Global Academic Journal of Economics and Business

Available online at https://www.gajrc.com
DOI: 10.36348/gajeb.2024.v06i03.001

OPEN ACCESS

ISSN: 2706-9001 (P)
ISSN: 2707-2584 (O)

Original Research Article

Money Supply, Reaction Functions, Financial Markets and Macroeconomic Conditions

Dr. Ioannis N. Kallianiotis[1*]
[1]Economics/Finance Department, The Arthur J. Kania School of Management, University of Scranton, Scranton, PA 18510-4602

***Corresponding Author**
Dr. Ioannis N. Kallianiotis
Economics/Finance Department, The Arthur J. Kania School of Management, University of Scranton, Scranton, PA 18510-4602

Article History
Received: 03.04.2024
Accepted: 10.05.2024
Published: 13.05.2024

Abstract: Monetary policy is a key driver of financial markets. The effects on financial markets are evident, not only around changes in monetary policy or Fed's announcements but also, indirectly, around macroeconomic data releases, political events, international issues, and the "news". The impact of inflation surprises on financial markets has an enormous effect over the past years, due to the high liquidity, low investment, and weak economic growth of the real sector of the economy. Investors, analysts, forecasters, economists, and policymakers have a keen interest in understanding how monetary policy and conditions in financial markets (Wall Street) affect economic activity (Main Street). To test this issue empirically, we can compare the current level of the central bank's policy rate (federal funds rate) by using an augmenting reaction function and with a hypothetical neutral or expected or optimal interest rate. If the federal funds rate is excessively below its neutral (optimal) level, this indicates that monetary policy is ineffective, and it is the one that has caused the bubbles in the markets and the inflation. According to many estimates, this is lately, since 2008, the case for the U.S. economy.

Keywords: Monetary Policy**,** Central Banks and Their Policies**,** Money and Interest Rates, Financial Markets and the Macro-economy, Model Evaluation and Testing**,** Social Welfare.
JEL (Classification): E52, E58, E4, E44, C52, D6.

I. INTRODUCTION

We are focusing on the short-term policy rate (federal funds rate) and on its intermediate objective variables, monetary base and money supply (MB and M^s) and we want to see also its effect on the broader financial conditions of all the markets. The effects of monetary policy beyond the financial markets, on the real economy, it depends also on long-term interest rates, on corporate bond yields and lending rates, on stock prices, exchange rates, housing prices, and other asset prices. These factors, together with the policy rate, help determine financial market effects and consecutively, on the broader economy [1]. To test this issue empirically, we can compare the current level of the central bank's policy rate (federal funds rate) by using different reaction functions and a hypothetical neutral interest rate [2] (Hodrick-Prescott Filter) on the real economy, inflation,

[1]Economic analysis, Economic Analysis | EY - US

[2]What is the neutral rate of interest? What is the neutral rate of interest? | Brookings

unemployment, financial market, output and production ($\pi, u, DJIA, GDP$, etc.)

This neutral rate of interest [3] (also called the long-run equilibrium interest rate, the natural rate and, to insiders, r-star or r*) [4] is the short-term interest rate that would prevail when the economy is at full employment and stable inflation: the rate at which monetary policy is neither contractionary nor expansionary. It is a function of the economy's underlying characteristics and is not set by the Federal Reserve. It is usually discussed in real terms, that is, with inflation subtracted out. The neutral rate cannot be observed directly; it can only be estimated [5].

We are trying to look at the reaction functions of the policy tools (i_{FF}, MB, and $M2$) on the objective variables and especially on financial markets ($DJIA$) and on prices (CPI). Then, we determine the effects of the markets and inflation on the macroeconomic variables of real output, unemployment, L-T interest rate, current account, exchange rate, and U.S. exchange rate index ($RGDP$, u, i_{10YTB}, CA, e, and $USXRI$). Arnaut and Bauer (2024) analyzed financial conditions indexes (FCIs) [6] to better understand recent financial developments and their underlying factors. First, they explain how some popular FCIs are constructed and use them to document how financial conditions have changed over time. Then, they try to provide evidence on the drivers of financial conditions, using event studies of monetary policy announcements and inflation data releases. This current analysis, here, shows that monetary policy has significant direct effects on financial conditions and the real economy, as evident from the response to monetary policy surprises. Further, the monetary policy also has indirect effects: Macroeconomic news, speculation, perceptions, etc. that affect financial conditions about the likely course of future policy. Financial market participants appear to be especially harmonized to recent high inflation data releases [7], which has led to unusually strong responses in financial conditions [8].

II. Recent Changes in Monetary Policy, Financial Market and Economic Conditions

Monetary policy affects financial markets directly and consequently a wide range of financial indicators affect economic activity, mainly by influencing the behavior of households and businesses. Financial markets create some changes for economic activity when interest rates (including long-term bond yields, lending rates, and mortgage rates) are high [9], when the stock market is doing poorly, and when the dollar is strong. As a result of these restrictive, or tight, financial conditions, overall demand for goods and services and macroeconomic activity (private investment) tend to slow, due to these unfavorable phenomena.

Financial Conditions Indexes (FCIs) are complex and summarize a variety of financial indicators in a single number, with the goal of measuring how current market conditions affect economic activity. Typically, FCIs are simply weighted averages of several financial indicators. (1) The Chicago Fed's National FCI is a weighted average of 105 different measures of financial activity in money, debt, and equity markets and the banking system, Graph 1 [10]. (2) An FCI from Bloomberg averages eight indicators from money, bond, and equity markets. (3) Goldman Sachs also produces its FCI using a dynamic macroeconomic model to determine the relative weights of five underlying

[3] See, Williams (2003).

[4] The real risk-free rate of interest is, $\bar{r}^* = 0.621\%$ and its $\sigma_{r*} = \mp 4.126\%$.

[5] See, "Measuring the Natural Rate of Interest", *Federal Reserve Bank of New York*, Measuring the Natural Rate of Interest - FEDERAL RESERVE BANK of NEW YORK (newyorkfed.org) Further, The Fed - An Estimate of the Long-Term Neutral Rate of Interest (federalreserve.gov), , Also, Federal Reserve Board - An Estimate of the Long-Term Neutral Rate of Interest Accessible Data.

[6] The Chicago Fed's National Financial Conditions Index (NFCI) provides a comprehensive weekly update on U.S. financial conditions in money markets, debt and equity markets, and the traditional and "shadow" banking systems. The Adjusted NFCI (ANFCI) isolates a component of financial conditions uncorrelated with economic conditions to provide an update on financial conditions relative to current economic conditions. See, "National Financial Conditions Index (NFCI): Current Data". National Financial Conditions Index: Current Data - Federal Reserve Bank of Chicago (chicagofed.org)

[7] See, Milly Smith, "US Economy Slows and Inflation Jumps, Damping Soft-Landing Hopes: GDP advances an annualized 1.6%, slower than all projections and First-quarter core inflation measure accelerates to 3.7% rate." *Bloomberg*, US GDP Q1 2024: Economy Slows as Spending Cools Amid Inflation Pickup - Bloomberg

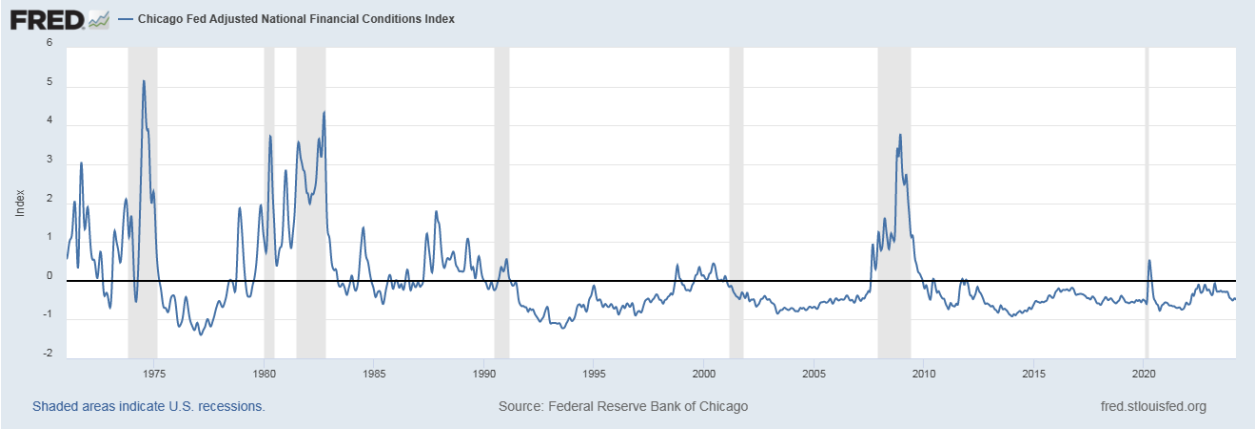
[8] But, "Fed Says Persistent Inflation Is Seen as Top Financial Risk", Fed Says Persistent Inflation Is Seen as Top Financial Risk - Bloomberg. For this reason, it continues to keep high the federal funds rate.

[9] As they are with April 2024: $i_{RF} = 5.404\%$, $i_{30YTB} = 4.852\%$, $i_{30YM} = 7.09\%$, and $i_P = 8.5\%$. *Wall Street Journal*, 4/25/2024.

[10] Graph 1: Chicago Fed Adjusted National Financial Conditions Index (ANFCI)

indicators: a policy rate, a long-term riskless bond yield, a corporate credit spread, a measure of equity valuations, and a trade-weighted exchange rate. (4) The Federal Reserve Board of Governors recently launched the Financial Conditions Impulse on Growth (FCI-G) index [11], to estimate how changes in financial indicators will affect the growth rate of output. The index weights its seven financial indicators based on how they affect output growth in the large-scale general equilibrium model used at the Board of Governors for forecasting and policy analysis, known as FRB/US [12]. Unlike most other FCIs, the FCI-G considers past financial market changes instead of only current market conditions.

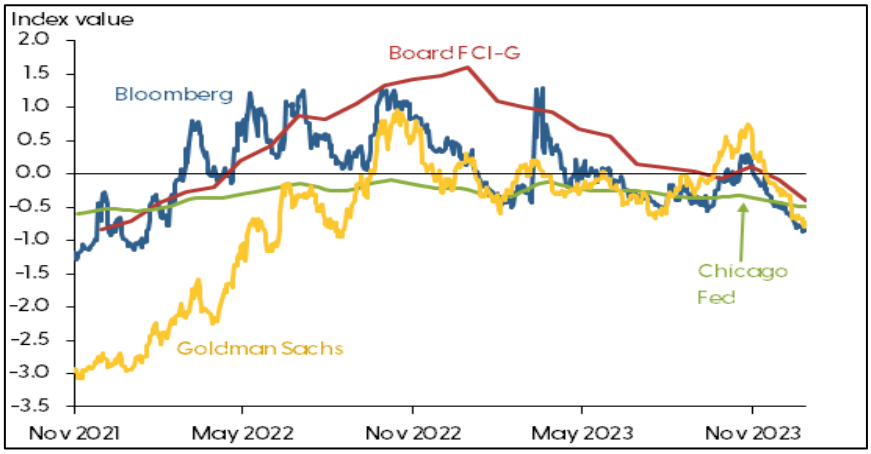
Graph 2 shows the above mentioned four FCIs over the period from November 2021 to December 2023 [13], with positive values corresponding to tighter financial conditions and negative values reflecting looser conditions. A value of zero corresponds to the average value of each index over a specific historical period, which is not necessarily a level that is "neutral" for economic activity. Financial conditions started to tighten before the first-rate hike by the Federal Open Market Committee (FOMC) on March 16, 2022, and continued tightening during the period of substantial policy rate hikes over 2022 and on May 3, 2023, reached 5.50% [14], as it is up to now.



Graph 1

Note: List of Financial Indicators: See, nfci-indicators-list-pdf (2).pdf

Source: Chicago Fed Adjusted National Financial Conditions Index (ANFCI) | FRED | St. Louis Fed (stlouisfed.org)



Graph 2

Note: The Bloomberg and Goldman Sachs series are daily, the Chicago Fed index is weekly, and the Board's FCI-G is monthly. To make the series comparable, the Bloomberg FCI was multiplied by -1, and 100 was subtracted from the Goldman Sachs FCI. Sample period: 11/01/2021 to 12/31/2023.

Source: https://www.frbsf.org/wp-content/uploads/el2024-07.pdf

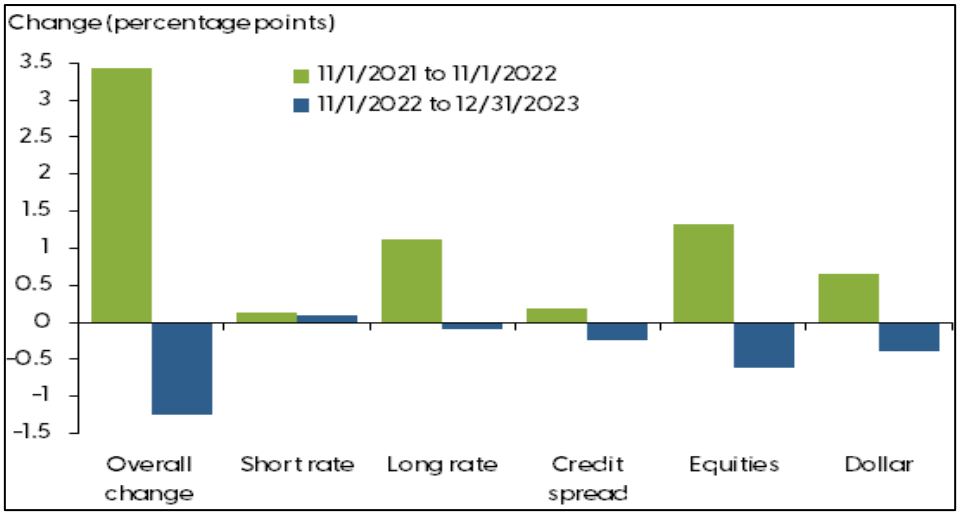
[11]See, Ajello, Cavallo, Favara, Peterman, Schindler, and Sinha (2023). https://www.federalreserve.gov/econres/notes/feds-notes/a-new-index-to-measure-us-financial-conditions-20230630.html

[12] See, FRB/US in EViews. https://www.federalreserve.gov/econres/us-models-about.htm

[13]Graph 2: Financial conditions indexes (FCIs) over time

[14]See, "Federal Funds Target Rate History: From 1990 to The Present", Fed Funds Target Rate History (Historical) (fedprimerate.com)

Monetary policy can affect all the components of FCIs. Graph 3 shows the overall change and contributions of five different components in the Goldman Sachs FCI for two different periods. During the financial tightening from November 2021 to November 2022 (green bars), the substantial increase in the federal funds rate made only a small contribution. According to the Goldman Sachs model and consistent with empirical research, this is because short-term rates are not as relevant for economic activity (investment in fixed assets). Instead, financial conditions tightened mainly because of higher long-term interest rates, lower stock prices, and a stronger dollar. As financial conditions eased from November 2022 to December 2023 (blue bars), about one-third of the earlier tightening in this FCI was reversed due to higher stock prices, a weaker dollar, and narrower credit spreads [15].



