Restraints on Federal Reserve Credit Expansion and Interest Rate Determination[1]

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Abstract

This paper seeks to answer whether the Federal Reserve System or the private market leads in the determination of interest rates. To answer this question, I explore the limitations of the ability of the Fed to expand credit in pursuance of its goals of economic stability, maximum employment, and macroeconomic welfare. Using Austrian school interest theory, monetary theory, and business cycle theory, I find that the Fed's ability to expand credit and stimulate economic booms is limited by several factors. These include the possibility of excessive inflation leading to a crack-up boom; political pressure to end monetary inflation; the public's demand for physical cash; the behavior of lending institutions in response to credit expansion; and the behavior of producers in response to credit expansion. Because of these factors, the Fed cannot unilaterally and indefinitely control interest rates. While the Fed leads in determining rates during periods of credit expansion, the market leads after the Fed is pressured by these limitations to cease credit expansion. I apply this theory to determine why the Fed failed to stimulate a boom during the stagflation of the 1970s and conclude that the Fed's failure was due to the new money created by credit expansion being directed toward consumer credit instead of loans for higher-order production.

Keywords: credit expansion, interest rates, central banking, business cycles, monetary theory

JEL Classification: E32, E43, E52, E58, E65

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1. Introduction

The creation of the Federal Reserve System in 1913 fundamentally changed the monetary system of the United States. The banking system had been regulated prior to 1913, but the creation of the Fed brought increasing centralization of the U.S. monetary system unlike anything that had before existed in the country. Rather than being determined only by the unhampered market, market interest rates are now heavily influenced by the Fed through credit expansion. The Fed's credit expansion and artificial suppression of interest rates, according to the Austrian tradition, cause the phenomenon of business cycles. The Fed influences market interest rates by increasing the supply of credit, but does the Fed lead or follow the market in determination of interest rates?

During expansionary booms the Fed leads the market in interest rate determination, but during busts the market leads in interest rate determination. Ultimately, the market sets the interest rate structure, which is determined primarily by the time preferences of individuals in the economy. However, the Fed causes distortions in the interest rate structure which create business cycles. During booms the Fed leads the market in setting the interest rate structure, causing distortions which create inflationary booms. During busts the Fed follows the market as the Fed's credit expansion is restrained and interest rates rise to allow readjustment and recovery in the economy. The Fed cannot unilaterally and indefinitely determine interest rates because its ability to expand credit faces several restraints. Busts are the mechanism by which interest rates return to their market level.

The groundwork for this analysis has been laid by Austrian theorists of interest and business cycles such as Mises and Fetter. According to Fetter (1905, 78-79), borrowers are willing to pay interest because they value some amount of present goods more than they value the same amount of goods at some point in the future Thus, the basis of interest is the difference

in the time preferences of lenders and borrowers: while both prefer present goods to future goods, borrowers more urgently prefer present goods than do lenders. The difference in time-preferences between lenders and borrowers creates the conditions for intertemporal exchange. As Fetter (1905, 78) says, "the interest they [borrowers] agree to pay is based on their estimate of the discount of future rents, which they think is involved in the present valuations of the goods." Mises incorporates Fetter's time preference theory of interest in his development of the circulation credit theory of the trade cycle, better known as the Austrian theory of the business cycle. In Mises' (1998; 2009) theory, business cycles are caused by bank issuance of fiduciary media.

In this paper I aim to answer whether the Fed or the market leads in determining interest rates. First, I apply Austrian business cycle theory to show that the Fed influences interest rates through credit expansion, but when the credit expansion ends the artificial suppression of interest rates ceases and rates begin to return to market levels. I then examine the economic restraints which prevent the Fed from stimulating production booms indefinitely by expanding credit and determining interest rates. In the final section, I analyze a historical example of a business cycle to show how the Fed failed to stimulate a continued economic boom by indefinitely suppressing interest rates.

