciding how to make forecasts in a period with a new policy regime. During the week on December 6, 2018, the gap between long- and short-dated U.S. Treasuries reached its lowest in more than a decade, with one version (the five-year minus two-year yield) turning negative. Stocks had sold off hard, as investors fear such so-called inversions of the yield curve presage recessions (every recession since the 1950s was foreshadowed by an inverted curve).⁶⁴



⁶⁰ See, “Fed’s Bullard: Inverting Yield Curve ‘Key Near-Term Risk’”, *The Wall Street Journal*, June 29, 2019.

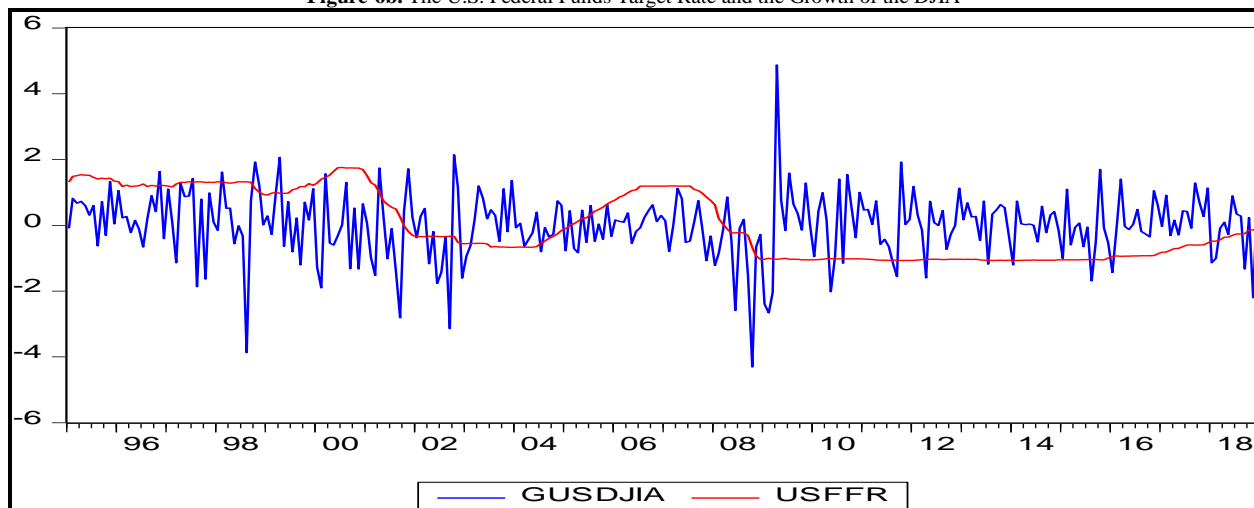
<https://www.wsj.com/articles/fedsbullard-inverting-yield-curve-key-near-term-risk-1530215999>

⁶¹ The Monetarist view: $M\bar{V} = \bar{Q}P \Rightarrow M2 = CPI$, $\rho_{m2,p} = 0.981$ and $p \Rightarrow m2$ ($F = 9.067$). As the following graph shows,

⁶² The average household today is working and pays taxes, interest on debt, student loans, and insurance. The most unfair, unethical, and unlawful tax is the property tax. Then, an individual never really own his home. It is owned by the bank until he will pay off the mortgage and then, it is owned by the local government and he pays “rent” (property taxes) to the government, otherwise he loses his home. Thus, in extreme systems (capitalism and communism) there is no homeownership. People live a very miserable life without any deeper objectives (spiritual and eternal), prospects, and hope for the future. Some people must be responsible for this continued social crisis. Are politicians responsible? Is education responsible? Or our controlled (ignorant) system is the only responsible? See, Kallianiotis (2017b).

⁶³ The Lucas critique argues that it is naive to try to predict the effects of a change in economic policy entirely on the basis of relationships observed in historical data, especially highly aggregated historical data. More formally, it states that the decision rules of Keynesian models, such as the consumption function, cannot be considered as structural in the sense of being invariant with respect to changes in government policy variables. The Lucas critique is significant in the history of economic thought as a representative of the paradigm shift that occurred in macroeconomic theory in the 1970s. See, Lucas (1976).

