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The Effectiveness of the Single Mandate of the ECB and the Dual of the Fed

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«Μήτι δύναται τυφλός τυφλόν ὁδηγεῖν;
οὐχί ἀμφότεροι εἰς βόθυνον πεσοῦνται;»
Λουκ. ς΄ 39

Abstract

In the current work, we discuss and measure the effectiveness of the recent (2008-2018) monetary policies of the European Central Bank (ECB) and the U.S. Federal Reserve (Fed), which are two new and distinct monetary policy regimes. First, the Zero Interest Rate Regime (2008:12-2015:11) and then, the New Regime (2015:12-present) with a rate from 0.50% to 2.50% and to 1.25% (recently) in the U.S. and the different European policies with a very high interest rate in ECB from 3.75% to 0.00% and lately, to -0.50% (since September 18, 2019). This late reaction of the ECB, made the two central banks' policies incomparable and the EU debt crisis deeper. These, dissimilar monetary policy regimes, have various effectiveness and provided distinct outcomes for the two economies. The analyses suggest that it was the Fed's quantitative easing and the interest on reserves the main causes of the negative real interest rate following the financial crisis and the new bubble in the financial market. In Euro-zone, the answer must be that a common, the 21st century newborn currency and monetary policy for all these completely different economies do not work; countries need their domestic independent public policies.

JEL classification numbers: E52, E58, E4, E44, E23, D69, D60
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1. Introduction

What are the U.S. Federal Reserve's and the ECB's objectives in conducting monetary policy during the different eras?[3] Is the country's social welfare one of these objectives? Are their policies benefiting the people (Main Street) of their countries? Are their policies national or global? The idea of a monetary policy regime is somewhat vague. It is related to the state of the economy, to central banks' experience, and their dependence as "independent" institutions, and to the idea of a monetary standard. This paper examines the two latest U.S. and Euro-zone policy regimes that were adopted to manage the financial crisis, the debt crises, and recessions. These regimes are defined by the different goals for policy and by the different procedures, the zero interest rate regime (ZIRR), December 16, 2008-December 15, 2015[4] (quantitative easing) and the new regime (NR), December 16, 2015-present,[5] which are used to implement monetary policy decisions.[6] The ECB had in December 2008 an interest rate 2.75% and reached 0.00% in July 2012.[7] After June 11, 2014, this interest rate became -0.10% and continues until today with a deep negative rate ($i_{OND} = -0.50\%$).[8]

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[3] The Congress established the statutory objectives for monetary policy--maximum employment, stable prices, and moderate long-term interest rates--in the Federal Reserve Act. See, https://www.federalreserve.gov/faqs/money_12848.htm.
Also, https://www.investopedia.com/articles/investing/100715/breaking-down-federal-reserves-dual-mandate.asp . The ECB objective is to maintain price stability and a single monetary policy for which it is responsible. This is laid down in the Treaty on the Functioning of the European Union, Article 127 (1).
https://www.ecb.europa.eu/mopo/intro/objective/html/index.en.html

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

[5] Chairman of the Board of Governors of the Fed: Janet Yellen (2/3/2014-2/3/2018) and U.S. President Barack H. Obama (2009-2017) and Donald Trump (2017-present). Then, Jerome Powell (2/5/2018-present) and U.S. President Donald Trump (2017-present).

[6] See, Bindseil [7], Gavin [25], and Bullard [8]. Also, "Donald Trump Complained about Fed Interest-Rate Increases at Fundraiser", Trump worried higher interest rates could cool off the economy, August 20, 2018. https://www.wsj.com/articles/trump-complained-about-fed-interest-rate-increases-at-fundraiser-1534782859

[7] See, Key ECB interest rates.
https://www.ecb.europa.eu/stats/policy_and_exchange_rates/key_ecb_interest_rates/html/index.en.html . Also, https://tradingeconomics.com/euro-area/interest-rate .

[8] The ECB has three key interest rates: (1) the main refinancing operations which is 0.00%; (2) the overnight deposit facility rate which is -0.50%; and (3) the overnight marginal lending facility rate which is 0.25%.
https://www.ecb.europa.eu/stats/policy_and_exchange_rates/key_ecb_interest_rates/html/index.en.html .
In a statement, the ECB said it would cut its key interest rate by 0.1 percentage point, to minus 0.5%, and start buying €20 billion ($22 billion) a month of Eurozone debt, restarting a so-called quantitative easing program that it only phased out last December. See, "ECB Launches Major Stimulus Package, Cuts Key Rate", *Wall Street Journal*, September 12, 2019. https://www.wsj.com/articles/ecb-launches-major-stimulus-package-cuts-key-rate-11568289016

The social welfare[9] of a nation is the well-being of its entire society (its citizens). The monetary policy ought to improve the well-being of all individuals inside the country and not only a group, a market, some institutions (banks) or a sector of the economy. The social welfare must satisfy Pareto efficiency, which holds if all alternatives have been exhausted to put at least one person in a more preferred position with no one put in a less preferred position. Unfortunately, this did not happen at all in Euro-zone,[10] even in the U.S. A *Pareto improvement* is a change to a different allocation that makes at least one individual or preference criterion better off without making any other individual or preference criterion worse off, given a certain initial allocation of "goods" (income, employment, inflation, interest rates, stock markets, consumption, interest rate on deposits, taxes, etc.) among all the individuals of the country or the Euro-zone. An allocation is defined as "Pareto efficient" or "Pareto optimal" when no further Pareto improvements can be made, in which case we are assumed to have reached *Pareto optimality*. Thus, according to this optimality condition, our central banks' policies have failed to satisfy it, so their monetary policies are ineffective and anti-social. Their problem is one and only: complete detachment from the people of the countries.[11]

The Fed has since 1977 a dual mandate, to promote price stability and maximum sustainable employment.[12] For the ECB, "to maintain price stability is the primary objective of the Eurosystem and of the single monetary policy for which it is responsible".[13] In practice, price stability is defined as 2% inflation rate. Achieving the maximum (and not the full) employment goal in U.S. is more problematic because the concept of full employment is not measured directly. This part of the dual or single mandate is implemented by following a countercyclical policy, easy (expansionary) policy when the economy is thought to be below its potential and tight (contractionary) policy when the economy is estimated to be growing above its sustainable long-run trend. In making decisions at Federal Open Market Committee (FOMC) meetings, the participants look at everything, but the two most important economic indicators are inflation and real gross domestic product (GDP) growth.[14] In Euro-zone the economic growth is still below 1% (0.2% in 2018:Q4, 0.4% in 2019:Q1, 0.2% for 2019:Q2 and Q3, and 0.1% for 2019:Q4),[15] which

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[9] Social welfare of a nation is not only an economic function, but a very complex one; it includes the standard of living, but it is more concerned with the ultimate objective of life, the well-being of every citizen, his quality of life (wealth, income, utility, environment, democracy, security and safety, human liberties, homogeneity, respect of life, freedom of speech, crime, health, education, social services, value system of the country, culture, civilization, faith, tradition, morality and ethics, independence, sovereignty, and many other aspects of life).

[10] See, Kallianiotis [38] and [37, 33-36].

[11] See, Drautzburg [19].

[12] For the Federal Reserve's Dual Mandate, See, https://www.chicagofed.org/research/dual-mandate/dual-mandate .

[13] For the ECB's objective of monetary policy, see, Treaty on the Functioning of the European Union, Article 127 (1). https://www.ecb.europa.eu/mopo/intro/objective/html/index.en.html

[14] See, Taylor [61]. See also, Kallianiotis [39].

[15] See, Euro Area GDP Growth Rate. https://tradingeconomics.com/euro-area/gdp-growth

proves the incompatibility and the problems that a common currency and a common monetary policy can cause to these 19 different Euro-zone member-nations. Also, the Taylor rule, the Bullard rule, and the Kallianiotis rule[16] had been considered by monetary policy circles and in Neo-Keynesian economics that it also incorporates another element of conventional central banking wisdom, the Phillips curve.[17] The potential monetary targets are the federal funds rate (or the overnight deposit rate for the ECB), the monetary base, and the money supply. But, the objectives (ultimate policy goals) are always the same, reasonable price stability (π = 2%), maximum employment, sustainable economic growth, moderate L-T interest rates, balance in the current account, which will affect personal income, consumption, personal savings, risk, and social welfare.

2. Intermediate and Ultimate Effects of Monetary Policy

Different experimental new monetary policy regimes lead to different equilibrium levels of real interest rates, risk, consumption, savings, financial market, real GDP, and social welfare. Our most basic theories of money assume the classical dichotomy; real variables are determined by real factors and nominal variables are determined by monetary policy (money illusion). Even Keynesian models with sticky prices assume that the real effects are short-lived, a few quarters at most. For monetary policy to have persistent real effects; do we have to consider extreme policies or just to extend the models to include more socially realistic features?
The latest monetary policy regime from 2008 to 2015 was an extreme policy for the U.S.,[18]

[16] See, Kallianiotis [35]. file:///C:/Users/R97719842/Desktop/7106-Article%20Text-18284-1-10-20190926.pdf

[17] See, Woodford [68], Bank of Canada [3], and Yellen [69]. See also, Williamson [64] and Summers [58].

[18] For example, for the U.S., it was as follows: $y = q + \pi \Rightarrow q = y - \pi < 0$ because $\pi > y$ and $i = r + \pi \Rightarrow r = i - \pi < 0$ because $\pi > i$. 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), which was the anticipated process. 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}), a little backward "innovative" procedure. See, Kallianiotis [36].

as it is the current ECB one after 2016, because the interest rate policy is not consistent with the 2% inflation objective.[19] This policy has led to persistently low (negative), real rates on bank reserves ($r_{ER} < 0$), on deposits ($r_D < 0$), and other safe assets ($r^*_{RF} < 0$). It has also led to a low level of real economic activity ($g_{RGDP} \downarrow$),[20] Figure 1 and Graph 2, real personal consumption expenditures ($g_{RPCE} \downarrow$), Figure 3, ($g_{GDP} \downarrow$), lower savings, high risk, with a new bubble in the financial markets,[21] Figure 4, and consequently, in reduction of social welfare. If some factor (easy money policy) keeps the interest rate below the equilibrium level, then the amount that people want to borrow will exceed the amount that people want to save (because this negative real rate of interest is a disincentive to save, $\bar{r}_D = -1.536\%$).[22] 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.[23]

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[19] Official inflation 2.8% with May 2018, 1.5% in February 2019, 1.8% in October 2019, and 2.5% in January 2020. https://tradingeconomics.com/united-states/inflation-cpi . But 6.5% (1990-based) or 11% (1980-based) from the SGS. http://www.shadowstats.com/alternate_data/inflation-charts. For the Euro-zone, the official inflation is also 1.5% for February 2019, became 0.7% in October 2019, and 1.4% in January 2020. https://tradingeconomics.com/euro-area/inflation-cpi . For Greece, it was 1% in April 2019, became -0.7% in October 2019, and 0.9% in January 2020. https://tradingeconomics.com/greece/inflation-cpi . How can we trust these official statistics?

[20] 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). In 2019:Q1 was 3.0961%, 2019:Q2 was 2.0138%, 2019:Q3 was 2.1%, and 2019:Q4 it was 2.08%. (Source: *Economagic.com*). Also, see, https://tradingeconomics.com/united-states/gdp-growth . Gavin et al. [26] 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.

[21] The DJIA from 6,547.05 (March 2009) reached 17,719.92 (December 2015); a growth of 11,172.87 points or 170.66% (24.38% p.a.). On November 13, 2019 was 27,783.59; a growth of 21,236.54 points or 324.37% or 30.41% p.a. On February 12, 2020, the DJIA reached 29,551.42 and on March 12, 2020 had fell to 21,200.62, a decline by 8,350.80 points (-28.26%); due to the new "coronavirus effect". (Yahoo/Finance). This is the worst bubble in the U.S. economic history and it is due to deregulation and the enormous liquidity by the Fed. The simple and hardworking investors will lose their wealth. The margin requirement, from 50% must be 100% hoping to confine a little the stock market bubble and to reduce the social cost of bailing out the banks with taxpayers money.

[22] The $\bar{r}^{eff}_{FF} = -1.458\%$ and the $\bar{r}^{*}_{RF} = -1.508\%$ during the ZIR Era. (Table 1).

[23] During the zero interest rate regime (ZIRR) the risk was; i.e., $i_{10YTB} = r^* + IP + RP \Rightarrow i_{10YTB} = 2.586\% = -1.508\% + 1.586\% + RP \Rightarrow RP = 2.508\%$. With the new regime (NR), the risk for the same instruments has become: $RP_{10YTB} = i_{10YTB} - r^*_{RF} - \pi = 2.357\% - (-0.920\%) - 1.906\% \Rightarrow RP = 1.371\%$. In March 28, 2019, the $i_{RF} = 2.41\%$ and the $i_{10YTB} = 2.389\%$, which shows that the yield curve became inverted (negative) that many people interpret it as a presage of a recession.

The anxiety has become enormous with the passing of time because the current monetary policy continuous to generate similar results with the previous one, since the federal funds rate was still very low with 2.50% and now, even worse with an $\bar{i}_{FF} = 1.75\%$[24] (bellow the SGS inflation rate, π = 9%).[25] The OND rate remains -0.50% and the dangerous bubbles in the financial markets are growing. The DJIA was 23,327.46 (12/31/2018), it reached 29,551.42 (2/12/2020) and back to 21,200.62 (3/12/2020). The European stock index (SX5E_Index) was 2,986.53 (12/31/2018), it reached 3,853.37 (2/20/2020) and fell to 2,619.01 (3/12/2020).

Monetary policy can affect the real return to saving (which must be at least, $r_S > 1\%$);[26] the latest and current stubbornly low interest rate policy leads to persistently subpar economic activity (economic well-being). The optimal level of economic activity can be achieved only when the real interest rate returns to a normal level making the real return positive.[27] 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 domestic firms tend to go out of business during recessions and are replaced during the recovery by new (unfortunately) foreign firms using technology that is more efficient. In Euro-zone (the Germanic suzerainty), the austerities by the Troika, the overvalued euro, and the high ECB rates until 2012 led all small businesses to bankruptcy. Was this a policy mistake or they acted this way for specific suspicious reason? The problem with U.S. is the destruction of the small cities and towns, due to loss of manufacturing, high unemployment, low quality of life, reduction of welfare, creation of ghost towns.[28] The last three years, the crisis became political (conflict between the administration and the opposition party, the Democrats) and it affects negatively the economy and our democracy.