2. Theory

As Mises (1998, 523) explains, the "originary rate of interest" is "the ratio of the value assigned to want-satisfaction in the immediate future and the value assigned to want-satisfaction in remoter periods of the future." The originary rate of interest is a function of time preference (Mises 1998, 521), the extent to which people value present satisfaction over future satisfaction. Interest rates in the credit market, then, are determined primarily by the originary rate of interest

(Mises 1998, 524), or the pure rate of interest. Because time preference is a subjective category determined in the minds of individuals, the Fed cannot change the rate of social time preference itself.[2] By increasing the supply of credit through credit expansion, however, the Fed can artificially suppress interest rates in the credit market. As Mises (1998) and Rothbard (2008a) write, the suppression of interest rates creates artificial booms which must end in recession when the credit expansion ceases or becomes insufficient to sustain the boom. The boom is revealed to be unsustainable when entrepreneurs realize that the supply of real saved resources is insufficient to complete the longer production processes that were begun as a result of the suppressed interest rates (de Soto 2020, 375).

De Soto (2020) explains the mechanisms by which interest rates return to market levels toward the end of credit expansions. Credit expansion causes price inflation which reduces the purchasing power of money. To charge the same real interest rate as before the inflation, lenders must add a purchasing power premium to the interest rate to account for the expected fall in the purchasing power of money (de Soto 2020, 371-372), so nominal interest rates will rise. Second, since entrepreneurs have already committed so many resources to extending their production processes, they will be willing to pay higher and higher interest rates to secure the funding necessary to complete the projects as long as they believe the projects can be completed (de Soto 2020, 371-374). As their demand for credit rises, so will interest rates (de Soto 2020, 372-374). When the credit expansion ends, the interest rate in the credit market is no longer affected by the artificially inflated supply of credit. Instead, it will be allowed to return to the market rate (de Soto 2020, 371), which is determined primarily by the originary interest rate as well as the

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Changes in the money relation could, but do not necessarily, change people's time preferences; such an effect cannot be axiomatically deduced (Mises 1998, 530-531).

entrepreneurial component (Mises 1998, 536) and the purchasing power component (Mises 1998, 538-539) of the market rate of interest.

As aforementioned, the boom created by credit expansion ends when the central bank ceases expanding credit or when the amount of credit expansion is insufficient to sustain the boom. The Fed has two options to respond to the bust: it could cease credit expansion, allowing interest rates to return to their market levels and permitting the bust to occur so the market can readjust and entrepreneurs can liquidate malinvestments. Alternatively, in pursuance of its goals of maximum employment and stable prices, the Fed could try to restimulate the boom by continuing or increasing the credit expansion. As Rothbard (2008a, 13) explains, the Fed can expand credit further, allowing businesses that are engaging in longer production processes to continue bidding factors of production away from lower order goods industries and delaying the crisis. The boom continues, generating more and more malinvestment and inflation, until the credit expansion ends.

If the Fed can simply continue expanding credit *ad infinitum* with a continuous boom and no adverse consequences, then the Fed effectively controls the interest rate structure rather than the market. However, the Fed's continuing credit expansion and its suppression of interest rates are restrained by the market in several ways. Mises (1928) explains how a continuing policy of credit expansion taken to its conclusion must lead to a hyperinflationary "crack-up boom." If the Fed engages in further credit expansion, the incomes of laborers and factor owners which are paid with the newly created money continue to rise. The demands for consumer goods of these income receivers increase, and the increased demand raises prices of consumer goods throughout the economy. The new money ripples throughout the economy, raising overall prices (Rothbard 2008b, 101). As Mises (1928, 114) says, "The inflation can continue only so long as the

conviction persists that it will one day cease. Once people are persuaded that the inflation will not stop, they turn from the use of this money. They flee then to 'real values,' foreign money, the precious metals, and barter." If the Fed continues credit expansion indefinitely, "the boom turns into the crack-up boom; the flight into real values begins, and the whole monetary system founders" (Mises 1998, 559) as the currency becomes worthless. Thus, to avoid this outcome, the Fed must end the credit expansion and permit the bust to occur, allowing interest rates to return to market levels.

