Monetary Policy, Real Cost of Capital, Financial Markets and the Real Economic Growth

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Abstract

In this paper we deal with the recent (1995-2018) Federal Reserve operated monetary policies, which were two unprecedented and distinct monetary policy regimes. The inflation stabilization era (1995-2008) and the zero interest rate era (2008-2015). These different monetary policy regimes provided different outcomes for inflation, interest rates, financial markets, personal consumption, and real economic growth. 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 and the real economic growth. The Fed's interest rate target was set during these seven years at 0% to 0.25%. We are trying to explain the low level of long-term interest rates and the negative real rate of interest (cost of capital). The evidence suggests that this monetary policy was not very effective; 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. It has increased the risk (RP) by making the real risk-free rate of interest negative. The effects on growth and employment were gradual and small, due to outsourcing and unfair trade policies.

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1 Introduction

The idea of a monetary policy regime is somewhat vague. It is related to the state of the economy, to Fed's experience, and to the idea of a monetary standard. Examples of monetary standards include the classical gold standard that existed in most developed economies between 1880 and 1914, the modified gold exchange standard adopted in 1946 after the Bretton Woods agreement (1944), and the paper money standard that evolved after the abandonment of the Bretton Woods agreement in 1971.[2] This paper examines two distinct U.S. policy regimes that were adopted to manage a paper money standard. These regimes are defined by the different goals for policy and by the different procedures, the inflation stabilization (moderation) era, 1995-2008 (2% inflation target) and the zero interest rate (ZIR) era, 2008-2015 (quantitative easing) used to implement monetary policy decisions.[3]

The Fed has since 1977 a dual mandate, to promote price stability and maximum sustainable employment.[4] In practice, price stability is defined as 2% inflation rate. Achieving the maximum (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 level 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.[5] 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.[6] But, the objective is the same: maximum employment, stable prices, and moderate long-term interest rates.

2 Nominal and Real Effects of Monetary Policy

Different monetary policy regimes lead to different equilibrium levels of real interest rates or real GDP. Our most basic theories of money assume the classical dichotomy; real variables are determined by real factors and nominal variables are

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[2] See, Kallianiotis [28].
[3] See, Bindseil [3], Gavin [16], and Bullard [4].
[4] For the Federal Reserve's Dual Mandate, See, https://www.chicagofed.org/research/dual-mandate/dual-mandate
[5] See, Taylor [39]. See also, Kallianiotis [25].
[6] See, Woodford [45], Bank of Canada [1], and Yellen [46]. See also, Williamson [42] and Summers [36].

determined by monetary policy (money as a veil, money is neutral, money illusion).[7] 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 most well-known example of extreme monetary policy is hyperinflation that takes place during war periods. This very high inflation causes firms to change prices daily and consumers to hold as little currency as possible and spend the rest to buy goods because their prices go up vertically. It makes the real interest rates and real economic activity negative[8] because the hyperinflation interferes with the price mechanism that is key to equilibrium adjustments and efficiency in market-based economies.[9]

The current policy regime since 2008 is also extreme because the interest rate policy is not consistent with the 2% inflation objective.[10] This policy has led to

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[7] In the strict sense, money is not neutral in the short-run (due to price stickiness or inertia), that is, classical dichotomy does not hold, since agents tend to respond to changes in prices and in the quantity of money through changing their supply decisions. However, money should be neutral in the long run, and the classical dichotomy should be restored in the long-run, since there was no relationship between prices and real macroeconomic performance at the data level. This view has serious economic policy consequences. In the long-run, owing to the dichotomy, money is not assumed to be an effective instrument in controlling macroeconomic performance, while in the short-run there is a trade-off between prices and output (or unemployment), but, owing to rational expectations, policymakers cannot exploit it in order to build a systematic countercyclical economic policy. See, Galbacs [15].

[8] As follows: $y = q + \pi \Rightarrow q = y - \pi < 0$ because $\pi > y$ and $i = r + \pi \Rightarrow r = i - \pi < 0$ because $\pi > i$.

[9] 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 reform 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}).

[10] Official inflation 2.9% with June 2018; but 6.5% (1990-based) or 11% (1980-based) from the SGS.

Consumer Inflation - Official vs ShadowStats (1990-Based) Alternate
CPI-U Year to Year Change. Not Seasonally Adjusted. to June 2018 (BLS, SGS)

— Official CPI-U   — Experimental C-CPI   — SGS Alternate 1990-Based

Published: July 12, 2018
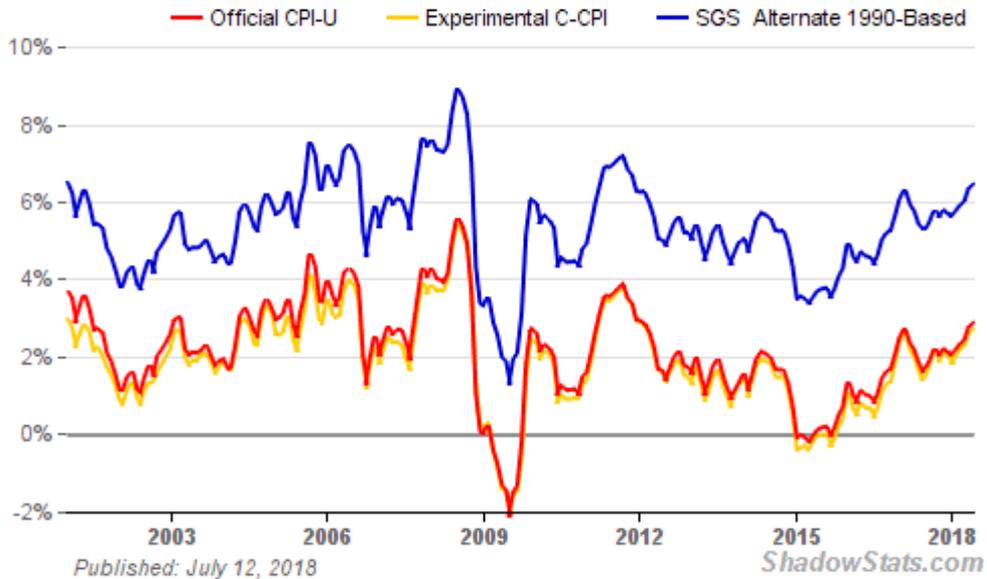
ShadowStats.com

Consumer Inflation - Official vs ShadowStats (1980-Based) Alternate
Year to Year Change. Through June 2018.   (BLS, SGS)

— SGS Alternate CPI, 1980-Based   — CPI-U

Published: July 12, 2018
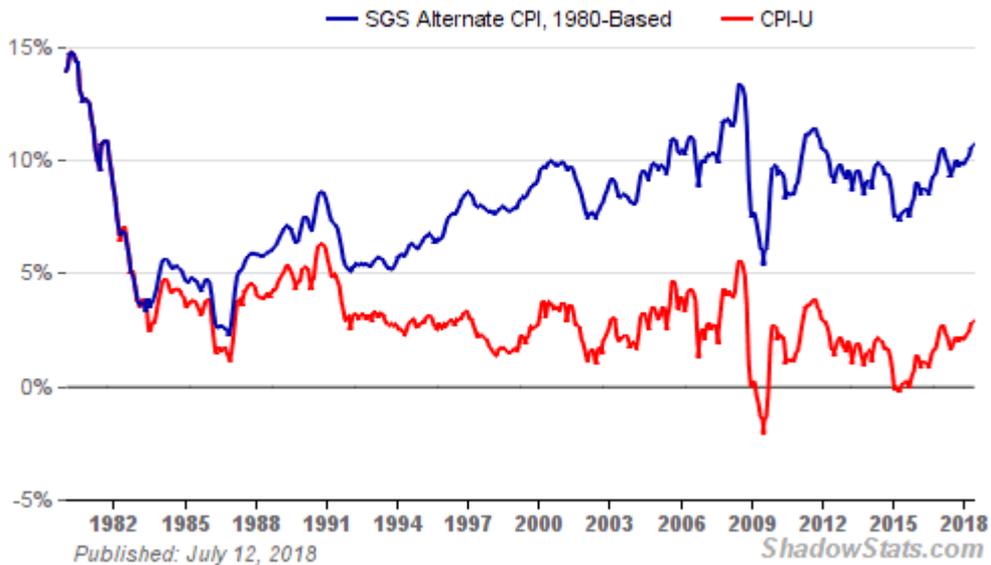
ShadowStats.com

Graph 1: Consumer Inflation

Source: http://www.shadowstats.com/alternate_data/inflation-charts

persistently low (negative, $r_D < 0$) real rates on bank reserves, deposits, and other safe assets. It has also led to a low level of real economic activity ($g_{RGDP} \downarrow$)[11] and real personal consumption expenditures ($g_{RPCE} \downarrow$). 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, $\bar{r}_D = -1.502\%$).[12] 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 the risk, too.[13]

Monetary policy can affect the real return to saving (which must be at least, $r_S > 1\%$);[14] the latest and current persistently low interest rate policy leads to lasting subpar economic activity. 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.[15] 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 or moving abroad during recessions and are replaced during the recovery by new firms using more efficient technology. Foster, Grim, and Haltiwanger [13] find that since the 2007-2008 financial crisis and 2007-2009 recession,[16] measures of turnover have yet to fully recover from the recession levels. 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

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[11] 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. [17] 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.

[12] The $\bar{r}_{FF}^{eff} = -1.422\%$ and the $\bar{r}_{RF}^{*} = -1.472\%$ during the ZIR Era.

[13] During the inflation stabilization (IS) era the risk was lower; i.e., $i_{10YTB} = r^{*} + IP + RP \Rightarrow$ $5.131\% = 1.238\% + 2.543\% + RP \Rightarrow RP = 1.35\%$. During the zero interest rate (ZIR) era, the risk for the same instruments has gone up; $i_{10YTB} = 2.582\% = -1.472\% + 1.552\% + RP \Rightarrow RP = 2.502\%$. These are indications of an ineffective policy, with artificiality everywhere, strange mysticism, and anti-social actions and results. (*Sic*).

[14] By making (now) the nominal (target) federal funds rate above 3.9%, the real federal funds rate become positive, as follow: $\bar{i}_{FF} = r + \pi$. i.e., $\bar{i}_{FF} = 3.9\% = 1\% + 2.9\%$, we have a positive $\bar{r}_{FF}$, but it is only $\bar{i}_{FF} = 2\%$ (August 2018), which makes the $r_{FF} = -0.9\%$. See, https://fred.stlouisfed.org/series/DFEDTARU

[15] Caggese and Perez-Orive [6].

[16] Real GDP growth was: -2.703% (2008:Q1), -1.903% (2008:Q3), -8.188% (2008:Q4), -5.428% (2009:Q1), and -0.540% (2009:02). Source: *Economagic.com*.

and reduced turnover of jobs and firms are not exogenous with respect to a monetary policy that pegs the interest rate near zero (from December 16, 2008 to December 16, 2015, for 7 years).[17] 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. All these objectives can be satisfied with an efficient and effective monetary policy.

3 Theory: The Two Latest Monetary Policy Regimes

A monetary regime[18] 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 two latest distinct regimes implemented by the Federal Reserve since 1995. The first is the Inflation Stabilization Regime (January 1995-December 15, 2008) and the second the Zero Interest Rate Regime (December 16, 2008-December 15, 2015). Each regime is an experiment that is associated with different policy objectives, different operating procedures, different statistical patterns in the data, different effectiveness, and different results.

3.1 The Inflation Stabilization (Great Moderation) Regime
The Great Moderation era starts in October 1982, when the Fed abandoned the M1 targeting procedure, and continues until December 2008; a period in which the Federal Reserve used interest rate targeting procedures to maintain the credibility for low inflation. We are starting, here, from January 1995, where the Volcker era inflation stabilization came to full fruition, with the FOMC tried to maintain a 2% inflation target,[19] which is actually a sub-period of the Great Moderation.[20] The method used to implement interest rate ($\bar{i}_{FF}$) targeting evolved over the next decade, became more explicit after 1987 when Alan Greenspan replaced Paul Volcker as head of the Fed.

According to Taylor's original version of "the rule", the nominal interest rate (federal funds rate targeting) should respond to divergences of actual inflation rates from *target* inflation rates and of actual GDP from *potential* GDP:

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[17] See, http://www.fedprimerate.com/fedfundsrate/federal_funds_rate_history.htm

[18] Gavin [16] examines four different monetary policy regimes from 1965 to 2015. See, https://research.stlouisfed.org/publications/review/2018/04/16/monetary-policy-regimes-and-the-real-interest-rate

[19] See, Bullard [4, p. 122].

[20] It was a period of low volatility of output and inflation. See, Stock and Watson [35], Bernanke [2], and Cochrane [7].

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

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.

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. Sometimes monetary policy goals may conflict, as in the case of stagflation (1979-1982, the Volcker Reform era), when inflation is above its target while output is below full employment. In such a situation, a Taylor rule specifies the relative weights given to reducing inflation versus increasing output.

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

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

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.

The above argument presupposed the existence of a Phillips curve. The Phillips curve, showing in Graph 2, can be written as follows:[21]

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[21] Phillips curve:

$$\pi_t = \pi_t^e + \varphi(q_{t-1} - q_t^N) \tag{3}$$

or

$$\pi_t = \pi_t^e - \psi(u_{t-1} - u_t^N) \tag{4}$$

and we want to test empirically this Phillips curve during the two previous monetary policy regimes.