Graph 3

Source: Goldman Sachs and https://www.frbsf.org/wp-content/uploads/el2024-07.pdf

The relationship and effects between monetary policy surprises and financial conditions is complex [16]. Correlations between time series, for example between the policy rate and an FCI, are not particularly useful for understanding this relationship because they do not reveal causal effects. We are using, here, correlations and causality between policy instruments (i_{FF}^{eff}, mb, and m^s) and ultimate objective variables (p, u, rgdp, i_{10YTB}, djia, ca, $\bar{e}$, and usxri). Then, we measure the effects of the DJIA (market) and CPI (inflation) on other macroeconomic variables ($i_{US10YTB}$, $rgdp$, u, e), plus on the gross private domestic investment (usi).

It is established that monetary policy can affect long-term and risk-free interest rates [17], which are important components of every FCI. In addition, monetary policy can also affect the risk appetite of investors, which is a crucial driver of all risky asset prices and hence of financial conditions more broadly [18]. A surprise monetary tightening leads to significant and persistent tightening in financial conditions. Macroeconomic data releases contain valuable information about the economic outlook; they therefore tend to affect monetary policy expectations, interest rates, investments, and financial conditions more broadly, as it can be observed from their causalities with the i_{FF}, mb, and m. But the nature and strength of these effects depends on perceptions about monetary policy. Macroeconomic news can cause a stronger financial market response when professional forecasters expect the Fed to be very responsive to economic conditions. The Fed has recently been perceived to be very responsive to the inflation outlook and continues to act the same way even today [19].

Time-varying effects of core consumer price index (CPI), inflation surprises, have significant effects on the Goldman Sachs FCI. The results show that the sensitivity of financial conditions to core

[15] Graph 3: Contributions to Goldman Sachs FCI

[16] Bauer and Swanson (2023) measure the surprise component of monetary policy actions using 30-minute changes in various market interest rates around the time of the announcements.

[17] See, Bauer and Swanson (2023).

[18] See, Bauer, Bernanke, and Milstein (2023).

[19] See, Bauer, Pflueger, and Sunderam (2023). The inflation in March 2024 was 3.5%; an increase by 0.4% since February 2024. Thus, the Fed will not reduce the federal funds rate. See, "Why stocks could still rise even as rate cut hopes fade", Why stocks could still rise even as rate cut hopes fade (yahoo.com).

inflation surprises is currently at its highest level in over two decades. Macroeconomic data, particularly inflation news, have increasingly taken center stage for financial markets [[20]], likely due to their importance for the monetary policy outlook. Strong data on real activity and persistently high inflation data in fall 2023 had fed a narrative that interest rates might need to remain "higher for longer", which in turn caused more restrictive financial conditions [21].

III. Theoretical Models of Fed' Reaction Functions

The objective of the Fed is stabilization of output (maximum employment) and prices (inflation target 2% or less per annum), which will be tested, here, with OLS analyses, Tables 1a, 1b, 1c, and 1d. Then, the correlation and causality tests of the monetary instruments (i_{FF} , mb, and m) with the policy objective variables ($p, u, djia, rgdp$, i_{10YTB}, ta, and e or $usxri$) and between *djia* and *p* with the other macro-variables will take place and appeared in Table 2a. Some economists believe in discretionary monetary policy and others in specific rules. Central bank's behavior (reaction to inflation and output-employment) can be presented with an interest rate reaction function, eq. (1), as follows (Sack-Wieland rule) [22]:

$$\bar{i}_{FF_t} = \rho \bar{i}_{FF_{t-1}} + (1-\rho)(\pi_t + r_t^*) + \alpha_\pi(\pi_t - \pi_t^*) - \alpha_u(u_t - u_t^N) \text{ ..... (1)}$$

Where, $\bar{i}_{FF_t}$ = the target federal funds rate, π_t = the rate of inflation as measured by the GDP deflator, π_t^* = the desired rate of inflation [23], r_t^* = the assumed equilibrium real interest rate, u_t = the unemployment rate, u_t^N = the natural level of unemployment, and ρ = the weight put on the past federal funds rate setting.

Now, we are augmenting the reaction function of eq. (1) to include all the objective variables mentioned above, as follows:

$$i_{FF\,t} = \alpha_0 + \alpha_1 i_{FF\,t-1} + \alpha_2(\pi_t - \pi_t^*) - \alpha_3(u_t - u_t^N) + \alpha_4(rgdp_t - rgdp_t^*)$$
$$+\alpha_5(djia_t - djia_t^*) - \alpha_6(i_{L-T\,t} - i_{L-T\,t}^*) - \alpha_7(ta_t - ta_t^*) + \alpha_8(e_t - e_t^*) + \varepsilon_t \text{ ..... (2)}$$

Where, $rgdp$ = the growth of real GDP, $rgdp_t^*$= the growth of target real GDP (full employment output), $djia$ = the growth of DJIA, $djia_t^*$ = the bubble free growth of DJIA (= $i_{RF} + HRP$), $i_{L-T\,t} = i_{10YTB}$ = interest rate on 10-year T-Bonds, $i_{L-T\,t}^*$ = target (historic average) L-T interest rate, ta = the growth of trade account or current account, $ta_t^* \cong 0$, e_t= the growth of the U.S. dollar/euro exchange rate. $e_t^* \cong 1$, or the use of $usxri$ = ln of the U.S. exchange rate index.

We also run two other variations of the reaction function by taking as dependent variables the two other policy tools or intermediate targets (mb and m^s), as follows:

$$mb_t = \alpha_0 - \alpha_1 i_{FF\,t-1} - \alpha_2(\pi_t - \pi_t^*) + \alpha_3(u_t - u_t^N) - \alpha_4(rgdp_t - rgdp_t^*)$$
$$-\alpha_5(djia_t - djia_t^*) + \alpha_6(i_{L-T\,t} - i_{L-T\,t}^*) + \alpha_7(ta_t - ta_t^*) - \alpha_8(e_t - e_t^*) + \varepsilon_t \text{ ..... (3)}$$

and

$$m_{\,t} = \alpha_0 - \alpha_1 i_{FF\,t-1} - \alpha_2(\pi_t - \pi_t^*) + \alpha_3(u_t - u_t^N) - \alpha_4(rgdp_t - rgdp_t^*)$$
$$-\alpha_5(djia_t - djia_t^*) + \alpha_6(i_{L-T\,t} - i_{L-T\,t}^*) + \alpha_7(ta_t - ta_t^*) - \alpha_8(e_t - e_t^*) + \varepsilon_t \text{ ..... (4)}$$

Where, mb_t= ln of monetary base (MB) and m_t= ln of money supply (M2). The variables of these equations can be run as their ln or growth (i.e., $rgdp$ or g_{rgdp}).

Kallianiotis (2015c and 2021c) has run a regression of eq. (1), which can be eq. (5), here. The target interest rate will follow the changes in inflation and unemployment based on the coefficients estimated in eq. (5). This interest rate measured by the interest rate reaction function must be the target federal funds rate:

[20]See, Stockman (2022). See also, "Hot inflation may put Fed rate cut in thick of election season", https://finance.yahoo.com/news/hot-inflation-may-put-fed-193551941.html

[21]See, Arnaut and Bauer (2024).

[22]See, Sack and Wieland (1999).

[23]The Fed ultimately stated explicitly that its target was a 2% per year increase in the raw personal consumption expenditures deflator. See, Williamson (2014, p. 112). Here, we forecast the desired inflation with a ARMA (2,2) process, as follows:

$$\pi_t^e = \pi_t^* = 3.568^{***} - 0.148^{***}\pi_{t-1} + 0.822^{***}\pi_{t-2} + 0.521^{***}\varepsilon_{t-1} - 0.454^{***}\varepsilon_{t-2}$$
$$(0.410)\quad (0.037)\qquad (0.035)\qquad (0.055)\qquad (0.053)$$
$$R^2 = 0.317, SER = 3.486, F = 89.165, D-W = 1.898, N = 774$$

$$\bar{i}_{FF_t} = \alpha_0 + \alpha_1 \bar{i}_{FF_{t-1}} + \alpha_2 \pi_t + \alpha_3 u_t^{GAP} + \alpha_4 u_{t-1}^{GAP} + \varepsilon_t \quad \text{..... (5)}$$

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

Using monthly data for the U.S. economy (1954:M08-2014:07), he had obtained the following results:

$$\bar{i}_{FF_t} = 0.080^{**} + 0.984^{***} \bar{i}_{FF_{t-1}} + 0.016^{***} \pi_t - 0.577^{***} u_t^{GAP} + 0.547^{***} u_{t-1}^{GAP}$$
$$(0.041) \quad (0.006) \quad (0.005) \quad (0.098) \quad (0.098)$$

$$R^2 = 0.980, \quad SER = 0.502, \quad F = 8{,}814.797, \quad D-W = 1.396, \quad N = 720$$

It is shown that the size of the partial adjustment, coefficient α_1, is 0.984^{***}, which provides direct evidence that the observed degree of persistence in federal funds rates is greater than the one that can be attributed to systematic policy responses to persistent inflation and unemployment (output) fluctuations. The coefficients of regression show that the federal funds rate must respond significantly to an increase in inflation ($\alpha_2 = 0.016^{***}$), but less aggressively to induce an increase in real rates and a tightening monetary policy. The federal funds rate must respond sufficiently aggressively to an increase in unemployment ($\alpha_3 = -0.577^{***}$) to induce a reduction in interest rate and an effective easing monetary policy [24].

Further, the Taylor rule is also a specific case of eq. (1); he puts $\rho = 0$ and we get, by substituting this original logarithm of GDP with the unemployment rate (u_t), the following equation:

$$\bar{i}_{FF_t} = \pi_t + r_t^* + \alpha_\pi (\pi_t - \pi_t^*) - \alpha_u (u_t - u_t^N) \quad \text{..... (6)}$$

Taylor (1993) proposed an $\alpha_\pi = 0.5$ and $\alpha_u = -0.5$ [25]. The rule "recommends" a high interest rate (a "tight" monetary policy) when inflation is above its target, in order to reduce inflationary pressure and a low interest rate ("easy" monetary policy) when the unemployment rate is above its natural level to stimulate production,

[24] By using data during the financial crisis (2007:08-2014:12), Kallianiotis (2015c) had the following results for eq. (5):

$$\bar{i}_t = -0.083 + 0.931^{***} \bar{i}_{t-1} + 0.014^{***} \pi_t - 0.038 u_t^{GAP} + 0.051 u_{t-1}^{GAP}$$
$$(0.055) \quad (0.015) \quad (0.003) \quad (0.064) \quad (0.064)$$

$$R^2 = 0.991, \quad SER = 0.121, \quad F = 2{,}253.707, \quad D-W = 1.236, \quad N = 85$$

The federal funds must respond significantly to an increase in inflation ($\alpha_2 = 0.014^{***}$), but there is no need to reduce the federal funds rate when the unemployment is increasing (the effect is insignificant). Thus, this latest easy monetary policy was ineffective on employment and unemployment became a double digit one ($u_{SGS} = 24\%$), Alternate Unemployment Charts (shadowstats.com) .

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

$$\pi_t = 1.064^{***} \pi_t^e - 0.160^{**} (u_t - 4)$$
$$(0.039) \quad (0.066)$$

$$R^2 = 0.373, SER = 3.258, D-W = 2.073, N = 719$$

The correlation between inflation and unemployment (1970:01-2014:09) was, $\rho_{\pi,u} = -0.042$ and inflation was causing unemployment: $\pi \Rightarrow (-2.406^*) \Rightarrow u$. From 2008:12 to 2024:01 the $\rho_{\pi,u} = -0.154$ and $\pi \Rightarrow (F = 2.493^*) \Rightarrow u$. The regression is:

$$\pi_t = 1.047^{***} \pi_t^e - 0.059\ (u_t - 4)$$
$$(0.095) \quad (0.091)$$

$R^2 = 0.223$, SER = 3.499, D-W = 1.979, N = 183, RMSE = 0.247021

In addition, see, Ihrig, Peneva, and Wolla (2021).

output, and employment [26]. Actually, rules-based monetary policy yields superior economic performance. Highly discretionary policy is unfocussed and ineffective [27]. Policymakers kept rates too low and for too long during the 2000s and later from 2008 to 2015 and 2020 to 2022, relative to what Taylor's rule approach would prescribe.

We generate, here, a monetary policy rule based on eqs. (1), (2), and (6) to determine the optimal federal funds rate, as follows:

$$\bar{\imath}_{FF\,t} = \pi_t + r_t^* + \alpha(\pi_t - \pi_t^*) - \beta(u_t - u_t^N) + \gamma(g_{RGDP\,t} - g^*_{RGDP\,t}) + \delta\left(g_{DJIA\,t} - g^*_{DJIA\,t}\right) - \theta(i_{L-T\,t} - i^*_{L-T\,t}) - \varphi\left(g_{TA\,t} - \hat{g^*_{TA\,t}}\right) + \psi(g_{e\,t} - g^*_{e\,t}) + \varepsilon_t \quad \ldots\ldots\ldots\ldots (7)$$

where, $\bar{\imath}_{FF_t}$ = the target (optimal) federal funds rate, π_t = the rate of inflation as measured by the CPI, r_t^* the assumed equilibrium real interest rate, π_t^* = the desired (expected) rate of inflation [28], u_t = the unemployment rate, u_t^N = the natural level of unemployment (4%), where, $g_{RGDP\,t}$ = the growth of real GDP, $g^*_{RGDP\,t}$ = the growth of target real GDP (full employment output, 3%), $g_{DJIA\,t}$ = the growth of DJIA, $g^*_{DJIA\,t}$ = the bubble free growth of DJIA (= $\bar{\imath}_{RF} + HRP$ = 3.3% + 8.9% = 12.2%) [29], $i_{L-T\,t}$= i_{10YTB} = interest rate on 10-year T-Bonds, $i^*_{L-T\,t}$ = target (historic average, 5.3%) L-T interest rate, $g_{TA\,t}$ = the growth of trade account, $g^*_{TA\,t} \cong 0$, $g_{e\,t}$ = the growth of the U.S. dollar/euro exchange rate. $g^*_{e\,t} \cong 0$ or $g_{USXRI\,t}$ = the growth of the U.S. exchange rate index and $g^*_{USXRI\,t} \cong 0$.