European have done the same, they concentrated in big cities (urbanization). Foster, Grim, and Haltiwanger [22] find that since the 2007-2008 financial crisis and 2007-

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[24] Since October 2019. See, https://tradingeconomics.com/united-states/interest-rate

[25] And 6.5% below the 1980-based inflation rate; then, $r_{FF} = -6.5\%$. The SGS give a U.S. inflation of 9% (October 2019). See, http://www.shadowstats.com/alternate_data/inflation-charts

[26] By making (in March 2019) the nominal (target) federal funds rate over: $\bar{i}_{FF} = r + \pi$. i.e., above 2.5% $\bar{i}_{FF} = 3.8\% = 1\% + 2.8\%$, $\bar{i}_{FF} \geq 2.5\% = 1\% + 1.5\%$ we have a positive $\bar{r}_{FF}$, but it is exactly $\bar{i}_{FF} = 2.5\%$, which makes the $r_{FF} = -0.8\%$ (1% with the official inflation or -6.5% with the SGS inflation rate). With October 2019, the $\bar{i}_{FF} = 1.75\%$ and $\pi = 1.8\% \Rightarrow$ $r_{FF} = -0.05\%$. See, https://fred.stlouisfed.org/series/DFEDTARU .With SGS, where π = 9% $\Rightarrow r_{FF} = -7.25\%$. http://www.shadowstats.com/alternate_data/inflation-charts . In Euro-zone the $r_{OND} = -1.2\%$ ($i_{OND} = -0.5\%$ and π = 0.7%). https://tradingeconomics.com/euro-area/inflation-cpi

[27] See, Caggese and Perez-Orive [10] and Kallianiotis [34].

[28] See, Nicholas J. Kallianiotis [44]. Also, "The fading American dream: Niko J Kallianiotis between towns and cities". http://www.c41magazine.it/niko-j-kallianiotis-america-trance/ . In Greece, it seems that they will occupy the villages and towns with illegal (Muslim) immigrants, which will be the end of the Greek "paideia" (civilization, culture, and Orthodoxy).

2009 recession, measures of turnover have yet to fully recover from the recession levels. In Euro-zone, the problem is much more complex, common currency, common inefficient policies, austerities, millions of illegal immigrants (especially in Greece, where the country is under new occupation)[29], foreign competition (Chinese and other emerging markets). After 2017, the U.S. economy started growing and there is hope to continue at this approximately level.[30] They suggest that inefficiencies in credit markets may be part of the problem. In any case, it seems possible that the low productivity growth rate and 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).[31] The real cost of capital must be positive, the real economic growth at the full employment level, and the financial market to grow at a level that minimizes investors' risk, personal savings to grow and social welfare to improve. All these objectives can be satisfied with efficient and effective monetary policies. Why the Fed and the ECB cannot serve these objectives?

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

A monetary regime[32] is characterized by four properties: (i) the weight policymakers put on price stability relative to their concern about output stabilization, (ii) the day-to-day procedures used to implement policy, (iii) the periodic evaluation of the policy effectiveness, and (iv) the social implications of the monetary policy. This paper deals with the latest and current regimes implemented by the Federal Reserve and the ECB since 2008. For the U.S., the first is the Zero Interest Rate Regime (December 16, 2008-December 15, 2015) and the second is the current New Regime (December 16, 2015-present).[33] For Euro-zone, the first is the High Interest Rate Regime (October 15, 2008-December 9, 2015)[34]

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[29] See, Διακήρυξη Προσωπικοτήτων για την Παράνομη Μετανάστευση , November 24, 2019. https://parmetanastefsi.blogspot.com/2019/11/blog-post.html

[30] The U.S. growth was: (2017:Q1) 1.7850%, (2017:Q2) 2.9917%, (2017:Q3) 2.8233%, (2017:Q4) 2.2912%, (2018:Q1) 2.2176%, (2018:Q2) 4.1588%, (2018:Q3) 3.5006%, (2018:Q4) 2.59%, (2019:Q1)1.1%, (2019:Q2) 3.1%, (2019:Q3) 2.1%, and (2019:Q4) 2.08%. See, *Economagic.com.* https://tradingeconomics.com/united-states/gdp-growth. In Euro-zone, the growth with 2018:Q4 was 0.2%, 2019:Q2 was 0.2%, 2019:Q3 was 0.2%, and with 2019:Q4 it was 0.1%. See, https://tradingeconomics.com/euro-area/gdp-growth . On April 9, 2019, the IMF cut its global growth outlook for 2019 to 3.3%, from 3.5% in January, with data showing world economic growth off to a worse start than was apparent earlier in the year. See, https://www.wsj.com/articles/imf-cuts-2019-global-growth-outlook-as-world-economy-stumbles-11554814949

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

[32] Gavin [25] 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

[33] See, Federal Funds Data. https://apps.newyorkfed.org/markets/autorates/fed%20funds

[34] Interest rate on main refinancing operations was from 3.75%-0.05%. See,

and the second Zero-Negative Interest Rate Regime (March 16, 2016-present). Each regime is an experiment that is associated with different policy objectives, different operating procedures, different statistical patterns in the data, different effectiveness, different social implications, but common "global end". (*Sic*).

3.1 The Zero Interest Rate Regime (ZIRR)

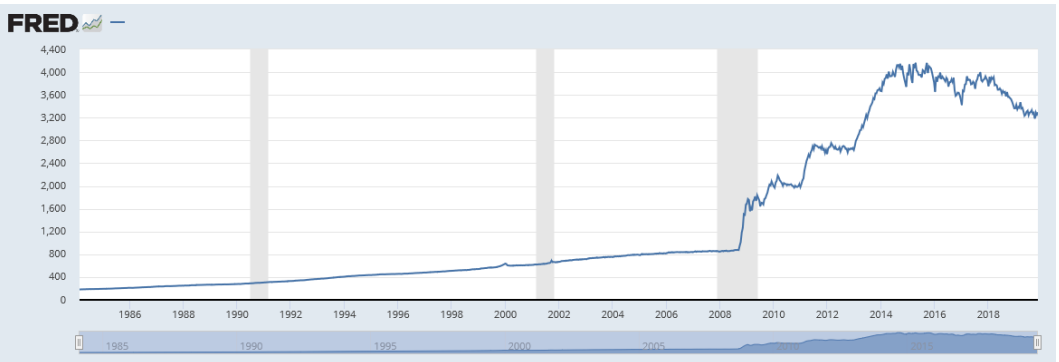
The Zero Interest Rate Regime (ZIRR) was from December 16, 2008 to December 15, 2015, a seven-year period, in which the target range for the federal funds rate was pegged between zero and 25 basis points ($\bar{i}_{FF} = 0\% - 0.25\%$). The market was flooded with trillions of dollars of excess reserves (R_E = \$2.7 trillion in August 2014)[35] as banks earned 0.25% on reserve balances at the Fed and an enormous monetary base (MB = \$4.17 trillion on September 16, 2015, the highest in Fed's history) had been created, Graph 1,[36] which generated (endogenously) a money supply (M^s = \$12.31 trillion on December 12, 2015).[37] The main concern in the U.S. was output stabilization, as output appeared to grow along a path that was considered to be well below the potential for GDP, Figure 1, (the real GDP growth was $g_{RGDP_t} = -2.703\%$ in 2008:Q1, -1.903% (2008:Q3), -8.188% (2008:Q4), -5.428% (2009:Q1), -0.540% (2009:Q2), -1.536% (2011:Q1), -1.0033% in (2014:Q1), 0.9639% (2015:Q2), and 0.4002% (2015:Q3).[38] Official inflation ($\bar{\pi} = 1.586\%$) tended to remain below the Fed's 2% long-term objective (Table 1)

https://www.ecb.europa.eu/stats/policy_and_exchange_rates/key_ecb_interest_rates/html/index.en.html

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

[36] See, the U.S. Fed's Monetary Base:

Graph 1: St. Louis adjusted monetary base



Source: https://fred.stlouisfed.org/series/BASE/

[37] Today, it is worse; with March 25, 2019, the M2 was \$14.5213 trillion, with November 4, 2019 it was \$15.2698 trillion, on February 3, 2020 was \$15.4898 trillion, and with March 5, 2020 had reached \$15.534 trillion. See, https://fred.stlouisfed.org/series/M2

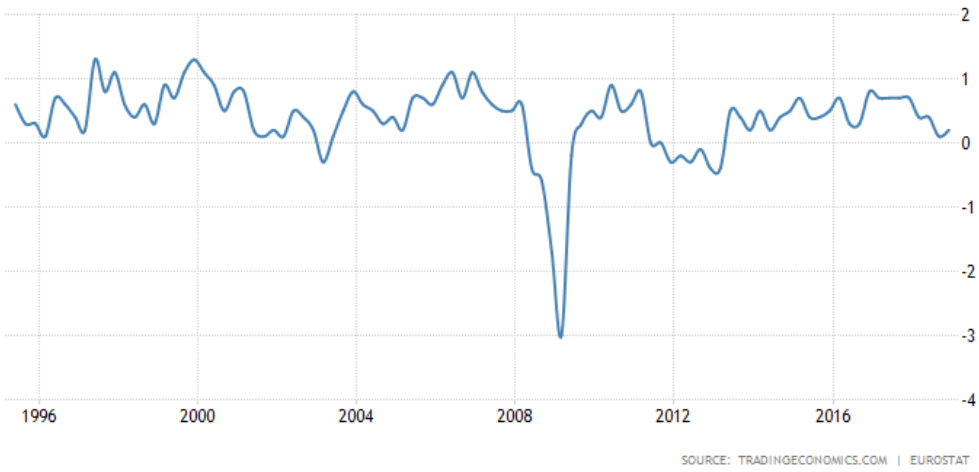
[38] See, https://tradingeconomics.com/united-states/gdp-growth . Also, https://fred.stlouisfed.org/series/A191RL1Q225SBEA and https://fred.stlouisfed.org/series/GDPC1/

and the Fed was anxious for a possible deflation $(-\pi)$, which would increase the real cost of capital [$r = i - \pi$; and then, $r = i - (-\pi) \Rightarrow r = i + \pi$]. The Federal Reserve recently 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.[39] The Euro-zone growth, after the introduction of euro (€) continues to stay below 1%,[40] an indication that a common policy and common currency for complete different economies do not work. The question remains since 1992: Why it was introduced (imposed)?

[39] 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

[40] See, GDP growth in Euro-zone:

Graph 2: Euro area GDP growth rate



Source: https://tradingeconomics.com/euro-area/gdp-growth

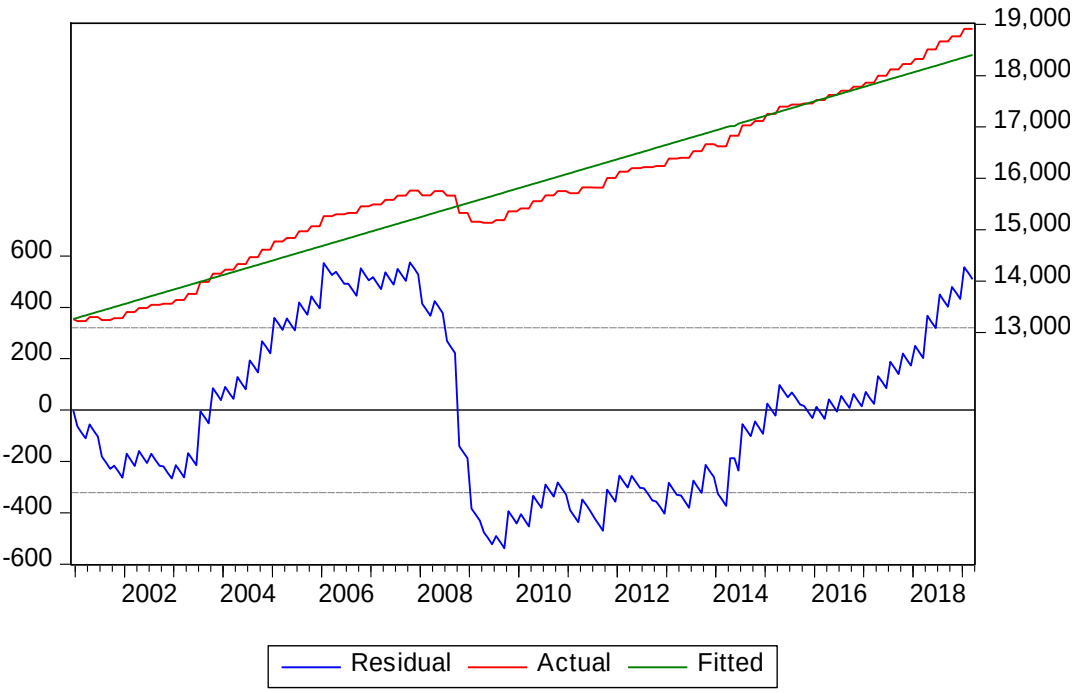


Figure 1: The U.S. real GDP and the time trend

Note: Actual = USRGDP2012 and Fitted = the L-T time trend.
Source: *Economagic.com*

The level and volatility of federal funds rate continued to drop. The FOMC had adopted a risk-management approach to monetary policy.[41] The financial crisis raised awareness of another downside of the federal funds rate, Figure 2. The abuses in the mortgage market were due to many factors, but many attributed the bad debt to low interest rates.[42] Today, the Federal Reserve takes responsibility for financial stability, but, as a practical matter, interest rate policy is aimed at stabilizing output and targeting inflation, but we did not see any significant improvement on real return, on risk, and consequently on social welfare. 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. But it was unattainable (the bubble of DJIA from 29,551.42 that threatened people's wealth) and its burst became a reality (DJIA fell to 21,200.62 on March 12, 2020) and caused an enormous capital loss (redistribution of wealth).

[41] See, Greenspan [31].
[42] See, Taylor [60] and Kallianiotis [41] and [39].