Monetary policy during the Moderation Era (1995:01-2008:11)[22] was praised by policymakers, business leaders, and academic researchers because of the low volatility in both output ($\sigma_{g_{RGDP}} = \pm 5.918\%$) and inflation ($\sigma_\pi = \pm 4.003\%$), as Table 1 and Figures 1a and 1b reveal. Figure 2 and Table 1 show that the volatility of the federal funds continued to decline throughout the Moderation ($\sigma_{FFR} = \pm 1.806\%$) and the Zero Interest Rate Era ($\sigma_{FFR} = \pm 0.041\%$) and dropped even further as
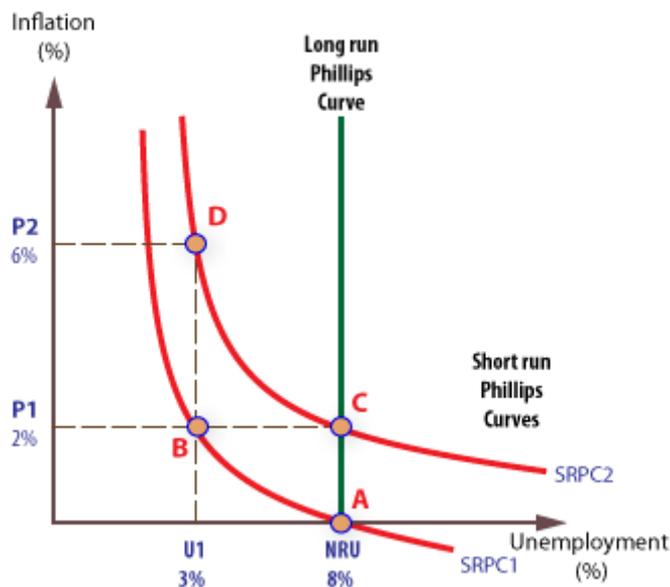
Graph 2: The Short run and the Long run Phillips Curve

See, Kallianiotis [29].
[22] Stock and Watson [35] coined the term "great moderation" the period from October 1982-December 2008. We take, here, the period from 1995:01-2008:11 because this period was when the Fed started to maintain an inflation target of 2%.

Greenspan gave up the pretense that the Fed was not targeting federal funds. Trends in interest rates were declining throughout much of the Moderation era. When the economy went into recession, the FOMC lowered the federal funds rate target to stimulate the economy. The FOMC expected this to lead to higher inflation, but it did not. The official inflation was $\bar{\pi} = 2.543\%$ during the Moderation Era (ME) and became $\bar{\pi} = 1.552\%$ during the Zero Interest Rate Era (ZIRE).
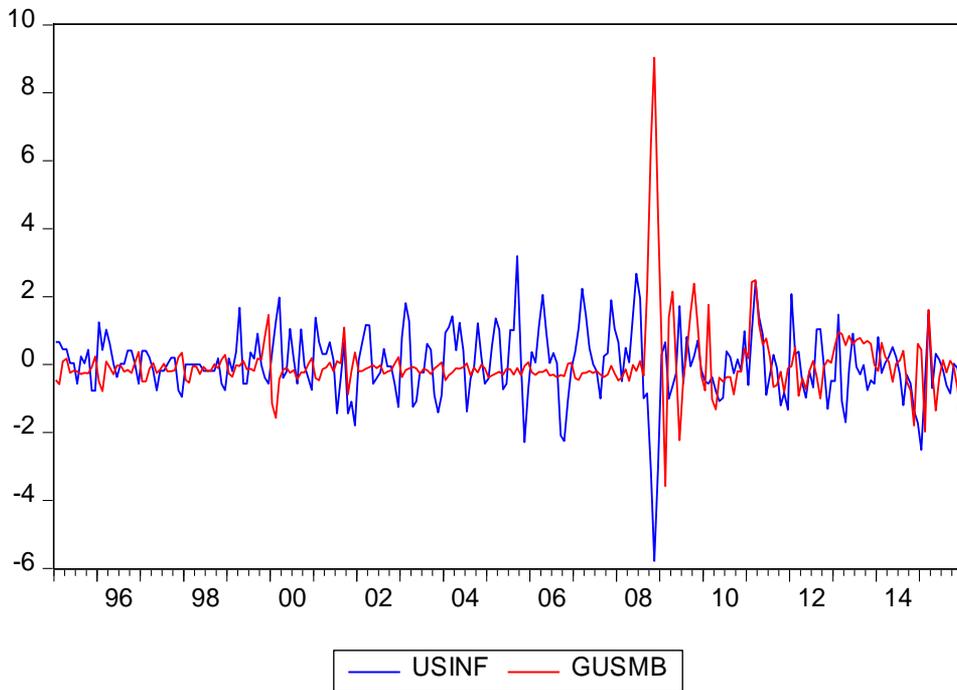
Figure 1a: Growth of Monetary Base and Inflation Rate

Note: USINF = U.S. inflation (π_t) and GUSMB = growth of the U.S. monetary base (g_{MB_t}). IS: $\rho_{g_{MB},\pi} = -0.537$, $g_{MB_t} \Rightarrow \pi$; ZIRP: $\rho_{g_{MB},\pi} = -0.044$.

Source: *Economagic.com*

The recoveries were not as vigorous as those during the previous era. As the economy expanded, the FOMC did not have to raise the federal funds rate target above the US10YTB (Figure 2). By the time that USFFR was approximately level with US10YTB, inflation and inflation expectations had moderated. So the policy during the Moderation period was asymmetric: The FOMC eased aggressively when the economy was weak, but did not have to raise rates so much during expansions. The result was that the average USFFR ($\bar{i}_{FF}^{eff} = 4.045\%$) was 1.086% lower than the average US10YTB ($\bar{i}_{10YTB} = 5.131\%$).

The signature characteristic of the Moderation 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) fell from $\sigma_{g_{RPCE}} = \pm 5.826\%$ to $\sigma_{g_{RPCE}} = \pm 3.775\%$. Also, the volatility of the growth of the real gross domestic product (GUSRGDP2009) fell from $\sigma_{g_{RGDP}} = \pm 5.918\%$ to $\sigma_{g_{RGDP}} = \pm 4.848\%$, but we had a big reduction of average growth of the GUSRGDP2009 from 2.670% to 1.711%. The volatility ($\sigma_{g_{DJIA}}$) had increased for the growth of the stock market (GUSDJIA) from ±53.809% to ±55.455% and the growth of the DJIA from 5.993% increased to 9.598% per annum, which keep pace with the growth of monetary base (GUSMB) from 8.712% (and $\sigma_{g_{MB}} = \pm 32.123\%$) to 13.549% p.a. (and $\sigma_{g_{MB}} = \pm 37.932\%$), as Table 1 and Figure 3 show. This growth in the stock market has created a new bubble.[23] This is an indication of an extreme and inefficient (risky) monetary policy.
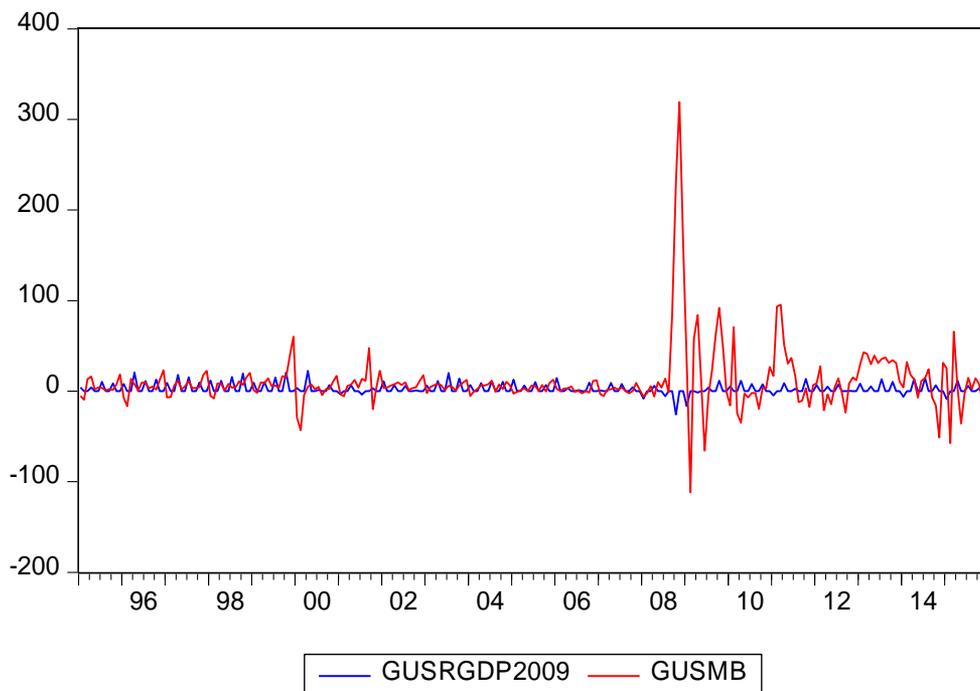
Figure 1b: Growth of Monetary Base and Real GDP

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[23] The hard working middle class, which is risk-averse is afraid that globalists will burst it to terrorize people again (for a second time) in this wrong appearing 21st century.

Note: GUSRGDP2009 = growth of the U.S. RGDP (2009 base) (g_{RGDP_t}) and GUSMB = growth of the U.S. monetary base (g_{MB_t}). IS: $\rho_{g_{MB},g_{RGDP}} = -0.247$, $g_{MB} \Rightarrow g_{RGDP}$; ZIRP: $\rho_{g_{MB},g_{RGDP}} = -0.004$, $g_{MB} \Rightarrow g_{RGDP}$.

Source: *Economagic.com*

The biggest surprise for the Fed was that the official inflation did not accelerate in response to lower federal funds rates during these two extended periods of low interest rates; the first from 1995 to 2008 ($\bar{\pi} = 2.543\%$) and the second from 2008 to 2015 ($\bar{\pi} = 1.552\%$) because the unemployment was high and this high unemployment causes reduction in personal income and aggregate demand, which affect negatively the price level,[24] even though that the official data do not support a Phillips curve. But, it seems that there was a need to invert the yield curve, raising federal funds rate above US10YTB, to keep inflation under control and reduce the bubble that was creating in the financial market. Another surprise was the rebound of more-rapid economic growth in the 2000s, as Figure 4a (RGDP above its L-T potential output) and Figure 4b show.

Figure 5 and Table 1 show that the 2000s was a period with high personal consumption expenditures ($\bar{g}_{PCE} = 5.059\%$ and $\bar{g}_{RPCE} = 2.516\%$), which fell after

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[24] 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 July 2018 was 21.3%.
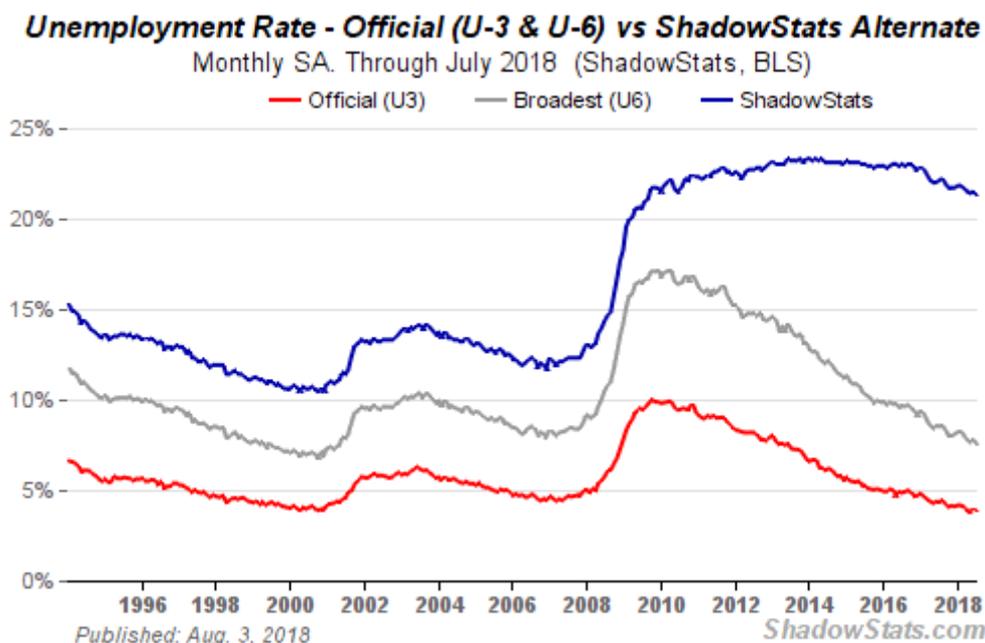
Graph 3: The U.S. Unemployment Rate
Source: http://www.shadowstats.com/alternate_data/unemployment-charts

2008 ($\bar{g}_{PCE} = 3.403\%$ and $\bar{g}_{RPCE} = 1.851\%$). 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 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, and the corruption in the banking industry.
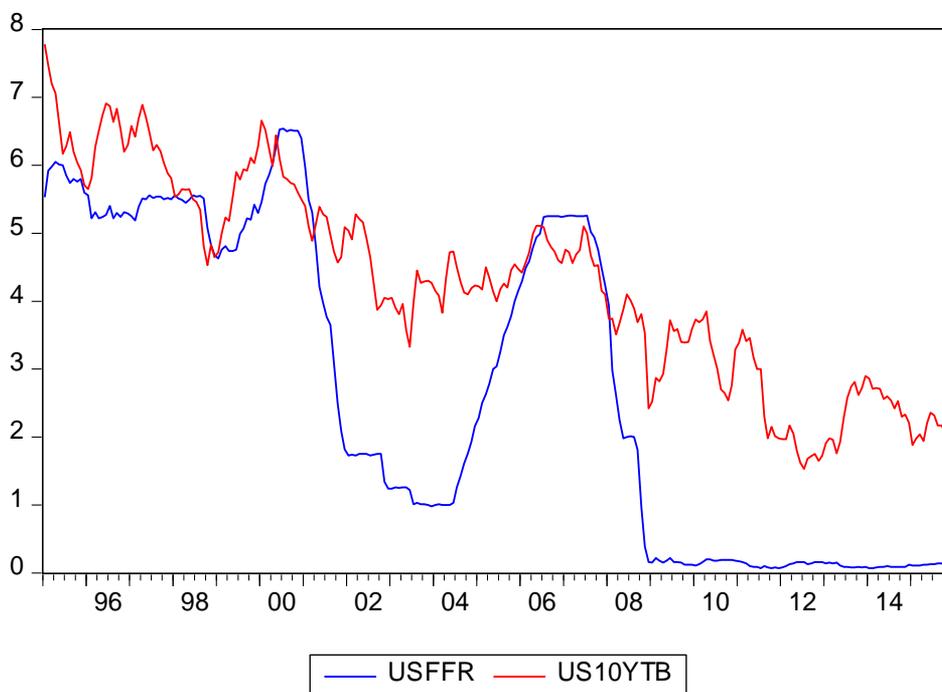
Figure 2: The Federal Funds Rate and the Yield on 10-Year Treasury Bonds

Note: USFFR = U.S. federal funds rate and US10YTB = U.S. 10-year Treasury bonds rate. IS: $\rho_{i_{FF}^{eff}, i_{10YTB}} = +0.741$, $i_{10YTB} \Rightarrow i_{FF}^{eff}$; ZIRP: $\rho_{i_{FF}^{eff}, i_{10YTB}} = +0.196$.