We can determine the desired i^d_{FF} based on eq. (7) as follows:

$$i^d_{FF\,t} = \pi^d_t + r_t^* + 0.5(\pi_t - \pi_t^{*e}) - 0.5(u_t - u_t^N) + 0.5\left(g_{DJIA\,t} - g^*_{DJIA\,t}\right) - 0.5(i_{L-T\,t} - i^*_{L-T\,t}) \quad \ldots\ldots\ldots\ldots\ldots (8)\ [30]$$

Our rule, here, "recommends" a high interest rate (a "tight" monetary policy) when inflation is above its target, in order to reduce inflationary pressure, a high interest rate when the growth of real GDP exceeds its long run target, a high interest rate if the growth of the stock market exceeds the long run growth (covering its historic risk), and an increase of the interest rate if the dollar is depreciated to attract foreign capital (CIF and appreciation of the dollar), and a low interest rate ("easy" monetary policy) when the unemployment rate is above its natural level to stimulate investment, production, output, and employment, low interest rate to keep the L-T rate at a moderate level, and a low interest rate to increase domestic investment, production, exports and improve the trade account. Rules-based monetary policy is more practical and has yield superior economic performance. Highly

[26] If the economy is in a recession (with high unemployment), we must have a target interest rate: $\bar{\imath}_{FF} = 2\% + 1\% + 0.5(2\% - 2\%) - 0.5(6.5\% - 4\%) = 1.75\%$. This must had been the federal funds rate in September 2014, but it was 0.25%, which was very low; and it did not improve growth and did not reduce unemployment.

[27] The problem with monetary policy is that it cannot prevent financial crises and recessions. See, Kallianiotis (2020a, 2021a, b, and c).

[28] Here, we forecast the desired inflation (π^d_t), as follows (π^e_t): $\pi^e_t = 3.572^{***} + 1.295^{***}\pi_{t-1} - 0.308^{***}\pi_{t-2} - 0.903^{***}\varepsilon_{t-1}$
(0.780) (0.035) (0.032) (0.023)
$R^2 = 0.342$, SER = 3.421, F = 114.739, D-W = 1.999, N = 889, RMSE = 3.412963 and $\bar{\pi}^e = 3.499\%$ and $\sigma_\pi = \mp 2.454\%$.

[29] The historical averages of interest rates are from Ross, Westerfield, Jaffe, and Jordan (2022, p. 311).

[30] With 2024:01, the i^d_{FF} must had been: i^d_{FF} = 0%+1%+0.5(6.5%-3.499%)- 0.5(3.7%-4%)+0.5(14.79%-12.2%)-0.5(3.99%-5.3%) = 4.466%. It is $5.25\% \leq i_{FF} \leq 5.50\%$, which means that it is a little high.

But, with 2009:11, the i^d_{FF}must had been: $i^d_{FF} = 0\% + 1\% + 0.5(4.9\% - 0\%) - 0.5(10.1\% - 4\%) + 0.5(9.649\% - 12.2\%) - 0.5(3.4\% - 5.3\%) = 0.088\%$. It was, $0.00\% \leq i_{FF} \leq 0.25\%$, which was good.

With 1012:02 the i^d_{FF} must had been: $i^d_{FF} = 0\% + 1\% + 0.5(3.369\% - 3.272\%) - 0.5(8.3\% - 4\%) + 0.5(23.848\% - 12.2\%) - 0.5(1.97 - 5.3\%) = 6.387\%$, but it was: $0.00\% \leq i_{FF} \leq 0.25\%$, which generated an enormous bubble in the financial markets and a huge inflation.

discretionary policy is unfocussed, ineffective, and consequently, questionable [31]. Policymakers kept rates too low and for too long during the 2000s and later close to zero ($0.00\% \leq i_{FF} \leq 0.25\%$) from 12/15/2008 to 12/15/2015 and then, from 3/15/2020 to 3/15/2022 [32]. This policy had an enormous social cost to taxpayers (bail-out cost), to depositors (bail-in cost) [33], to consumers (high inflation), to investors (increases the market risk, bubbles) and unfortunately, continues up to now [34].

IV. EMPIRICAL RESULTS

We start estimating the augmenting reaction function, eq. (2), and the results appeared in Table 1a. The data are from 1999:02 (column I), from 1964:01 (column II), and from 1954:08 (column III) up to 2008:11, before the major changes in monetary policy (Old Regime, OR). The size of the partial adjustment, coefficient α_1 is 0.885^{***} (I), 0.566^{***} (II), and 0.507^{***} (III), which show that the degree of persistence in federal funds rates is greater than the one that can be attributed to systematic policy responses to persistent unemployment, real GDP, L-T interest rate and less for the other objective variables. The coefficients of the three regressions show that the federal funds rate must respond significantly to an increase in unemployment ($\alpha_3 = -0.189^{**}$) I, ($\alpha_3 = -0.422^{***}$) II, and ($\alpha_3 = -0.382^{**}$) III. Then, it must respond significantly to an increase in i_{L-T} ($\alpha_6 = 0.131^{*}$) I, ($\alpha_6 = 0.640^{***}$) II, and ($\alpha_6 = 0.652^{***}$) III, but less aggressively to real GDP ($\alpha_4 = -0.004^{**}$) III. The federal funds rate has no significant respond from any other objective variables ($\pi_t, djia_t, ta_t, e_t, usxri_t$). The most stranger results are with the inflation rate (π_t), which has no significant respond on i_{FF} [35].

Then, we look at the augmenting reaction function, eq. (3), of the growth of monetary base (mb_t), Table 1a. The coefficient of this regression shows that the growth of monetary base (g_{mb_t}) must respond significantly to an increase in inflation ($\alpha_2 = -0.636^{***}$) to induce a reduction in monetary base (tight money policy). Lastly, eq. (4), the growth of money (g_m) show that the g_m must respond significantly on unemployment ($\alpha_3 = 1.313^{***}$), on an increase in real GDP ($\alpha_4 = 0.150^{***}$), on an increase on exchange rate index ($\alpha_8 = 11.881^{***}$) and on L-T interest rate ($\alpha_6 = -1.092^{***}$) to induce a reduction in money supply, the objective is to keep the L-T interest rate at a moderate level. We run the same equations by using, instead of the growth of variables, their logarithms, Table 1b. The coefficients are very similar; the only improvement is in the RMSEs, which are lower by using the ln of the variables.

We continue with the same augmenting reaction functions, eqs. (2), (3) and (4) for the period 2008:12 to 2023:12 (New Regime, NR) and the results are shown in Tables 1c and 1d. The federal funds rate (i_{FF}) must respond significantly to an increase in inflation (π_t), to unemployment rate (u_t), to the growth of RGDP, to the growth of DJIA, and to an increase in L-T government bonds rate. Then, the growth of monetary base (g_{mb_t}) must respond significantly to inflation (π_t), to g_{DJIA}, to growth of CA_t, and to the growth of the spot exchange rate (g_S). Lastly, the growth of money (g_m) must respond significantly to inflation (π_t), to unemployment (u_t), to growth of the RGDP, to L-T interest rate, and to growth of CA. Very similar results are shown when we use the ln of the variables, Table 1d.

Table 1a: Estimations of the Augmenting Reaction Functions (OR), Eqs. (2), (3), and (4)

	i_{FF} (I)	i_{FF} (II)	i_{FF}(III)	g_{MB}	g_m
c	0.627^{*}	3.429	0.752^{*}	54.337	-51.640^{***}
	(0.335)	(3.518)	(0.373)	(70.294)	(11.118)
$i_{FF\,t-1}$	0.885^{***}	0.566^{***}	0.507^{***}	-0.555	0.577^{***}
	(0.065)	(0.044)	(0.030)	(1.183)	(0.218)
π_t	0.005	0.001	-	-0.636^{***}	-0.061
	(0.004)	(0.007)		(0.233)	(0.083)
u_t	-0.189^{**}	-0.422^{***}	-0.382^{***}	1.838	1.313^{***}
	(0.090)	(0.060)	(0.054)	(1.676)	(0.319)
$g_{RGDP\,t}$	0.002	-0.003	-0.004^{**}	-0.043	0.150^{***}

[31]See, Kallianiotis (2023).

[32]See, "Fed's interest rate history: The federal funds rate from 1981 to the present", Fed's Interest Rate History: The Fed Funds Rate Since 1981 | Bankrate

[33]See, Kallianiotis (2022, 2021a, and 2021b).

[34]A 3-month maturity CD has an interest rate of 1%, today, and with an inflation of $\pi_{SGS} = 14\%$; the real return of this CD is: $r_{CD} = i_{CD} - \pi = 1\% - 14\% = -13\%$. This is an enormous bail-in cost for the poor depositors. (*Sic*).

[35]Does the inflation matter for our economy or not? The public policy makers and some "Nobel laureates" declare continuously that even "debts do not matter". How is it possible to believe and trust them?

	i_{FF} (I)	i_{FF} (II)	i_{FF}(III)	g_{MB}	g_m
	(0.002)	(0.003)	(0.002)	(0.082)	(0.041)
$g_{DJIA\,t}$	-0.001 (0.001)	-0.001 (0.001)	-	-0.005 (0.010)	0.004 (0.006)
$i_{L-T\,t}$	0.131* (0.071)	0.640*** (0.048)	0.652*** (0.033)	-0.198 (1.692)	-1.092*** (0.342)
$g_{CA\,t}$	-0.001 (0.002)	-0.001 (0.001)	-	0.016 (0.027)	0.013 (0.015)
$g_{e\,t}$	0.001 (0.001)	-	-	-	-
$usxri_t$	-	-0.236 (0.778)	-	-10.686 15.345)	11.881*** (2.435)
$AR(1)$	0.887*** (0.088)	0.739 (0.050)	0.785*** (0.031)	0.327*** (0.034)	-
$MA(1)$	-0.437*** (0.123)	-	-	0.571*** (0.036)	-
R^2	0.994	0.980	0.982	0.433	0.098
SER	0.153	0.473	0.448	15.430	6.879
F	1,536.170	2,551.502	5,882.708	36.546	7.194
$D-W$	1.954	2.021	2.058	1.836	2.071
N	118	539	652	539	539
$RMSE$	0.144920	0.468214	0.445393	15.24355	6.821564

Note: Data for i_{FF} (I) are from 1999:02 to 2008:11, data for i_{FF} (II) are from 1964:01 to 2008:11, data for i_{FF} (III) are from 1954:08 to 2008:11, data for g_{MB} are from 1964:01 to 2008:11, and data for g_M are from 1964:01 to 2008:11. g_{RGDP} = growth of the real GDP, $usxri$ = the ln of the U.S. exchange rate index, $AR(1)$ = autoregressive 1 process, $MA(1)$ = moving average 1 process, *** = significant at the 1% level, ** = significant at the 5% level, * = significant at the 10% level, R^2 = R-squared, SER = S.E. regression, F = F-statistic, $D-W$ = Durbin-Watson statistic, N = number of observations, and $RMSE$ = root mean square error.
Source: Economagic.com, Bloomberg, and FRED.

Table 1b: Estimations of the Augmenting Reaction Functions (OR), Eqs. (2), (3), and (4)

	i_{FF}	i_{FF}	mb	m
c	-17.999 (14.792)	2.263 (9.019)	13.890*** (3.263)	3.343*** (1.174)
$i_{FF\,t-1}$	0.946*** (0.037)	0.899*** (0.026)	0.006 (0.007)	-0.006*** (0.002)
cpi_t	-5.317*** (2.025)	-2.287* (1.265)	-0.764 (0.493)	0.432*** (0.132)
u_t	-0.096 (0.083)	-0.223*** (0.042)	0.002 (0.005)	0.004 (0.003)
$rgdp_t$	5.344* (2.728)	1.736 (1.711)	-0.242 (0.192)	0.289** (0.117)
$djia_t$	-0.650* (0.332)	-0.313 (0.211)	-0.010 (0.019)	0.004 (0.011)
$i_{L-T\,t}$	0.213*** (0.059)	0.140*** (0.032)	0.001 (0.007)	-0.004* (0.002)
ca_t	-0.884 (0.766)	-0.754 (0.495)	-0.030 (0.038)	-0.016 (0.025)
eus_t	0.771** (0.294)	-	-	-
$usxri_t$	-	-0.769*** (0.182)	-0.059 (0.069)	0.055* (0.031)
$AR(1)$	0.323*** (0.101)	0.327*** (0.074)	1.947*** (0.058)	0.999*** (0.003)
$AR(2)$	-	-	0.948*** (0.058)	-
$MA(1)$	-	-	0.331***	-

	i_{FF}	i_{FF}	mb	m
			(0.066)	
R^2	0.994	0.992	0.998	0.999
SER	0.148	0.149	0.015	0.007
F	1,800.580	2,529.333	6,633.257	33,993.75
$D-W$	2.033	2.115	1.920	1.763
N	119	119	203	203
$RMSE$	0.141716	0.143705	0.014512	0.006540

Note: See, Table 1a. $rgdp$ = ln of the real GDP, cpi = ln of CPI, $djia$ = ln of DJIA index, ca = ln of CA, eus = ln of EUS ($/€), $usxri$ = ln of U.S. exchange rate index (FC/$), mb = ln of monetary base (MB), m = ln of money supply (M2).
Source: See, Table 1a.