⁶⁴ See, “Afraid of the Yield Curve? You’re Looking at the Wrong One”. When bond yields flatten to current levels before a recession, the S&P often posts gains over next year. <https://www.wsj.com/articles/afraid-of-the-yield-curve-youre-looking-at-the-wrong-one-1544120177>

Figure-6b. The U.S. Federal Funds Target Rate and the Growth of the DJIA

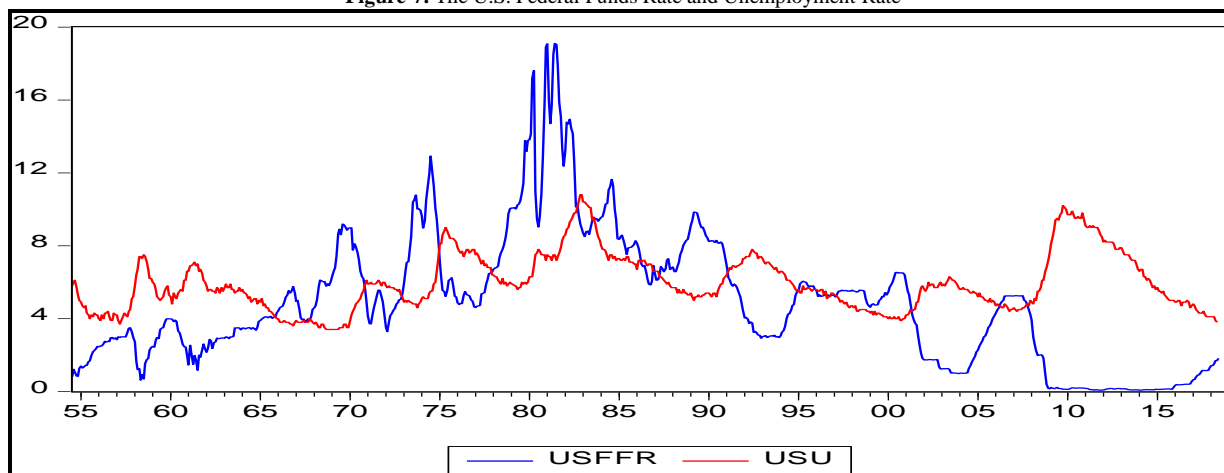
Note: USFFR = i_{FF}^{eff} = U.S. federal funds rate and GUSDJIA = the growth of the U.S. DJIA Index.

ZIRP Era: $\rho_{i_{FF}^{eff}, g_{DJIA}} = -0.091$, $i_{FF}^{eff} \Rightarrow g_{DJIA} (F = 4.287)$

New Era: $\rho_{i_{FF}^{eff}, g_{DJIA}} = -0.060$ and no significant causality.

Source: Economagic.com

Lastly, during the ZIRP era, real interest rates on 10-year Treasury bonds ($\bar{r}_{10YTB} = 1.000\%$) were significantly lower than the growth of the real personal consumption expenditures ($\bar{g}_{RPCE} = 1.821\%$). But, real short-term returns on safe assets ($r^* = -1.508\%$) remain significantly below the growth of the real personal consumption expenditures ($\bar{g}_{RPCE} = 1.821\%$) during the ZIRP Era as it is also today ($r^* = -0.920\%$ and $\bar{g}_{RPCE} = 2.459\%$), and this low demand affected the growth of the RGDP ($\bar{g}_{RGDP} = 1.857\%$). The Taylor's rule shows that the federal funds rates are too low since 2008. The Bullard rule gives similar results, the target rate is for all these years low. The social welfare (ISW) is relatively low during the ZIRP and has improved a little lately with the New regime. Nominal interest rates on deposits continue to be closed to zero,⁶⁵ which keep the real return on deposits negative. Empirical evidence surveyed by Williams (2014) suggests that the Fed can influence real interest rates on long-term safe assets. What we do not know is the sign

Figure-7. The U.S. Federal Funds Rate and Unemployment Rate

Note: USFFR = U.S. Federal Funds Rate and USU = U.S. Unemployment Rate.