Source: *Economagic.com*

3.2 The Zero Interest Rate Era (ZIRE)
The Zero Interest Rate Era (ZIRE) 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, Graph 6)[25] as banks earned 0.25% on reserve balances at the Fed (for this reason, banks kept their deposit rates close to zero, $i_D = 0.05\%$, to discourage supply of deposits

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[25] See, https://fred.stlouisfed.org/series/EXCSRESNS

by savers) and an enormous monetary base (MB = \$4.13 trillion on August 20, 2014, Graph 5),[26] which generated (endogenously) a money supply (M^s = \$11.47 trillion on August 25, 2014).[27] 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 [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), and $g_{RGDP} = -1\%$ in 2014:Q1].[28] Official inflation ($\bar{\pi} = 1.552\%$) 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 [$r = i - \pi$; but, if $\pi < 0 \Rightarrow r = i - (-\pi) \Rightarrow r = i + \pi$]. The Federal Reserve recently is 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.[29]

Also, Figure 2 and Table 1 show that the level and volatility of federal funds rate continued to drop, as we mentioned above, it fell even further as Greenspan gave

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[26] See, https://fred.stlouisfed.org/series/BASE/
[27] Today, it is worse, with July 30, 2018, the M2 was \$14.156 trillion. See, https://fred.stlouisfed.org/series/M2
[28] See, https://tradingeconomics.com/united-states/gdp-growth . Also, https://fred.stlouisfed.org/series/A191RL1Q225SBEA and https://fred.stlouisfed.org/series/GDPC1/
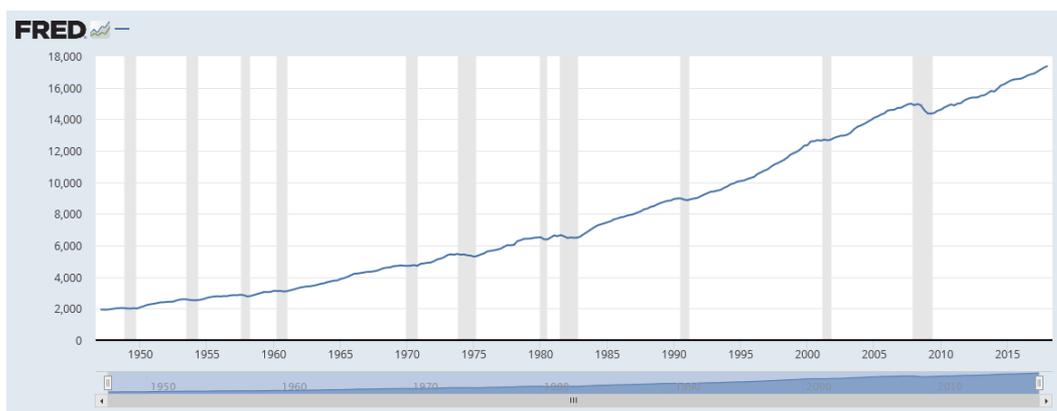
Graph 4: Real Gross Domestic Product

Source: *FRED*, https://fred.stlouisfed.org/series/GDPC1/

[29] 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

up the pretense that the Fed was not targeting federal funds rate ($\bar{i}_{FF}$). During this period the FOMC adopted a risk-management approach to monetary policy.[30] The
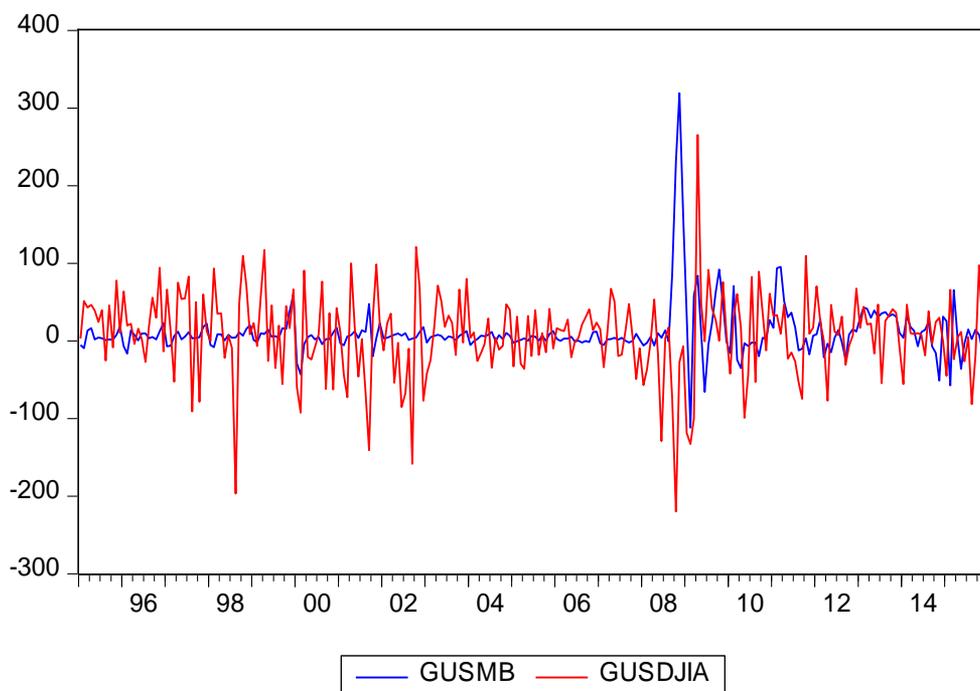
Figure 3: Growth of Monetary Base and Growth of Dow Jones Industrial Index

Note: GUSMB = growth of the U.S. monetary base and GUSDJIA= growth of the U.S. DJIA. IS:
$\rho_{g_{MB}, g_{DJIA}} = -0.222$; ZIRP: $\rho_{g_{MB}, g_{DJIA}} = +0.196$, $g_{MB} \Rightarrow g_{DJIA}$.
Source: *Economagic.com*

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.[31] 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. 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.

As it is well known, with the onset of the global financial crisis (August 2007), the Fed abruptly switched to a new monetary policy regime, the Zero Interest Rate Policy regime. In response to this financial crisis, in September 2008, the Fed

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[30] See, Greenspan [22].
[31] See, Taylor [38] and Kallianiotis [27] and [25].

flooded the market with about \$600 billion in excess bank reserves (R_E)[32] and drove
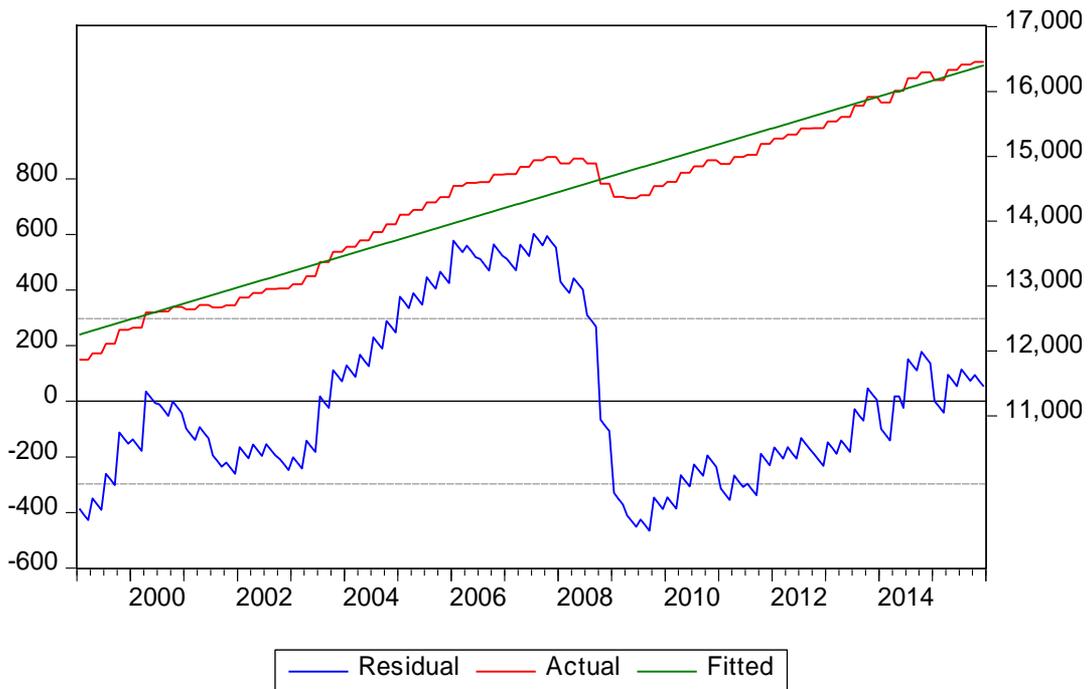
Figure 4a: The Real GDP and the Time Trend

Note: Actual = USRGDP2009 and Fitted = the L-T time trend.
Source: *Economagic.com*

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[33] that were intended to keep money market interest rates near zero (i.e., the average 3-month T-Bills rate: $\bar{i}_{RF} = 0.080\%$) for an extended period.[34]

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[32] See, "Excess Reserves: Oceans of Cash",
https://www.clevelandfed.org/newsroom-and-events/publications/economic-commentary/2015-economic-commentaries/ec-201502-excess-reserves-oceans-of-cash.aspx. With August 2014, the R_E = \$2.7 trillion. https://fred.stlouisfed.org/series/EXCSRESNS
[33] Central banks communicate regularly and frequently with the public about the state of the economy, the economic outlook, and the likely future course of monetary policy. Communication about the likely future course of monetary policy is known as "forward guidance". See, https://www.federalreserve.gov/faqs/what-is-forward-guidance-how-is-it-used-in-the-federal-reserve-monetary-policy.htm
[34] See, Fawley and Neely [12]. The 3-month T-Bill rate (i_{RF}) became zero in 2011:11, 2011:12, and 2014:09.

Although the Fed has a target range for federal funds, the actual policy rate set by the Fed is the interest rate on reserves (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
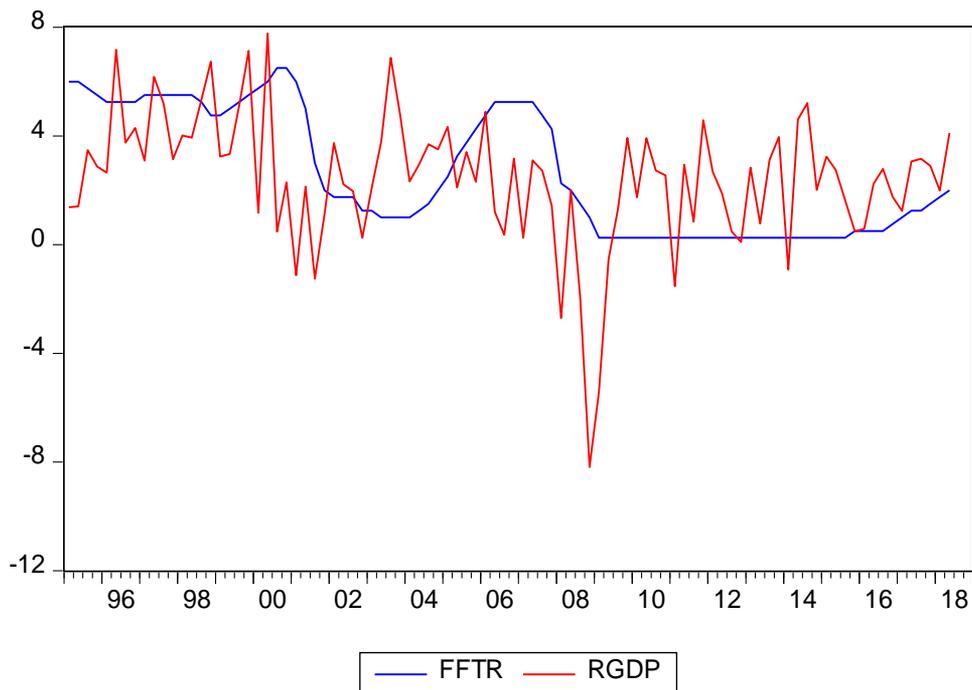
Figure 4b: The Real GDP and the Federal Funds Target Rate

Note: FFTR = U.S. Federal Funds Target Rate and RGDP = Real GDP. $\rho_{\bar{i}_{FF}, g_{RGDP}} = +0.255$.

Source: *Economagic.com* and
http://www.fedprimerate.com/fedfundsrate/federal_funds_rate_history.htm

seven years.[35] 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 (Figure 2 and Table 1). Initially, the Fed supplied about $600 billion in reserves mainly by making loans of 180 days or less (Graph 6). 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 has shown an aversion to reversing interest rate movements within a short time span.

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[35] See, Gagnon and Sack [14].