Table 1c: Estimations of the Augmenting Reaction Functions (NR), Eqs. (2), (3), and (4)

	i_{FF}	g_{MB}	g_m
c	-0.090 (0.074)	-12.839 (18.635)	6.558* (3.886)
$i_{FF\,t-1}$	0.982*** (0.016)	-0.638 (9.233)	3.668* (1.970)
π_t	0.009*** (0.002)	-1.311** (0.579)	-0.305* (0.180)
u_t	-0.012* (0.007)	3.911 (3.573)	2.043*** (0.420)
$g_{RGDP\,t}$	0.002*** (0.001)	-0.229 (0.691)	-0.141*** (0.038)
$g_{DJIA\,t}$	-0.001** (0.001)	0.088* (0.047)	0.013 (0.008)
$i_{L-T\,t}$	0.075*** (0.023)	-0.814 (9.009)	-6.028*** (0.790)
$g_{CA\,t}$	0.001 (0.001)	-0.371*** (0.097)	-0.051** (0.024)
$g_{e\,t}$	0.001 (0.001)	0.251*** (0.086)	0.008 (0.023)
$usxri_t$	-	-	-
$AR(1)$	0.384*** (0.066)	0.241*** (0.090)	0.237*** (0.078)
$MA(1)$	-	-	-
R^2	0.993	0.235	0.531
SER	0.114	30.899	6.779
F	2,573.662	3.737	15.407
$D-W$	2.076	1.856	1.979
N	181	133	147
$RMSE$	0.110469	28.08922	6.491809

Note: Data are from 2008:12 to 2023:12 (new regime). See Table 1a. g_{RGDP} = growth of the real GDP, $usxri$ = the ln of the U.S. exchange rate index, $AR(1)$ = autoregressive 1 process, $MA(1)$ = moving average 1 process, *** = significant at the 1% level, ** = significant at the 5% level, * = significant at the 10% level, R^2 = R-squared, SER = S.E. regression, F = F-statistic, $D-W$ = Durbin-Watson statistic, N = number of observations, and $RMSE$ = root mean square error.
Source: See, Table 1a.

Table 1d: Estimations of the Augmenting Reaction Functions (NR), Eqs. (2), (3), and (4)

	i_{FF}	i_{FF}	mb	m
c	-17.437*** (4.312)	-20.204*** (4.389)	14.374*** (2.362)	9.852*** (0.677)
$i_{FF\,t-1}$	0.905*** (0.017)	0.889*** (0.019)	-0.046 (0.037)	-0.016*** (0.004)
cpi_t	0.007*** (0.003)	0.007*** (0.003)	-0.001 (0.001)	0.001 (0.001)

	i_{FF}	i_{FF}	mb	m
u_t	0.004 (0.009)	0.012 (0.012)	0.004 (0.004)	0.002*** (0.001)
$rgdp_t$	2.008*** (0.516)	2.289*** (0.514)	-0.758*** (0.235)	-0.052 (0.065)
$djia_t$	-0.233** (0.090)	-0.233 (0.126)	0.094** (0.042)	0.009 (0.008)
$i_{L-T\,t}$	0.106*** (0.016)	0.113*** (0.022)	-0.021 (0.014)	-0.005* (0.002)
ca_t	0.285 (0.335)	0.424 (0.566)	-0.352*** (0.090)	-0.022 (0.023)
eus_t	-0.261 (0.172)	-0.244 (0.312)	0.179** (0.074)	0.004 (0.021)
$usxri_t$	-	-	-	-
$AR(1)$	-	0.349*** (0.072)	0.998*** (0.009)	1.983*** (0.002)
$AR(2)$	-	-	-	-0.983*** (0.002)
$MA(1)$	-	-	0.334*** (0.083)	-0.774*** (0.055)
R^2	0.993	0.994	0.993	0.999
SER	0.118	0.112	0.025	0.006
F	3,030.608	2,699.826	1,732.391	38,853.72
$D-W$	1.348	1.982	1.961	1.743
N	181	181	146	174
$RMSE$	-	0.108561	0.054791	0.033379

Note: See, Table 1a. $rgdp$ = ln of the real GDP, cpi = ln of CPI, $djia$ = ln of DJIA index, ca = ln of CA, eus = ln of EUS ($/€), $usxri$ = ln of U.S. exchange rate index, mb = ln of monetary base (MB), m = ln of money supply (M2).
Source: See, Table 1a.

Now, we calculate the correlation coefficients (ρ) between the instruments of monetary policy and Fed's objectives, and we test their causality. The i_{FF} has a high positive correlation with $djia$ and i_{L-T}, but no causality with $djia$; it has a high negative correlation with u and smaller ones with p, $rgdp$, e, and m, Table 2a. The mb has high positive correlation with p, $rgdp$, e, and m; it has high negative correlation with i_{L-T}, ca, and $usxri$. Also, mb has correlation and causality with $djia$ and only correlation with u, Table 2a. The m has high positive correlation with p, $rgdp$, e; and negative correlation with i_{L-T}, ca, $usxri$. It also has correlation and causality with $djia$ and no causality with u. The $djia$ has high correlation and causality with $rgdp$; and no causality with u, and e. Also, correlation with i_{L-T} and ca. The p is highly correlated and causes the $djia$, and no causality with the $rgdp$, and it is negatively correlated and causes i_{L-T} and ca, but no causality. Thus, inflation (p) contributes to the bubble of financial markets ($djia$), depreciation of the dollar ($e\uparrow$), and increase in $rgdp$; also, some positive effects on u, negative effects on ca and i_{L-T}. The financial market ($djia$) causes inflation (p), increases in $rgdp$, and e, i_{L-T} and ca, unemployment is falling and private investment (usi) is improving. These were the direct and indirect effects of monetary policy on our macroeconomic variables (Old Regime).

After 2008 (New Regime), the monetary policy instruments (i_{FF}^{eff}, mb and m) have caused inflation, have reduced unemployment, have increase growth in the RGDP, the have reduce the spot exchange rate (appreciation of the dollar). The indirect effects of these tools through the DJIA are causing growth of the RGDP, growth in investments (usi), reduction in unemployment and L-T interest rates, and the $djia$ has caused the i_{FF}^{eff} to go up. The price level (p) has reduced unemployment (Phillips effect), it has increase the $djia$ (the bubble), it has increased the real GDP, it has appreciated the dollar, it has increased the money supply and the U.S. investment. Thus, the data show that inflation and bubbles in the stock markets are caused by the monetary policy and then, the financial markets improve the real sector of the economy (RGDP, USI and u) of course, these bubbles are dangerous because can be burst any time. (See, Table A5).

Table 2a: Effectiveness of Monetary Policy (Correlation, ρ and causality, =>)

Old Regime: 1950:01 – 2008:11			
	djia	***p***	***u***
i_{FF}^{eff}	ρ = +0.537 => ?	ρ = -0.175 => (F=38.601***)	ρ = -0.946 => (F=14.031***)
mb	ρ = +0.271=> (F=2.966*)	ρ = +0.919 => (F=7.062***)	ρ = +0.485 => ?
m	ρ = +0.407=> (F=2.751*)	ρ = +0.982=> (F=5.710***)	ρ = +0.419 => ?
$i_{US10YTB}$	*rgdp*	*e*	
i_{FF}^{eff}	ρ = +0.711=> (F=3.342**)	ρ = -0.121=> (F=7.592***)	ρ = -0.169 => ?
mb	ρ = -0.687 => ?	ρ = +0.906=> (F=7.711***)	ρ = +0.743=> (F=3.567**)
m	ρ = -0.716=> (F=8.443***)	ρ = +0.974=> (F=26.006***)	ρ = +0.823=> (F=3.261**)
	ca	*usxri*	*m*
i_{FF}^{eff}	ρ = +0.392 => ?	ρ = +0.056 => ?	ρ = -0.311=> (F=8.765***)
mb	ρ = -0.604 => ?	ρ = -0.751 => ?	ρ = +0.949=> (F=4.367**)
m	ρ = -0.627 => ?	ρ = -0.825=> (F=2.690***)	ρ = +1
	p	$i_{US10YTB}$	*rgdp*
djia	ρ = +0.502 => (F=7.772***)	ρ = +0.169 => (F=4.530**)	ρ = +0.550 => (F=3.822**)
	u | *ca*	*e*	*usi*
djia	ρ = -0.510=> ? | ρ = +0.036 => ?	ρ = +0.516 => ?	ρ = +0.961 => (F=5.674***)
	u	*djia*	$i_{US10YTB}$
p	ρ = +0.294 => (F=4.121**)	ρ = +0.502 => (F=6.052***)	ρ = -0.627 => (F=5.285***)
	rgdp	*ca*	*e*
p	ρ = +0.980 => ?	ρ = -0.536 =>?	ρ = +0.831 => ?
New Regime: 2008:12 – 2023:11			
	djia	*p*	*u*
i_{FF}^{eff}	ρ = +0.613 => ?	ρ = +0.606 => (F=2.439*)	ρ = -0.686 => (F=24.810***)
mb	ρ = +0.853=> ?	ρ = +0.842 => ?	ρ = -0.534 => (F=9.040***)
m	ρ = +0.961=> (F=3.119**)	ρ = +0.978=> (F=2.896*	ρ = -0.578 => (F=9.549***)
	$i_{US10YTB}$	*rgdp*	*e*
i_{FF}^{eff}	ρ = +0.055 => ?	ρ = +0.699=> (F=12.514***)	ρ = -0.486 => ?
mb	ρ = -0.603 => ?	ρ = +0.788=> (F=19.583***)	ρ = -0.627=> (F=3.455**)
m	ρ = -0.648=> ?	ρ = +0.942=> (F=19.583***)	ρ = -0.752=> (F=3.270**)
	ca	mb	mb
i_{FF}^{eff}	ρ = +0.159 => (F=9.222***)	ρ = +0.195 => (F=13.069***)	ρ =+0.511=> (F=25.836***)
mb	ρ = -0.058 => ?	ρ = +1.000	ρ = +0.857=> (F=9.786***)
m	ρ = -0.146 => (F=7.998***)	ρ = +0.857=>?	ρ = +1.000
	p	$i_{US10YTB}$	*rgdp*
djia	ρ = +0.982 => ?	ρ = -0.514 => (F=2.346*)	ρ = +0.965 => (F=2.523*)
	u	*e*	*usi*
djia	ρ = -0.662=> (F=9.313***)	ρ = -0.711 =>(F=6.893***)	ρ = +0.963 => (F=13.590***)
	i_{FF}^{eff}		
djia	ρ = +0.613 => (F=4.212**		
	u	*djia*	$i_{US10YTB}$
p	ρ = -0.646 => (F=4.456**)	ρ = +0.982 => ?	ρ = -0.589 => (F=2.845*)
	rgdp	*e*	*m*
p	ρ = +0.965 => (F=9.309***)	ρ = -0.719 =>(F=2.845*)	ρ = +0.978 => (F=4.304**)
	usi		
p	ρ = +0.973 => (F=12.670***)		

Note: See, Table 1a; $\rho_{i,j}$= correlation coefficient, => = causality, F-Statistic in parenthesis [i.e., => (F = 14.175***)].

Source: See, Table 1a.

At the end, in the Appendix, there are many figures and tables that support our arguments about the monetary policy and its effect on the economy. Figure A1 shows the forecasting of i_{FF}^{eff} (USFFRF), eq. (2), i_{FF} (I) from Table 1a. Figure A2 gives the forecasting of eq. (2), i_{FF} (II). Figure A3 gives the forecasting of eq. (2), i_{FF}(III). Then, these graphs and the mean values and standard deviations of the forecasting i_{FF} show that the reaction functions are

necessary statistics to determine the federal funds rate.

Figures A4 and A5 give the decomposition of the i_{FF} to its trend (Hodrick-Prescott Filter) and its cycle. Table A1 shows the statistics of the i_{FF} and the Hodrick-Prescott trend, which are almost identical; the HPTREND has smaller standard deviation (σ). Figure A6 shows the enormous growth of the DJIA and the CPI during the period that i_{FF} was zero. Table A2 gives the statistics of these three variables (i_{FF}, CPI, and DJIA), their mean values, standard deviations, correlation coefficients, and causality. The i_{FF} is highly and negatively correlated with CPI and DJIA; and the DJIA highly positively correlated with the CPI. The i_{FF} causes inflation (F = 6.950***), the DJIA also causes inflation (F = 7.889***), and CPI causes DJIA (F = 3.020**). People feel wealthier with the high DJIA and demand more goods and services and prices are going up, together with their debts.

Figure A7 shows the growth of MB, CPI, and DJIA, which move the same direction. The enormous liquidity has caused the CPI and the DJIA to grow extensively. Table A3 gives the statistics of these three variables, their high positive correlations ($\rho_{MB,CPI} = +0.824$ and $\rho_{MB,DJIA} = +0.948$) and their causalities. MB => CPI ($F = 3.692^{**}$), MB => DJIA ($F = 8.559^{***}$), and DJIA => CPI ($F = 4.193^{**}$).

Figure A8 gives the M2, CPI, and DJIA. The enormous money supply [36] causes inflation and bubbles. Table A3 shows the statistics of these three variables and their high positive correlation. This enormous liquidity has caused serious problems to our economy. M2 => CPI ($F = 6.204^{***}$), M2 => DJIA ($F = 9.283^{***}$), and DJIA => CPI ($F = 4.193^{**}$). Thus, the monetary policy is responsible for our economic problems and in 2021 came the new (liberal) fiscal policy that made the economy and the society worse off [37]. Figures A9, A10, and A11 give the M2, the personal consumption expenditures (PCE), the CPI, the gross private domestic investment (GPDI), and Figure A12 gives the M2, DJIA, and USI (GPDI) together. Table A4 gives the statistics of M2, DJIA, and USI. The M2 =>DJIA ($F = 9.283^{***}$), M2 => USI ($F = 12.546^{***}$), and DJIA => USI ($F = 7.988^{***}$).

Lastly, Table A5 gives the growth of money, the inflation rate, the unemployment rate, the growth of GDP, and the bear markets and recessions from 1980 to 2020. The huge growth of money (liquidity) had caused immense inflation and colossal bubbles in the stock markets, which were burst later and led the economy to recessions. The experience says that moderation and prevention of crises is the best solution. So far, we have not seen either one of these two virtuous policies (moderation or prevention) [38]. Then, something is wrong with our public policies; they need serious revisions.