ZIRP: $\rho_{i_{FF}^{eff}, u} = +0.425$, $i_{FF}^{eff} \Rightarrow u (F = 4.468)$ and $u \Rightarrow i_{FF}^{eff} (F = 2.522)$.

New Regime: $\rho_{i_{FF}^{eff}, u} = -0.957$, $u \Rightarrow i_{FF}^{eff} (F = 3.723)$ and $i_{FF}^{eff} \Rightarrow u (F = 2.631)$

⁶⁵ See, "Banks' Golden Deposits Are Heading Out the Door". Customers are starting to move their money out of deposits that pay no interest, posing a big risk to bank profits. <https://www.wsj.com/articles/banks-golden-deposits-are-heading-out-the-door-1540200600>

of the effect that policy-induced low interest rates have on real economic activity. But, we know that low real interest rates are causing redistribution of wealth from risk-averse savers to banks, speculators, and investors of financial assets, and affect negatively savings (encouraging dissaving and consumption); this might be the reason of this policy to increase consumption, aggregate demand, and stimulate the economy (a capitalistic economy is driven by consumption). Actually, this is an anti-social and unethical policy, with a very uncertain future. We need some serious structural reforms for the entire socio-economic system. The dual mandate of the Fed does not maximize the social welfare. The ECB's "effectiveness" will be our next project.

Figure-8. Impulse Responses (1995:01-2008:11)

Response to Cholesky One S.D. Innovations ± 2 S.E.