If the policymakers at the Fed are not aware of the possibility of the crack-up boom, they may also be restrained by political pressure. Boettke and Smith (2013) argue that the bulk of empirical evidence shows that the members of the Board of Governors are subject to considerable political influence from both the executive and legislative branches of the federal government. These political pressures include appointment power; media releases to create public pressure; congressional testimony, audits, and reports; congressional threats against the Fed; and informal channels of influence such as presidential meetings with the Chairman (Boettke and Smith 2013, 33-36). The Federal Reserve System is not totally independent from the federal government and thus is subject to some degree of political influence. The Federal Open Market Committee, which conducts the Fed's monetary policy, consists of all seven members of the BOG as well as five of the regional Federal Reserve Bank presidents (BOG 2021, 12). The members of the BOG are nominated by the President of the United States and are confirmed by the Senate (BOG 2021, 7). Additionally, the chair of the BOG is nominated by the President and confirmed by the Senate for terms of four years and can be reappointed to additional terms (BOG 2021, 8). The policymakers at the Fed are politically appointed and are thus subject to political influence. Policymakers have an incentive to commit to setting Fed

policy according to the desires of the President and the Senate to gain their positions at the Fed. The chair of the BOG in particular, only serving four-year terms, is encouraged to act in accordance with the policy goals of the federal government in order to gain reappointment. Additionally, individual members of the BOG may shape policy in accordance with the desires of legislators and the President with the hope of receiving the next nomination for chair. If the President and the Senate face political pressure to take action against price inflation during heavily inflationary periods, the policymakers at the Fed, particularly the chair of the BOG, may be encouraged to tighten monetary policy to stem the inflation. Political pressure to reduce inflation during highly inflationary periods can act as a constraint on the Fed's credit expansion.

Another constraint on central bank credit expansion is the public's demand for cash. Rothbard (2008b, 141-145) explains that if the public increases their demand for physical cash, commercial banks have less reserves on which to expand credit. When the public increases their demand for cash, individuals will redeem their demand deposits at commercial banks and receive bank notes. This requires commercial banks to draw down their reserves at the Fed. If the banks are fully loaned up, they must contract credit to remain at their required or prudential reserve ratios. Thus, the public's demand for physical cash can limit the central bank's ability to expand credit. One major factor determining the demand for cash is loss of confidence in banks: if the public loses confidence in the ability of commercial banks to fulfill redemption claims on demand, the demand for cash will increase. This factor of the demand for cash in the U.S. has largely been negated by the creation of the FDIC, which guarantees individuals' bank deposits so that the public need not be concerned about the inability of banks to redeem demand deposits (Rothbard 2008b, 147). Additionally, the demand for physical cash has been reduced by the development of clearing systems and electronic transfer of money. These developments reduce

the need to carry physical cash to use in transactions and thus the demand for physical cash (Rothbard 2008b, 147). In the United States, the constraint on the Fed's credit expansion from the public's demand for cash is significantly negated.

The behavior of commercial banks can also be a restraint on the Fed's credit expansion. As aforementioned, the Fed expands credit by increasing bank reserves. The Fed then depends on the banks to remain fully loaned up by extending more loans on top of the new reserves, thus decreasing interest rates and stimulating borrowing by businesses who will use the new funds to extend production processes. If banks do not lend out on top of the new reserves but instead hold onto the excess reserves, the new money does not make it into the credit market, so the interest rate is not artificially suppressed. Entrepreneurs are not then misled by suppressed interest rates to engage in longer production processes, and a boom does not begin. Banks holding onto significant excess reserves is a relatively new phenomenon – before the 2008 financial crisis, the amount of excess reserves in the system was close to zero (Murphy 2021, 144). When the Fed injected new reserves into the financial system after the crisis, commercial banks held onto some of the new reserves rather than staying fully loaned up (Murphy 2021, 94). This phenomenon may restrain the Fed's ability to expand credit.