Appendix

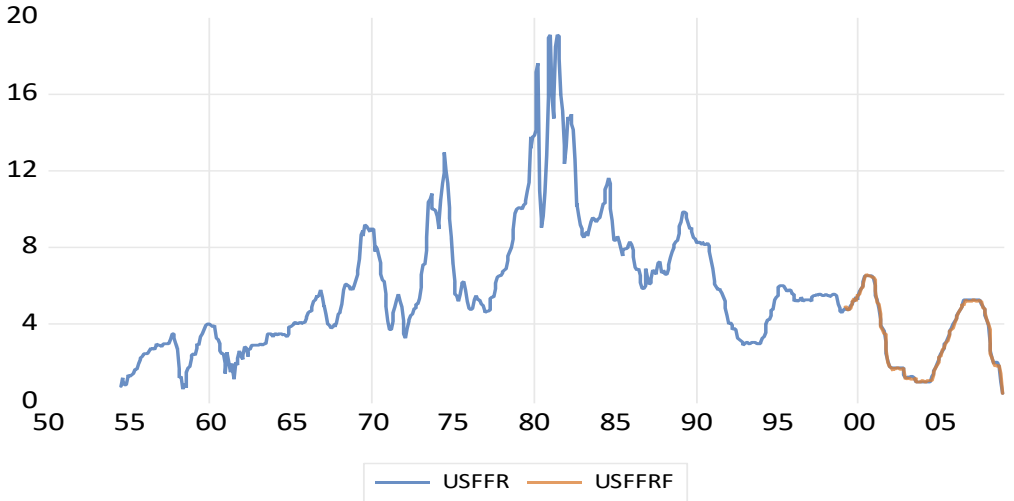


Figure A1: Federal Funds Rate and its Forecasting

Note: Estimation of eq. (2), i_{FF}(I), Table 1a. Actual $\overline{USFFR}$ =3.442564, σ_{USFFR}= ∓ 1.844308 and forecasting $\overline{USFFRF}$ =3.445495, σ_{USFFRF}= ∓ 1.853778.

Source: Data by the FRED and estimations by the author.

[36]It was: M2 = $21,851 billion (April 2022) and $20,981.9 billion (April 23, 2024). See, M2 (M2NS) | FRED | St. Louis Fed (stlouisfed.org). The M2 was $7,505.5 billion in 2008 and reached $21,851 billion in 2022; a growth by $14,345.5 billion or 191.13% (13.65% per annum). For this reason, the true inflation is a double digit figure (14%).

[37]The budget deficit is increasing (BD = $1.812 trillion) and the same is going on with the national debt (ND = $34.684 trillion) with April 2024; a growth of $8.174 trillion or 30.83% since 2020 ($26.51 trillion in 2020 and $34.684 trillion in 2024).

[38]See, Kallianiotis (2023 and 2020a).

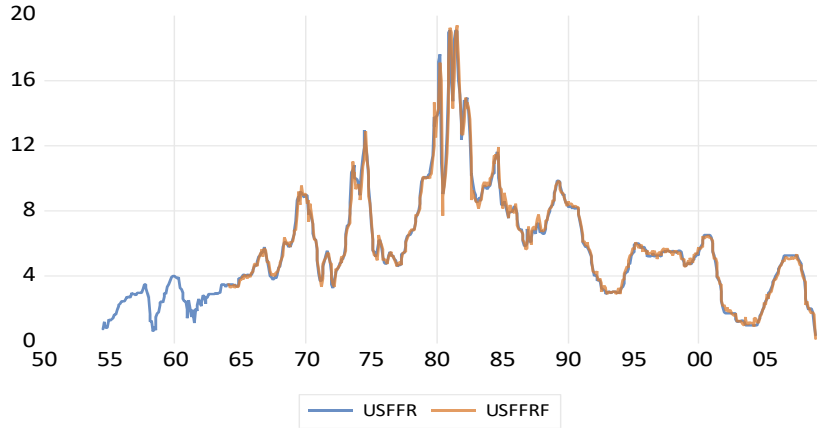


Figure A2: Federal Funds Rate and its Forecasting

Note: Estimation of eq. (2), i_{FF}(II), Table 1a. Actual $\overline{USFFR}$ = 6.289647, σ_{USFFR}= ∓ 3.292602 and forecasting $\overline{USFFRF}$ = 6.292036, σ_{USFFRF}= ∓ 3.249984.

Source: See Figure A1.

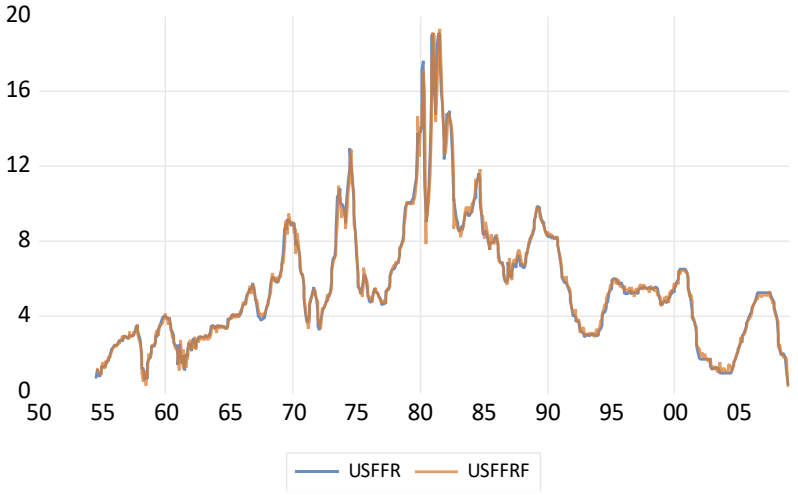


Figure A3: Federal Funds Rate and its Forecasting

Note: Estimation of eq. (2), i_{FF}(III), Table 1a, by taking out the insignificant variables. Real $\overline{USFFR}$ = 5.643579, σ_{USFFR}= ∓ 3.326079 and forecasting $\overline{USFFRF}$ = 5.645814, σ_{USFFRF}= ∓ 3.285190.

Source: Figure A1.

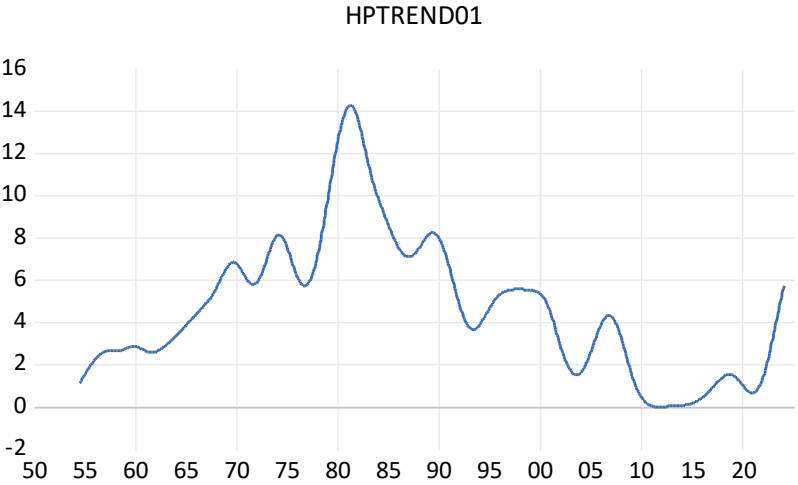
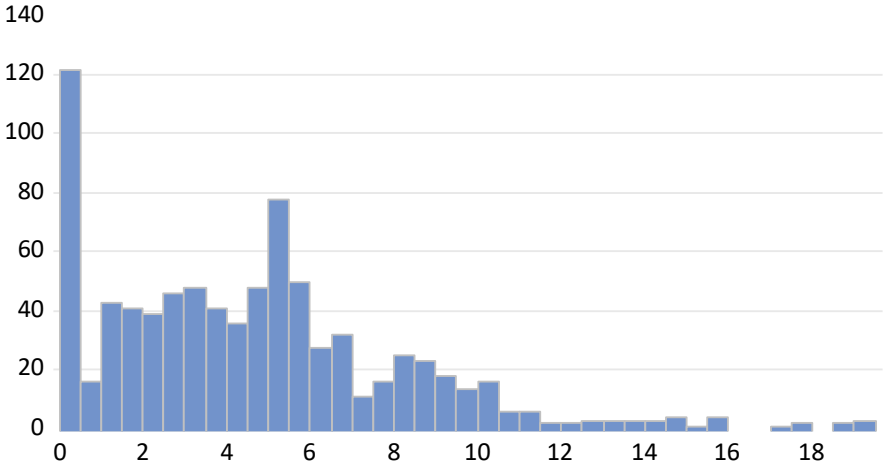


Figure A4: Hodrick-Prescott Filter of USFFR

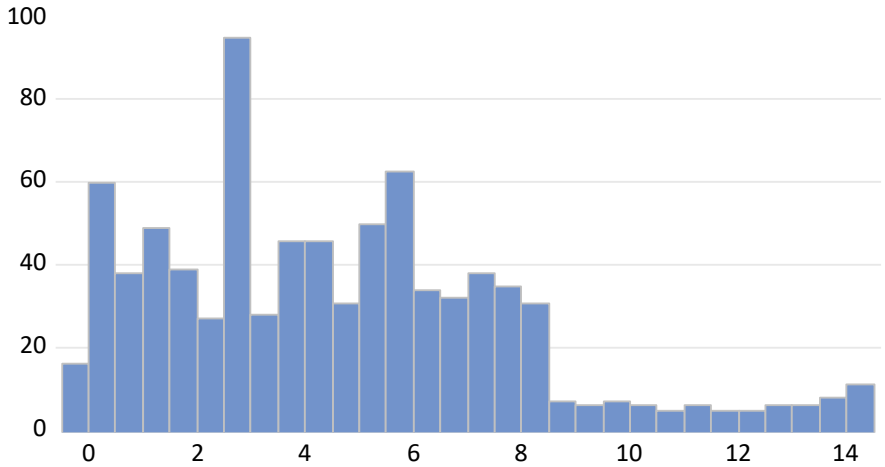
Note: HPTREND01= Hodrick-Prescott trend of the USFFR (effective).

Source: Figure A1.

Table A1: USFFR and HPTREND Statistics



Series: USFFR	
Sample 1950M01 2024M12	
Observations 836	
Mean	4.604103
Median	4.190000
Maximum	19.10000
Minimum	0.050000
Std. Dev.	3.587723
Skewness	1.063431
Kurtosis	4.589769
Jarque-Bera	245.6067
Probability	0.000000



Series: HPTREND01	
Sample 1950M01 2024M12	
Observations 836	
Mean	4.604103
Median	4.199270
Maximum	14.24959
Minimum	-0.026361
Std. Dev.	3.290830
Skewness	0.798101
Kurtosis	3.425770
Jarque-Bera	95.06517
Probability	0.000000

Note: USFFR = the U.S. effective federal funds rate and HPTREND01 = the Hodrick-Prescott trend.
Source: Figure A1.

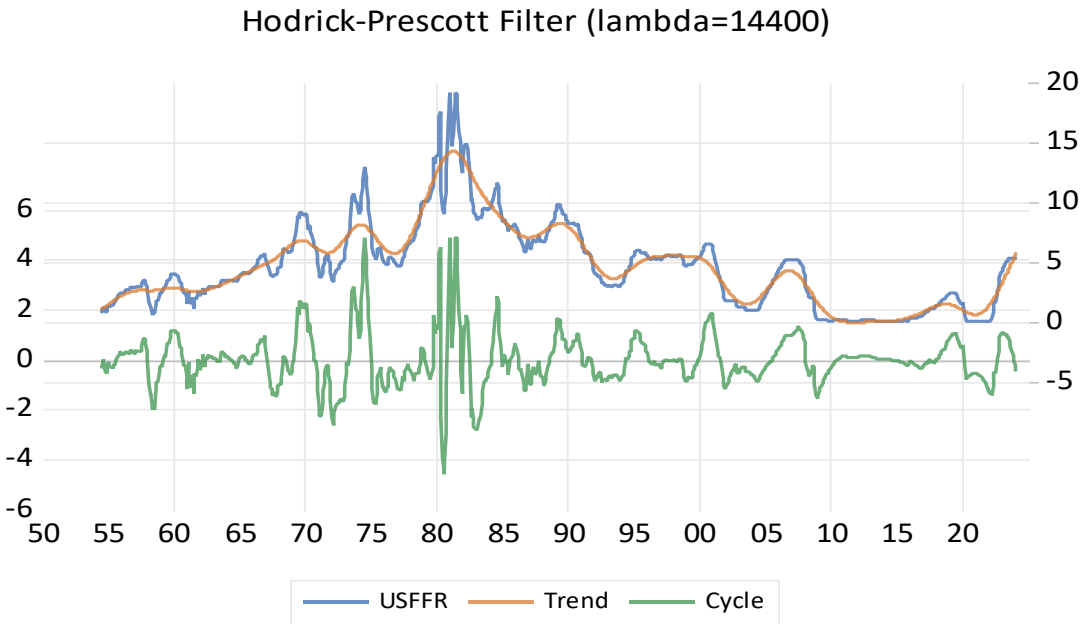


Figure A5: USFFR and its Decomposition into Hodrick-Prescott Filter (Trend)
Note: USFFR = U.S. effective i_{FF}, Trend = the Hodrick-Prescott trend of USFFR (effective), and Cycle = the cycle of the i_{FF}.
Source: FRED and author's estimations.

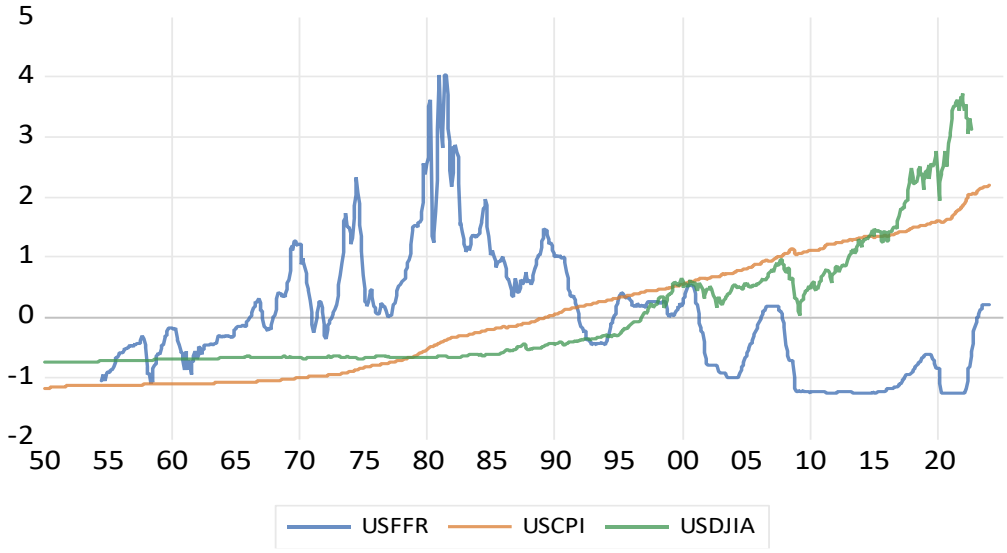


Figure A6: USFFR, USCPI, and USDJIA

Note: USFFR = U.S. i_{FF}, USCPI = U.S. Consumer Price Index, and USDJIA = U.S. Dow Jones Industrial Average index.