Unfortunately, the rescue (bailout) of financial institutions[36] was funded by the U.S.
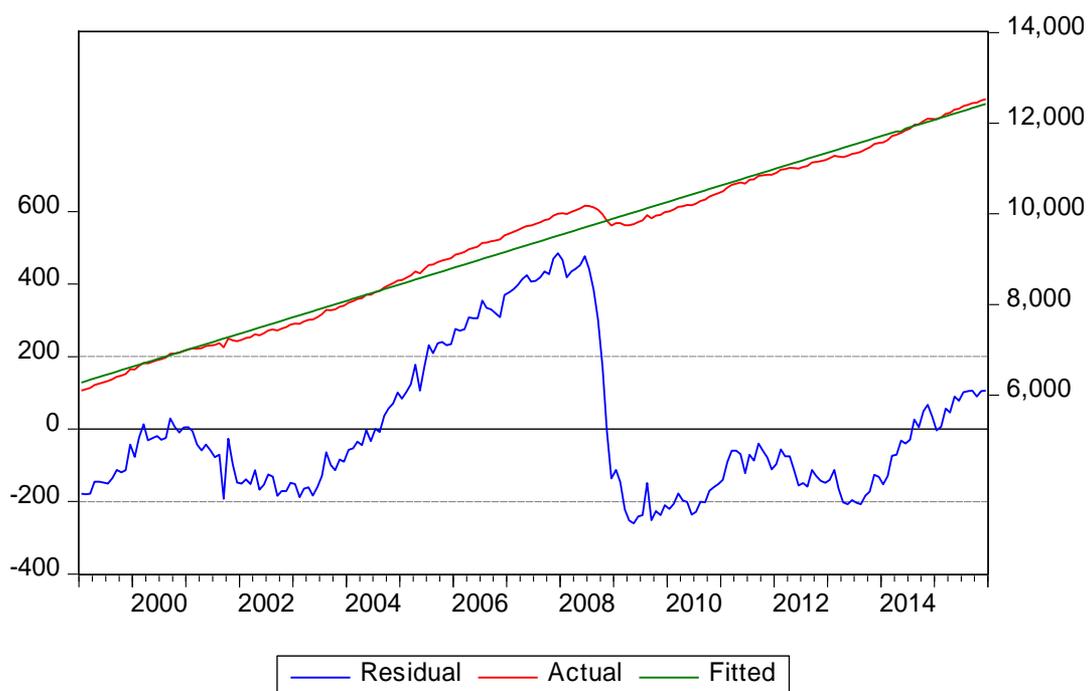
Figure 5: The Personal Consumption Expenditures and the Time Trend

Note: Actual = USPCE and Fitted = the L-T time trend
Source: *Economagic.com*

Treasury (the taxpayers) with the Emergency Economic Stabilization Act of 2008[37] and with Fed loans and asset purchases with terms to maturity of 6 months or less. 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

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[36] The problem of the banks was the low capital requirements. See, D'Erasmo [11]. This problem caused the Euro-zone debt crisis because governments (tax payers) were borrowing to recapitalize the corrupted foreign banks. See, Kallianiotis [24].

[37] The *Emergency Economic Stabilization Act of 2008* (Division A of <u>Pub.L. 110–343</u>, 122 <u>Stat. 3765</u>, 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. The Act was proposed by Treasury Secretary Henry Paulson (an ex-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.

interest rates. But, this too easy money kept the interest rate on deposits at zero [$i_D = 0.05\%$, with an average official inflation ($\bar{\pi} = 1.552\%$) it was making the $r_D = -1.502\%$ [38] and today, 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 ($g_{DJIA} = 9.598\%$ p.a.), but their risk was also immense ($\sigma_{DJIA} = \pm 55.455\%$),[39] as Table 1 shows. Thus, this extreme monetary policy created a new bigger bubble the last years (DJIA reached 26,616.71 on January 26, 2018).

Later, the average maturity of assets on the Fed's balance sheet (Graph 5)[40] 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 it was the goal of policy suggested in FOMC post-meeting statements, policymaker speeches, and Congressional testimony.[41] 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

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[38] 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).

[39] These markets have become riskier than casinos because the risk in casino falls on the person that made the mistake to bid his money there; but simple investors that believe to a decent return from this "efficient" 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.

[40] See, *All Federal Reserve Banks: Total Assets:*
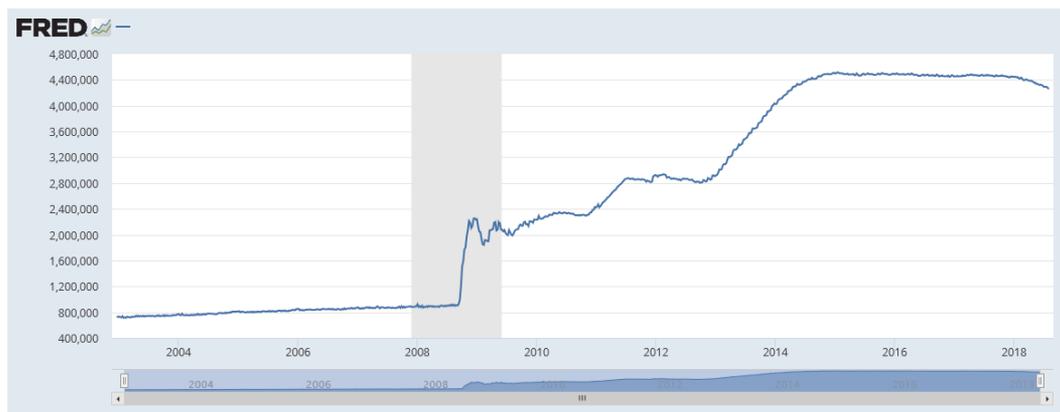
Graph 5: Total Assets of All Federal Reserve Banks

The Fed's balance sheet has gotten huge. Quantitative easing (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. Currently (8/2/2018), it holds $4.256 trillion. See, https://fred.stlouisfed.org/series/WALCL

[41] See, Potter (2017).

range and remained about 20 basis points above the discount rate on 3-month Treasury bills ($i_{IOR} = i_{RF} + 0.20\%$).[42] This was a factor that increased banks' willingness to hold a large stock of excess reserves.[43] 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.[44]

There is also an old and good example of a Zero Interest Rate Policy in use in Japan since 1995.[45] An important feature of the ZIRP regime, which began with a big two-quarter decline in Consumption (Figure 5), is the failure of the economy to return to the trend in potential GDP (Figures 4a and 4b) 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.[46] The end of the ZIRP regime is assumed to have occurred when the FOMC voted to raise the federal funds rate target range by 0.25% on December 16, 2015 and reached 0.50%.[47]

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[42] On the average this i_{IOR} was: $\bar{i}_{IOR} = \bar{i}_{RF} + 0.20\% = 0.080\% + 0.20\% = 0.280\%$. 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).

[43] Banks' Excess Reserves:
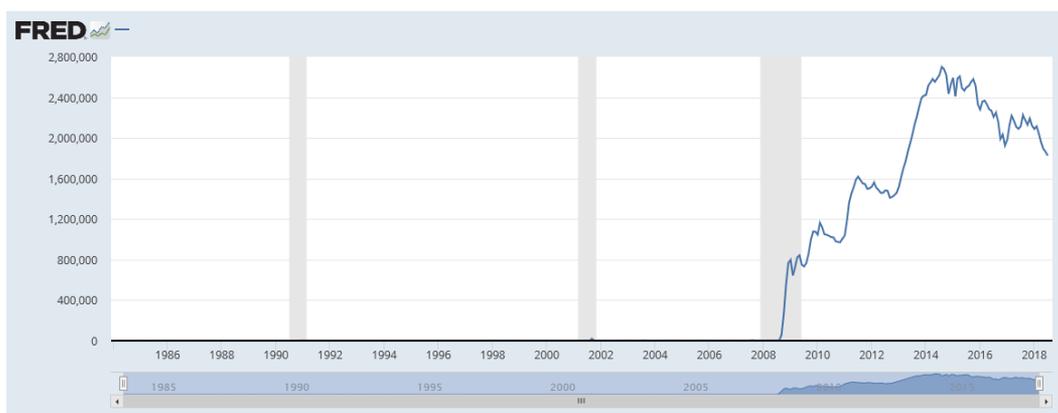
Graph 6: Excess Reserves of Depository Institutions

Note: With August 2014, the R_E = $2.7 trillion.
Source: https://fred.stlouisfed.org/series/EXCSRESNS

[44] See, Bindseil [3].
[45] See, Cooke and Gavin [9].
[46] Fed's Balance Sheet was $4.513 trillion on January 21, 2015. See, https://fred.stlouisfed.org/series/WALCL
[47] See, http://www.fedprimerate.com/fedfundsrate/federal_funds_rate_history.htm

Further, to test the effectiveness of the monetary policy during these two regimes, a VAR model, eqs. (5), and five OLS equations [eqs. (6), (7), (8), (9), and (10)] 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) as endogenous variables by making them a function of the lagged values of all these endogenous variables in the system and the policy instruments ($i_{FF_t}^{eff}$, mb_t, and m_t) as exogenous variables. The mathematical representation is as follows:

$$djia_t = \alpha_{11}djia_{t-j} + \beta_{11}rgdp_{t-j} + \gamma_{11}i_{10YTB_{t-j}} + \delta_{11}p_{t-j} + \zeta_{11}u_{t-j} + c_o + \theta_{11}i_{FF_t}^{eff} + \kappa_{12}mb_t$$
$$+ \lambda_{13}m_t + \varepsilon_{1t}$$

$$rgdp_t = \alpha_{21}djia_{t-j} + \beta_{21}rgdp_{t-j} + \gamma_{21}i_{10YTB_{t-j}} + \delta_{21}p_{t-j} + \zeta_{21}u_{t-j} + c_o + \theta_{21}i_{FF_t}^{eff} + \kappa_{22}mb_t$$
$$+ \lambda_{23}m_t + \varepsilon_{2t}$$

$$i_{10YTB_t} = \alpha_{31}djia_{t-j} + \beta_{31}rgdp_{t-j} + \gamma_{31}i_{10YTB_{t-j}} + \delta_{31}p_{t-j} + \zeta_{31}u_{t-j} + c_o + \theta_{31}i_{FF_t}^{eff} + \kappa_{32}mb_t$$
$$+ \lambda_{33}m_t + \varepsilon_{3t} \qquad (5)$$

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

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

Then, we use OLS equations to test the effectiveness of the instruments of monetary policy on the goal variables by taking them one by one as dependent variables.

$$djia_t = \alpha_0 + \alpha_1 djia_{t-1} + \alpha_2 rgdp_{t-1} + \alpha_3 i_{10YTB_{t-1}} + \alpha_4 p_{t-1} + \alpha_5 u_{t-1} + \alpha_6 i_{FF_t}^{eff} + \alpha_7 mb_t$$
$$+ \alpha_8 m_t + \varepsilon_t \qquad (6)$$

$$rgdp_t = \beta_0 + \beta_1 djia_{t-1} + \beta_2 rgdp_{t-1} + \beta_3 i_{10YTB_{t-1}} + \beta_4 p_{t-1} + \beta_5 u_{t-1} + \beta_6 i_{FF_t}^{eff} + \beta_7 mb_t$$
$$+ \beta_8 m_t + \varepsilon_t \qquad (7)$$

$$i_{10YTB_t} = \gamma_0 + \gamma_1 djia_{t-1} + \gamma_2 rgdp_{t-1} + \gamma_3 i_{10YTB_{t-1}} + \gamma_4 p_{t-1} + \gamma_5 u_{t-1} + \gamma_6 i_{FF_t}^{eff} + \gamma_7 mb_t$$
$$+ \gamma_8 m_t + \varepsilon_t \qquad (8)$$

$$p_t = \delta_0 + \delta_1 djia_{t-1} + \delta_2 rgdp_{t-1} + \delta_3 i_{10YTB_{t-1}} + \delta_4 p_{t-1} + \delta_5 u_{t-1} + \delta_6 i_{FF_t}^{eff} + \delta_7 mb_t$$
$$+ \delta_8 m_t + \varepsilon_t \qquad (9)$$

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

where, $djia_t$ = USDJIA = ln of U.S. Dow Jones Industrial Average Index, $rgdp_t$ = USRGDP2009 = ln of 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, and m_t = LUSM2 = ln of U.S. money supply (M2).

4 The Data and Empirical Work

The study uses five monthly economic indicators over the period January 1995–December 2015. They include the effective federal funds rate (i_{FF}^{eff}), the yield on 10-year Treasury (government) bonds (i_{10YTB}), the inflation rate (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, hence the inclusion of *CPI* and GDP. The 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 Treasury 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 ($i_{3MTB} \equiv i_{RF}$), the spread between the effective federal funds rate and the yield on the 10-year Treasury 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 [$GAP (= r_{FF}^{eff} - g_{RPCE})$], the U.S. Dow Jones Industrial Average Index (*DJIA*), the unemployment rate (*u*), and the real risk-free rate of interest (r_{RF}^*). The nominal (*i*) and the real (*r*) interest rates; the natural logarithms of variable X (ln *X*), the rate of growth (g_X) of the variables, their mean values, standard deviations, correlation coefficients, and causality are also measured and tested.

The Moderation Era and then, the ZIRE show that the slope of the federal funds tread was negative (Figure 6). 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 some people ("experts") because of the low volatility in both output and inflation.[48] The average values ($\bar{R}$) and the standard deviations (σ_R) of all our variables for the two eras are given in Table 1. Policymakers place a large value on models that "fit the data."[49]

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[48] See, Stock and Watson [35], Bernanke [2], and Cochrane [7].
[49] See, Gavin and Kydland [19] and [18].

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 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
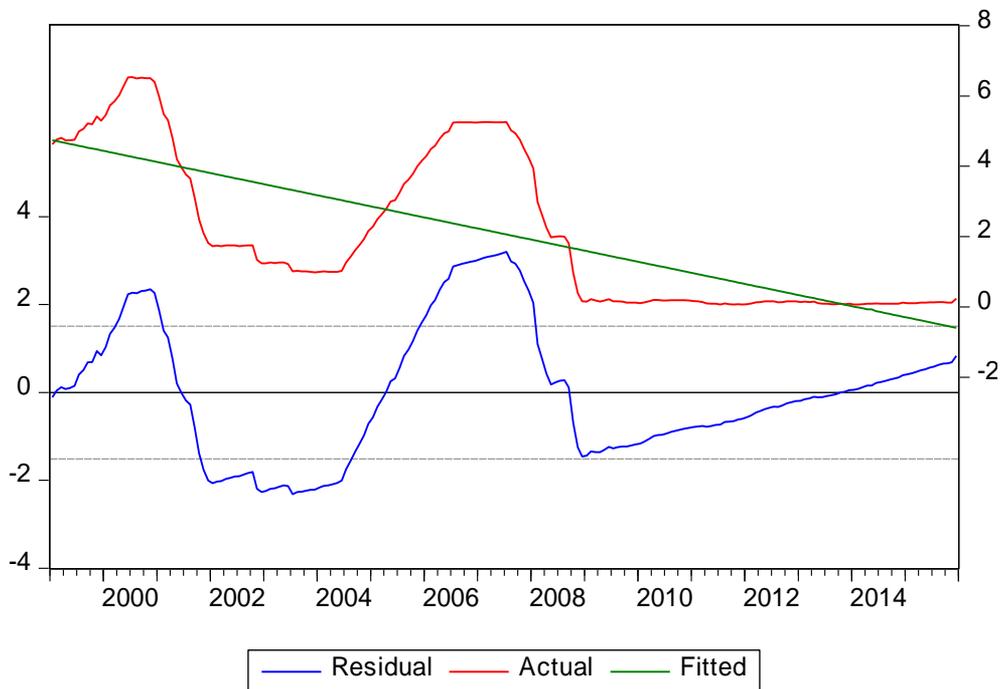
Figure 6: The Federal Funds Rate and the Time Trend