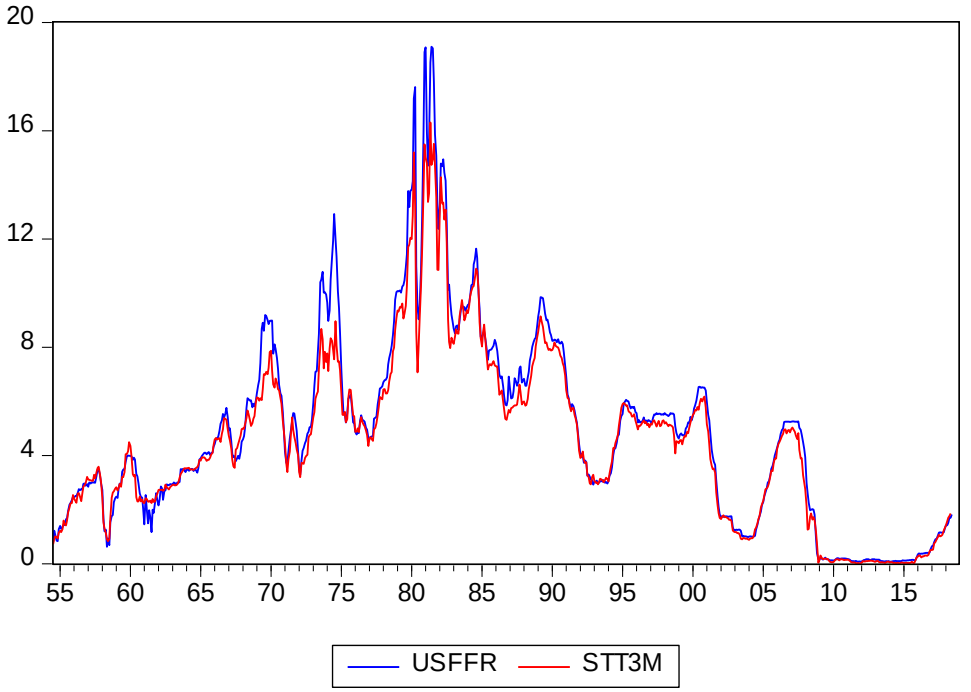


Figure 2: The federal funds rate and the yield on 3-month treasury bills

Note: USFFR = U.S. federal funds rate (i_{FF}^{eff}) and STT3M = the 3-month T-Bill rate (i_{RF}). ZIRR: $\rho_{i_{FF},i_{RF}} = +0.821$, $i_{FF} \Rightarrow i_{RF}$ (F=20.581). NR: $\rho_{i_{FF},i_{RF}} = +0.996$, $i_{RF} \Rightarrow i_{FF}$ (F= 15.103).
Source: *Economagic.com*

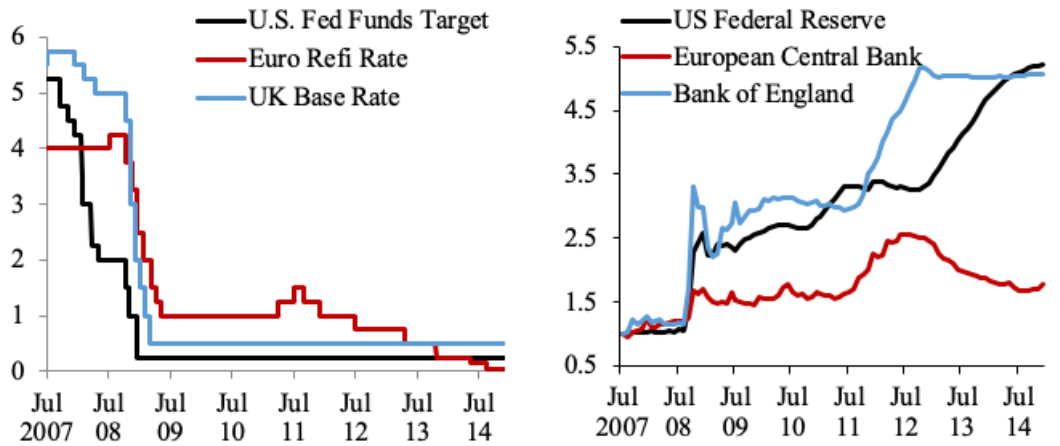
With the onset of the global financial crisis, the Fed abruptly switched to this infamous new monetary policy regime, the Zero Interest Rate Policy regime. In response to the financial crisis, in September 2008, the Fed flooded the market with about $600 billion in excess bank reserves and drove federal funds rate toward zero. On December 16, 2008, the FOMC voted to set the bottom of the 0.25% target range for federal funds rate at zero (0.00%). It also adopted unconventional policies known as quantitative easing (QE) and forward guidance that were intended to keep money market interest rates near zero ($\bar{i}_{RF} = 0.078\%$) for an extended period.[43]

[43] See, Fawley and Neely [21]. The 3-month T-Bill rate became zero ($i_{RF} = 0.00\%$) in 2011:11, 2011:12, and 2014:09.

The ECB reduced its OND rate from 2.75% to 2.00% on December 10, 2008, which was very high comparing with the U.S. federal funds rate.[44]
Although the Fed had a target range for federal funds closed to zero ($\bar{i}_{FF} = 0.129\%$), the actual (strange) policy 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 these seven years[45] and they continued it up to now. The negative ECB overnight rate is also a hidden interest on reserves. The Fed justified this action as insurance against the worldwide collapse of financial markets, the Great Recession (the 1st global crisis of the 21st century and the worst debt crisis for the Euro-zone) and a replay of the Great Depression for the EMU. Generally, the Fed and later the ECB had shown an aversion to reversing interest rate movements within a short time span because they ignore (conceal) the true inflation rate.

[44] Central Banks target rates and assets:

Graph 3: Policy rates and central banks assets



Sources: Left panel - Federal Reserve Bank of New York, "Federal Funds Data Historical Search"; European Central Bank, "Main Refinancing Operations," fixed-rate tenders; Bank of England, https://www.bankofengland.co.uk/boeapps/database/Bank-Rate.asp; Right panel - Federal Reserve Bank of St. Louis, codes ECBASSETS for the ECB, WALCL for the U.S. Fed. UKASSETS and code RPQB75A of the Bank of England for BoE. See, Mody [50].

[45] See, Gagnon and Sack [24]. On the average: $i_{IOR} = i_{RF} + 0.20\% = 0.078\% + 0.20\% = 0.278\%$.

The rescue (bailout) of financial institutions[46] was funded by the U.S. Treasury (the taxpayers) with the Emergency Economic Stabilization Act of 2008[47] and with Fed loans and asset purchases with terms to maturity of 6 months or less. Thus, QE was an attempt to extend the expected time that the interest rate would stay near zero and an attempt to stimulate the economy by lowering longer-term interest rates. But, this too easy money kept the interest rate on deposits at zero [$i_D = 0.05\%$, with an average inflation ($\bar{\pi} = 1.586\%$) was making the $r_D = -1.536\%$ [48] and later, with an official $\pi = 2.9\%$, the $r_D = -2.85\%$], which continues up to now, for eleven years. This policy was forcing risk averse savers to withdraw their deposits and buy securities that their growth was enormous ($g_{DJIA} = 9.952\%$ p.a.), but their risk is immense ($\sigma_{DJIA} = \pm 55.692\%$),[49] as Table 1 (U.S.) and Table 2 (EMU)[50] show. Thus, this extreme monetary policy created a new bigger bubble the last years (DJIA reached 29,551.42 on February 12, 2020) and the poor investors (previous depositors) will lose their money. This kind of public (monetary) policy is completely unethical. (*Sic*). In Euro-zone the deposit rate is very similar with the U.S. one.[51]

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[46] The problem of the banks was the low capital requirements. See, D'Erasmo [18]. This problem caused the Euro-zone debt crisis because governments (tax payers) were borrowing to recapitalize the corrupted foreign banks. See, Kallianiotis [38].

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

[48] By using the *SGS*, the average consumer inflation was ($\bar{\pi} = 10\%$) and the $r_D = -9.95\%$ (an amazing inflationary finance of banks, which is an inflationary tax; an unethical robbery of poor depositors, *bail in*). Banks' golden deposits are heading out the door, due to negative real deposit rates. Customers are starting to move their money out of deposits that pay no interest, posing a big risk to bank profits. https://www.wsj.com/articles/banks-golden-deposits-are-heading-out-the-door-1540200600. This Confiscation of deposits continues up to now, which shows the anti-social monetary policy by the central banks (Fed and ECB).

[49] These markets have become riskier than casinos because the risk in a 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" (out of control) market, they lose their money (wealth) and the economy is going to a recession. The financial crises have to be prevented and not corrected with a public policy after their appearance.

[50] Where, $g_{SX5E\_Index} = 5.237\%$ and $\sigma_{SX5E\_Index} = \pm 63.57\%$.

[51] See, https://www.euro-area-statistics.org/bank-interest-rates-deposits?cr=eur&lg=en

Later, the average maturity of assets on the Fed's balance sheet[52] also rose as the FOMC rebalanced the portfolio, substituting long-term assets for short-term ones (Graph 1). Interest rates were also expected to stay low because this was the goal of policy suggested in FOMC post-meeting statements, policymaker speeches, and Congressional testimony.[53] In October 2008, the Federal Reserve had begun to pay interest on reserves IOR). The IOR was set at the top of the federal funds target range and remained about 20 basis points above the discount rate on 3-month Treasury bills ($i_{IOR} = i_{RF} + 0.20\%$).[54] This was a factor that increased banks' willingness to hold a large stock of excess reserves. Paying interest on excess reserves and supplying a large stock meant that the FOMC had switched from direct federal funds targeting to a floor system.[55]

An important feature of the ZIRP regime, which began with a big two-quarter decline in Consumption (Figure 3), is the failure of the economy to return to the trend in potential GDP (Figure 1) 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.[56]

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[52] The Fed's balance sheet has gotten huge. Quantitative easing (or QE) has increased the size of the Fed's balance sheet almost eightfold since the turn of the century. The Fed's balance sheet had just over $500 billion in assets in 2000 and $925.725 billion on September 10, 2008, it reached over $4.5 trillion in 2015, and on July 18, 2018, it holds $4.292 trillion. It fell on April 10, 2019 to $3.937 trillion and lately, started going up again; on November 27, 2019 it became $4.053 trillion and on February 12, 2020, it was $4.183 trillion. See, https://fred.stlouisfed.org/series/WALCL

[53] See, Potter [53].

[54] Then, if banks are receiving interest from the Fed, why to pay interest on deposits? They do not need more funds from depositors as long as the Fed provides this enormous liquidity (R_E). Another proof that the Fed has failed (or it has no interest) to maximize the depositors' interest income and consequently, their welfare. (*Sic*).

[55] See, Bindseil [7].

[56] Fed's Balance Sheet was $4.513 trillion on January 21, 2015. See, https://fred.stlouisfed.org/series/WALCL

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%.[57] On December 19, 2018, the target federal funds rate reached $\bar{i}_{FF} = 2.50\%$, on October 30, 2019, it became 1.75%,[58] and now, since March 4, 2020, it is 1.25%.

Further, according to Taylor's original version of the rule, the nominal interest rate should respond to divergences of actual inflation rates from *target* inflation rates and of actual GDP from *potential* GDP:

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

where, $\bar{i}_{FF_t}$ = the target short-term nominal interest rate (the federal funds rate), π_t = the rate of inflation as measured by the GDP deflator, π_t^* = the desired rate of inflation, r_t^* = the assumed equilibrium real interest rate, q_t = the logarithm of real GDP, and $\bar{q}_t$ = the logarithm of potential output, as determined by a linear trend.

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

[58] Federal Reserve Bank of New York President John Williams said the central bank isn't committed to any particular policy path in the months ahead, even though he and his colleagues are comfortable right now with keeping rates steady after cutting them three times this year. https://www.wsj.com/articles/new-york-feds-williams-stresses-flexible-approach-to-setting-interest-rates-11574174115 . The policy statement, released by the rate-setting Federal Open Market Committee Wednesday, signaled a potentially higher bar for rate reductions after the latest move, which will drop the target for the federal-funds rate to a range between 1.5% and 1.75%. (10/30/2019). See, https://apps.newyorkfed.org/markets/autorates/fed%20funds . Also, https://www.wsj.com/articles/fed-cuts-rates-by-quarter-point-11572458556?mod=article_inline. The FOMC decided on the December 11, 2019 meeting the keep the federal funds rate in the same range (from 1.50% to 1.75%). See, https://over50finance.com/2019/12/11/the-december-federal-reserve-meeting-just-ended-heres-what-investors-need-to-know/

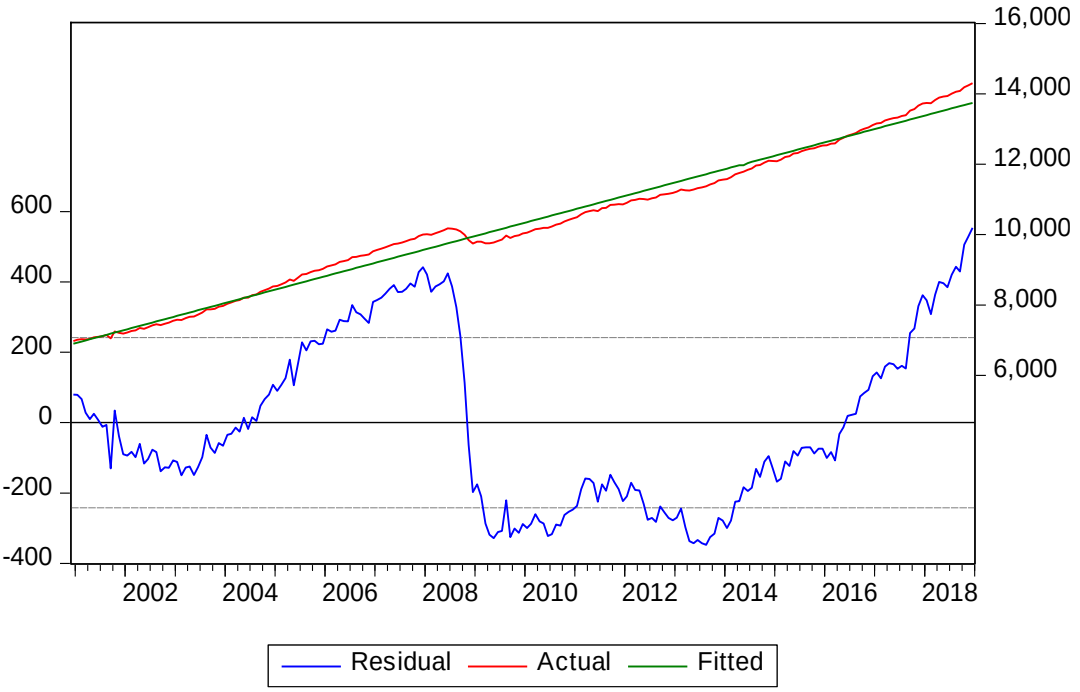

Figure 3: The U.S. personal consumption expenditures and the time trend

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

In this equation, both α_π and α_q should be positive (as a rough rule of thumb, Taylor's 1993 paper proposed setting $\alpha_\pi = \alpha_q = 0.5$). That is, the rule "recommends" a relatively high interest rate (a "tight" monetary policy) when inflation is above its target or when output is above its full employment level, in order to reduce inflationary pressure. It recommends a relatively low interest rate ("easy" monetary policy) in the opposite situation, to stimulate output.
Taylor's rule can be modified by using unemployment (u_t) instead of GDP:

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

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. Furthermore, the Bullard rule is given as follows:

$$\bar{i}_{FF_t} = \rho\, i_{FF_{t-1}} + (1-\rho)[r_t^* + \pi^* + \phi_\pi(\pi_t - 2\%) + \phi_q(u_t - u_t^N)] \quad (3)$$

Lastly, the Kallianiotis rule[59] takes into consideration the financial market, too:

$$\bar{i}_{FF_t} = \pi_t + r_t^* + \alpha_\pi(\pi_t - \pi_t^*) - \alpha_u(u_t - u_t^N) + \alpha_{DJIA}(g_{DJIA_t} - g_{DJIA_t}^*) \quad (4)$$

where, g_{DJIA_t} = the actual growth of the DJIA index, $g_{DJIA_t}^*$ = the optimal (the bubble prevention) growth of the DJIA ($g_{DJIA_t}^* \leq 7\% \cong i_{10YTB} + 5\%$),[60] and $\alpha_\pi = 0.25$, $\alpha_u = -0.50$,[61] $\alpha_{DJIA} = 0.25$.