In addition to holding onto excess reserves, bank behavior can restrain the Fed's credit expansion through the banks' lending practices. The Fed's credit expansion creates a boom by decreasing the interest rate on loanable funds which increases the availability of loans to entrepreneurs. When entrepreneurs can take out loans at a lower interest rate, they will tend to borrow more from banks, expanding production by lengthening their production processes in hopes of higher returns. If, however, commercial banks do not increase lending to producers and instead increase consumer loans, the boom in higher production stages will not take place.

Instead, the amount of consumer credit will increase. The new money created by the Fed will go to consumers, who, unless their time preferences have changed, will spend the money in the same ratio of consumption to saving-investing that they had before the credit expansion. This will cause consumer price inflation but will not cause a boom in higher-stage production relative to the boom in lower-order goods industries. Thus, if the banks lend the new money to consumers instead of producers, the credit expansion will fail to create a boom.

The choices of producers may provide a further restraint on the Fed's credit expansion. To create a boom, banks must lend to producers so that producers expand production and employ higher order factors of production. If the demand for credit of producers across the economy decreases and they are unwilling to take out new loans, they will not choose to pursue longer production processes and a boom will not begin—or, if a boom does begin, the production boom will be lesser than it otherwise would be. Several factors may decrease producers' demand for credit. If producers are excessively uncertain about future economic conditions, they may choose to refrain from taking out new loans. If entrepreneurs foresee a future decrease in demand for the factors of production they are producing, they may refrain from expanding the production process because they expect profitability to fall, and thus expect a lower return on investment for the longer line of production.

In sum, Austrian interest theory and business cycle theory show that the Fed cannot unilaterally and indefinitely control interest rates on the loanable funds market. During expansionary booms, the Fed leads the market in determining interest rates in the credit market, but the Fed's credit expansion faces restraints and cannot continue forever. When the Fed is forced to stop expanding credit, it must allow interest rates to return to market levels. During busts and recoveries, then, the market leads the Fed in determining interest rates.

3. Historical Analysis

The expansionary boom of the 1960s and the subsequent bust and stagflation of the 1970s provide an example of the Fed's failure and inability to indefinitely lead the market in setting the interest rate structure. Measured by the federal funds rate (r_{FF}), the U.S. economy was in a period of credit expansion through most of the 1960s. The r_{FF} can be used as a metric for credit expansion because it is targeted by the Fed and heavily influenced by the Fed's credit expansion. The r_{FF} is reflective of other market interest rates throughout the economy (BOG 2021, 24) because the increase in bank reserves caused by the Fed's credit expansion lowers other rates through increases of the supply of credit in general, not only for overnight loans between banks. I aim to show that the Fed's credit expansion during the 1970s was limited by the ensuing price inflation and the political pressure that came with it. Additionally, I aim to demonstrate that the Fed's credit expansion failed to stimulate a sustained production boom during the 1970s because a large proportion of the newly created money went toward consumer credit instead of loans for production.

Before 1969 the r_{FF} was kept low relative to the heights it would reach in the late 60s as well as at points throughout the 70s and early 80s. From November 1960 to December 1968 the r_{FF} ranged from a low of 0.25% to a high of 6.25% (BOG 2022). The Dow Jones Industrial Average reflects a boom as well: from the low point in October 1960 to the high point in December 1968 before the bust, the DJIA grew approx. 43% (Macrotrends 2022). By the end of the decade, the inflationary boom began to manifest price inflation: while for the first half of the decade the CPI-U did not rise above 2%, beginning in 1966 the CPI-U steadily rose to over 5% on the eve of the 1970s (Bureau of Labor Statistics 2022). Norman Bowsher (1969, 2) records how political pressure to bring down price inflation existed:

> Inflation has been the nation's most serious domestic economic problem in recent years. The extent of concern over this problem has been evident from the numerous tough decisions the public authorities have made in an attempt to moderate it. Tax rates were raised, growth in Government spending was reduced, and monetary growth was restrained.