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

Table 1: Average Values and Standard Deviations

	Inflation Stabilization (Moderation) Era		Zero Interest Rate Era	
	$\bar{R}$	σ_R	$\bar{R}$	σ_R
USFFR	4.045%	1.806%	0.130%	0.041%
USRFFR	1.502%	4.216%	-1.422%	3.564%
USMB	670.628	160.790	2877.898	835.440
LUSMB	6.480	0.237	7.922	0.299
GUSMB	8.712%	32.123%	13.549%	37.932%
M2	5437.578	1311.626	10015.12	1318.604
LUSM2	8.571	0.246	9.203	0.132
GUSM2	5.856%	7.030%	6.155%	6.357%
USCPI	179.865	18.929	227.491	8.493
LUSCPI	5.187	0.104	5.426	0.038
USINF	2.543%	4.003%	1.552%	3.563%
US10YTB	5.131%	0.978%	2.582%	0.625%
USR10YTB	2.588%	4.061%	1.030%	3.483%
SPREAD1	-1.086%	1.265%	-2.452%	0.619%
STT3M	3.781%	1.718%	0.080%	0.060%
RRFRI	1.238%	4.220%	-1.472%	3.556%
USPCE	7361.775	1620.933	11047.62	828.479
LUSPCE	8.880	0.223	9.307	0.075
GUSPCE	5.059%	5.531%	3.403%	3.884%
GUSRPCE	2.516%	5.826%	1.851%	3.775%
GAP1	-1.014%	5.590%	-3.273%	3.890%
USDJIA	9474.928	2320.785	13408.81	3117.535
LUSDJIA	9.120	0.286	9.475	0.248
GUSDJIA	5.993%	53.809%	9.598%	55.455%
USRDJIA	5215.049	981.975	5853.096	1171.078
LUSRDJIA	8.538	0.215	8.653	0.212
GUSRDJIA	3.482%	54.213%	8.046%	55.412%
USRGDP2009	12782.88	1524.858	15380.85	665.787
LUSRGDP2009	9.449	0.122	9.640	0.043
GUSRGDP2009	2.670%	5.918%	1.711%	4.848%
USU	5.850%	0.649%	7.805%	4.566%

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, 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, GAP1 = the gap between the real effective federal funds rate and the growth of the real PCE, 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, USRGDP2009 = U.S. real GDP (2009 base year), LUSRGDP2009 = ln of the U.S. real GDP (2009 base year), GUSRGDP2009 = growth of the U.S. real GDP (2009 base year), USU = U.S. unemployment rate, $\bar{R}$ = the average value of the variable, and σ_R = the standard deviation of the variable.

Source: *Economagic.com* and *Yahoo.Finance*

(unemployment). Here, we show the correlation coefficients between our variables (Tables 2a and 2b in the Appendix)[50] during the two regimes (1995:01-2008:11 and 2008:12-2015:12). Also, Tables 3a and 3b (in the Appendix) reveal the causality tests for the two eras.[51] 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 (easy money policy) increased these variables. 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 $FFR \Rightarrow GUSRGDP2009$, and $FFR \Rightarrow USU$. The monetary base (MB) and the money supply (M2) have positive effect on PCE, DJIA, LUSRGDP2009, and negative effect on USU. Furthermore, $MB \Rightarrow PCE$, $MB \Rightarrow DJIA$, $MB \Rightarrow LUSRGDP2009$, and $MB \Rightarrow USU$; $M2 \Rightarrow DJIA$, $M2 \Rightarrow LUSRGDP2009$, $M2 \Rightarrow USU$. In addition, FFR is positively correlated with GAP1 and negatively with SPREAD1; $FFR \Rightarrow GAP1$ and $FFR \Rightarrow SPREAD1$.

The VAR results for the period 1995:01 to 2008:11 appeared in Table 4 and for the period from 2008:12 to 2015:12 are shown in Table 5 below. During the period of Inflation Stabilization, the Fed monetary policy had some significant effects on RGDP, on CPI, and unemployment (u). For the ZIR Era, the Fed had an effect only on official unemployment (u). The impulse responses for the two eras are shown on Figures 7 and 8, which give the response of our endogenous variables (LUSDJIA, LUSRGDP2009, US10YTB, LUSCPI, and USU) to Cholesky.

The OLS estimations are given in Tables 6 and 7. For the Inflation Stabilization Era, the Fed policy has affected RGDP ($rgdp$), L-T interest rate (i_{10YTB}), prices (p), and unemployment (u). For the ZIR Era, the monetary policy has affected the financial markets (DJIA), [the bubble was increasing (Figures 9 and 10)], also the RGDP, the 10YTB rate, the CPI, and the unemployment (u).

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[50] These Tables 2a and 2b and the entire Appendix are omitted from the paper, due to space limitations, but are available from the author upon request.

[51] The same with Tables 3a and 3b; they are omitted.

Table 4: Vector Autoregression Estimates (1995:01-2008:11)

Variables	$djia_t$	$rgdp_t$	i_{10YTB_t}	p_t	u_t
$djia_{t-1}$	0.810***	0.013	1.005***	-9.007	-0.012
	(0.087)	(0.009)	(0.419)	(0.005)	(0.263)
$djia_{t-2}$	0.020	-0.005	-0.683*	0.006	-0.232
	(0.083)	(0.009)	(0.401)	(0.005)	(0.251)
$rgdp_{t-1}$	0.293	0.642***	3.905	-0.041	-4.488**
	(0.733)	(0.080)	(3.533)	(0.044)	(2.212)
$rgdp_{t-2}$	0.383	0.331***	-6.706*	0.064	-2.546
	(0.818)	(0.089)	(3.944)	(0.049)	(2.469)
$i_{10YTB_{t-1}}$	-0.011	-0.001	1.074***	0.003***	-0.001
	(0.016)	(0.002)	(0.078)	(0.001)	(0.049)
$i_{10YTB_{t-2}}$	-0.001	-0.001	-0.224***	-0.003***	0.034
	(0.016)	(0.002)	(0.078)	(0.001)	(0.049)
p_{t-1}	-0.849	0.004	12.447***	1.293***	1.948
	(1.207)	(0.132)	(5.819)	(0.073)	(3.643)
p_{t-2}	0.477	-0.104	-13.198***	-0.370***	1.000
	(1.214)	(0.133)	(5.853)	(0.073)	(3.664)
u_{t-1}	-0.029	0.001	-0.006	0.001	0.425***
	(0.027)	(0.003)	(0.129)	(0.002)	(0.081)
u_{t-2}	0.001	0.001	0.038	0.001	0.169***
	(0.024)	(0.003)	(0.115)	(0.001)	(0.072)
c_0	-2.172	0.273	19.066	-0.082	36.278***
	(0.007)	(0.282)	(12.434)	(0.156)	(7.784)
$i_{FF_t}^{eff}$	-0.001	0.001*	0.046	0.001	-0.103***
	(0.007)	(0.001)	(0.033)	(0.001)	(0.020)
mb_t	-0.156*	-0.017*	0.637	-0.035***	0.546**
	(0.093)	(0.010)	(0.451)	(0.006)	(0.282)
m_t	0.058	0.061**	0.535	0.057***	1.850**
	(0.287)	(0.031)	(1.382)	(0.017)	(0.865)
R^2	0.980	0.999	0.960	0.999	0.964
SEE	0.042	0.005	0.203	0.003	0.127
F	576.468	8924.719	283.461	21327.73	319.582
N	167	167	167	167	167

Note: $djia_t$ =USDJIA= ln of U.S. Dow Jones Industrial Average Index, $rgdp_t$ = USRGDP2009= ln of 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.

We also test the Phillips curve for the two Eras. Low inflation ($\bar{\pi} = 1.552\%$) together with high unemployment ($\bar{u} = 7.805\%$) supported the conventional wisdom that there is a Phillips curve, here (about point C in Graph 2); but, the data discredited the Phillips curve as a policy framework.

Table 5: Vector Autoregression Estimates (2008:12-2015:12)

Variables	$djia_t$	$rgdp_t$	i_{10YTB_t}	p_t	u_t
$djia_{t-1}$	0.680***	-0.002	0.818	0.016**	0.353
	(0.119)	(0.011)	(0.550)	(0.008)	(0.354)
$djia_{t-2}$	-0.206*	0.001	-0.642	0.001	-0.720**
	(0.116)	(0.011)	(0.539)	(0.007)	(0.347)
$rgdp_{t-1}$	0.617	0.664***	-5.833	-0.034	-3.776
	(1.295)	(0.118)	(5.997)	(0.083)	(3.866)
$rgdp_{t-2}$	1.515	0.124	10.987*	-0.038	-6.906*
	(1.354)	(0.124)	(6.273)	(0.086)	(4.044)
$i_{10YTB_{t-1}}$	0.020	0.002	0.990***	-0.001	-0.234***
	(0.024)	(0.002)	(0.109)	(0.002)	(0.070)
$i_{10YTB_{t-2}}$	-0.005	-0.002	-0.210*	-0.001	0.176**
	(0.026)	(0.002)	(0.118)	(0.002)	(0.076)
p_{t-1}	-1.406	0.091	0.945	1.074***	8.632*
	(1.715)	(0.157)	(7.945)	(0.109)	(5.122)
p_{t-2}	1.609	-0.025	-17.857***	-0.307***	-5.952
	(1.568)	(0.143)	(7.264)	(0.100)	(4.683)
u_{t-1}	0.025	0.001	0.381***	0.001	0.660***
	(0.035)	(0.003)	(0.162)	(0.002)	(0.105)
u_{t-2}	0.017	0.001	-0.260*	-0.001	0.116
	(0.031)	(0.003)	(0.145)	(0.002)	(0.093)
c_0	-21.665**	1.302	16.007	1.502**	100.384***
	(9.800)	(0.896)	(45398)	(0.625)	(29.268)
$i_{FF_t}^{eff}$	-0.124	0.027	-0.902	-0.007	1.868***
	(0.241)	(0.022)	(1.115)	(0.015)	(0.719)
mb_t	0.098	0.019	0.659	0.012	0.932*
	(0.176)	(0.016)	(0.814)	(0.011)	(0.525)
m_t	0.423	0.026	2.053	0.021	-1.548
	(0.417)	(0.038)	(1.930)	(0.027)	(1.244)

R^2	0.976	0.994	0.920	0.996	0.995
SEE	0.041	0.003	0.192	0.003	0.124
F	225.363	836.744	63.094	1305.199	1028.195
N	85	85	85	85	85

Note: See, Table 4.
Source: See, Table 1.
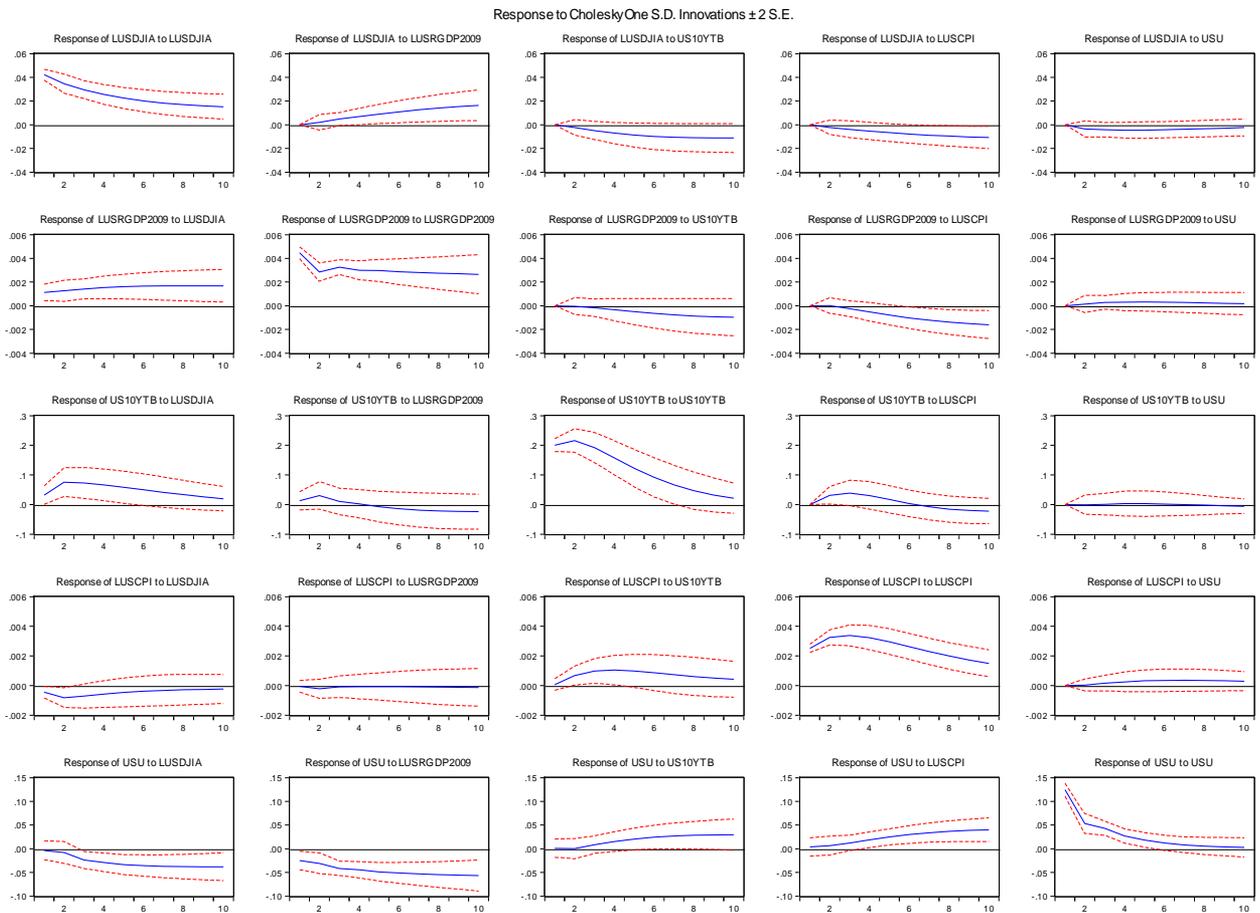
Figure 7: Impulse Responses (1995:01-2008:11)

Note: See, Table 4.
Source: *Economagic.com* and *Yahoo.Finance*.