In addition, the Phillips curve can be written as follows:

$$\pi_t = \pi_t^e + \varphi(q_{t-1} - q_t^N) \quad (5)$$

or

$$\pi_t = \pi_t^e + \psi(u_{t-1} - u_t^N) \quad (6)$$

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

Monetary policy during the ZIRR (2008:12-2015:11)[62] was an experimental one by policymakers. It had a relatively low volatility in both output ($\sigma_{RGDP} = \pm 4.532\%$) and inflation ($\sigma_\pi = \pm 3.571\%$), as Table 1 reveals, but their mean values were also very low. In Euro-zone these volatilities are very high (Table 2). Figures 2 and Table 1 show that the volatility of the federal funds continued to decline throughout the Zero Interest Rate Era ($\sigma_{FFR} = \pm 0.040\%$). Trends in interest rates were declining throughout much of the ZIRR. The FOMC expected this to lead to higher inflation, but it did not. (*Sic*). The official inflation was $\bar{\pi} = 1.586\%$; but, the SGS inflation

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[59] See, Kallianiotis [35].

[60] If the growth of the DJIA was the moderate 7%, its value would have been since March 9, 2009: 6,547.05 $(1+0.07)^{11}$ = 13,780,885 or with 9% the highest (because the HRP = 8.7%), it would have been: 6,547.05 $(1+0.09)^{11}$ = 16,894.007. Then, the loss of wealth, due to coronavirus would have been relatively small. Thus, this new monetary policy was inefficient and ineffective to improve social welfare. See, Ross, et al. [54].

[61] The coefficient of unemployment is higher because full employment is the most important objective of every policy. Citizens of a country need work (employment), certainty (zero risk), confidence for the financial market (no bubbles and enormous declines), and low inflation (the true cost of production of a good).

[62] Stock and Watson [57] coined the term "great moderation" the period from October 1982-December 2008. Kallianiotis [36] took the period from 1995:01-2008:11 because this period was when the Fed started to maintain an inflation target of 2%. Here, we take the period from 2008:12-2015:11, the ZIRP regime and the New regime from 2015:12 to present.

was over 10%[63] during the Zero Interest Rate Era (ZIRR). The standard deviation (σ) of the growth of real personal consumption expenditures (GUSRPCE) was $\sigma_{g_{RPCE}} = \pm 3.788\%$. We had a big reduction of average growth of the GUSRGDP2012 to 1.857%. The volatility ($\sigma_{g_{DJIA}}$) had increased for the growth of the stock market (GUSDJIA) to $\pm$ 55.692% and the growth of the DJIA increased to 9.952% per annum, which keep pace with the growth of monetary base (GUSMB) to 14.289% (and $\sigma_{MB} = \pm 37.538\%$), as Table 1 show. This growth in the stock market has created a new bubble.[64] This is an indication of an extreme and inefficient (risky) monetary policy and out of control financial markets and financial institutions.

The recoveries were not as vigorous as those during the previous eras. As the economy was going to a deeper recession, the FOMC reduced the federal funds rate target to zero (Figure 2). By the time that USFFR was approximately at the same level with 3-month T-Bill rate, inflation and inflation expectations had moderated and the Fed was worrying for deflation. So the policy during the ZIR period was asymmetric: The FOMC eased aggressively when the economy was weak, but did not raise rates during expansions. The result was that the average USFFR ($\bar{i}_{FF}^{eff} = 0.129\%$) was 0.051% higher than the average STT3M ($\bar{i}_{RF} = 0.078\%$).

The story of Draghi's pledge to save the euro has become a big issue from all the liberal media with their fake news.[65] The euro area is an investors' free-for-all, and the stakes are as high as they get. The survival of the single currency, which for Draghi, like a few liberal and ignorant Europeans, is the emblem of an effort of a global single currency, which "will bring peace and prosperity to the entire world". (*Sic*). It was early summer of 2012, with financial markets doubtful that the weakest Euro-zone countries can repay their debts and with an economy plunging back into recession, the flaws of a single currency are all too apparent. There were 17 "independent" countries,[66] with a tangle of budgets, no unified governance, wildly different economies and a common currency and common monetary policy, which desperately tried to stimulate the economies of the PIIGSC with $3 trillion new money supply. Mario Draghi, as they said, saved the euro, but he did not save the Europeans, which must be the ultimate objective of public policies.

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[63] See, SGS inflation rate. http://www.shadowstats.com/alternate_data/inflation-charts

[64] 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 and to take revenge on Trump's anti-globalist policy.

[65] See, Kallianiotis [38].

[66] Now, the Euro-zone member-nations are 19. Latvia joined on January 1, 2014 and Lithuania on January 1, 2015, in the middle of the Euro-zone debt crisis. (*Sic*). It is amazing how the "leaders" of these countries are thinking or how much they are controlled.

Thus, his policy has failed.[67]

The biggest "surprise" for the Fed was that inflation did not accelerate in response to lower interest rates during this extended period of low interest rates; the official inflation from 2008 to 2015 was ($\bar{\pi} = 1.586\%$) because the unemployment was high and this high unemployment ($\bar{u} = 7.838\%$) causes reduction in personal income and aggregate demand, which affect negatively the price level.[68] 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,[69] Figure 1. It was not a surprise that the growth of monetary base has caused the enormous growth of the DJIA. (Figure 4).

Figure 3 and Table 1 show that after 2008, it was a period with low personal consumption expenditures ($\bar{g}_{PCE} = 3.407\%$ and $\bar{g}_{RPCE} = 1.821\%$). If there was no inflation, then interest rates probably were not too low, but the problem was the wrong measurement of inflation and unemployment. The 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 and in controlled governments. In EU, the corruption was in banking industry and in governments, too.[70]

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[67] See, "3 Words and $3 Trillion: The Inside Story of How Mario Draghi Saved the Euro". On July 26, 2012, the European Central Bank president drew a line in the sand and framed his legacy. https://www.bloomberg.com/news/features/2018-11-27/3-words-and-3-trillion-the-inside-story-of-how-mario-draghi-saved-the-euro?srnd=economics-vp

[68] 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 June 2018 was 21.5%, for October 2019 it fell to 21.0%, and it continues to be the same in January 2020. See, http://www.shadowstats.com/alternate_data/unemployment-charts . See also, Komlos [47], who measures labor market slack (the gap between the official unemployment rate and U6).

[69] See, United States GDP Growth Rate. https://tradingeconomics.com/united-states/gdp-growth

[70] This corruption in Europe reminds us the notorious corruption in France before the French Revolution (1789). See, Kallianiotis [40].

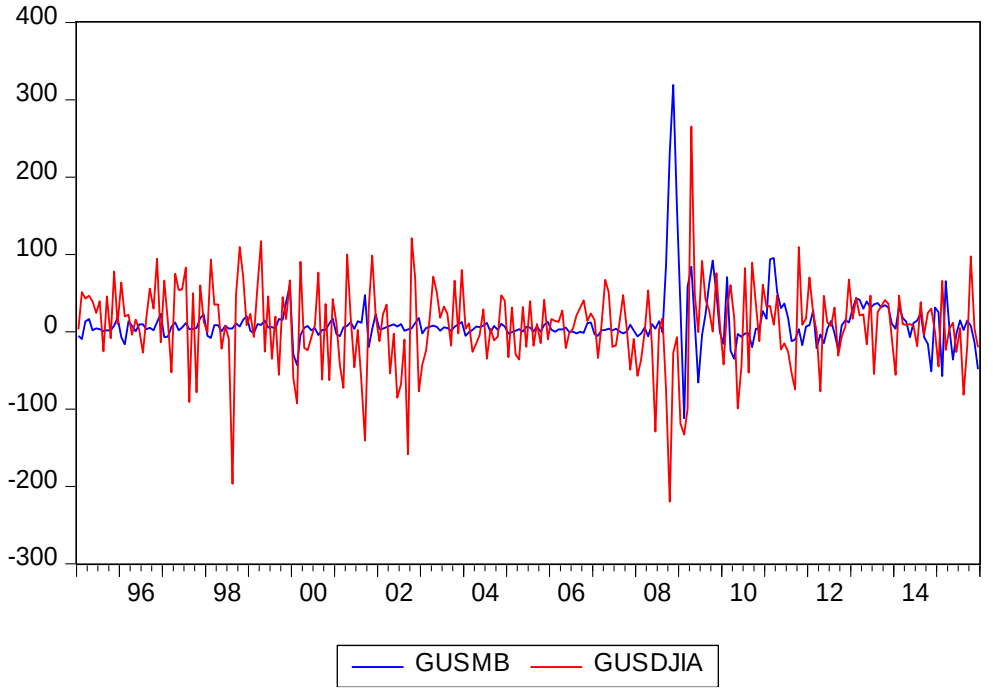

Figure 4: Growth of monetary base and Dow Jones Industrial Index

Note: GUSMB = growth of the U.S. monetary base and GUSDJIA= growth of the U.S. DJIA.

ZIRR: $\rho_{g_{MB},g_{DJIA}} = +0.189$, $g_{MB} \Rightarrow g_{DJIA}$ (F=14.464***). NR: $\rho_{g_{MB},g_{DJIA}} = +0.149$, $g_{MB} \Rightarrow g_{DJIA}$(F=3.356**).

Source: *Economagic.com*

3.2 The New Monetary Policy Regime (NMPR)

The New Monetary Policy Regime starts on December 16, 2015, when the Fed abandoned the ZIRR ($\bar{i}_{FF} = 0\% \; to \; 0.25\%$) and had begun to raise the $\bar{i}_{FF} = 0.50\%$ and continues, which had reached 2.50% and now back to 1.25%.[71] Fed had started to signal rate increase for the entire new monetary policy period.[72] This is also a period in which the Federal Reserve used interest rate targeting procedures to maintain the credibility for low inflation. The FOMC tried to maintain a 2% inflation target.[73] The method used to implement interest rate ($\bar{i}_{FF}$) targeting started in October 1982 and became more explicit after 1987 when Alan Greenspan replaced Paul Volcker as head of the Fed. The ECB continues with its zero interest rate policy.[74] The ECB continues with its "Old Regime" with a negative overnight deposit rate.

($\bar{i}^{*}_{OND} = -0.40\%$ since March 16, 2016 and -0.50% since September 18, 2019). The Euro-zone area it seems that cannot recover with common currency, austerities, internal devaluations, bail ins,[75] bail outs, capital controls, positive primary surpluses, and all the other half-measures; it need to abandon the destructive common currency (the euro).

For the ECB, Bianchi and Mondragon [6] show that the inability to use monetary policy for macroeconomic stabilization leaves a government more vulnerable to a rollover crisis. They study a sovereign default model with self-fulfilling rollover crises, foreign currency debt and nominal rigidities.

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[71] But, "Fed Tracking World Growth Worries, Chairman Powell Says". Central banker finds slowdown 'concerning,' but U.S. economy still strong. See, https://www.wsj.com/articles/fed-tracking-world-growth-worries-chairman-powell-says-1542242914 . See also, https://tradingeconomics.com/united-states/interest-rate

[72] The central bankers also express more fear about prolonged trade disputes. See, https://www.wsj.com/articles/fed-signals-rate-increase-at-next-month-1534961014?mod=article_inline&mod=article_inline

[73] See, Bullard [8, 122]. Even, Fed's George Calls for More Rate Increases. The Federal Reserve Bank of Kansas City leader was speaking on the sidelines of her bank's annual research conference in Jackson Hole, Wyo. https://www.wsj.com/articles/feds-george-calls-for-more-rate-increases-1535026744

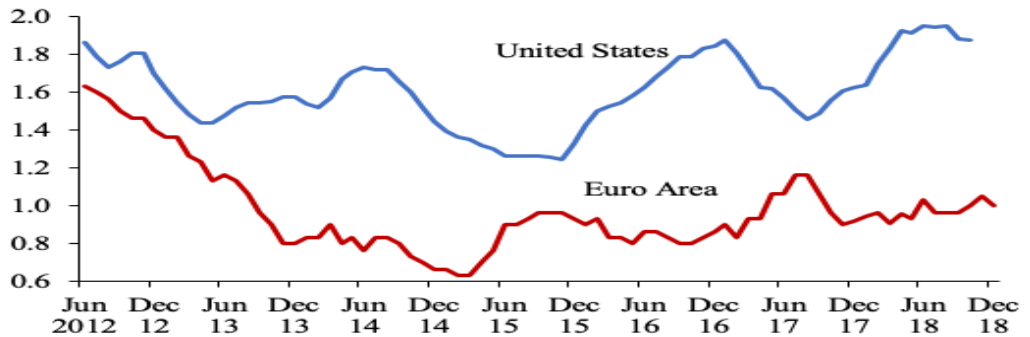
[74] See, "ECB to Press Ahead With QE Taper, Holds Rates". European Central Bank President Mario Draghi said Eurozone economic momentum is 'somewhat weaker'. https://www.wsj.com/articles/ecb-to-press-ahead-with-qe-taper-holds-rates-1540468560

[75] Of course, a negative real deposit rate ($r_D < 0$) in the U.S. is similar to a bail in. Banks are confiscating depositors' deposits, due to inflation.

When the government lacks monetary autonomy and national currency, as it is in the Euro-zone member-nations, lenders anticipate that the government will face a severe recession in the event of a liquidity crisis, different inflation rates (Graphs 4 and 5),[76]and are therefore more prone to run on government bonds. By contrast, a government with monetary autonomy can stabilize the economy and can easily remain immune to a rollover crisis. The lack of monetary autonomy played a central role in making the Euro-zone vulnerable to a rollover crisis. A lender of last resort can help ease the costs from giving up monetary independence.[77]

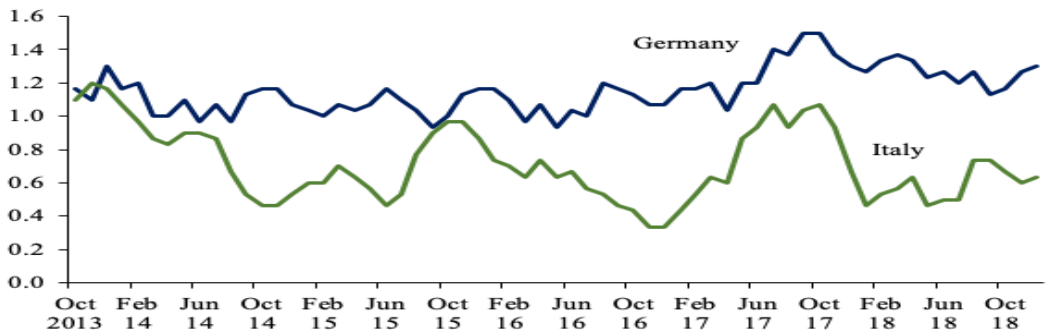
[76] Inflation rates:

Graph 4: U.S. and Euro-zone inflation



Note: Euro area inflation rate, three-month moving average of "core" annual inflation rates (percent). Sources: Eurostat: "HICP—All Items Excluding Energy and Food"; St. Louis Fed, FRED: "Personal Consumption Expenditures Excluding Food and Energy (Chain-Type Price Index)." See, Mody [50].