While the Fed had been expanding credit for years to stimulate an economic boom, it could no longer expand credit without deepening price inflation and ultimately causing a crack-up boom if the inflation continued at high rates for too long.

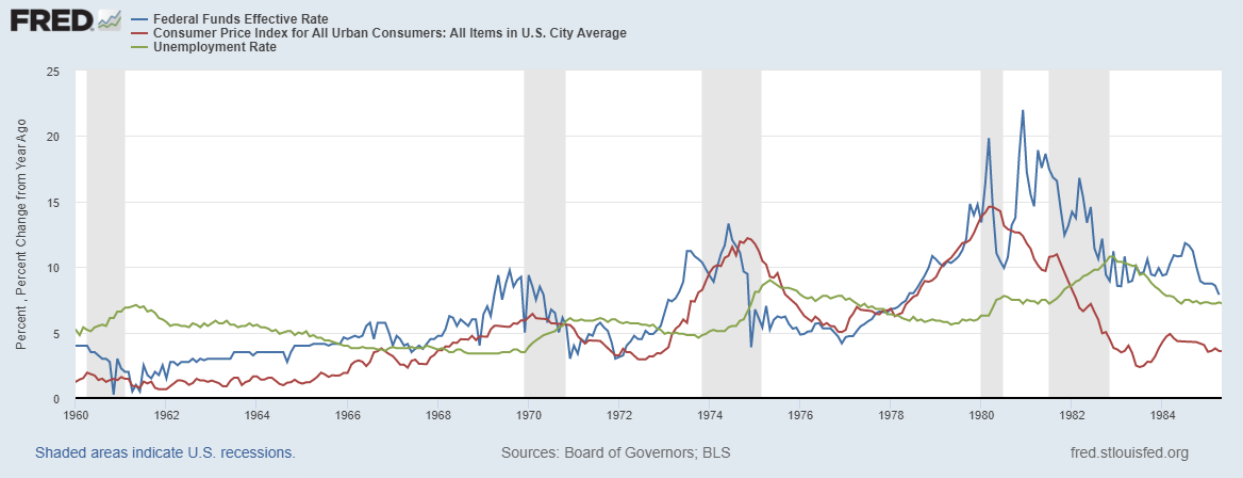

Fig. 1: Federal Funds Effective Rate, CPI-U YOY % change, and Unemployment from 1960-1985 (BOG 2022; Bureau of Labor Statistics 2022)

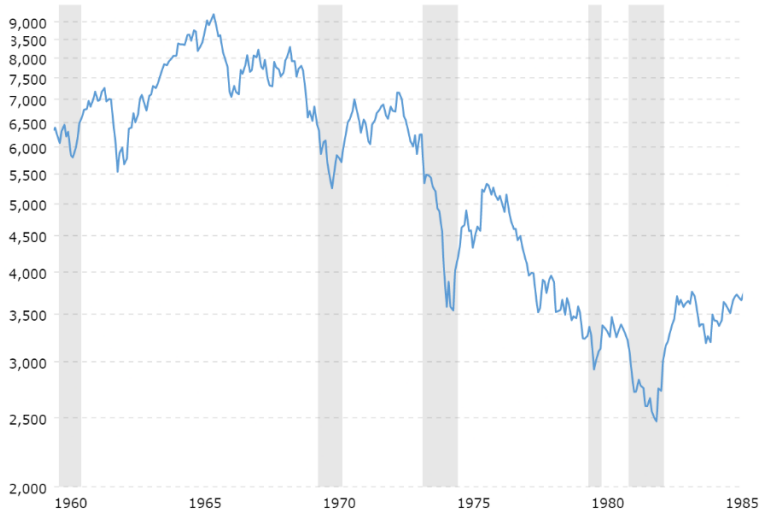

Fig. 2: Dow Jones Industrial Average from 1960-1985 (Macrotrends 2022)