Source: FRED and Yahoo/Finance.

Table A2: Statistics, Correlation and Causality of USFFR, USCPI, and USDJIA

Statistics			
	USFFR	**USCPI**	**USDJIA**
Mean	4.601895	125.7715	6635.773
Median	4.135000	118.7500	2289.000
Maximum	19.10000	296.3110	36338.30
Minimum	0.050000	26.70000	335.8000
Std. Dev.	3.624968	80.30196	8169.016
Skewness	1.055790	0.244547	1.605550
Kurtosis	4.503563	1.689843	5.089629
Jarque-Bera	229.0219	66.65758	500.2655
Probability	0.000000	0.000000	0.000000
Sum	3764.350	102881.1	5428062.
Sum Sq. Dev.	10735.70	5268347.	5.45E+10
Observations	818	818	818

Correlation Coefficients			
	USFFR	**USCPI**	**USDJIA**
USFFR	1.000000	-0.433459	-0.529962
USCPI	-0.433459	1.000000	0.879202
USDJIA	-0.529962	0.879202	1.000000

Pairwise Granger Causality Tests			
Date: 04/03/24 Time: 14:44			
Sample: 1950M01 2024M12			
Lags: 2			
Null Hypothesis:	Obs	F-Statistic	Prob.
USCPI does not Granger Cause USFFR	834	1.72717	0.1784
USFFR does not Granger Cause USCPI		6.94992	0.0010
USDJIA does not Granger Cause USFFR	816	1.96390	0.1410
USFFR does not Granger Cause USDJIA		0.35201	0.7034
USDJIA does not Granger Cause USCPI	870	7.88885	0.0004
USCPI does not Granger Cause USDJIA		3.01959	0.0493

Note: See, Figure A6.

Source: See, Figure A6.

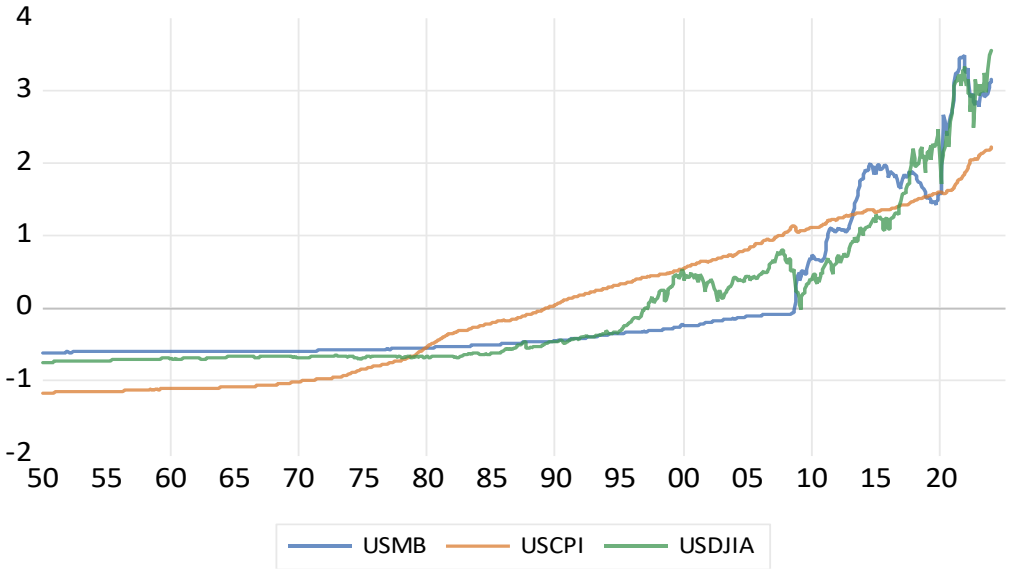


Figure A7: USMB, USCPI, and USDJIA

Note: USMB = U.S. Monetary Base, USCPI = U.S. CPI, and USDJIA = U.S. DJIA index.

Source: See, Figure A6.

Table A3: Statistics, Correlation and Causality of USMB, USCPI, and USDJIA

Statistics			
	USMB	**USCPI**	**USDJIA**
Mean	974.5476	123.1009	6778.140
Median	233.2600	111.2000	1914.200
Maximum	6413.100	308.4170	38150.30
Minimum	32.47300	23.50000	201.8000
Std. Dev.	1553.915	84.46640	8866.949
Skewness	1.878198	0.365583	1.678916
Kurtosis	5.386247	1.803232	5.172975
Jarque-Bera	733.5987	72.85573	592.5504
Probability	0.000000	0.000000	0.000000
Sum	866372.8	109436.7	6025767.
Sum Sq. Dev.	2.14E+09	6335500.	6.98E+10
Observations	889	889	889

Correlation Coefficients			
	USMB	**USCPI**	**USDJIA**
USMB	1.000000	0.823650	0.948328
USCPI	0.823650	1.000000	0.886402
USDJIA	0.948328	0.886402	1.000000

Pairwise Granger Causality Tests			
Date: 04/04/24 Time: 16:33			
Sample: 1950M01 2024M12			
Lags: 2			
Null Hypothesis:	Obs	F-Statistic	Prob.
USCPI does not Granger Cause USMB	888	2.69789	0.0679
USMB does not Granger Cause USCPI		3.69220	0.0253
USDJIA does not Granger Cause USMB	887	1.77501	0.1701
USMB does not Granger Cause USDJIA		8.55946	0.0002
USDJIA does not Granger Cause USCPI	887	4.19344	0.0154
USCPI does not Granger Cause USDJIA		2.63675	0.0722

Note: See, Figure A7.

Source: See, Figure A6.

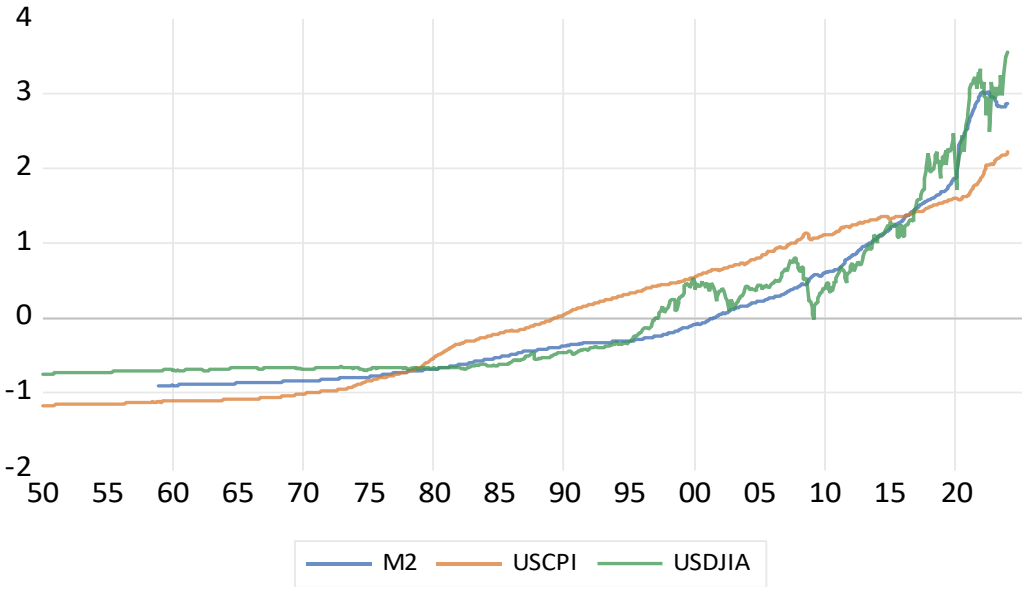


Figure A8: M2, USCPI, and USDJIA

Note: M2 = U.S. money supply (M2), USCPI = U.S. CPI, and USDJIA = U.S. DJIA index.

Source: See, Figure A6.

Table A3: Statistics, Correlation and Causality of M2, USCPI, and USDJIA

Statistics			
	M2	**USCPI**	**USDJIA**
Mean	5206.491	136.4193	7665.205
Median	3359.540	136.2000	3016.800
Maximum	21739.80	308.4170	38150.30
Minimum	287.7100	28.90000	561.3000
Std. Dev.	5493.210	81.61024	9111.632
Skewness	1.441313	0.195077	1.516845
Kurtosis	4.353128	1.798757	4.600270
Jarque-Bera	329.9882	51.91068	382.8246
Probability	0.000000	0.000000	0.000000
Sum	4066270.	106543.5	5986525.
Sum Sq. Dev.	2.35E+10	5194980.	6.48E+10
Observations	781	781	781

Correlation Coefficients			
	M2	**USCPI**	**USDJIA**
M2	1.000000	0.912228	0.982182
USCPI	0.912228	1.000000	0.885435
USDJIA	0.982182	0.885435	1.000000

Pairwise Granger Causality Tests			
Date: 04/04/24 Time: 16:38			
Sample: 1950M01 2024M12			
Lags: 2			
Null Hypothesis:	Obs	F-Statistic	Prob.
USCPI does not Granger Cause M2	779	6.01350	0.0026
M2 does not Granger Cause USCPI		6.20362	0.0021
USDJIA does not Granger Cause M2	779	0.92236	0.3980
M2 does not Granger Cause USDJIA		9.28325	0.0001
USDJIA does not Granger Cause USCPI	887	4.19344	0.0154
USCPI does not Granger Cause USDJIA		2.63675	0.0722

Note: See, Figure A8.

Source: See, Figure A6.

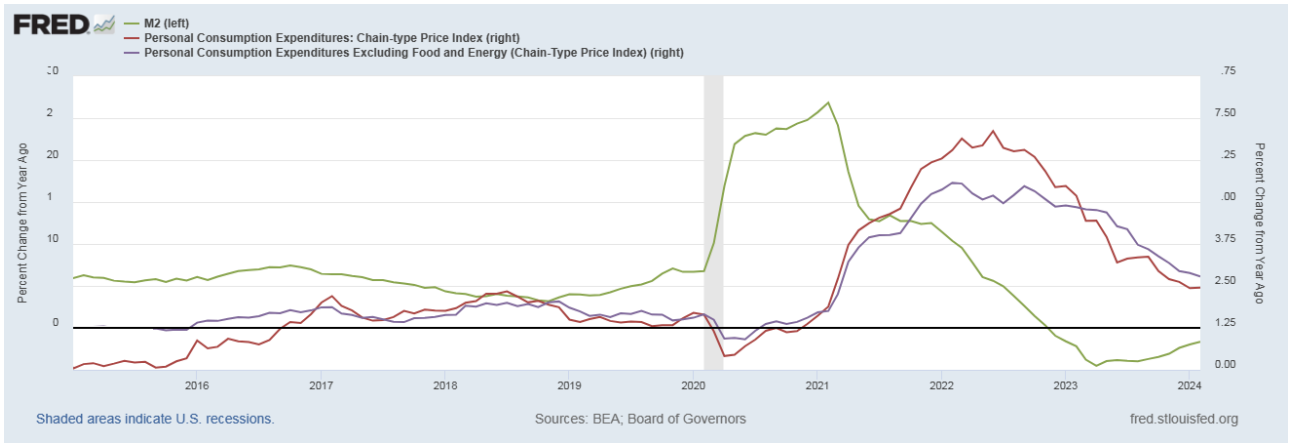


Figure A9: M2 Growth and PCE Inflation

Note: M2 = money supply and PCE = personal consumption expenditures.

Source: FRED®, Federal Reserve Bank of St. Louis; https://fred.stlouisfed.org/graph/?g=13lDl. See also, FRED Economic Data, St. Louis Fred, Federal Reserve Economic Data | FRED | St. Louis Fed (stlouisfed.org)

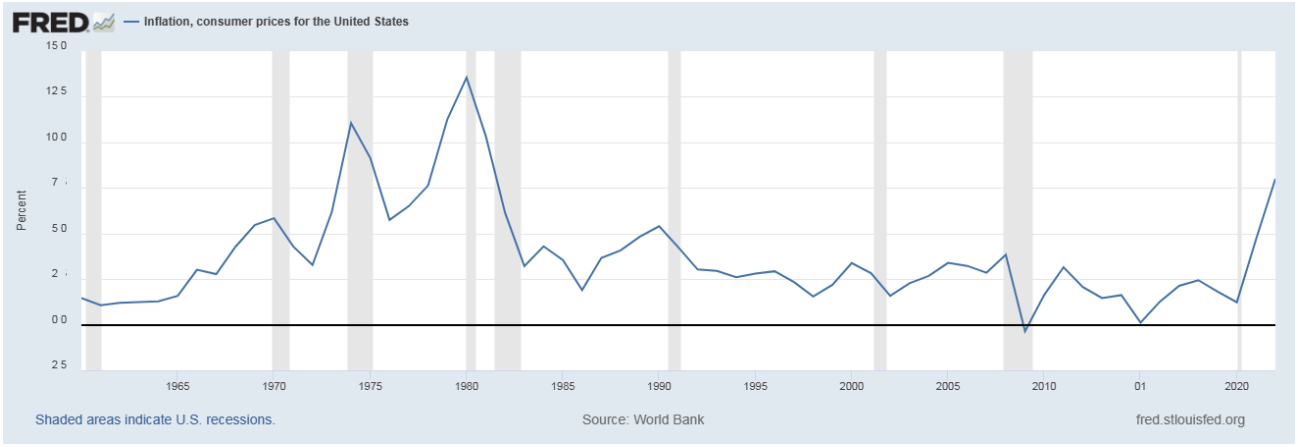


Figure A10: Inflation, Consumer Prices for the United States (FPCPITOTLZGUSA)