Graph 5: Inflation in Germany and Italy



Note: The euro area problem: a single monetary policy causes inflation divergence. Annual core inflation, three-month moving average (percent). Source: Eurostat. Core inflation is the annual percentage change in the Harmonized Index of Consumer Prices excluding energy, food, alcohol, and tobacco. December 2018 figures are Eurostat estimates. See, Mody [50].

[77] See, Bianchi and Mondragon [6], "Monetary Independence and Rollover Crises". https://www.minneapolisfed.org/research/wp/wp755.pdf

With a major policy reversal on March 7, 2019, the ECB became the first central bank to unveil new stimulus in response to the global economic slowdown.[78] The European Central Bank announced new stimulus plans and the Federal Reserve signaled more reluctance to raise U.S. interest rates this year.[79] ECB president Mario Draghi made further dovish comments on March 27, 2019, suggesting there could be another delay in hiking interest rates if required.[80] Six month later, in September 18, 2019, ECB reduced the OND rate further to -0.50%. Consequently, the ECB is paying interest on reserves since June 11, 2014,[81] as the "innovator" Fed is doing since October 2008.

Now, to test the effectiveness of both monetary policies during these two regimes, a VAR model is constructed. We use a vector autoregression (VAR) model for the interrelated objective variables of the U.S. monetary policy ($djia_t$, $rgdp_t$, i_{10YTB_t} , p_t , and u_t)[82] as endogenous dependent variables and as 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 independent exogenous variables. The same VAR is also used to test the effectiveness of the ECB policy. The mathematical representation is as follows:

$$
\begin{aligned}
djia_t &= \alpha_{11} djia_{t-j} + \beta_{11} gdp_{t-j} + \gamma_{11} i_{TB_{t-1}} + \delta_{11} p_{t-j} + \zeta_{11} u_{t-j} + c_o + \theta_{11} i_{FF_t}^{eff} + \kappa_{12} mb_t + \lambda_{13} m_t + \varepsilon_{1t} \\
rgdp_t &= \alpha_{21} djia_{t-j} + \beta_{21} gdp_{t-j} + \gamma_{21} i_{TB_{t-1}} + \delta_{21} p_{t-j} + \zeta_{21} u_{t-j} + c_o + \theta_{21} i_{FF_t}^{eff} + \kappa_{22} mb_t + \lambda_{23} m_t + \varepsilon_{2t} \\
i_{TB_t} &= \alpha_{31} djia_{t-j} + \beta_{31} gdp_{t-j} + \gamma_{31} i_{YTB_{t-j}} + \delta_{31} p_{t-j} + \zeta_{31} u_{t-j} + c_o + \theta_{31} i_{FF_t}^{eff} + \kappa_{32} mb_t + \lambda_{33} m_t + \varepsilon_{3t} \\
p_t &= \alpha_{41} djia_{t-j} + \beta_{41} gdp_{t-j} + \gamma_{41} i_{YTB_{t-j}} + \delta_{41} p_{t-j} + \zeta_{41} u_{t-j} + c_o + \theta_{41} i_{FF_t}^{eff} + \kappa_{42} mb_t + \lambda_{43} m_t + \varepsilon_{4t} \\
u_t &= \alpha_{51} djia_{t-j} + \beta_{51} gdp_{t-j} + \gamma_{51} i_{YTB_{t-j}} + \delta_{51} p_{t-j} + \zeta_{51} u_{t-j} + c_o + \theta_{51} i_{FF_t}^{eff} + \kappa_{52} mb_t + \lambda_{53} m_t + \varepsilon_{5t}
\end{aligned}
\tag{7}
$$

where, $djia_t$ = LUSDJIA = ln of U.S. Dow Jones Industrial Average Index, $rgdp_t$ = LUSRGDP2012 = 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,

[78] See, "Europe's Economy Starts 2019 With a Whimper", https://www.wsj.com/articles/europes-economy-starts-2019-with-a-whimper-11549366726?mod=article_inline&mod=article_inline . See also, "ECB Reverses Course With New Stimulus Measures". https://www.wsj.com/articles/ecb-to-launch-new-stimulus-measures-11551963228

[79] See, "Slow Growth Prods Central Banks". https://www.wsj.com/articles/ecb-fed-react-to-a-slowing-global-economy-11551990608

[80] See, "Draghi says the ECB stands ready to act and could delay a rate hike". https://www.cnbc.com/2019/03/27/ecb-president-mario-draghi.html

[81] See, Key ECB interest rates. https://www.ecb.europa.eu/stats/policy_and_exchange_rates/key_ecb_interest_rates/html/index.en.html

[82] Which are: ln of DJIA, ln of RGDP, yield on 10YTB, ln of CPI, and USU 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. Data and Empirical Results

This study uses five monthly economic indicators over the period December 2008-December 2018. They include the effective federal funds rate (i_{FF}^{eff}) and the OND rate (i_{OND}), the yield on 10-year government bonds (i_{10YGB} and i_{10YGB}^{*}), year-over-year inflation (π and π^{*}) in the consumer price index (CPI and $HICP$), and the growth rate of real GDP (g_{RGDP} and g_{RGDP}^{*}), the growth of the financial markets (g_{DJIA} and g_{SX5E_Indes}). The fundamental policy goals involve inflation and real economic activity (unemployment), hence the inclusion of *CPI* and GDP (u). The policy instruments are i_{FF}^{eff} and i_{OND}. Once i_{FF}^{eff} hits the zero lower bound, the FOMC uses balance-sheet policies to lower rates on long-term assets represented here by the 10-year government bonds rate (i_{10YGB}). 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}, and i_{3MDL}), the personal savings rate (psr), the spread between the effective federal funds rate and the yield on the 10-year government bonds [$spread(i_{FF}^{eff} - i_{10YGB})$], 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^{*}). The nominal (i) and the real (r) interest rates; the natural logarithms of variable X ($\ln X$) and the rate of growth (g_X) of the variables, their mean values, standard deviations, and some correlation coefficients, and causality tests are also measured.

Policymakers place a large value on models that "fit the data."[83] Econometric methods extract information from the dynamic variance-covariance structure of data. There were statistically significant changes in the variance-covariance structure of datasets that include nominal indicators. It was also generally true that there did not appear to be significant changes in the variance-covariance structure of datasets that included only real quantities such as consumption, investment, or labor (unemployment).

[83] See, Gavin and Kydland [28] and [27].

Table 1: U.S. average values and standard deviations

	Zero Interest Rate Regime (2008:12-2015:11)		New Regime (2015:12-2018:12)	
	$\overline{R}$	σ_R	$\overline{R}$	σ_R
USFFR	0.129%	0.040%	1.054%	0.638%
USRFFR	-1.458%	3.570%	-0.853%	2.441%
USMB	2866.094	833.296	3757.755	140.920
LUSMB	7.918	0.298	8.231	0.038
GUSMB	14.289%	37.538%	-5.845%	23.333%
M2	9987.648	1301.828	13472.13	595.869
LUSM2	9.201	0.130	9.507	0.045
GUSM2	6.163%	6.395%	5.326%	3.718%
USCPI	227.366	8.464	245.215	4.922
LUSCPI	5.426	0.038	5.502	0.020
USINF	1.586%	3.571%	1.906%	2.371%
US10YTB	2.586%	0.628%	2.357%	0.474%
USR10YTB	1.000%	3.493%	0.451%	2.439%
SPREAD1	-2.457%	0.620%	-1.304%	0.311%
STT3M	0.078%	0.058%	0.986%	0.665%
RRFRI	-1.508%	3.561%	-0.920%	2.481%
USPCE	11029.96	817.193	13380.31	532.171
LUSPCE	9.306	0.074	9.501	0.040
GUSPCE	3.407%	3.907%	4.365%	2.767%
GUSRPCE	1.821%	3.788%	2.459%	3.058%
GAP1	-3.279%	3.913%	-3.312%	2.803%
USDJIA	13361.00	3104.75	21596.05	3180.336
LUSDJIA	9.471	0.247	9.969	0.150
GUSDJIA	9.952%	55.692%	10.780	41.747
USRDJIA	5835.631	1166.922	8786.433	1134.105
LUSRDJIA	8.651	0.211	9.073	0.131
GUSRDJIA	8.366%	55.666%	8.873%	41.599%
USRGDP2012	16207.12	709.469	18111.24	484.100
LUSRGDP2012	9.692	0.044	9.804	0.026
GUSRGDP2012	1.857%	4.532%	3.110%	6.431%
USU	7.838%	1.544%	4.389%	0.441%
USPSR	5.264%	1.169%	3.805%	1.045%
RPUS10YTB (Risk)	2.508%	0.606%	1.371%	0.321%

Note: USFFR = U.S. effective federal funds rate, USRFFR = U.S. real effective federal funds rate, USMB = U.S. monetary base, LUSMB = ln of U.S. monetary base, GUSMB = growth of U.S. monetary base, M2 = money supply (M2), LUSM2 = ln of money supply (M2), GUSM2 = growth

of money supply (M2), USCPI = U.S. consumer price index, LUSCPI = ln of USCPI, USINF = U.S. inflation rate, US10YTB = U.S. 10-year Treasury bonds rate, USR10YTB = U.S. real 10-year Treasury bonds rate, SPREAD1 = spread between the effective federal funds rate and the yield on 10-year Treasury bonds (normal, positive; flat; inverted yield curve, negative), STT3M= short-term Treasury bill 3-month maturity, RRFRI = real risk-free rate of interest ($i_{RF} - \pi$), USPCE = U.S. personal consumption expenditures, LUSPCE = ln of USPCE, GUSPCE = growth of the USPCE, GUSRPCE = growth of the U.S. real PCE, GAP1 = the gap between the real effective federal funds rate and the growth of the real PCE (=USRFFR-GUSRPCE), USDJIA = the U.S. Dow Jones Industrial Average, LUSDJIA = ln of the DJIA, GUSDJIA = growth of the DJIA, USRDJIA = U.S. real DJIA, LUSRDJIA = ln of the real DJIA, GUSRDJIA = growth of the real DJIA, USRGDP2012 = U.S. real GDP (2012 base year), LUSRGDP2012 = ln of the U.S. real GDP (2012 base year), GUSRGDP2012 = growth of the U.S. real GDP (2012 base year), USU = U.S. unemployment rate, USPSR = U.S. personal savings rate, RPUS10YTB = risk premium on 10-year Treasury bonds (=US10YTB-STT3M), $\overline{R}$ = the average value of the variable, and σ_R = the standard deviation of the variable.

Source: Economagic.com and Yahoo/Finance

Table 2: Euro-zone average values and standard deviations

Positive, Zero, and Negative Interest Rate (2008:12-2015:11)			Deep Negative Interest Rate Regime (2015:12-2018:12)	
	$\overline{R}$	σ_R	$\overline{R}$	σ_R
EUOND	0.527%	0.437%	-0.035%	0.194%
EUROND	-0.729%	6.327%	-1.320%	6.417%
ECBMB	-	-	-	-
LECBMB	-	-	-	-
GECBMB	-	-	-	-
EUM2	8,877.222	600.906	10,960.040	446.261
LEUM2	9.089	0.067	9.301	0.041
GEUM2	3.425%	4.731%	4.479%	5.579%
EUHICP	96.713	3.260	101.808	1.608
LEUHICP	4.571	0.034	4.623	0.016
EZINF	1.256%	6.316%	1.284%	6.387%
EU10YGB	3.137%	1.041%	1.125%	0.225%
EUR10YGB	1.881%	6.305%	-0.159%	6.383%
EUSPREAD	-2.610%	0.861%	-1.160%	0.358%
EU3MDL	0.333%	0.354%	-0.328%	0.064%
EUR3MDL	-0.923%	6.333%	-1.613%	6.397%
EUPCE	1,367.978	39.587	1,506.658	39.433
LEUPCE	14.128%	0.029%	14.225%	0.026%
GEUPCE	1.261%	3.624%	2.728%	4.167%
GEURPCE	0.005%	7.758%	1.443%	9.203%
EUGAP	-0.734%	3.764%	-2.763%	4.163%
SX5E_Index	2,812.760	395.733	3,299.634	241.304
LSX5E_Index	7.932	0.141	8.099	0.074
GSX5E_Index	5.237%	63.576%	-5.205%	44.767%
RSX5E_Index	2,593.936	494.508	3,239.385	218.015
LRSX5E_Index	7.844	0.185	8.081	0.068
GRSX5E_Index	6.309%	69.082%	-6.431%	44.023%
EMUGDP	2,558,428	111,324.9	2,796,566	105,276.5
LEMUGDP	14.754	0.043	14.843	0.038
GEMUGDP	0.327%	33.378%	3.008%	23.026%
EZU	10.764%	0.927%	9.158%	0.820%
EUPSR	12.694%	2.324%	11.965%	2.204%
RPEU10YGB (Risk)	2.804%	0.881%	1.454%	0.249%

Note: EUOND = ECB overnight deposit rate, EUROND = ECB real OND rate, ECBMB = ECB monetary base, LECBMB = ln of ECB monetary base, GECBMB = growth of ECB monetary base,

EUM2 = money supply (M2), LEUM2 = ln of money supply (M2), GEUM2 = growth of money supply (M2), EUHICP = EU Harmonized Index of Consumer Prices, LEUHICP = ln of EUHICP, EZINF = Euro-zone inflation rate, EU10YGB = Euro-zone 10-year government bonds rate, EUR10YGB = Euro-zone real 10-year government bonds rate, EUSPREAD = spread between the EUOND rate and the yield on EU 10-year government bonds (normal, positive; flat; inverted yield curve, negative), EU3MDL= EU 3-month deposit rate (LIBOR), EUR3MDL = EU real 3-month deposit rate (LIBOR), EUPCE = EU personal consumption expenditures, LEUPCE = ln of EUPCE, GEUPCE = growth of the EUPCE, GEURPCE = growth of the EU real PCE, EUGAP = the gap between the real effective OND rate and the growth of the real PCE (=EUROND-GEURPCE), SX5E_Index = the EURO STOXX 50 stocks index,[84] LSX5E_Index = ln of the SX5E_Index, GSX5E_Index = growth of the SX5E_Index, RSX5E_Index = EU real SX5E_Index, LRSX5E_Index = ln of the real SX5E_Index, GRSX5E_Index = growth of the real SX5E_Index, EMUGDP = Euro-zone real GDP, LEMUGDP = ln of the Euro-zone real GDP, GEMUGDP = growth of the Euro-zone real GDP, EZU = Euro-zone unemployment rate, EUPSR = EU personal savings rate, RPEU10YGB = risk premium on 10-year government bonds (=EU10YGB-EU3MDL), $\overline{R}$ = the average value of the variable, and σ_R = the standard deviation of the variable.