After March 1969 the Fed tightened monetary policy by targeting a higher r_{FF} and reducing credit expansion. Beginning in April 1969 the r_{FF} remained at higher levels between 7.50% and 9.75% until June of 1970 apart from December 1969, when it dropped rates to 5% but quickly reversed the next month (BOG 2022). When unemployment began to rise (Meltzer 2009, 843) and the DJIA fell even further, falling from a high point of 7800 in April 1969 to a low point of 5250 in June 1970 (Macrotrends 2022), the Fed reversed course and loosened policy by further expansion of credit starting in the middle of 1970. The DJIA reacted positively to the resumed credit expansion but did not recover to where it had been even as far back as the mid-60s. Price inflation, however, began to rise again in 1973 as a result of the prior credit expansion, leading the Fed to tighten policy by reducing credit expansion again. Unemployment again rose and the DJIA fell even further than it had before, and after some months of decline in the stock market the Fed loosened again, resuming credit expansion as they had been doing before the tightening of policy. The DJIA initially recovered some but in 1975, despite continued credit expansion, it began a precipitous decline until late 1982 (Macrotrends 2022). GDP did experience higher growth in 1975 but slowed in 1976 (Meltzer 2009, 893). Consumer price inflation, however, persisted at above 5% and again began to grow significantly in 1978, reaching an all-time peak of over 14% in 1980 (BLS 2022).

Finally, beginning in 1978, the Fed significantly reduced credit expansion, causing rates to rise to a high of 22% in December 1980 (BOG 2022). Until the mid-1980s, rates were at elevated levels relative to where they had been through most of the 60s and 70s. Instead of artificially suppressing interest rates and preventing the market from readjusting, the Fed stopped expanding credit at the high rate at which it had been expanding before, allowing some liquidation, readjustment, and recovery to occur. Price inflation began to fall in 1980 and the

DJIA began its recovery in 1982. In the case of the inflation of the 1970s, although the Fed attempted to suppress interest rates by expanding credit to create a boom, the Fed's credit expansion was restrained by the risk of ever-increasing inflation. Continued credit expansion would cause politically unacceptable levels of inflation and would contradict the Fed's stated goal of maintaining stable prices. When the credit expansion was largely ended and a correction was permitted to occur, the market was allowed to lead in determining interest rates and the Fed followed until it started another boom by expanding credit.

One factor contributing to the Fed's failure to stimulate a sustained production boom during the 1970s may be that a large proportion of the new money created went to consumer credit instead of loans for production. If this were the case, then the increase in consumer credit would increase the amount of money available for consumers to spend, which would lead to an increase in the demands for consumer goods and lower-order goods. In an expansionary period where the new money is used mostly for loans for higher order production, the demand for higher order goods increases relative to the demand for lower order and consumer goods, causing a boom in higher stages of production. If the demand for consumer goods and lower order goods increases at a high rate as well, however, then there will be no increase in demand for higher order goods relative to lower order goods, or at least the increase will be less than it would be otherwise. As a result, a boom in higher order production will not occur, or the boom will occur to a lesser extent.

Total consumer credit increased at high rates during the credit expansion in the 1970s. From January 1965 to January 1971, total consumer credit owned and securitized increased by an annual average of only 8.98% (BOG 2022). After the Fed began cutting rates in response to the first downturn of the decade, consumer credit began to grow at higher rates. From January