Source: Inflation, consumer prices for the United States (FPCPITOTLZGUSA) | FRED | St. Louis Fed (stlouisfed.org)
Also, "United States Historical Inflation Rates",
US Historical Inflation Rates | 1956-2024 (inflationtool.com)
And "us annual inflation rates by year", us annual inflation rates by year - Search (bing.com)

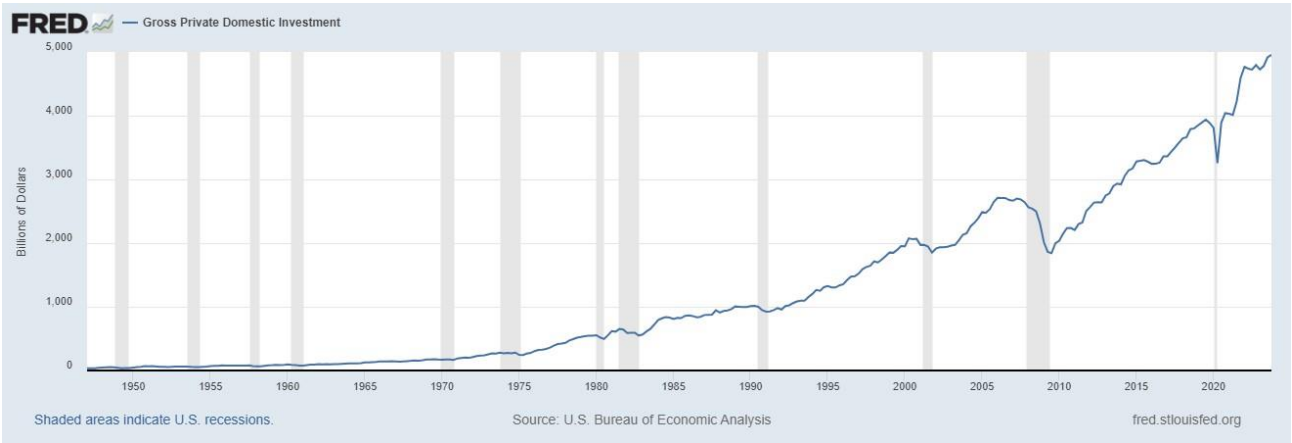


Figure A11: Gross Private Domestic Investment (GPDI)

Source: FRED, Gross Private Domestic Investment (GPDI) | FRED | St. Louis Fed (stlouisfed.org)

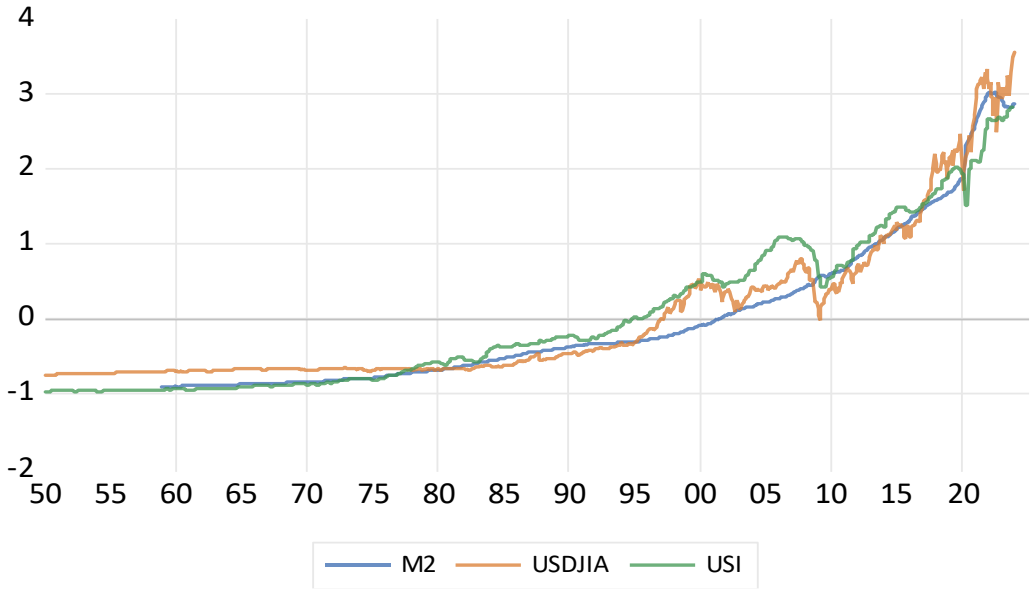


Figure A12: M2, USDJIA, and USI

Note: M2 = U.S. Money Supply, USI = U.S. Gross Private Domestic Investment, and USDJIA = U.S. DJIA index.

Source: See, Figure A6.

Table A4: Statistics, Correlation and Causality of M2, USDJIA and USI

Statistics			
	M2	**USDJIA**	**USI**
Mean	5186.407	7626.122	1474.101
Median	3359.095	2965.350	1003.267
Maximum	21739.80	37689.54	4954.426
Minimum	287.7100	561.3000	75.96300
Std. Dev.	5467.967	9051.734	1296.401
Skewness	1.444064	1.513036	0.825189
Kurtosis	4.374327	4.589992	2.732406
Jarque-Bera	332.4769	379.7688	90.84892
Probability	0.000000	0.000000	0.000000
Sum	4045398.	5948375.	1149799.
Sum Sq. Dev.	2.33E+10	6.38E+10	1.31E+09
Observations	780	780	780

Correlation Coefficients			
	M2	**USDJIA**	**USI**
M2	1.000000	0.982107	0.967508
USDJIA	0.982107	1.000000	0.965053
USI	0.967508	0.965053	1.000000

Pairwise Granger Causality Tests			
Date: 04/11/24 Time: 14:46			
Sample: 1950M01 2024M12			
Lags: 2			
Null Hypothesis:	Obs	F-Statistic	Prob.
USDJIA does not Granger Cause M2	779	0.92236	0.3980
M2 does not Granger Cause USDJIA		9.28325	0.0001
USI does not Granger Cause M2	778	1.44198	0.2371
M2 does not Granger Cause USI		12.5463	4.E-06
USI does not Granger Cause USDJIA	886	0.79253	0.4530
USDJIA does not Granger Cause USI		7.98815	0.0004

Source: See, Figure A6.

Table A5: Money Supply, Inflation, Bear Markets and Recessions

Dates	g_{M2}	π	S&P 500	Length of Days	Events	Period Range	Duration	u	g_{GDP}
11/28/1980-8/12/1982	+8.56% +9.73%	13.55% 10.33%	-27.11%	622	1980 recession	January 1980 – July 1980 [39]	6 months	7.8%	−2.2%
1981-1982	+9.73% +8.57%	8.92% 3.83%			1981–1982 recession	July 1981 – November 1982 [40]	1 year 4 months	10.8%	-2.7%
8/25/1987–12/4/1987	+9.47%	4,43%	-33.51%	101					
1990-1991	+6.97%	6.11%			Early 1990s recession	July 1990 – March 1991 [41]	8 months	7.8%	-1.4%
3/24/2000–9/21/2001	+6.19% +10.33%	3.39% 1.55%	-36.77%	546	Early 2000s recession	March 2001 – November 2001 [42]	8 months	6.3%	-0/3%
1/4/2002–10/9/2002	+6.22%	2.38%	-33.75%	278					
10/9/2007–11/20/2008	+5.66% +9.64%	4.08% 0.09%	-51.93%	408	Great Recession	December 2007 – June 2009 [43]	1 year6 months	10.0%	-5.1%
1/6/2009–3/9/2009	+3.71	2.72%	-27.62%	62					
2/19/2020–3/23/2020	+24.77%	1.36%	-33.92%	33	COVID-19 recession	February 2020 – April 2020 [44]	2 months	14.7%	-19.2%

Note: g_{M2} = growth of money supply (M2), π = inflation rate, S&P 500 = S&P 500 index, u = unemployment rate, g_{GDP} = growth of GDP.

Source: Kimberlee Leonard, "The Complete History Of Bear Markets", May 2022, Bear Market History: Top Bear Markets Since 1900 | Seeking Alpha, Also, "List of recessions in the United States", List of recessions in the United States - Wikipedia, and from the author.

[39]Note: The NBER considers a very short recession to have occurred in 1980, followed by a short period of growth and then a deep recession. Unemployment remained relatively elevated in between recessions. The recession began as the Federal Reserve, under Paul Volcker, raised interest rates dramatically to fight the inflation of the 1970s. The early 1980s are sometimes referred to as a "double-dip" or "W-shaped"

[40]The Iranian Revolution sharply increased the price of oil around the world in 1979, causing the 1979 energy crisis. This was caused by the new regime in power in Iran, which exported oil at inconsistent intervals and at a lower volume, forcing prices up. Tight monetary policy in the United States to control inflation led to another recession. The changes were made largely because of inflation carried over from the previous decade because of the 1973 oil crisis and the 1979 energy crisis.

[41]After the "lengthy peacetime expansion of the 1980s" (U.S. is in constantly wars from 1950, the Korean war, to present with the Ukraine and Israeli war, inflation began to increase and the Federal Reserve responded by raising interest rates from 1986 to 1989. This weakened but did not stop growth, but some combination of the subsequent 1990 oil price shock, the debt accumulation of the 1980s, and growing consumer pessimism combined with the weakened economy to produce a brief recession.

[42]The 1990s were the longest period of economic growth in American history up to that point. The collapse of the speculative dot-com bubble, a fall in business outlays and investments, and the September 11th attacks, brought the decade of growth to an end. Despite these major shocks, the recession was brief and shallow.

[43]The subprime mortgage crisis led to the collapse of the United States housing bubble. Falling housing-related assets contributed to a global financial crisis, even as oil and food prices soared. The crisis led to the failure or collapse of many of the United States' largest financial institutions: Bear Stearns, Fannie Mae, Freddie Mac, Lehman Brothers, and AIG, as well as a crisis in the automobile industry. The government responded with an unprecedented $700 billion bank bailout and $787 billion fiscal stimulus package. The National Bureau of Economic Research declared the end of this recession over a year after the end date. The Dow Jones Industrial Average (Dow) finally reached its lowest point on March 9, 2009. EU nations and worse the Euro-zone country-members (GIIPSC) went to aa deep crisis, which will have a social cost carrying for three generations.

[44]The economic effects of the suspicious pandemic (COVID-19) were severe after the first quarter of 2020. More than 24 million people lost jobs in the United States in just three weeks in April, due to the dangerous vaccine mandates and other unnecessary and unethical political controls on individuals' freedoms. The economic impact of the virus is still being determined, but the recession was the shortest on record.

V. CONCLUSION

Central banking [45] and its monetary policy plays a crucial role on financial markets and on financial conditions and consequently, on the economy, both through direct effects from policy announcements (changes in target federal funds rate) and indirect effects from macroeconomic news via perceptions about the likely future policy response. While the complexity, uncertainty [46], the unacceptable margin requirements ($r_m = 50\%$), the short selling, and the enormous bubble of financial markets make it difficult to pinpoint the exact determinants of observed changes in Financial Conditions Index (FCIs), monetary policy (fiscal [47] has also drastic effects on perceptions) [48], and macroeconomic official (political) data (true data are unknown) are clearly two important and interrelated drivers of financial market conditions.

The statistical analysis of this paper shows that the immense and unnecessary liquidity by the Fed for 16 years has caused a few positive effects, like reduction in (official = political) unemployment and increase in output, but the negative ones are huge, like bubbles in the financial markets, high inflation, enormous social cost (bail-in and bail-out). Financial markets affect positively the investment, the growth, the employment, and cause inflation and divisions between the markets (Wall Street) and real economy (Main Street). Also an extensive and irrational wokeism, leftist ideology, cultural war, environmental obsession, elections' integrity, the suspicious COVID-19 plague, and lack of leadership (leaders are completely control, as we see from their wrong policies) reduce the social welfare. Of course, we hope, and we must transfer an optimism to our young people, who are the future of our world and are not responsible for our generation's colossal and deadly mistakes.

REFERENCES

- Ajello, A., Michele, C., Giovanni, F., William, B. P., John, W. S., & Nitish, R. S. (2023). "A New Index to Measure U.S. Financial Conditions", June 30, https://www.federalreserve.gov/econres/notes/feds-notes/a-new-index-to-measure-us-financial-conditions-20230630.html
- Arnaut, Z., & Michael, B. (2024). "Monetary Policy and Financial Conditions", Federal Reserve Bank of San Francisco *Economic Letter*, 2024-07, March 4, pp. 1-6. https://www.frbsf.org/wp-content/uploads/el2024-07.pdf
- Bauer, M., & Eric, S. (2023). "A Reassessment of Monetary Policy Surprises and High-Frequency Identification", *NBER Macroeconomics Annual,* (37), 87–155.
- Bauer, M., Ben, B., & Eric, M. (2023). "Risk Appetite and the Risk-Taking Channel of Monetary Policy", *Journal of Economic Perspectives, 37*(1), 77–100.

[45]See, "How Did the Ancient Greeks and Romans Do Banking?" https://greekreporter.com/2024/04/13/how-did-ancient-greeks-romans-banking/?utm_source=MadMimi&utm_medium=email&utm_content=GreekReporter+Daily+News%3A+EIB+Announces+220+Euro+Loan+To+Greece+For+Civil+Protection&utm_campaign=20240413_m180672433_GreekReporter+Daily+News+Simple&utm_term=How+Did+the+Ancient+Greeks+and+Romans+Do+Banking_3F

[46]Due to our leaders, because they do not know how to make peace or they do not allow them to act by themselves. See, Mearsheimer and Walt (2007). See, also, "NATO to plan long-term Ukraine aid, mulls 100-billion euro fund" By Andrew Gray and John Irish, https://www.reuters.com/world/europe/nato-ministers-mull-100-billion-euro-military-fund-ukraine-2024-04-02/?eType=EmailBlastContent&eId=e4f97aa9-5419-4cd4-826c-1d949eb590ce

[47]Vivek Ramaswamy (presidential candidate for 2024 elections) said that, "The unholy alliance between Joe Biden, the corrupt Deep State, the DC Swamp, the Liberal Media, and the Radical Left Democrats is a national disgrace. We, the American People, will never forget what they've done to us. Luckily, we have a plan to stop these radicals who: Desecrated Easter Sunday with wokeism. Arrested the leader of the Republican Party. Removed Trump from the ballot in key states. Raided Mar-a-Lago with armed agents. Censored Conservative voices. Spied on Catholic worshippers. Gutted election integrity measures. Peddled the Russia Hoax for years. Threw open our border to illegals. Abandoned Americans in Afghanistan. Caved to the Chinese Communist Party. Moved to pack the Supreme Court. Forced propaganda into classrooms."