Source: ECB, Eurosystem, http://sdw.ecb.europa.eu/

Kallianiotis [36] shows the correlation coefficients between the U.S. variables during the two regimes (2008:12-2015:11 and 2015:12-2018:12). Also, he reveals the causality tests for the two regimes in the U.S. The federal funds rate (FFR) is negatively correlated with CPI (inflation), real GDP, personal consumption expenditures, and DJIA. Then, the reduction of the federal funds 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, $FFR \Rightarrow GUSRGDP2012$, and $FFR \Rightarrow USU$. The monetary base (MB) and the money supply (M2) have positive effect on PCE, DJIA, LUSRGDP2012, and negative effect with USU. Furthermore, $MB \Rightarrow PCE$, $MB \Rightarrow DJIA$, $MB \Rightarrow LUSRGDP2012$, and $MB \Rightarrow USU$; $M2 \Rightarrow DJIA$, $M2 \Rightarrow LUSRGDP2012$, $M2 \Rightarrow USU$. In addition, FFR is positively correlated with GAP1 and negatively with SPREAD1; $FFR \Rightarrow GAP1$ and $FFR \Rightarrow SPREAD1$.

The VAR results for the U.S. for the period 2008:12-2015:11 appeared in Table 3 and for the period from 2015:12 to 2018:12 are shown in Table 4 below. During the period of ZIRR, the Fed monetary policy had a significant effect only on official unemployment. For the New Era, the Fed had some effects on DJIA, on GDP, and on prices.

[84] It is a stock index of 50 Eurozone stocks. See, https://www.bing.com/search?q=SX5e_Index&src=IE-SearchBox&FORM=IESR3N

Table 3: Vector Autoregression estimates for the U.S. (2008:12-2015:11)

Variables	$djia_t$	$rgdp_t$	i_{10YTB_t}	p_t	u_t
$djia_{t-1}$	0.678***	-0.002	0.823	0.016**	0.347
	(0.119)	(0.011)	(0.554)	(0.008)	(0.357)
$djia_{t-2}$	-0.206*	-0.001	-0.640	0.001	-0.723**
	(0.117)	(0.011)	(0.542)	(0.007)	(0.350)
$rgdp_{t-1}$	0.604	0.660***	-5.781	-0.034	-3.833
	(1.305)	(0.119)	(6.044)	(0.083)	(3.895)
$rgdp_{t-2}$	1.505	0.121	11.026*	-0.038	-6.948*
	(1.364)	(0.124)	(6.319)	(0.087)	(4.072)
$i_{10YTB_{t-1}}$	0.021	0.002	0.990***	-0.001	-0.233***
	(0.024)	(0.002)	(0.110)	(0.002)	(0.071)
$i_{10YTB_{t-2}}$	-0.005	-0.002	-0.211*	-0.001	0.176**
	(0.026)	(0.002)	(0.119)	(0.002)	(0.077)
p_{t-1}	-1.393	0.096	0.891	1.074***	8.692*
	(1.728)	(0.157)	(8.005)	(0.110)	(5.158)
p_{t-2}	1.615	-0.023	-17.882***	-0.307***	-5.925
	(1.579)	(0.144)	(7.315)	(0.101)	(4.714)
u_{t-1}	0.024	0.001	0.382***	0.001	0.659***
	(0.035)	(0.003)	(0.163)	(0.002)	(0.105)
u_{t-2}	0.017	0.001	-0.260*	-0.001	0.117
	(0.031)	(0.003)	(0.146)	(0.002)	(0.093)
c_0	-21.567**	1.334	15.625	1.503**	100.804***
	(9.876)	(0.899)	(45.755)	(0.630)	(29.484)
$i_{FF_t}^{eff}$	-0.102	0.035	-0.989	-0.006	1.963***
	(0.262)	(0.024)	(1.214)	(0.017)	(0.782)
mb_t	0.102	0.021	0.641	0.013	0.952*
	(0.178)	(0.016)	(0.826)	(0.011)	(0.532)
m_t	0.422	0.026	2.056	0.021	-1.552
	(0.419)	(0.038)	(1.943)	(0.027)	(1.252)
R^2	0.976	0.994	0.920	0.996	0.995
SEE	0.042	0.004	0.193	0.003	0.125
F	218.563	807.381	61.995	1263.581	975.740
N	84	84	84	84	84

Note: $djia_t$ = LUSDJIA = ln of U.S. Dow Jones Industrial Average Index, $rgdp_t$ = LUSRGDP2009

= 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.

Table 4: Vector Autoregression estimates for the U.S. (2015:12-2018:12)

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

Note: See, Table 3.
Source: See, Table 1.

The VAR estimations for Euro-zone are given in Tables 5 and 6. For the Positive, Zero and Negative Interest Rate Era, the ECB policy has affected EU10YGB (reduction, liquidity effect), and unemployment (reduction). (Table 5). For the Deep Negative Interest Rate Era, the monetary policy has no significant effect on any objective variable (Table 6). Thus, ECB's monetary policy is completely ineffective,[85] which is catastrophic for the poor Euro-zone member-nations. (*Sic*).

[85] These results show that ECB's monetary policy after 2015 is a big failure.

Table 5: VAR estimations of the objective variables for Euro-zone (2008:12-2015:11)

Variables	$sx5e\_index_t$	$emugdp_t$	$i^*_{10YGB_t}$	p^*_t	u^*_t
$sx5e\_index_{t-1}$	0.732***	0.003	-0.232	-0.007	-0.254
	(0.135)	(0.072)	(0.554)	(0.051)	(0.164)
$sx5e\_index_{t-2}$	-0.100	-0.008	0.602	-0.050	0.088
	(0.127)	(0.068)	(0.518)	(0.047)	(0.153)
$emugdp_{t-1}$	0.401*	0.843***	1.673*	0.079	-0.181
	(0.255)	(0.136)	(1.043)	(0.095)	(0.308)
$emugdp_{t-2}$	-0.197	-0.203	-0.675	-0.069	0.514*
	(0.265)	(0.142)	(1.084)	(0.099)	(0.321)
$i^*_{10YGB_{t-1}}$	0.027	0.030**	0.884***	0.007	-0.087***
	(0.030)	(0.016)	(0.121)	(0.011)	(0.036)
$i^*_{10YGB_{t-2}}$	-0.035	-0.025*	-0.090	-0.011	0.058*
	(0.030)	(0.016)	(0.123)	(0.011)	(0.036)
p^*_{t-1}	-0.254	0.039	0.991	0.917***	0.121
	(0.320)	(0.171)	(1.308)	(0.120)	(0.386)
p^*_{t-2}	-0.083	-0.147	1.133	-0.048	0.034
	(0.341)	(0.183)	(1.395)	(0.128)	(0.412)
u^*_{t-1}	-0.177*	-0.035	-0.289	-0.038	1.257***
	(0.104)	(0.056)	(0.425)	(0.039)	(0.126)
u^*_{t-2}	0.193**	0.030	0.233	0.041	-0.268***
	(0.102)	(0.054)	(0.416)	(0.038)	(0.123)
c_0	1.754	5.021***	-3.848	1.808	-0.734
	(3.531)	(1.890)	(14.445)	(1.321)	(4.269)
$i^*_{OND_t}$	-0.008	0.005	-0.009	0.008	0.048**
	(0.023)	(0.012)	(0.093)	(0.008)	(0.027)
m^*_t	-0.044	0.098	-2.481***	-0.101	0.221
	(0.280)	(0.150)	(1.147)	(0.105)	(0.339)
R^2	0.894	0.660	0.968	0.913	0.996
SEE	0.051	0.027	0.207	0.019	0.061
F	47.882	11.015	168.791	59.496	1483.708
N	81	81	81	81	81

Note: *SEE* = S.E. equation. See also, Table 3.
Source: See, Table 2.

Table 6: VAR estimations of the objective variables for the Euro-zone (2015:12-2018:12)

Variables	$sx5e\_index_t$	$emugdp_t$	$i^*_{10YGB_t}$	p^*_t	u^*_t
$sx5e\_index_{t-1}$	0.756***	0.041	1.489**	0.025	-0.407*
	(0.204)	(0.098)	(0.811)	(0.022)	(0.246)
$sx5e\_index_{t-2}$	-0.009	-0.108	-1.352*	-0.034*	0.346
	(0.193)	(0.093)	(0.768)	(0.021)	(0.233)
$emugdp_{t-1}$	0.023	0.446**	-1.472	-0.021	-0.103
	(0.460)	(0.222)	(1.829)	(0.050)	(0.555)
$emugdp_{t-2}$	-0.206	-0.200	1.201	-0.082*	0.091
	(0.468)	(0.225)	(0.646)	(0.051)	(0.564)
$i^*_{10YGB_{t-1}}$	0.048	-0.001	0.961***	0.006	-0.046
	(0.050)	(0.024)	(0.199)	(0.006)	(0.060)
$i^*_{10YGB_{t-2}}$	-0.032	-0.008	-0.347*	-0.004	-0.023
	(0.052)	(0.025)	(0.207)	(0.006)	(0.063)
p^*_{t-1}	1.005	0.839	0.385	0.358**	0.703
	(1.788)	(0.860)	(7.104)	(0.196)	(2.154)
p^*_{t-2}	-3.358**	-0.076	2.467	-0.047	0.956
	(1.779)	(0.856)	(7.068)	(0.195)	(2.143)
u^*_{t-1}	-0.061	-0.001	-0.446	-0.009	0.500***
	(0.168)	(0.081)	(0.668)	(0.018)	(0.203)
u^*_{t-2}	-0.013	-0.043	0.328	-0.007	0.430**
	(0.180)	(0.087)	(0.716)	(0.020)	(0.217)
c_0	16.376	11.986	13.991	5.029***	8.559
	(18.396)	(8.853)	(73.100)	(2.018)	(22.163)
$i^*_{OND_t}$	0.105	0.024	-0.074	-0.008	0.042
	(0.074)	(0.036)	(0.294)	(0.008)	(0.089)
m^*_t	-0.007	-0.362	-2.445	-0.010	-1.604
	(1.748)	(0.841)	(6.947)	(0.192)	(2.106)
R^2	0.841	0.858	0.730	0.957	0.998
SEE	0.036	0.017	0.143	0.004	0.043
F	10.606	12.061	5.397	44.577	1067.823
N	37	37	37	37	37

Note: *SEE* = S.E. equation. See, Table 3.
Source: See, Table 2.

We also test the Phillips curve for the two Eras and the two economies. Low inflation together with high unemployment must support the conventional wisdom that there is a Phillips curve, here; but, the data discredited the Phillips curve as a policy framework, which is questionable. The only explanation can be that the high unemployment reduces personal income and affects negatively the aggregate demand ($AD\downarrow$), then prices are falling or something wrong with the official measurement of inflation and unemployment.
By testing the Phillips curve equation, eq. (6), we found as results:

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

(i) U.S.A.:

$$\pi_t = 1.015^{***}\,\pi_t^e - 0.074\,(u_{t-1} - u_t^N)$$
$$(0.036) \qquad (0.064)$$
$$R^2 = 0.349,\ SER = 3.351,\ D-W = 2.009,\ \ N = 817$$

(ii) Euro-zone

$$\pi_t = 1.001^{***}\,\pi_t^e - 0.001^{**}\,(u_{t-1} - u_t^N)$$
$$(0.001) \qquad (0.001)$$
$$R^2 = 0.980,\ SER = 0.011,\ D-W = 2.063,\ \ N = 247$$

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

(i) U.S.A.:

$$\pi_t = 0.849^{***}\,\pi_t^e + 0.101\,(u_{t-1} - u_t^N)$$
$$(0.264) \qquad (0.132)$$
$$R^2 = 0.145,\ SER = 3.322,\ D-W = 2.108,\ \ N = 84$$

(ii) Euro-zone:

$$\pi_t = 1.004^{***}\,\pi_t^e - 0.003\,(u_{t-1} - u_t^N)$$
$$(0.003) \qquad (0.002)$$
$$R^2 = 0.905,\ SER = 0.018,\ D-W = 2.106,\ \ N = 83$$

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

(i) U.S.A.:

$$\pi_t = 1.127^{***}\,\pi_t^e - 1.198\,(u_{t-1} - u_t^N)$$
$$(0.235) \qquad (0.904)$$
$$R^2 = 0.169,\ SER = 2.191,\ D-W = 2.068,\ \ N = 37$$

(ii) Euro-zone:

$$\pi_t = 1.001^{***}\,\pi_t^e - 0.001\,(u_{t-1} - u_t^N)$$
$$(0.001) \qquad (0.001)$$
$$R^2 = 0.891,\ SER = 0.005,\ D-W = 2.126,\ \ N = 37$$

The coefficient of the U.S. unemployment (ψ), for the entire period (1950:12-2018:12), is negative ($\psi < 0$), but statistically insignificant. For the Euro-zone, it is negative and significant at the 5% level. During the ZIRP period (2008:12-2015:11) the U.S. unemployment coefficient became positive ($\psi > 0$) but insignificant. For the Euro-zone, it is negative but insignificant, too. Currently with the New Regime (2015:12-2018:12) the sign of the U.S. unemployment coefficient became again negative ($\psi < 0$) but it is insignificant. For the Euro-zone, the unemployment coefficient is negative but insignificant. Thus, these results show that the Phillips curve does not hold any more and especially, during the ZIRP regime for the U.S.[86] (*sic*). For the Euro-zone, the Phillips curve exists for the long term; during the periods of 2008-2018, still it give a negative sign, but it is insignificant.
In addition, we use the Taylor's rule to see if the target federal funds rate was the appropriate according to the rule. Taylor's rule can be modified by using unemployment instead of GDP:

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

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 federal funds rate was between (0.00%-0.25%) for the period 2008:12 to 2015:11.[87] Thus, i_{FF} must have been:

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

From 2015:12 to 2018:12 the i_{FF} must have been:

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

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

For the Euro-zone, the results are:

(1) For the period 2008:12 to 2015:11, the $\bar{i}_{OND}$ must have been:

$i_{OND} = 1.256\% + 1\% + 0.5(1.256\% - 2\%) - 0.5(10.764\% - 4\%) = -1.498\%$; it was 0.527%, which was very high.

(2) From 2015:12 to 2018:12 the $\bar{i}_{OND}$ must have been:

$i_{OND} = 1.284\% + 1\% + 0.5(1.284\% - 2\%) - 0.5(9.158\% - 4\%) = -0.653\%$; but it was -0.035%, which was high.

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[86] See also, Williamson [64] and Summers [58]. In fact, in the U.S., we have become pure consumers and our system from "capitalism" is becoming "debtism".

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

Then, by using the Bullard rule, we have:

$$\bar{i}_{FF_t} = \rho\, i_{FF_{t-1}} + (1-\rho)[r_t^* + \pi^* + \phi_\pi(\pi_t - 2\%) + \phi_q(u_t - 4\%)] \qquad (3')$$

For the ZIRR (2008:12-2015:11) the i_{FF} must have been:

$$i_{FF} = 0.85(0.25\%) + 0.15[1\% + 2\% + 1.5(1.586\% - 2\%) + 1(7.838\% - 4\%) = 1.14505\%;$$

but it was 0.129%, very low.

For the NR (2015:12-2018:12) the i_{FF} must have been:

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

$$i_{FF} = 0.85(0.25\%) + 0.15[1\% + 2\% + 1.5(1.906\%) + 1(4.389\% - 4\%) = 0.6997\%$$

which was low.

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

$$i_{FF} = 0.85(0.50\%) + 0.15[1\% + 2\% + 1.5(1.906\% - 2\%) + 1(4.389\% - 4\%) = 0.9122\%$$

which was low.