By testing the Phillips curve equation, eq. (4), we found as results:

(1) 1995:01-2015:12 (the last two regimes)

$$\pi_t = 1.002^{***} \pi_t^e - 0.058(u_{t-1} - u_t^N)$$
$$\quad\;\;(0.091)\qquad\;\;(0.101)$$
$$R^2 = 0.221, \, SER = 3.433, \, D-W = 2.027, \; N = 252$$
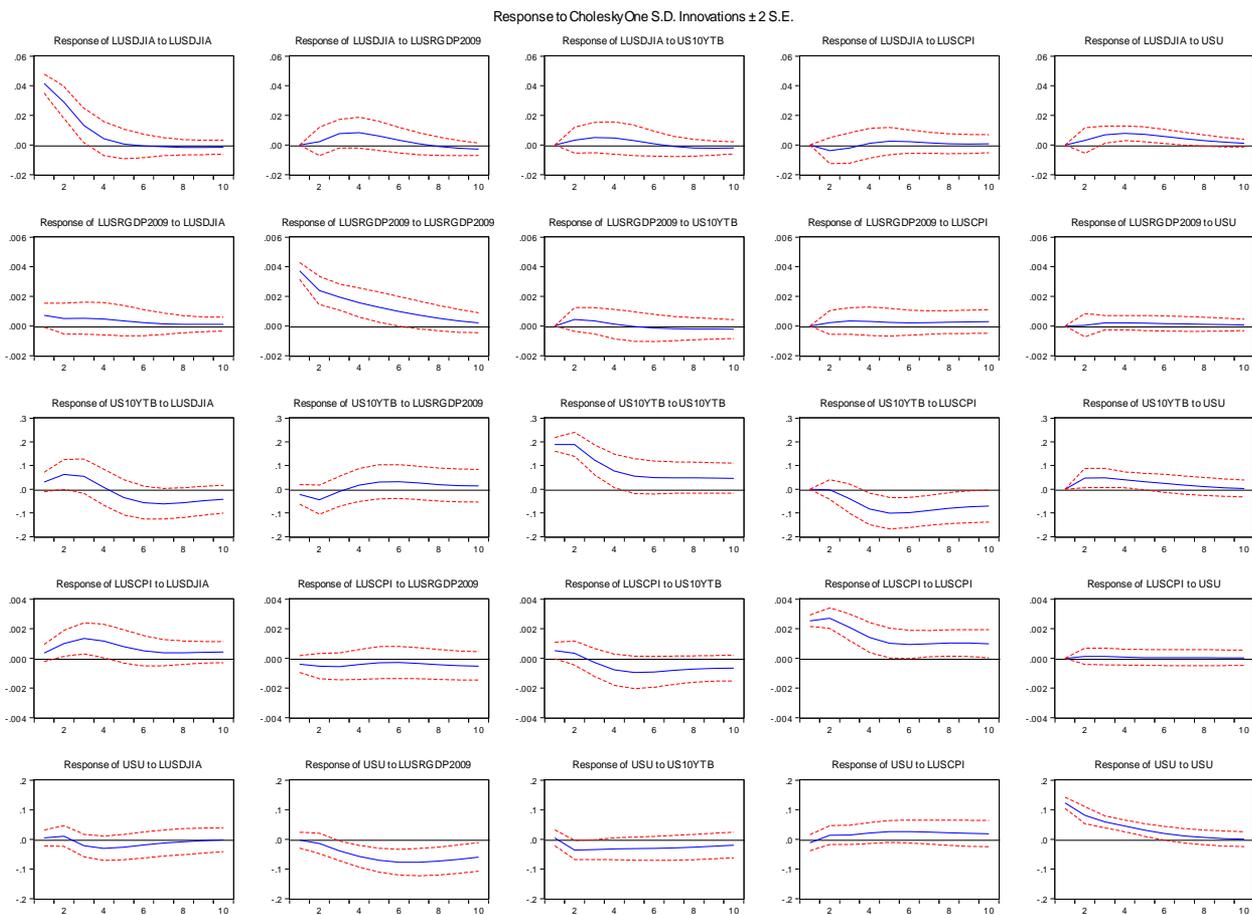
Figure 8: Impulse Responses (2008:12-2015:12)

Note: See, Table 5.
Source: *Economagic.com* and *Yahoo.Finance*.

Table 6: OLS Estimations of the Objective Variables (1995:01-2008:11)

Variables	$djia_t$	$rgdp_t$	i_{10YTB_t}	p_t	u_t
c_0	-2.203*	0.245	5.034***	0.033	27.614***
	(1.212)	(0.157)	(1.514)	(0.027)	(6.689)
$djia_{t-1}$	0.832***	-	-	-	-0.346**
	(0.036)				(0.133)
$djia_{t-2}$	-	-	-	-	-
$rgdp_{t-1}$	0.680***	0.722***	-	-	-5.281***
	(0.233)	(0.075)			(1.197)
$rgdp_{t-2}$	-	0.263***	-	-	-
		(0.079)			
$i_{10YTB_{t-1}}$	-0.013*	-	1.124***	0.001*	-
	(0.007)		(0.076)	(0.001)	
$i_{10YTB_{t-2}}$	-	-	-0.277***	-	-
			(0.075)		
p_{t-1}	-0.333*	-0.094***	-0.846***	1.314***	2.915***
	(0.179)	(0.033)	(0.267)	(0.072)	(0.944)
p_{t-2}	-	-	-	-0.390***	-
				(0.072)	
u_{t-1}	-0.026***	-	-	-	0.613***
	(0.010)				(0.053)
u_{t-2}	-	-	-	-	-
$i_{FF_t}^{eff}$	-	0.001	0.032**	0.001	-0.099***
		(0.001)	(0.014)	(0.001)	(0.018)
mb_t	-0.117	-	-	-0.031***	-
	(0.076)			(0.005)	
m_t	-	0.044*	-	0.064***	1.479*
		(0.025)		(0.009)	(0.786)
R^2	0.980	0.999	0.957	0.999	0.962
SER	0.04	0.005	0.206	0.003	0.130
F	1300.642	22951.14	895.739	45387.25	666.653
$D-W$	2.026	2.221	1,955	1.743	2.291
N	167	167	167	167	167

Note: See, Table 4. SER = S.E. regression, $D-W$ = Durbin-Watson statistic.
Source: See, Table 1.

Table 7: OLS Estimations of the Objective Variables (2008:12-2015:12)

Variables	$djia_t$	$rgdp_t$	i_{10YTB_t}	p_t	u_t
c_0	-16.805[**]	1.554[***]	59.420[***]	0.929[***]	99.802[***]
	(6.689)	(0.449)	(17.758)	(0.236)	(21.083)
$djia_{t-1}$	0.636[***]	-	-	0.013[**]	-
	(0.082)			(0.005)	
$djia_{t-2}$	-	-	-	-	-
$rgdp_{t-1}$	1.694[*]	0.752[***]	-	-	-8.913[***]
	(0.887)	(0.056)			(2.539)
$rgdp_{t-2}$	-	-		-	-
$i_{10YTB_{t-1}}$	-	-	1.070[***]	-0.002[***]	-0.102[**]
			(0.100)	(0.001)	(0.040)
$i_{10YTB_{t-2}}$	-	-	-0.319[***]	-	-
			(0.113)		
p_{t-1}	-	0.117[**]	-17.174[***]	1.182[***]	-
		(0.051)	(4.141	(0.085)	
p_{t-2}	-	-		-0.392[***]	-
				(0.085)	
u_{t-1}	0.033[***]	-	0.114[**]	-	0.801[***]
	(0.008)		(0.044)		(0.024)
u_{t-2}	-	-	-	-	-
$i^{eff}_{FF_t}$	-0.228[*]	0.042[**]	-	-	1.571[**]
	(0.132)	(0.017)			(0.710)
mb_t	-	0.025[***]	1.252[**]	0.012[**]	1.110[**]
		(0.009)	(0.551)	(0.006)	(0.458)
m_t	0.402[*]	-	2.562[*]	-	-2.291[**]
	(0.235)		(1.503)		(1.084)
R^2	0.974	0.993	0.908	0.996	0.994
SER	0.041	0.003	0.200	0.003	0.130
F	585.987	2911.116	124.029	3529.995	2017.772
$D-W$	1.839	2,240	1.864	2.138	2.246
N	85	85	85	85	85

Note: See, Tables 4 and 6.
Source: See, Table 1.

(2) 1995:01-2008:11 (Inflation Stabilization regime)

$$\pi_t = 1.243^{***} \pi_t^e - 0.477 \, (u_{t-1} - u_t^N)$$
$$\quad (0.121) \qquad (0.291)$$
$$R^2 = 0.273, \, SER = 3.424, \, D-W = 1.883, \, N = 167$$
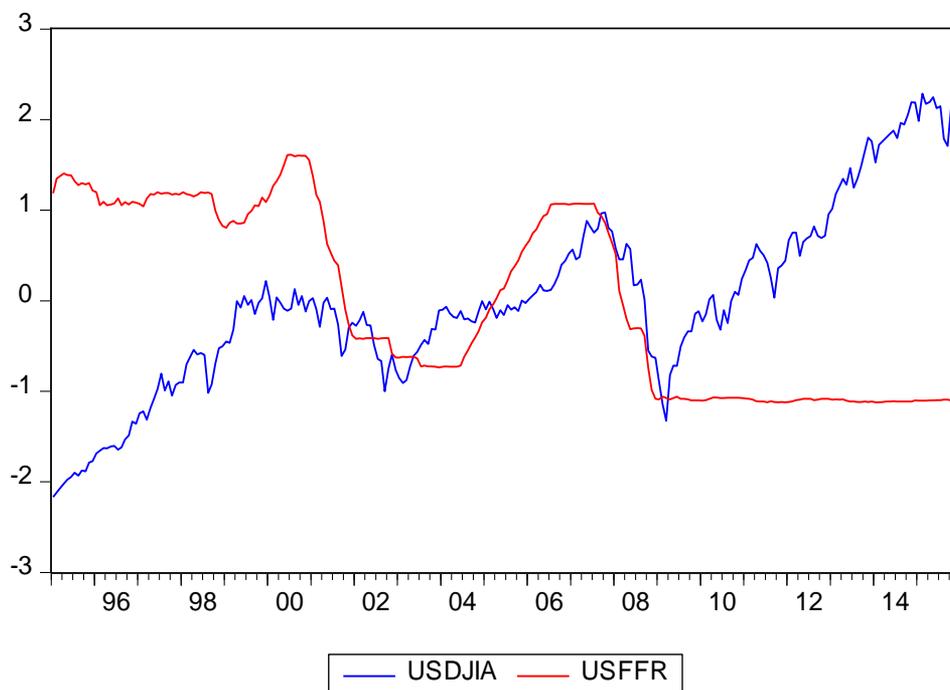
Figure 9: The U.S. Federal Funds Rate and the Financial Market (DJIA)

Note: USFFR = i_{FF}^{eff} = U.S. federal funds rate and USDJIA = the U.S. DJIA Index. IS: $\rho_{FF, \, DJIA} = -0.202$; ZIRP: $\rho_{FF, \, DJIA} = -0.505$.
Source: *Economagic.com*

(3) 2008:12-2015:12 (ZIRP regime)

$$\pi_t = 0.579^{***} \pi_t^e + 0.154 \, (u_{t-1} - u_t^N)$$
$$\quad (0.175) \qquad (0.117)$$
$$R^2 = 0.154, \, SER = 3.297, \, D-W = 2.141, \, N = 85$$

The coefficients of unemployment ($\psi < 0$) for the sample periods (1995:01-2015:12) and (1995:01-2008:11) are correct (negative) but insignificant; for the period (2008:12-2015:12) the sign of the unemployment coefficient became

positive and insignificant. Thus, these results show that the Phillips curve does not hold any more.[52]

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, eq. (1), can also be modified by using unemployment instead of GDP, as follows:
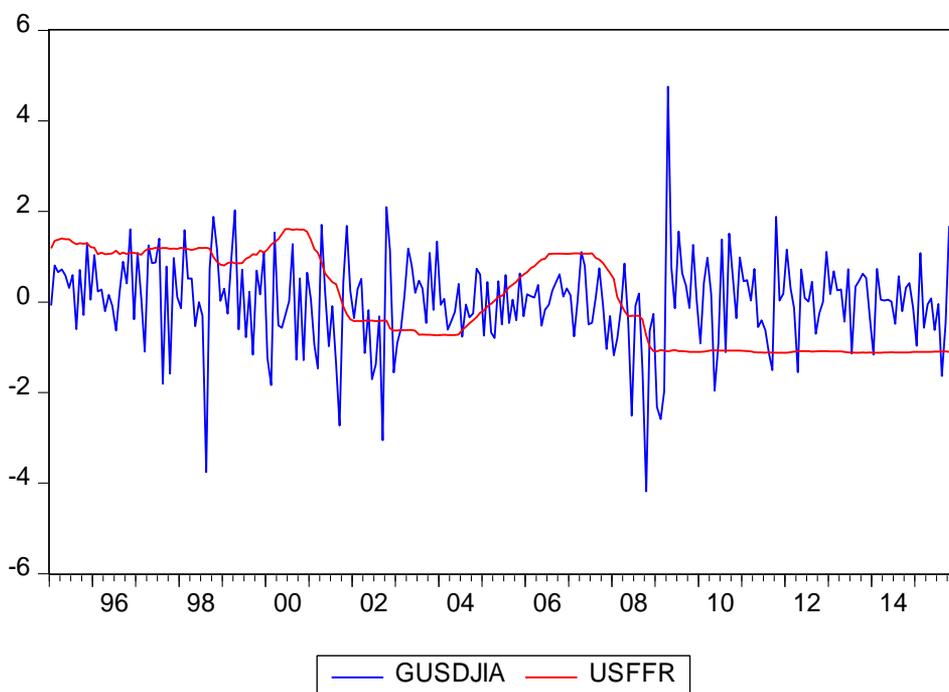
Figure 10: The U.S. Federal Funds Target Rate and the Growth of the DJIA

Note: USFFR = i_{FF}^{eff} = U.S. federal funds rate and GUSDJIA = the growth of the U.S. DJIA Index.
IS: $\rho_{FF, g_{DJIA}} = +0.163$, $USFFR \Rightarrow GUSDJIA$;   ZIRP: $\rho_{FF, g_{DJIA}} = -0.074$,
$GUSDJIA \Rightarrow USFFR$.
Source: *Economagic.com*

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

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

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[52] See also, Williamson [42] and Summers [36].

federal funds rate was between (6%-1%) for the period 1995:01 to 2008:11.[53] Thus, i_{FF} must have been:

$i_{FF} = 2.543\% + 1\% + 0.5(2.543\% - 2\%) - 0.5(5.850\% - 4\%) = 2.8895\%$; but, it was between 6% and 1% (average $\bar{i}_{FF}^{eff} = 4.045\%$), which was a little high (1.4 x), according to the rule.