[48]This year (2024) is also a presidential election year and the divisions and liberalism are going to play a major role in our financial markets and the economy. The political issues are enormous for the country as are discussed daily in the news, like: "But what Joe Biden has done to our once great nation is *DISGUSTING: #1* OPEN BORDERS, *#2* MIGRANT CRIME, *#3* RECORD LEVEL INFLATION, *#4* ELECTION INTERFERENCE, *#5* CENSORSHIP AND INDOCTRINATION, *#6* DEEP STATE CORRUPTION, *#7* DESTRUCTION OF AMERICA." In addition, the "woke virus" has destroyed the entire western societies. See, "Έρευνα αποδεικνύει πως η woke παράκρουση οδηγεί σε άγχος και κατάθλιψη", Έρευνα αποδεικνύει πως η woke παράκρουση οδηγεί σε άγχος και κατάθλιψη - Ορθόδοξος Τύπος (orthodoxostypos.gr). See, also, " Ὁ γουοκισμός ὡς ἐργαλεῖο ἀποδόμησης " - Μοναχός Ἀρσένιος Βλιαγκόφτης. Μετεμορφώθης: " Ὁ γουοκισμός ὡς ἐργαλεῖο ἀποδόμησης " - Μοναχός Ἀρσένιος Βλιαγκόφτης (metemorfothis.blogspot.com)

https://www.aeaweb.org/articles?id=10.1257/jep.37.1.77

- Bauer, M., Carolin, P., & Adi, S. (2023). "Perceptions about Monetary Policy", *FRB San Francisco Working Paper 2023-31.* https://www.frbsf.org/research- and-insights/publications/working-papers/2023/10/perceptions-about-monetary-policy/
- Bindseil, U. (2016). "Evaluating Monetary Policy Operational Frameworks," in Designing Resilient Monetary Policy Frameworks for the Future. *Proceedings of the Federal Reserve Bank of Kansas City Jackson Hole Economic Policy Conference*, Jackson Hole, WY, August 25-27, pp. 179-277. https://www.kansascityfed.org/publications/research/escp/symposiums/~/media/6c10f54077ef4f70ae9214d2ac5dad35.ashx
- Buiter, W. H. (2014). "CENTRAL BANKS: POWERFUL, POLITICAL AND UNACCOUNTABLE?" *Discussion Paper No. 10223*, Centre for Economic Policy Research, London, UK. file:///E:/Central_Banks_Powerful_Political_and_Una%20(1).pdf
- Bullard, J. (2018). "Allan Meltzer and the Search for a Nominal Anchor", *Review*, Federal Reserve Bank of St. Louis, Vol. 100, No, 2, Second Quarter, pp. 117-126. https://research.stlouisfed.org/publications/review/2018/02/13/allan-meltzer-and-the-search-for-a-nominal-anchor
- Davidson, J. D. (2015). *The Age of Deception: Decoding the Truths About the U. S. Economy,* New York: Strategic Investment.
- De Ruiter, R. (2023). *Paving the Road to Hell II*, Mayra Publications, Las Vegas, NV.
- De Ruiter, R. (2022). *Paving the Road to Hell*, Mayra Publications, North Haven, CT.
- Gavin, W. T. (2018). "Monetary Policy Regimes and the Real Interest Rate", *Review*, Federal Reserve Bank of St. Louis, Vol. 100, No, 2, Second Quarter, pp. 151-169.
- Goodson, S. M. (2019). *A History of Central Banking and the Enslavement of Mankind*, 4th Edition, Black House Publishing Lid, London, United Kingdom.
- Holston, L., & Williams. (2023). "Measuring the Natural Rate of Interest after COVID-19", *Federal Reserve Bank of New York Staff Reports*, no. 1063, June. Holston, Laubach, and Williams (2017), "Measuring the Natural Rate of Interest: International Trends and Determinants," *Journal of International Economics, 108*(Supplemental 1), S39–S75.
- Ihrig, J., Ekaterina, P., & Scott, A. W. (2021), "Inflation Expectations, the Phillips Curve, and the Fed's Dual Mandate", Page One Economics, Economic Research Federal Reserve Bank of St. Louis, Summer, pp. 1-8. Inflation Expectations, the Phillips Curve, and the Fed's Dual Mandate | St. Louis Fed (stlouisfed.org)
- Kallianiotis, I. N. (2023). "Ethics, Public Policies, Financial Markets, and Institutions: New Global Policies, Financial, and Social Crises", Chapter 1, in *Current Topics on Business, Economics and Finance Vol. 1*, Dr. Turgut Tursoy (Editor), BP International, February 24, 2023, DOI: 10.9734/bpi/ctbef/v1/8882F, Print ISBN: 978-81-19039-96-8, eBook ISBN: 978-81-19039-99-9, pp. 1-51. file:///C:/Users/R97719842/Downloads/Kallianiotis_2022_BP_8882F.pdf https://doi.org/10.9734/bpi/ctbef/v1/8882F https://www.bookpi.org/bookstore/product/current-topics-on-business-economics-and-finance-vol-1/https://stm.bookpi.org/CTBEF-V1/issue/view/972
- Kallianiotis, J. N. (2022). "The Latest New Public Policies and their Unfair Social Cost", *International Journal of Research in Commerce and Management Studies*, Vol. 4, Issue 5, October 2022, pp. 96-136. THE LATEST NEW PUBLIC POLICIES AND THEIR UNFAIR SOCIAL COST http://dx.doi.org/10.38193/IJRCMS.2022.4506, file:///E:/The%20Latest%20New%20Public%20Policies.ijrcms_04_168.pdf
- Kallianiotis, J. N. (2021a). "The New Monetary Policy: Its Social Cost and Benefits", Chapter 1, in *Progress in Economics Research*, Volume 46, Albert Tavidze (Editor), pp. 1-111, Hauppauge, N.Y.: Nova Science Publishers, May, ISBN: 978-1-53619-704-4 (eBook) and ISBN: 1549-1552. https://novapublishers.com/shop/progress-in-economics-research-volume-46/
- Kallianiotis, J. N. (2021b). "Monetary Policy: Effectiveness, Efficiency, Risk, and Perspectives", *International Journal of Social Sciences and Management Review*, Volume 04, Issue 04, July-August 2021, pp. 46-95. http://ijssmr.org/uploads2021/ijssmr04_35.pdf and https://ijssmr.org/2021/07/22/monetary-policy-effectiveness-efficiency-risk-and-perspectives/
- Kallianiotis, J. N. (2021c). "Monetary Policy Rules vs Discretion: Social Cost and Benefits", *Journal of Applied Finance & Banking*, *1*1(5), 121-183. https://www.scienpress.com/journal_focus.asp?main_id=56&Sub_id=IV&volid=490. DOI number is: https://doi.org/10.47260/jafb/1156
- Kallianiotis, I. N. (2020a). "Can Monetary Policy Prevent Financial Crises?", *International Journal of Economics and Financial Research*, *6*(4), 51-75. https://ideas.repec.org/s/arp/ijefrr.html and https://ideas.repec.org/a/arp/ijefrr/2020p51-75.html
- Kallianiotis, I. N. (2020b). "Evaluating Monetary Policy's New Instruments", International *Journal*

of Economics, Business and Management Research, *4*(2), 55-99. http://ijebmr.com/link4.php?id=510 , http://ijebmr.com/uploads2020/IJEBMR_510.pdf

- Kallianiotis, John N. (2019), *Foreign Exchange Rates and International Finance*, Hauppauge, N.Y.: Nova Science Publishers, October 2019, ISBN: 978-1-53616-550-0. https://novapublishers.com/shop/foreign-exchange-rates-and-international-finance/
- Kallianiotis, J. N. (2017). "Central Banks, Monetary Policy, and their Efficiency", (Chapter in *Monetary Policy: Perspectives, Strategies and Challenges*, Harriet Ward (editor), New York: Nova Science Publishers, 2017.
- Kallianiotis, J. N. (2015a). "The Latest 'Planned' Financial Crisis, which Caused the First Depression of the 21st Century, Was a Moral and Political Crisis", in *Global Financial Crisis: Causes, Consequences and Impact on Economic Growth*, Jeanne Barnett (editor), New York: Nova Science Publishers, Inc., Chapter 2, pp. 15-78.
- Kallianiotis, I. N. (2015b). "Fed's Target Rate versus Banks' Deposits and Loans Rates", *Journal of Business Management and Economics*, 3(4), 7-28. http://innovativejournal.in/jbme/index.php/jbme/article/view/68
- Kallianiotis, I. N. (2015c). "Economic Crises and the Substitution of Fiscal Policy by Monetary Policy", *International Journal of Economics and Financial Issues*, *5*(1), 44-68. http://www.econjournals.com/index.php/ijefi/article/view/963
- Kallianiotis, I. N. (2014a). "Fed and ECB with Dollar and Euro as International Currency Reserves: Some Socio-Politico-Economic Considerations", *Journal of Business and Economics*, *5*(5), 605-625.
- Kallianiotis, I. N. (2014b). "The Future of the Undervalued U.S. Dollar as an International Currency Reserve", *International Research Journal of Applied Finance*, *5*(3), 224-252. https://irjaf.com/uploads/IRJAF_Vol_V_Issue_3__March_2014_
- Kallianiotis, N. J. (2018). *America in a Trance*, published by Damiani. www.nikokallianiotis.com
- Komlos, J. (2019a). "The Real U.S. Unemployment Rate is Twice the Official Rate, and the Phillips Curve", https://www.dropbox.com/s/tooigw05ojqlxnv/real%20unemployment%20new.pdf?dl=0. Also, https://drive.google.com/file/d/1913Um32spONxLlQgFgPz6VQxPtYt7Ieb/view?usp=sharing
- Komlos, J. (2019b). *Foundations of Real-World Economics*, Second Edition, New York: Routledge.
- Laubach, T., & John, C. W. (2003). "Measuring the Natural Rate of Interest," *Review of Economics and Statistics, 85*(4), 1063-1070.
- Laubach, T., & John, C. W. (2001). "Measuring the Natural Rate of Interest", *Board of Governors of the Federal Reserve System,* November, pp. 1-26. nr_main_v2.dvi (federalreserve.gov)
- Leonard, K. (2022). "The Complete History Of Bear Markets", May, Bear Market History: Top Bear Markets Since 1900 | Seeking Alpha
- Lopez-Salido, D., Sanz-Maldonado, G., Carly, S., & Min W. (2020). "Measuring the Natural Rate of Interest: The Role of Inflation Expectations", June 19, The Fed - Measuring the Natural Rate of Interest: The Role of Inflation Expectations (federalreserve.gov)
- Marchant, E. C., & Todd, O. J. (1997). *Xenophon: Memorabilia, Oeconomicus, Symposium, Apology,* Loeb Classical Library, Cambridge, Massachusetts, U.S.A.: Harvard University Press.
- McGuire, P., & Troy, A. (2018), *Trumpocalypse,* New York: Hachette Book Group.
- Mearsheimer, J. J., & Stephen, M. W. (2007). *The Israel Lobby and U.S. Foreign Policy*, Farrar, Straus and Giroux, New York.
- Mishkin, F. S., & Stanley G. E. (2018). *Financial Markets and Institutions*, Ninth Edition, New York, N.Y.: Pearson.
- Neely, C. J. (2023). "The Rise and Fall of M2", *Economic Synopses*, No. 11, Economic Research, Federal Reserve Bank of St. Louis. The Rise and Fall of M2 (stlouisfed.org)
- O'Donnell, E. T. (2015). *Henry George and the Crisis of Inequality: Progress and Poverty in the Gilded Age*, New York: Columbia History of Urban Life.
- Papanikos, G. T. (2022). "Hesiod's Theory of Economic History", *Athens Journal of History*, *8*(2), 147-174.
- Rickards, J. (2014). *The Death of Money: The Coming Collapse of the International Monetary System*, New York: Portfolio/Penguin.
- Ross, S. A., Randolph, W. W., Jeffrey, J., & Bradford, D. J. (2022). *Corporate Finance*, 13th edition, New York, N.Y.: McGraw-Hill Education.
- Sack, B., & Volker, W. (1999). "Interest-Rate Smoothing and Optimal Monetary Policy: A Review of Recent Empirical Evidence", Board of Governors of the Federal Reserve System. http://www.federalreserve.gov/pubs/feds/1999/199939/199939pap.pdf
- Search, R. E. (1989). *Lincoln Money Martyred*, Omni Publications, Palmdale, California.
- Selgin, G. (2017). "The Strange Official Economics of Interest on Excess Reserves", October 3, 2017. https://www.alt-m.org/2017/10/03/strange-official-economics-of-interest-on-excess-

reserves/. The strange official economics of interest on excess reserves : News : Data-Z

- Stiglitz, J. E. (2002), *Globalization and its Discontents*, New York: W.W. Norton & Company.
- Stockman, D. A. (2022). *The Great Money Bubble*, Humanix Books, West Palm Beach, FL, U.S.A.
- Taylor, J. B. (1993). "Discretion versus Policy Rules in Practice". *Carnegie-Rochester Conference Series on Public Policy 39,* pp. 195–214.
- Wessel, D. (2009), *In Fed we Trust*, Crown Business, New York, U.S.A.
- Williams, J. C. (2014). "Monetary Policy at the Zero Lower Bound: Putting Theory into Practice." *Hutchins Center on Fiscal & Monetary Policy at Brookings*, January 16. https://www.brookings.edu/research/monetary-policy-at-the-zero-lower-bound-putting-theory-into-practice/f
- Williams, J. C. (2003). "The Natural Rate of Interest", *FRBSF ECONOMIC LETTER*, Number 2003-32, October 31, pp. 1-4. https://www.frbsf.org/wp-content/uploads/el2003-32.pdf
- Williamson, S. D. (2014), "Monetary Policy in the United States: A Brave New World?", *Review*, Federal Reserve Bank of St. Louis, *96*(2), 111-121.
- Wolla, S. A. (2019), A New Frontier: Monetary Policy with Ample Reserves, *Page on Economics, Economic Research Federal Reserve Bank of St. Louis, A New Frontier: Monetary Policy with Ample Reserves*, St. Louis Fed (stlouisfed.org)