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

$$i_{FF} = 0.85(2.25\%) + 0.15[1\% + 2\% + 1.5(1.906\% - 2\%) + 1(4.389\% - 4\%) = 2.3997\%$$

which was relatively good.

(iv) When $\bar{i}_{FF} = 1.75\%$:

$$i_{FF} = 0.85(2.00\%) + 0.15[1\% + 2\% + 1.5(1.906\% - 2\%) + 1(4.389\% - 4\%)] = 2.4122\%$$

which is very low (1.75%).

Currently, with i_{FF} =1.25%, it is still low; the target rate must be 1.975%. Thus, even Bullard's rule shows that the target federal funds rate is relatively low.

For the Euro –zone, the Bullard rule gives:

(1) For the ZIRR (2008:12-2015:11) the i_{OND} must have been:

$$i_{OND} = 0.85(2.75\%) + 0.15[1\% + 2\% + 1.5(1.256\% - 2\%) + 1(10.764\% - 4\%)] = 3.9695\%$$

which was low (2%).

(2) For the NR (2015:12-2018:12) the i_{OND} must have been:

$$i_{OND} = 0.85(-0.40\%) + 0.15[1\% + 2\% + 1.5(1.284\% - 2\%) + 1(9.158\% - 4\%)] = 1.0448\%$$

which is very low (-0.50%)

Lastly, the Kallianiotis rule:

$$\bar{i}_{FF_t} = \pi_t + r_t^* + \alpha_\pi(\pi_t - \pi_t^*) - \alpha_u(u_t - u_t^N) + \alpha_{DJIA}(g_{DJIA_t} - g_{DJIA_t}^*) \qquad (4')$$

For the U.S., the Kallianiotis rule gives the following results:

(1) For the ZIRR (2008:12-2015:11) the i_{FF} must have been:

$$i_{FF} = 1.586\% + 1\% + 0.25(1.586\% - 2\%) - 0.50(7.838\% - 4\%) + 0.25(9.952\% - 7\%) = 1.5095\%$$

which was very low (0.00%).

(2) For the NR (2015:12-2018:12) the i_{FF} must have been:

$$i_{FF} = 1.906\% + 1\% + 0.25(1.906\% - 2\%) - 0.50(4.389\% - 4\%) + 0.25(10.78\% - 7\%) = 3.633\%$$

which is very low (1.75%).

For the Euro-zone, the Kallianiotis rule gives the following results:

(1) For the ZIRR (2008:12-2015:11) the i_{OND} must have been:

$$i_{OND} = 1.256\% + 1\% + 0.25(1.256\% - 2\%) - 0.50(10.764\% - 4\%) + 0.25(5.237\% - 7\%) = -1.7195\%$$

which was very high (0.527%).

(2) For the NR (2015:12-2018:12) the i_{OND} must have been:

$$i_{OND} = 1.284\% + 1\% + 0.25(1.284\% - 2\%) - 0.50(9.158\% - 4\%) + 0.25(-5.205\% - 7\%) = 2.57725\%$$

which was very low (-0.035%).

The results show that the target rates of both central banks (Fed and ECB) are very low. The empirical results and all the tests and rules show that these monetary policies do not promote social welfare, but cause serious problems to U.S. and European citizens.

5. Policy Implications of the Latest Monetary Regimes by the Fed and the ECB

Six important issues arose during the ZIRP regime; (1) controversy surrounding the use of the Fisher equation ($i = r + \pi^e$) to explain low inflation, (2) controversy over the cause of low real interest rates ($r = i - \pi^e$), (3) controversy over the discredited Phillips curve, (4) controversy over the IOR (bail out), (5) controversy over the zero deposit rate (bail in), and (6) controversy over the effectiveness of the single (ECB) and the dual (Fed) mandate on social welfare. The correlation between USINF and USU was $\rho_{\pi,u} = +0.180$, but there is no any causality between the two variables.

The regression equation gives a coefficient +0.101 and it is insignificant. The low real interest rate is due to inflation ($\pi = 1.586\%$), which gives a USR10YTB ($r_{10YTB} = 1.000\%$) and a RRFRI negative ($r_{RF}^{*} = -1.508\%$).[88] Of course, it is not reasonable to think that monetary policy[89] itself is the cause of the low natural rate estimated by Federal Reserve economists.

The Fisher equation[90] is an equilibrium condition, which says that, no matter what policy regime is in effect, the market interest rate will be the sum of two components; a real return (r) and a premium for 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, ($0 = \bar{i}_{FF} = r \uparrow + \pi^{e} \downarrow$), which cannot happen in reality, due to the enormous liquidity. 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[91] among economists and non-economists, and the real interest rate negative. Depositors were and are paying the banks for keeping their deposits. (*sic*). The $r_D = i_D - \pi < 0$ because the Fed has introduced the interest on reserves (IOR), which is paid by the poor taxpayers. These monetary policies are completely unethical and anti-social acts by the "independent" Fed and ECB.

As it was mentioned above and it is known to every saver, the $i_D \cong 0\%$ since 2008. Now, however, the average savings account pays only 0.10% annually,[92] that is one-tenth of 1%, and many of the country's biggest banks pay less than that (0.05%). If you were to put $10,000 in a regular bank in the U.S. savings account (paying 0.05%) today, in a year you would have collected only $5 in interest. But he has offered to the bank (inflationary revenue from his deposits $180 = $10,000x1.80%) a net revenue of $175 (*bail in*). The U.S. total deposits were

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[88] Historically, the average real risk-free rate of interest for the U.S. economy is positive ($r^{*} = 0.4\%$). See, Ross, Westerfield, Jaffe, and Jordan [54, 311]. Another measure of the real interest rate that is relatively independent of monetary policy is the ex post return to capital (see, Gomme, Ravikumar, and Rupert [30] and [29]. Bullard [9] uses Gomme, Ravikumar, and Rupert, [30] and [29] data when explaining that it is the real interest rate on safe assets, not real returns to capital, that are abnormally low.

[89] 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 [38].

[90] Williamson [67] presents a macroeconomic model that captures many features of the post-crisis economy and emphasizes the role of the Fisher equation. See also, Williamson [65] and [66] for a less-formal treatment of the issue.

[91] See, SGS. http://www.shadowstats.com/alternate_data/inflation-charts.

[92] See, https://www.bankrate.com/banking/savings/best-high-yield-interests-savings-accounts/

$14,275,617 million.[93] Then, the inflationary bail in is $249,823.298 million per annum. That is true for the depositors; but banks themselves are earning 1.55% on their deposits at the Federal Reserve.[94] These deposits can be required (IORR) or excess reserves (IOER), include the reserves the banks have from our deposits, and on which they are paying almost nothing; and unlike with our deposits, there is no $250,000 cap on the sums banks can stash at the Fed amassing interest. A whopping $1,535,831 million in reserves are now (11/20/2019) sitting in Fed reserve accounts.[95] The Fed rebates its profits (seigniorage)[96] to the government after deducting its costs, and interest paid to banks is one of those costs. That means we, the taxpayers, are paying $23,805.381 million annually (*bail out*) to private banks for the privilege of parking their excess reserves at one of the most secure banks in the world "parking them, rather than lending them out."[97] This policy tool is, if not anything else, a unfair policy against small savers (investors) with a bail in (due to negative real deposit rate, $r_D = i_D - \pi = 0.05\% - 1.8\% = -1.75\%$)[98] and against the poor taxpayers with a bail out (of $23.805 billion per annum) and another bail in of $249.823 billion, a total social cost of $273.628 billion per annum.[99] Political leaders have to do something for these private and "independent" from the public and the indifferent from the social welfare of the countries central banks. Their policies are ineffective for the economy and anti-social for the people.

In theory, real interest rates matter for real economic activity because they influence consumption, investment, savings decisions, wealth, and welfare. 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

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[93] See, https://ycharts.com/indicators/us_banks_total_deposits . See also, https://fred.stlouisfed.org/series/DPSACBW027SBOG .Further, http://www.bankregdata.com/allDP.asp

[94] Interest on Required Reserve Balances and Excess Balances. https://www.federalreserve.gov/monetarypolicy/reqresbalances.htm

[95] Currency, https://fred.stlouisfed.org/series/MBCURRCIR . Monetary Base, https://fred.stlouisfed.org/series/BASE/

[96] Seigniorage is the difference between the face value of money, such as a $100 bill, and the cost to produce it ($0.50), the profit is $99.50. In other words, the economic cost of producing a currency within a given economy or country. If the seigniorage is positive, the central bank will make an economic profit, with which it will pay for its expenses and the remaining balance will be offered to government; while a negative seigniorage will result in an economic loss.

[97] See, Ellen Brown, "Why Is the Fed Paying So Much Interest to Banks?", https://www.truthdig.com/articles/why-is-the-fed-paying-so-much-interest-to-banks/ . See also, "2.4%, Why Is the Fed Paying So Much Higher Interest Rate to Banks?", https://www.econmatters.com/2019/04/24-why-is-fed-paying-so-much-higher.html

[98] According to SCS, $\pi = 9\%$. Thus, $r_D = 0.05\% - 9\% = -8.95\%$ and the bail in is: $1,277,667.7 million per annum.

[99] And with the unofficial inflation, $\pi = 9\%$, our cost is $1,301.47 billion or over $1.3 trillion per annum. (*Sic*). This is a pure system of deception!

periods of low interest rates.[100] 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).[101] Of course, trade policies can be imposed by the government (tariffs, quota, import taxes, etc.), too. The U.S.A. and the EU face 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),[102] which will be politically, economically, and socially beneficial for both countries. The outsourcing, the free trade, globalization, and illegal migration ("insourcing") have caused enormous problems and pains to the U.S. and EU economies (especially, Greece's one because it experiences a new Muslim invasion and occupation) and their citizens. Domestic public policies cannot improve the economic growth, income, and employment because the damage is structural, it has been planned and generated by an "economic elite" since the 18th century;[103] then, recessions cannot be predicted, so they cannot be prevented.[104]

As shown in Tables 1 and 2, ex post real interest rates were extremely low (negative) during the Zero Interest Rate Era, the USRFFR averaged -1.458% and the EUROND = -0.729%, while the USR10YTB averaged 1.000% and the EUR10YGB = 1.881%, and the U.S. RRFRI was -1.508% and the EUR3MDL = -0.923%. This was a period of slowing productivity growth. It was also a period when people were devoting many resources to protecting themselves from the damage done by inflation ($\pi_{SGS} \geq 10\%$), U.S. official ($\bar{\pi} = 1.586\%$) and EZINF = 1.256%. (*Sic*). Nevertheless, the GUSRPCE and the GUSRGDP2012 were relatively low, just slightly below 2% ($g_{RPCE} = 1.821\%$) and $g_{RGDP} = 1.857\%$). During the New Regime, following the crisis, USRFFR is –0.853% and the EUROND = -1.320%, while the return to holding a USR10YTB fell to 0.451% and EUR10YTB = -0.159%, and the RRFRI remains negative ($r^{*}_{RF} = -0.920\%$) and EUR3MDL = -1.613%; the GUSRPCE went up to 2.459% and the GUSRGDP increased to 3.110%. These are indications that the monetary policy was not very effective even though that the real cost of capital had become negative. But, unemployment is still high ($u_{SGS} = 21\%$ and the official $\bar{u} = 4.389\%$) and EZU = 9.158%,[105] which reveals low personal income, reduction in aggregate demand, and low production and growth.

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[100] Many have argued that exogenous factors have kept the economy operating below trend, inflation low, and real interest rates low. Very stranger!... See, Summers [59] and Williams [63].

[101] See, Kallianiotis [42] and [37].

[102] See, Kallianiotis [40].

[103] See, Kallianiotis [40].

[104] "Economists can't tell you when the next downturn is coming… Expansions don't die of old age. They're murdered by bubbles, central-bank mistakes or some unforeseen shock to the economy's supply (e.g., energy price spike, credit disruption) and/or demand slide (e.g., income/wealth losses)." Jared Bernstein, *Washington Post*, 7/5/2018.

[105] The unemployment according to the SGS during the ZIR Era was between 15% and 23%. See, *SGS*, http://www.shadowstats.com/alternate_data/unemployment-charts .

What would the real interest rate on federal funds and 10-year Treasury securities be if the Fed were not following the ZIRP regime, but a policy to keep RRFRI positive (i. e., the historic $\bar{r}^{*}_{RF} = 0.5\%$). The 3-month T-Bill rate must be: $i_{RF} = \bar{r}^{*}_{RF} + \pi^{e} = 0.5\% + 1.586\% = 2.086\%$. Thus, the Fed must keep $\bar{i}_{FF} > 2.086\%$, because $\bar{i}_{FF} = i_{RF} + RP = 2.086\% + 0.25\% = 2.336\%$. The ECB must keep $i_{OND} \geq 0.5\% + 1.256\% = 1.756\%(i^{*}_{RF}) + 0.25\% = 2.006\%$. The Federal Reserve, as a private bank, uses its monopoly on bank reserves to lower interest rates when it wants to lower the cost of capital and "improve" the financial market. Are real rates low because future growth is expected to be low or because the Fed is holding short-term rates on bank reserves low? But, this negative real rate of interest causes savings to fall, which affect negatively investment and depositors' wealth and forces depositors to invest in risky financial assets and this IOR is paid by the taxpayers. The rate of interest must increase in the future. In other words; are low interest rates in the United States and around the world caused by Fed policy? The answer is YES; a zero federal funds rate with an increase in monetary base and money supply[106] have increased inflation expectations and made real interest rates negative ($\bar{i}_{FF} = 0 = r \downarrow + \pi^{e} \uparrow$).

Lately, the Fed tried to prevent deflation, as they were saying.[107] 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). Was capitalism turning to debtism?[108] 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 and bailins. During these eleven years (and continue) they also exercise a low profile bailin by forcing the depositors and the taxpayers to pay for these extreme and unfair policies.

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[106] The U.S. money supply with (2/3/2020) was $15.490 trillion. See, https://fred.stlouisfed.org/series/M2

[107] See, https://www.investopedia.com/articles/investing/051315/what-deflation-and-how-do-central-banks-fight-it.asp

[108] With March 11, 2020: U.S. RGDP = $19.221 trillion; ND = $23.457 trillion (122.038% of the RGDP), Interest on debt = $375.5 billion, Total personal debt = $20.057 trillion, Mortgage debt = $15.867 trillion, Student loans = $1.654 trillion, Credit card debt = $1.099 trillion, State government debt = $1.176 trillion, Unfunded Pension liability = $6.861 trillion, Local government debt = $1.863 trillion, U.S. debt held by foreign countries = $6.885 trillion, U.S. trade deficit = $871 billion, U.S. trade deficit with China = $364 billion, Social security liability = $20.174 trillion, Medicare liability = $31.149 trillion, U.S. unfunded liabilities = $127.145 trillion. This enormous debt is sustainable, as long as the GDP covers the interest on all these debts, otherwise the country would have been bankrupt, as it happened with the Euro-zone countries. $(\dot{q} + \pi) - \dot{k} \neq |\dot{t} - \dot{g}|$; where, q = the growth of real output (GDP), π = inflation, $q + \pi = y$ = the growth of nominal GDP, k = borrowing (interest) cost (as a percentage of GDP), and $t - g < 0$ = primary deficit (as a percentage of GDP). Sustainable if, $(4\% + 2\%) - 3\% > 2\%$. Not sustainable if, $(3\% + 1\%) - 2\% < 3\%$. See, https://usdebtclock.org/ . See also, Kallianiotis [41] and [39].