From 2008:12 to 2015:12 the i_{FF} must have been:

$i_{FF} = 1.552\% + 1\% + 0.5(1.552\% - 2\%) - 0.5(7.805\% - 4\%) = 0.4255\%$; but it was between 0% and 0.25% (average $\bar{i}_{FF}^{eff} = 0.130\%$), which was too low (3.273 x).

5 Policy Implications of the Latest Monetary Regimes

Two important issues arose during the ZIRP regime: (1) controversy surrounding the use of the Fisher equation to explain low inflation and (2) controversy over the cause of low real interest rates. The correlation between USINF and USU was $\rho_{\pi,u} = +0.193$, but there is no any causality between the two variables. The regression equation [eq. (4)] gives a coefficient $\psi = +0.154$ and it is insignificant. The low real interest rate is due to inflation ($\bar{\pi} = 1.552\%$), which gives a USR10YTB ($\bar{r}_{10YTB} = 1.030\%$) and a RRFRI negative ($\bar{r}_{RF}^* = -1.472\%$).[54] Of course, it is not reasonable for some researchers to think that monetary policy[55] itself is the cause of the low natural rate estimated by Federal Reserve economists.

The Fisher equation[56] is an equilibrium condition, which says that, no matter which policy regime is in effect, the market interest rate will be the sum of two

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[53] For federal funds target rate, see,
http://www.fedprimerate.com/fedfundsrate/federal_funds_rate_history.htm

[54] Historically, the average real risk-free rate of interest for the U.S. economy is positive ($\bar{r}^* = 0.5\%$). See, Ross, Westerfield, Jaffe, and Jordan [33, p.315]. 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 [21] and [20]. Bullard [5] uses Gomme, Ravikumar, and Rupert [21] and [20] data when explaining that it is the real interest rate on safe assets, not real returns to capital, that are abnormally low.

[55] 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 [24]. Unfortunately, lately, globalists' and ecumenists' "religion" is the Ecology. The rests are all under their control before the French Revolution (1789). See, https://www.jacobinmag.com/2015/07/french-revolution-bastille-day-guide-jacobins-terror-bonaparte/

[56] Williamson [44] presents a macroeconomic model that captures many features of the post-crisis economy and emphasizes the role of the Fisher equation. See also, Williamson [43] for a less-formal treatment of the issue.

components, a real return (r) and a premium for 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.

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.[57] 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). 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 will allow it),[58] which will be politically, economically, and socially beneficial for both countries.[59] The outsourcing, the unfair 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 the

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[57] Many have argued that exogenous factors have kept the economy operating below trend, inflation low, and real interest rates low. See, Summers [37] and Williams [41].

[58] See, Kallianiotis [26].

[59] 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-helsinkis-hall-of-mirrors/

economic elites (the "dark powers") since the British Revolution (1640), as they assert.[60]

As shown in Table 1, ex post real interest rates were quite low during the Moderation Era, the USRFFR averaged 1.502%, while the USR10YTB averaged 2.588% and the RRFRI was 1.238%. 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 ($\bar{\pi} = 2.543\%$). Nevertheless, the GUSRPCE and the GUSRGDP2009 were relatively high, just slightly above 2 percent ($\bar{g}_{RPCE} = 2.516\%$ and $\bar{g}_{RGDP} = 2.670\%$). During the ZIRP regime, following the crisis, USRFFR fell to –1.422%, while the real return to holding a US10YTB fell to 1.030% and the RRFRI became negative ($\bar{r}_{RF}^{*} = -1.472\%$); the GUSRPCE fell to 1.851% and the GUSRGDP2009 dropped to 1.711%. These are indications that the monetary policy was not very effective even though that the real cost of capital had become negative. But, unemployment was very high ($\bar{u} = 7.80\%$),[61] which reveals low personal income, reduction in aggregate demand, and low production and growth.

What would the 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 (at the historic level $\bar{r}_{RF}^{*} = 0.5\%$)? They would be as follows: $i_{RF} = \bar{r}_{RF}^{*} + \pi^e = 0.5\% + 1.552\% = 2.052\%$. Thus, $\bar{i}_{FF} > 2.052\%$, because it is riskier (private banks) $\bar{i}_{FF} = i_{RF} + RP = 2.052\% + 0.25\% = 2.302\%$.

The $i_{10YTB} = i_{RF} + HMRP = 2.052\% + 2.6\% = 4.652\%$.[62] The $\bar{r}_{FF}$ and the $\bar{r}_{10YTB}$ would be their nominal rate of interest minus the average inflation ($\bar{\pi}$): $\bar{r}_{FF} = 0.75\%$ and $\bar{r}_{10YTB} = 3.1\%$. The Federal Reserve, as a private bank, uses its monopoly power on bank reserves to lower interest rates when it wants to lower the cost of capital and "improve" the financial markets. 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 will 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 enormous increase in monetary base and money supply have increase inflation expectations and made real interest rates negative ($\bar{i}_{FF} = 0 = r \downarrow + \pi^e \uparrow$).

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[60] See, Kallianiotis [26].

[61] The unemployment according to the SGS during the ZIR Era was between 13% and 23%. See, Graph 3.

[62] The historic (maturity) risk premium (HMRP) for L-T Treasury bonds is: $HRP_{LTGB} = \bar{i}_{10YTB} - \bar{i}_{RF} = 6.1\% - 3.5\% = 2.6\%$. See, Ross, Westerfield, Jaffe, and Jordan [33, p. 315].

As shown, here, the ZIRP regime is an extreme policy setting given the Fed's inflation moderation objective (its deflation unreasonable worry). 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 –1.014% during the Inflation Stabilization era and –3.273% during the ZIRP regime. Public policy must be a mixed policy, a combination of monetary and fiscal, otherwise cannot be very effective. Lately, liberalism (a cast and chaff of globalism) has become a serious social and political problem for the country, which affects negatively the administration, the public policy, the economy, and the wellbeing of the citizens.[63]

Figure 11 plots r_{FF}^{eff} and g_{RPCE} throughout the two regimes. During the inflation moderation, the average rates had a difference (GAP1) of -1.014%; the r_{FF}^{eff} was lower than g_{RPCE}. Then, during the ZIRP era the difference (GAP1) became -3.273%; the r_{FF}^{eff} was very low compared to the g_{RPCE}. The Fed tried to prevent deflation. (*Sic*). 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".[64] The U.S. economy grew at 1.99% rate in the First Quarter of 2018[65] and at 4.1% rate in Second Quarter of 2018.[66] China warns of protectionism at BRICS Summit in Johannesburg on July 26, 2018.[67] We need to

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[63] 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

[64] 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

[65] See, *Economagic.com*

[66] See, *The Wall Street Journal,* July 27, 2018. https://www.wsj.com/articles/u-s-economy-grew-at-4-1-rate-in-second-quarter-1532694956

[67] 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

change our philosophical thinking and to understand that the best public policy is a mixed policy (a combination of monetary and fiscal policy), which could become very effective with one only objective in the mind of policymakers, the wellbeing of the citizens of the country.
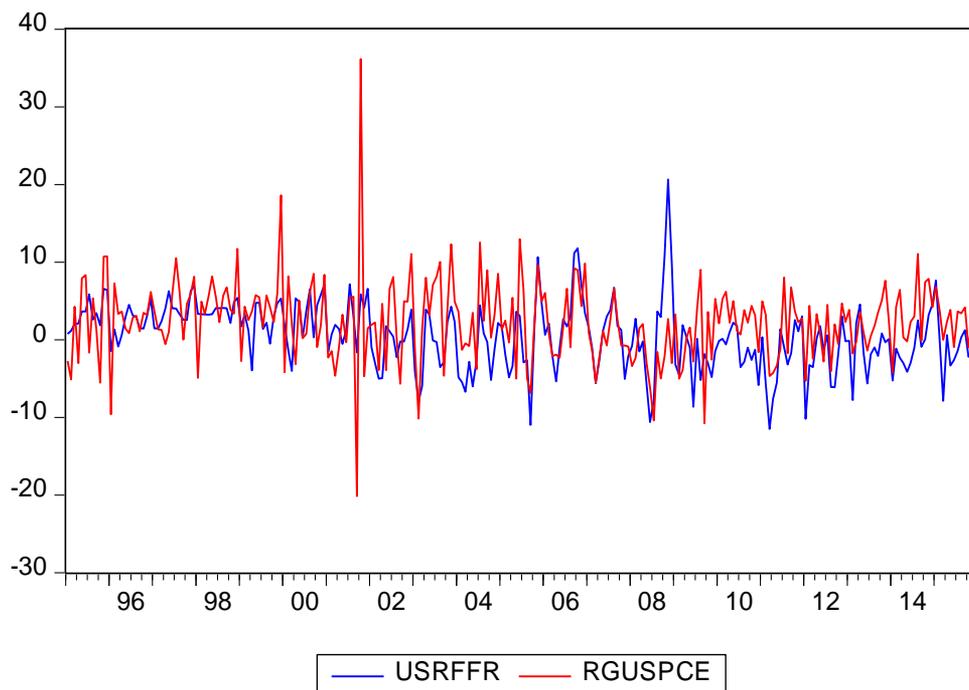
Figure 11: The Real Federal Funds Rate and the Growth of the Real Personal Consumption Expenditures

Note: USRFFR = r_{FF}^{eff} = U.S. real federal funds rate and RGUSPCE = g_{RPCE} = growth of the real U.S. personal consumption expenditures. IS: $\rho_{RFFR,\, g_{RPCE}} = +0.416$, $USRFFR \Rightarrow GUSRPCE$; ZIRP: $\rho_{RFFR,\, g_{RPCE}} = +0.439$, $USRFFR \Rightarrow GUSRPCE$.
Source: *Economagic.com*

6 Conclusion

This paper discusses the theory and empirical implications of the latest two alternative monetary policy regimes that have been in place since the 1983 [here, we take the Moderation Era (1995:01-2008:11) and the ZIRP Era (2008:12-2015:12)]. 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), growth of RGDP, financial markets (DJIA), unemployment rate (u), nominal and real interest rates (short term and long term), and risk (RP_{10YTB}). 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 (r_{10YTB}), real risk-free rate of interest (r_{RF}^*), and real deposit rates (r_D). During the Moderation Era, the results were, a very high real interest rate ($\bar{r}_{RF}^* = 1.238\%$) and below-trend growth in the economy for some period ($g_{RGDP} = 2.670\%$). During the seven years following the 2007-2008 financial crisis, the results of the ZIRP Era were, a very low real interest rate (negative, i.e., $\bar{r}_{RF}^* = -1.472\%$) and below-trend growth in the economy ($g_{RGDP} = 1.711\%$). The ZIRP regime caused the low real interest rate on safe assets ($\bar{r}_{10YTB} = 1.030\%$) and subpar real consumption ($\bar{g}_{RPCE} = 1.851\%$) and real GDP growth, and high unemployment ($\bar{u} = 7.805\%$). But, the bubble in the financial market was growing ($\bar{g}_{DJIA} = 9.598\%$ p.a. and $\sigma_{g_{DJIA}} = \pm55.455\%$) 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. Figure 12 reveals the bubble of the nominal DJIA compared to its real value (RDJIA).

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 that can be our future research. As it has begun to raise the federal funds rate target (from to 2% today), it is merely taking a rate that is well below normal to one that is closer to normal (still the real federal funds rate is negative). Incoming data show that the real economy has not been damaged by slightly higher interest rates. However, the economy still remains below the trend that was predicted for potential GDP in 2007 (Figure 4a).[68] The rate of return on safe assets must be above the expected inflation ($\pi = 2.9\%$, today) and the growth of the financial market (DJIA) must be above the prime rate ($i_P = 5\%$, today) to cover the risk, but not very high to generate new bubbles. Why the unofficial (true) inflation is so high? Perhaps, the federal funds rate is too low. Then, the federal funds rate must be further increased. There, are others that believe "the Fed does not have to be so

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[68] See, Summers [37].

aggressive", as Federal Reserve Bank of St. Louis President James Bullard had said.[69]

In theory, we expect the monetary policy regime to have important effects on inflation, interest rates, growth, unemployment, financial markets, and the current account. The growth of the RGDP must exceed the growth of the RPCE and the difference must be the growth of the personal savings ($g_{RGDP} = g_{RPCE} + g_{PS}$),
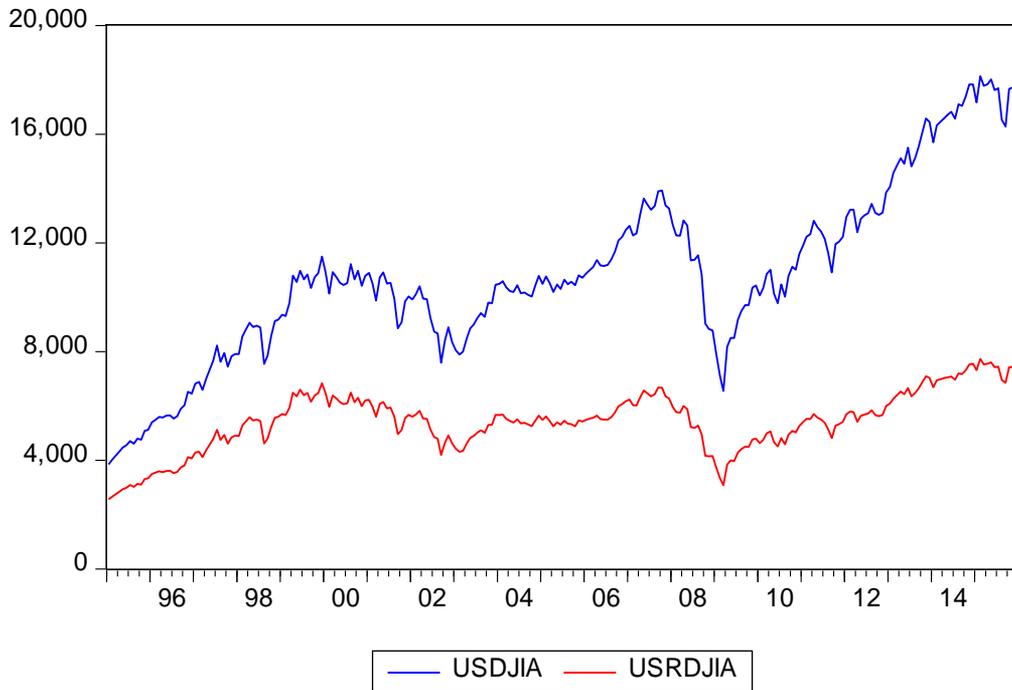
Figure 12: Nominal (Market) Value of DJIA and its Real Value RDJIA

Note: $USDJIA$ = U.S. Dow Jones Industrial Average and $USRDJIA = \dfrac{USDJIA}{P} = \dfrac{USDJIA}{CPI/100}$ the real DJIA.
Source: *Economagic.com* and *Yahoo.Finance*.

otherwise households' debt will go up, their interest cost will increase,[70] and their bankruptcies will follow up. During the inflation stabilization (Moderation) Era it

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[69] 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
[70] 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

was: $\bar{g}_{RGDP} = 2.670\%$, $\bar{g}_{RPCE} = 2.516\%$, then, $\bar{g}_{PS}$ was 0.154% (lending). But, during the ZIR Era it was: $\bar{g}_{RGDP} = 1.711\%$, $\bar{g}_{RPCE} = 1.851\%$, then, $\bar{g}_{PS}$ was -0.14% (borrowing). The Lucas critique[71] is important when deciding how to make forecasts in a period with a new policy regime.