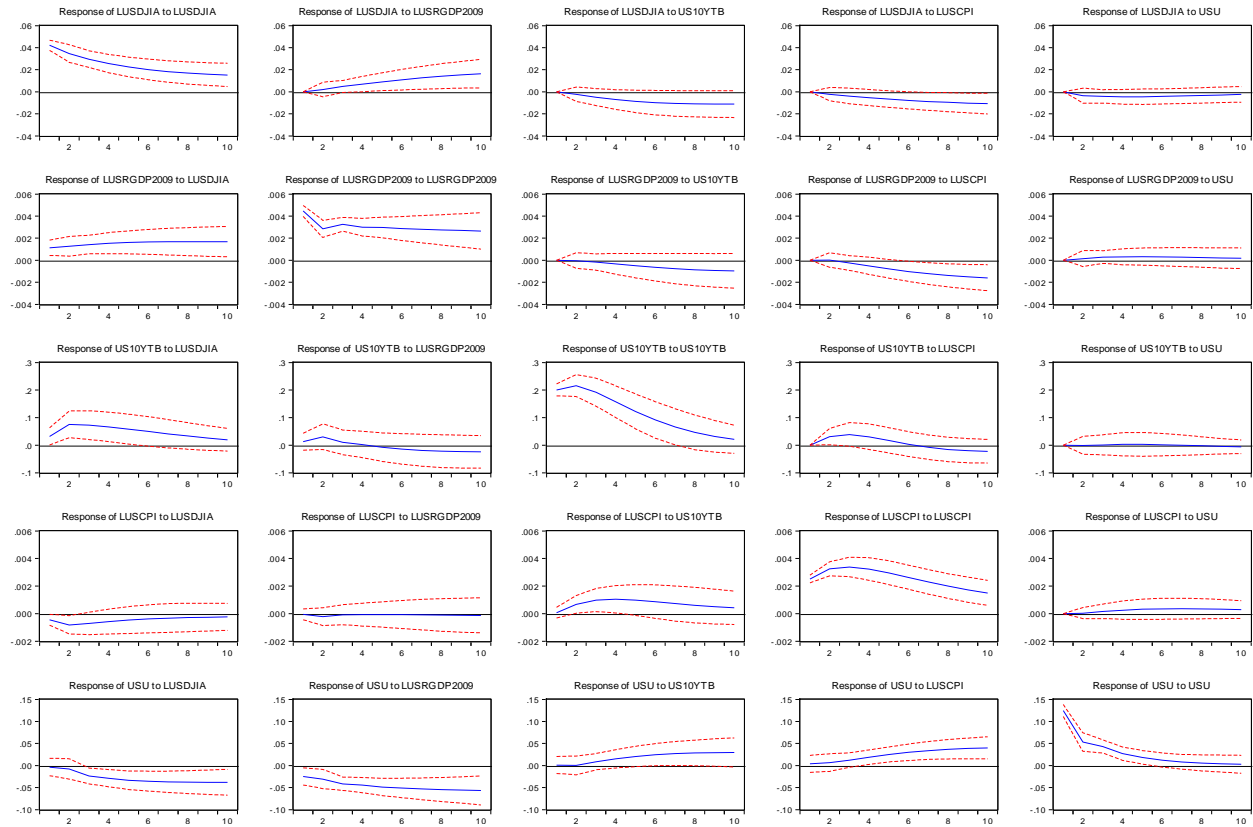
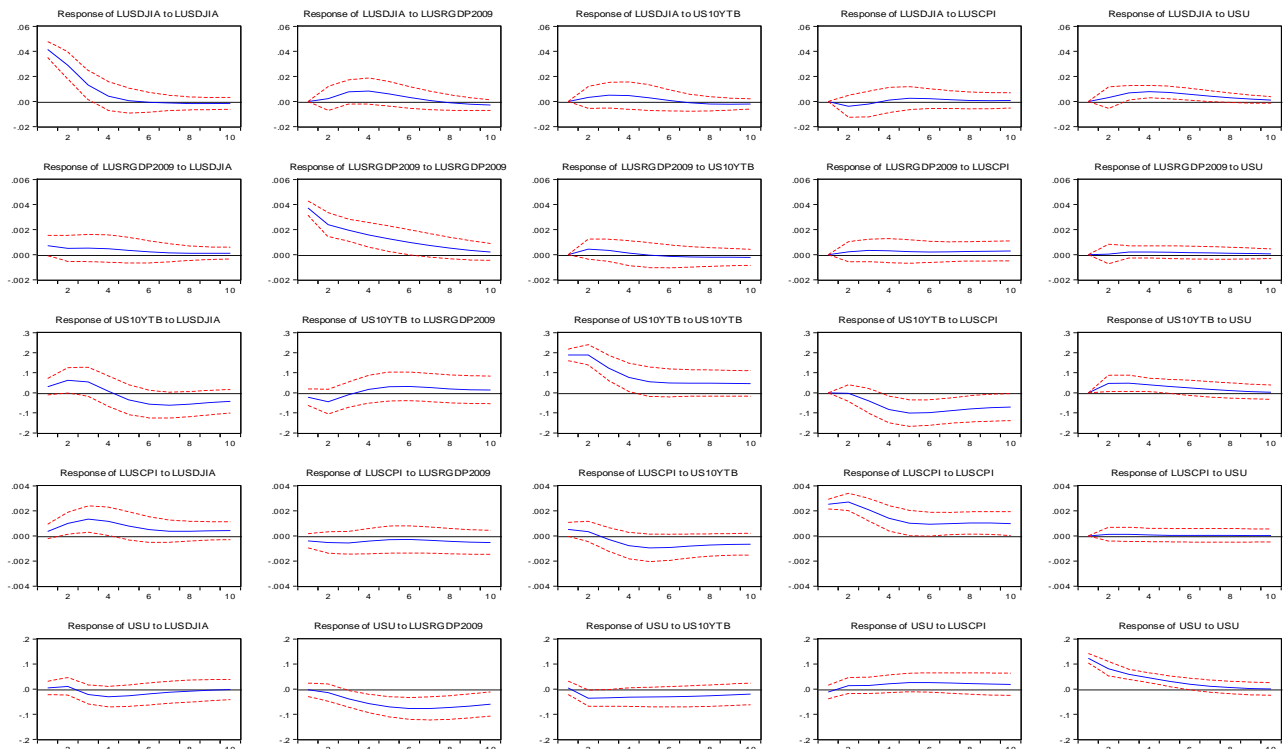


Figure-9. Impulse Responses (2008:12-2015:12)

Response to Cholesky One S.D. Innovations ± 2 S.E.



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