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".[109] U.S. Economy grew at 2.2176% rate in the First Quarter of 2018 and at 4.1588% rate in Second Quarter of 2018, at 3.3569% in the Third Quarter and 2.59% in the Fourth Quarter of 2018.[110] China warns of protectionism at BRICS Summit in Johannesburg on July 26, 2018.[111] There is a Chinese economic warfare against the U.S., the EU, and other countries.[112]
European Central Bank President Mario Draghi signaled on April 10, 2019 that the bank could take fresh action to shore up the Eurozone's faltering economy if the outlook darkens, underscoring deepening concerns among policy makers over a slowdown that has dragged on for more than eleven years, much longer than expected. Draghi gave an outrageous reason by saying Europe's economic slowdown would continue for the 2019, in part because of the uncertainty facing businesses as a result of U.S. threats to raise tariffs on automobiles and other imports from Europe. (*Sic*). He does not blame the wrong liberal European policies, but tries to lie that their problems are due to the conservative American policy. European citizens cannot trust these anti-European policies anymore. The social welfare of the Euro-zone member-nations does not depend on the U.S. national policy, but on the Troika's anti-humane policy. He emphasized that the ECB has "plenty of instruments" at its disposal if the situation will require a further monetary easing.

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[109] 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

[110] See, http://sub1.economagic.com/popular.htm . The U.S. growth for 2019 was: Q1 = 3.096%, Q2 = 2.01%, Q3 + 2.10%, and Q4 = 2.08%. (*Economagic.com*).

[111] See, "China's Xi Warns of Globalization Backlash at BRICS Summit". The Editor of Technocracy News & Trends said: "Globalists everywhere, and especially China, are sweating over the rise in populism around the world. The New International Economic Order as originally specified by the Trilateral Commission, is clearly in jeopardy."
https://www.technocracy.news/chinas-xi-warns-of-globalisation-backlash-at-brics-summit/. The controlled establishment ("elites") try with all their means to impeach the populist leaders. See, NEWS ON TRUMP IMPEACHMENT. HTTPS://WWW.POLITICO.COM/NEWS/TRUMP-IMPEACHMENT

[112] Lately with the coronavirus epidemic in China, there is a growing negative effect on trade and income there. See, https://www.washingtonpost.com/business/economy/economic-fallout-from-chinas-coronavirus-mounts-across-the-globe/2020/02/13/7bb69a12-4e8c-11ea-9b5c-eac5b16dafaa_story.html .See also, https://www.voanews.com/science-health/coronavirus-outbreak/china-coronavirus-lockdown-crippling-global-supply-chain . The Fed said that it will consider its effect in the new monetary policy. https://www.bloomberg.com/news/articles/2020-01-29/powell-says-fed-very-carefully-monitoring-coronavirus-impact

The ECB left its key interest rate (OND) unchanged at -0.4% and reiterated that it does not expect to raise rates before next year,[113] but it reduced this rate to -0.50% on September 18, 2019.[114] With the 2019 European Parliament elections, European citizens showed that they were not happy with the existing EU public policies (monetary and fiscal). They voted against the EU liberal establishment.[115] The president of the European Central Bank, Mario Draghi, is doubling down on a tried-and-tested strategy in an attempt to guard the bloc against too-low inflation. [116] The Governing Council of the ECB with the new governor, Christine Lagarde, voted in December 2019 to keep the main deposit rate at the historic low of -0.5%, in line with market expectations. The ECB forecasted annual real GDP growth for the euro area at 1.2% in 2019,[117] 1.1% in 2020 and 1.4% in 2021 and 2022. Euro-zone and Europeans are in a very big trouble as long as they will continue to preserve this artificial union.

[113] See, "ECB's Mario Draghi Shows Willingness to Bolster Faltering Eurozone Economy". https://www.wsj.com/articles/ecb-awaits-stimulus-impact-as-it-leaves-rates-on-hold-11554897032

[114] Bank stocks and government bonds reacted positively to Christine Lagarde's first policy decision as President of the European Central Bank, taking their cue from her slightly more optimistic comments about growth in the Euro-zone. The ECB kept interest rates unchanged at -0.5% and made no other policy adjustments during its December 12, 2019 meeting. See, https://www.wsj.com/articles/markets-welcome-christine-lagardes-first-ecb-policy-meeting-11576179677?mod=md_usstk_news

[115] See, "European elections 2019: Power blocs lose grip on parliament". https://www.bbc.com/news/world-europe-48417744

[116] See, "ECB's Draghi Grows Bolder as His Tenure Nears End", *The Wall Street Journal*, July 1, 2019, pp. A1 and A6. https://www.wsj.com/articles/ecbs-draghi-grows-bolder-as-his-tenure-nears-end-11561887001 . The next head of the European Central Bank (started on November 1, 2019), Christine Lagarde, appears to be as much of a fan of negative interest rates as the current chief, Mario Draghi. "Lagarde says negative rates have helped Europe more than they've hurt ". https://www.marketwatch.com/story/lagarde-says-negative-rates-have-helped-europe-more-than-theyve-hurt-2019-08-29?mod=mw_quote_news

[117] But, the growth with 2019:Q4 was only 0.1%. See, https://tradingeconomics.com/euro-area/gdp-growth

6. Conclusions

The current article discusses the theoretical and empirical implications of the latest two alternative monetary policy regimes that have been in place since the 2008 by the U.S. Fed and the ECB [here, we take the ZIRP Era (2008:12-2015:11) and the New Era (2015:12-2018:12)]. Clearly, the alternative monetary policy regimes have had important effects on the level, variance, standard deviation, covariance, correlation coefficient, and causality of datasets including measures of inflation (π), real risk-free rate of interest (r^*), real personal consumption expenditures ($RPCE$), growth of $RGDP$, financial markets ($DJIA$ and $SX5E\_Index$), unemployment rate (u), nominal and real interest rates (short term and long term), personal saving rate (psr), deposit rate (i_D), and social welfare by imposing bail in and bail out to depositors and taxpayers.[118] In periods of extreme policy settings (that is, setting the interest rate well above or well below a normal level), it appears that the Fed has influenced the level of real interest rates on safe assets, including ex post real returns on long-term Treasury securities, real risk-free rate of interest, and real deposit rates. During the ZIRP Era, the results were a very low real interest rate (negative) and below-trend growth in the economy. The IOR has caused serious ethical issues because it is an unfair, unethical, and anti-social policy. During the seven years following the 2007-2008 financial crisis (the Great Recession in the U.S. and the Chaos of the Debt Crises in Euro-zone), the ZIRP regime caused the low real interest rate on safe assets and subpar real consumption and real GDP growth, and high unemployment. But, the bubble in the financial market was growing ($\bar{g}_{DJIA} = 9.952\%$ p.a. and $\sigma_{g_{DJIA}} = \pm 55.692\%$) artificially and its risk is very high for the global economic system; it can cause an enormous systemic risk. The results show the ineffectiveness of monetary policy for both economies (U.S. and Euro-zone). The bubble of the nominal $DJIA$ that the latest "over-easy" monetary policies have caused is huge. The real growth of the DJIA is much smaller; its nominal growth is an inflationary one, due to the enormous increase in money supply (money illusion).

[118] See, Kallianiotis [41] and [40].

After seven years of this experiment of Quantitative Easing (QE), the FOMC has begun a transition to a new policy regime (NPR) or perhaps a return to an old one. As it has begun to raise the federal funds rate target (from 0% to 2.50% and back to 1.25%, today), it was merely taking a rate that was well below normal to one that was closer to normal and back to below the normal. Incoming data show that the real economy has not been damaged by slightly higher interest rates;[119] it has been improved and now with the reduction of $\bar{i}_{FF}$ the economy started deteriorating again. However, the economy remained during this ZIR period below the trend that was predicted for potential GDP in 2007.[120] The rate of return on safe assets must be above the expected inflation ($\pi = 2\%$ or today's inflation)[121] and the growth of the financial market (DJIA) must be above the prime rate ($i_P = 4.75\%$ or 4.25% today) to cover the risk (HRP), but not very high to generate new bubbles. Then, the federal funds rate must be further increased. There, are other that believe "the Fed does not have to be so aggressive", as Federal Reserve Bank of St. Louis President James Bullard said.[122]

In theory, we expect the monetary policy regime to have important effects on inflation,[123] interest rates, growth, unemployment, financial markets, and of course, on the social welfare.

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[119] The Gross Domestic Product (GDP) in the United States expanded 2.80% in the first quarter of 2018 over the same quarter of the previous year, the GDP grew 4.1% in the second quarter, 3.4% in the third, 2.6% in the fourth quarter of 2018 and above 2% for the 2019. GDP Annual Growth Rate in the United States averaged 3.19% from 1948 until 2018, reaching an all-time high of 16.6718% in the first quarter of 1950 and a record low of -8.3784% in the fourth quarter of 2008. See, http://sub1.economagic.com/em-cgi/data.exe/var/rgdp-qtrchg and https://tradingeconomics.com/united-states/gdp-growth-annual. Also, see, the Annual RGDP growth. https://www.statista.com/statistics/188165/annual-gdp-growth-of-the-united-states-since-1990/ . In Euro-zone the economies are still in crisis (the cost of integration) and in Greece in complete destruction, due to the puppet politicians in power since 1974.

[120] See, Summers [59].

[121] See, *Wall Street Journal*, March 10, 2020, p. B9 and π = 2.5% (today). https://www.usinflationcalculator.com/inflation/current-inflation-rates/ .

[122] 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

[123] The Monetarist view: $M\bar{V} = \bar{Q}\,P \Rightarrow M2 = CPI$, $\rho_{m2,\,p} = 0.981$ and $p \Rightarrow m2 \quad (F = 9.067)$.

The growth of the RGDP must exceed the growth of the RPCE and the difference must be the growth of the real personal savings ($g_{RGDP} = g_{RPCE} + g_{RPS}$), otherwise households' debt will go up, their interest cost will increase,[124] and their bankruptcies will follow up. During the ZIRP Era it was: $\bar{g}_{RGDP} = 1.731\%$, $\bar{g}_{RPCE} = 1.821\%$, then, $\bar{g}_{RPS}$ was -0.09% (dissaving, borrowing). But, during the New Era it is: $\bar{g}_{RGDP} = 3.110\%$, $\bar{g}_{RPCE} = 2.459\%$, then, $\bar{g}_{RPS}$ is 0.651% (very low). During the week on December 6, 2018, the gap between long- and short-dated U.S. Treasurys reached its lowest in more than a decade, with one version (the five-year minus two-year yield) turning negative. Stocks had sold off hard, as investors fear such so-called "inversions of the yield curve" presage recessions (every recession since the 1950s was foreshadowed by an inverted curve).[125]

Further, during the ZIR Era, real interest rates on 10-year Treasury bonds ($\bar{r}_{10YTB} = 1.000\%$) were significantly lower than the growth of the real personal consumption expenditures ($\bar{g}_{RPCE} = 1.821\%$). But, real short-term returns on safe assets ($r^* = -1.508\%$) remain significantly below the growth of the real personal consumption expenditures ($\bar{g}_{RPCE} = 1.821\%$) during the ZIR Era, as it is also during the New Regime ($r^* = -0.920\%$ and $\bar{g}_{RPCE} = 2.459\%$), and this low demand affected the growth of the RGDP ($\bar{g}_{RGDP} = 1.857\%$). The Taylor's rule shows that the federal funds rates are too low since 2008. The Bullard rule and Kallianiotis rule give similar results, the Fed target rate is for all these years low. The social welfare is relatively low during the ZIRR and has improved a little lately with the New regime. Nominal interest rates on deposits continue to be closed to zero,[126] which keep the real return on deposits negative. Empirical evidence surveyed by Williams [62] 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

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[124] The average household today is working and pays taxes, usurious interest on debt (up to 39.99%), student loans, insurance, and receiving zero (negative) interest on deposits and paying the IOR of the banks. The most unfair, unethical, and unlawful tax is the property tax and the new central banks' "innovations" (bail ins and bail outs). Then, an individual never really own his home. It is owned by the bank until he will pay off the mortgage and then, it is owned by the local government and he pays "rent" (property taxes) to the government, otherwise he loses his home. Thus, in extreme systems (capitalism and communism) there is no homeownership. People live a very miserable life without any deeper objectives (spiritual and eternal), prospects, and hope for the future. Some people must be responsible for this continued social crisis. Are politicians responsible? Is education responsible? Or our controlled (ignorant) non-democratic system is the only responsible? See, Kallianiotis [40].

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

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

on real economic activity. But, we know that low real interest rates are causing redistribution of wealth from risk-averse savers to banks, speculators, and investors of financial assets, and affect negatively savings (encouraging dissaving and consumption); this might be the reason of this policy to increase consumption, aggregate demand, and stimulate the economy (a capitalistic economy is driven by consumption). Actually, this is an anti-social and unethical policy, with a very uncertain future. We need some serious structural reforms for the entire socio-economic system. The dual mandate of the Fed does not maximize the social welfare. The ECB's "effectiveness" is non-existent. The common currency (euro) has destroyed 18 countries; there is only the 19th (Germany), who has been benefited from the euro and the ECB's policy.[127]

Finally, the deduction for more than ten years of observations and economic evidence suggest that it is the Fed's quantitative easing the main cause of the low (negative) real interest rate following the 2007-2008 financial crisis. In Euro-zone the answer must be that a common currency and monetary policy for all these nineteen (19) completely different economies do not work. Both these monetary policies were not very effective (especially, the austerities of the ECB and of the suspicious Troika). The Fed's policy has created a new bubble in the financial market, future inflation, and a redistribution of wealth from risk-averse savers to banks and risk-taker speculators. In Euro-zone, the wealth of individuals has been destroyed and small businesses have disappeared from the member-nations. The suicide rate is historically the highest in the poor Euro-zone. In addition, their policies have increased the risk (RP) by making the real risk-free rate of interest negative. The effects on growth, prices, and employment were gradual and very small, due to the European common policy and currency, austerities, illegal migration ("planned insourcing"), the outsourcing, the unfair trade policies, privatizations (sell offs of the national wealth), and liberalism in general, which have affected negatively the social welfare of the countries and the wellbeing of their citizens. People's ignorance and fake news have contributed to these prolog problems in the U.S. and the EU by making the education a value neutral one.[128] We need a market oriented social welfare state, where people must be the first priority of any public policy (monetary, fiscal, trade, etc.) and not the institutions and businesses.

[127] See, Kallianiotis [38].

[128] Greeks are saying regarding today's education: «Μπαίνεις κούτσουρο καί βγαίνεις τοῦβλο».

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