Finally, during the inflation stabilization era, real interest rates ($\bar{r}_{10YTB} = 2.588\%$) were a little higher than the growth of the real personal consumption expenditures ($\bar{g}_{RPCE} = 2.516\%$). But, real long-term returns on safe assets ($\bar{r}_{10YTB} = 1.030\%$) remain significantly below the growth of the real personal consumption expenditures   ($\bar{g}_{RPCE} = 1.851\%$) during the ZIRP Era as it is also today, and this low demand affected the growth of the RGDP ($\bar{g}_{RGDP} = 1.711\%$). Empirical evidence surveyed by Williams [40] suggests that the Fed can influence real interest rates on long-term safe assets. What we do not know is the sign 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, consumption, and borrowing-debt); this might be the goal 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. But, who is going to do the reforms in our divided society and weak democracy?

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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 social crisis. The corrupted system is at death's door and needs a revision (the swamp has to be drained) from its foundations. Are politicians responsible? Is education responsible? Are the economic elites responsible? Or is our controlled (ignorant) and powerless socio-politico-economic system the only responsible? Just follow the (fake) news after the 2016 U.S. elections and you can see the problems that the "deep state" has caused to the country, to Europe, and to the world by controlling all the institutions (θεσμούς). It is frightful for humanity (φοβερόν). See, Kallianiotis [26].

[71] 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 [30].

References

[1] Bank of Canada, "Monetary Policy", (2017),.
http://www.bankofcanada.ca/core-functions/monetary-policy/

[2] Bernanke, Ben. "The Great Moderation." Speech given at the annual meetings of the Eastern Economic Association, February 20, (2004).
https://www.federalreserve.gov/boarddocs/speeches/2004/20040220/

[3] Bindseil, Ulrich, "Evaluating Monetary Policy Operational Frameworks," in Designing Resilient Monetary Policy Frameworks for the Future. Proceedings of the Federal Reserve Bank of Kansas City Jackson Hole Economic Policy Conference, Jackson Hole, WY, August 25-27, (2016), 179-277.
https://www.kansascityfed.org/publications/research/escp/symposiums/~/media/6c10f54077ef4f70ae9214d2ac5dad35.ashx

[4] Bullard, James, "Allan Meltzer and the Search for a Nominal Anchor", Review, Federal Reserve Bank of St. Louis, 100 (2), Second Quarter (2018), 117-126.
https://research.stlouisfed.org/publications/review/2018/02/13/allan-meltzer-and-the-search-for-a-nominal-anchor

[5] Bullard, James. "An Illustrative Calculation of r†." Federal Reserve Bank of Atlanta 22nd Annual Financial Markets Conference, Amelia Island, FL, May 8, (2017).
https://www.stlouisfed.org/~/media/Files/PDFs/Bullard/remarks/2017/Bullard_Amelia_Island_8_May_2017.pdf?la=en.

[6] Caggese, Andrea and Perez-Orive, Ander, "Capital Misallocation and Secular Stagnation." Finance and Economics Discussion Series 2017-009, Board of Governors of the Federal Reserve System, (2017).

[7] Cochrane, John H., Asset Pricing, Princeton University Press, 2001.

[8] Coibion, Oliver and Gorodnichenko, Yuriy, "Monetary Policy, Trend Inflation, and the Great Moderation: An Alternative Interpretation", American Economic Review, 101, February, (2011), 341–370.

[9] Cooke, Diana A. and Gavin, William T., "Three Scenarios for Interest Rates in the Transition to Normalcy." Federal Reserve Bank of St. Louis Review, First Quarter (2015), 97(1), 1-24.
https://papers.ssrn.com/sol3/papers.cfm?abstract_id=2646132

[10] DeLong, J. Bradford, "America's Peacetime Inflation: The 1970s," in C. Romer and D.H. Romer (editors), Reducing Inflation:Motivation and Strategy. University of Chicago Press, 1997, 247-80.

[11] D'Erasmo, Pablo, "Are Higher Capital Requirements Worth It?", Economic Insights, Federal Reserve Bank of Philadelphia, Volume 3(2), Second Quarter, (2018), 1-8.

[12] Fawley, Brett W. and Neely, Christopher J., "Four Stories of Quantitative Easing", Federal Reserve Bank of St. Louis Review, January-February 95(1), (2013), 51-88.

https://research.stlouisfed.org/publications/review/2013/01/04/four-stories-of-quantitative-easing/

[13] Foster, Lucia, Grim, Cheryl, and Haltiwanger, John, "Reallocation in the Great Recession: Cleansing or Not?" in D. Card and A. Mas, organizers, Labor Markets in the Aftermath of the Great Recession. National Bureau of Economic Research, (2016), 293-331.

[14] Gagnon, Joseph E. and Sack, Brian, Monetary Policy with Abundant Liquidity: A New Operating Framework for the Federal Reserve, Peterson Institute for International Economics, 2014.

[15] Galbacs, Peter, The Theory of New Classical Macroeconomics: A Positive Critique, Switzerland: Springer, 2012.
https://link.springer.com/content/pdf/10.1007%2F978-3-319-17578-2.pdf

[16] Gavin, William T., "Monetary Policy Regimes and the Real Interest Rate", Review, Federal Reserve Bank of St. Louis, 100(2), Second Quarter (2018), 151-169.

[17] Gavin, William T., Keen, Benjamin D., Richter, Alexander W., and Throckmorton, Nathaniel A., "The Zero Lower Bound, the Dual Mandate, and Unconventional Dynamics." Journal of Economic Dynamics & Control, 55, (2015), 14-38.

[18] Gavin, William T. and Kydland, Finn E., "The Nominal Facts and the October 1979 Policy Change." Federal Reserve Bank of St. Louis Review, 82(6), (2000), 39-61.
http://citeseerx.ist.psu.edu/viewdoc/summary?doi=10.1.1.196.4648

[19] Gavin, William T. and Kydland, Finn E., "Endogenous Money Supply and the Business Cycle." Review of Economic Dynamics, 2(2), (1999), 347-69.
https://www.sciencedirect.com/science/article/pii/S1094202598900552

[20] Gomme, Paul, Ravikumar, B., and Rupert, Peter, "Secular Stagnation and Returns on Capital." Economic Synopses, 19, August 18, 2015.
https://research.stlouisfed.org/publications/economic-synopses/2015/08/18/secular-stagnation-and-returns-on-capital/

[21] Gomme, Paul, Ravikumar, B., and Rupert, Peter, "The Return to Capital and the Business Cycle." Review of Economic Dynamics, 14(2), (2011), 262-78.
https://ac.els-cdn.com/S1094202510000591/1-s2.0-S1094202510000591-main.pdf?_tid=24378eb9-b6a0-4569-ba72-346729689c8b&acdnat=1530286243_438b80cee525e117b3c07902e3b5b961

[22] Greenspan, Alan, "Risk and Uncertainty in Monetary Policy", American Economic Review, 94 (2), (2004), 33-40.

[23] Holston, Kathryn, Laubach, Thomas, and Williams, John C., "Measuring the Natural Rate of Interest: International Trends and Determinants." Working Paper 2016-11, Federal Reserve Bank of San Francisco, December (2016).
https://www.frbsf.org/economic-research/publications/working-papers/2016/11/

[24] Kallianiotis, John N., The European Union and its Debt Crises: The Deception of the Greeks, New York: Nova Science Publishers, Inc., 2018.

[25] Kallianiotis, John N., "Central Banks, Monetary Policy, and their Efficiency", (Chapter 1) in Monetary Policy: Perspectives, Strategies and Challenges, Harriet Ward (editor), New York: Nova Science Publishers, 2017a.

[26] Kallianiotis, I. N., «Ἡ Τρέχουσα Ἑλληνική Κρίσις ἐστίν Ἔργον τῶν Δημιουργῶν τῶν Δυτικῶν Ἐπαναστάσεων τοῦ Παρελθόντος», Ἀπολογητικά, February 19, 2017b, 1-17. http://apologitikaa.blogspot.com.cy/2017/02/i.html

[27] Kallianiotis, John N., "The Latest 'Planned' Financial Crisis, Which Caused the First Depression of the 21st Century, Was a Moral and Political Crisis", in Global Financial Crisis: Causes, Consequences and Impact on Economic Growth, Jeanne Barnett (editor), New York: Nova Publishers, December (2015), Chapter 2, 15-78.

[28] Kallianiotis, John N., Exchange Rates and International Financial Economics: History, Theories, and Practices, New York: Palgrave Macmillan, 2013.

[29] Kallianiotis, I.N., "Unemployment and Risk Revisited: The Dual Disease of our Socio-Economic System", Journal of Business and Society, 17(1 & 2), 2004, 46-66.

[30] Lucas, Robert, "Econometric Policy Evaluation: A Critique", In Brunner, K. and Meltzer, A., *The Phillips Curve and Labor Markets*, Carnegie-Rochester Conference Series on Public Policy, 1, New York: American Elsevier, (1976), 19–46.

[31] Nelson, Edward, "The Great Inflation of the Seventies: What Really Happened?" B.E. Journal of Macroeconomics: Advances in Macroeconomics, 5(1), (2005), 1-48.

[32] Potter, Simon, "Implementing Monetary Policy with the Balance Sheet." Speech at the ECB workshop Money Markets, Monetary Policy Implementation, and Central Bank Balance Sheets, Frankfurt Am Main, Germany, November 6 (2017). https://www.bis.org/review/r171106f.pdf

[33] Ross, Stephen A., Randolph W. Westerfield, Jeffrey Jaffe, and Bradford D. Jordan, Corporate Finance, 11th edition, New York, N.Y.: McGraw-Hill Education, 2016.

[34] Sargent, Thomas J., "Reactions to the Berkeley Story." October 21, 2002. http://www.tomsargent.com/research/romers3.pdf

[35] Stock, James H. and Watson, Mark W., "Has the Business Cycle Changed and Why?" in M. Gertler and K. Rogoff (editors), NBER Macroeconomics Annual 2002, 17, MIT Press, 2003.

[36] Summers, L. H., "Less is More When It Comes to Federal Reserve Policy." Financial Times, May 7 (2017). https://www.ft.com/content/ab77d236-318c-11e7-9555-23ef563ecf9a

[37] Summers, Lawrence H., "Secular Stagnation and Monetary Policy", Federal Reserve Bank of St. Louis Review, Second Quarter, 98(2), (2016), 93-110.

https://research.stlouisfed.org/publications/review/2016/06/17/secular-stagnation-and-monetary-policy/

[38] Taylor, John B., "Reviewing the 'Too Low for Too Long' Evidence." Economics One, October 19 (2013). https://economicsone.com/2013/10/19/reviewing-the-too-low-for-too-long-evidence/

[39] Taylor, John B., "Discretion versus Policy Rules in Practice". Carnegie-Rochester Conference Series on Public Policy 39, (1993), 195–214.

[40] Williams, John C., "Monetary Policy at the Zero Lower Bound: Putting Theory into Practice." Hutchins Center on Fiscal & Monetary Policy at Brookings, January 16 (2014).
https://www.brookings.edu/research/monetary-policy-at-the-zero-lower-bound-putting-theory-into-practice/f

[41] Williams, John C., "The Global Growth Slump: Causes and Consequences." Federal Reserve Bank of San Francisco Economic Letter, 2017-19, July 3 (2017).
https://www.frbsf.org/economic-research/publications/economic-letter/2017/july/global-growth-slump-causes-consequences-speech/

[42] Williamson, Stephen, "Inflation Control: Do Central Bankers Have it Right?", Review, Federal Reserve Bank of St. Louis, 100(2), Second Quarter (2018), 127-150.
 https://research.stlouisfed.org/publications/review/2018/04/16/inflation-control-do-central-bankers-have-it-right/

[43] Williamson, Stephen D., "Neo-Fisherian Denial." New Monetarist (blog), April 14 (2016). http://newmonetarism.blogspot.com/

[44] Williamson, Stephen D., "Liquidity, Monetary Policy, and the Financial Crisis: A New Monetarist Approach", American Economic Review, 102(6), (2012), 2570-605.
https://pubs.aeaweb.org/doi/pdfplus/10.1257/aer.102.6.2570

[45] Woodford, M., Interest and Prices: Foundations of a Theory of Monetary Policy, Princeton, N.J.: Princeton University Press, 2003.

[46] Yellen, Janet, "The Goals of Monetary Policy and How We Pursue Them". Speech at the Commonwealth Club, San Francisco, CA, (2017). https://www.federalreserve.gov/newsevents/speech/yellen20170118a.htm