1975 to January 1980, consumer credit grew annually at an even greater rate of an average of 18.77%. The increases in the rate of growth of consumer credit shortly follow credit expansion by the Fed measured by decreases in the r_{FF}. Further, increases in the rate of CPI follow increases in the rate of growth of consumer credit. The r_{FF} was cut from 8.98% in January 1970 to 4.14% in January 1971 and remained at or below 5.55% until January 1973, when the Fed began to tighten (BOG 2022). From January 1971 to January 1975, consumer credit increased at an average rate of 12.1% each year (BOG 2022). While CPI had not risen above 5% from 1965 to 1969, CPI grew from 5.28% in January 1971 to 11.75% in January 1975 (BLS 2022). The Fed then tightened policy in response to inflation, keeping the r_{FF} at a relatively elevated rate above 8.9% from July 1973 to November 1974 (BOG 2022). After this change in policy, consumer credit increased only 4% from January 1974 to January 1975, and CPI fell from a peak of 12.2% in November 1974 to 5.03% in December 1976 (BLS 2022).

In response to a second downturn in the middle of the decade, the Fed loosened policy and the r_{FF} fell from a high of 12.92% in July 1974 to 5.22% in May 1975. The r_{FF} remained below 6.5% until November 1977 and below 10% until December 1978 (BOG 2022). Following this increase in the rate of credit expansion, consumer credit grew at an annual average of 18.77% from January 1975 to January 1980 (BLS 2022). CPI then grew from 5.85% in April 1975 to a peak of 14.59% in March 1980 (BLS 2022). After monetary policy was tightened at the end of the decade, consumer credit grew at an annual average of only 3.93% from January 1980 to January 1983 (BLS 2022). By 1983, CPI had fallen from its peak in March 1980 to only 3.7% (BLS 2022).

As Figure 3 shows, the Fed's credit expansion measured by decreases in the r_{FF} are followed by increased growth rates of consumer credit, which are followed by higher rates of

CPI. This is consistent with the explanation that much of the newly created money was used for consumer credit rather than for production, at least partially offsetting increased demand for higher order goods and preventing a sustained boom in higher production stages from occurring.

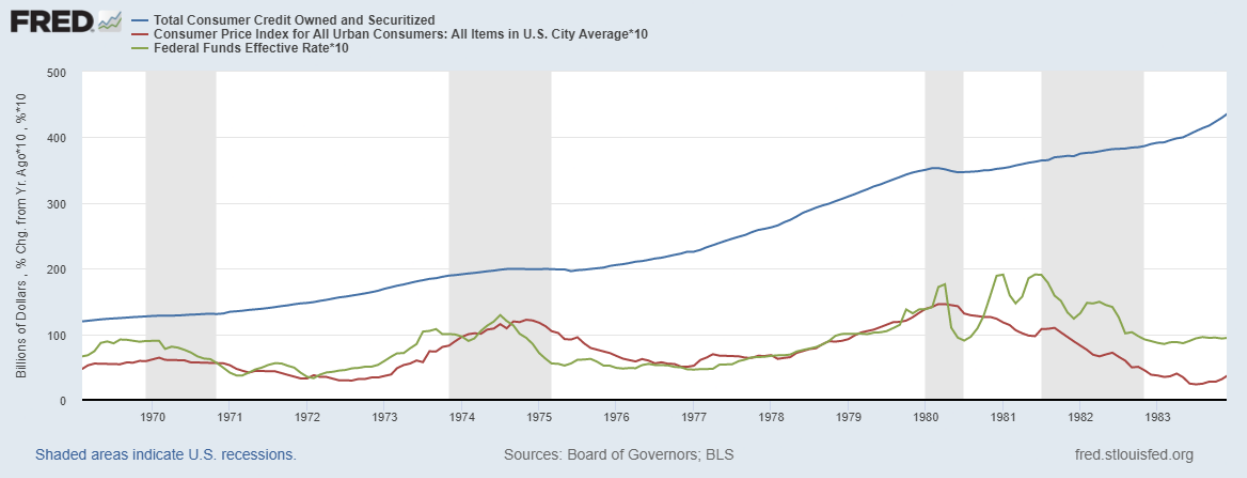

Fig. 3: Total Consumer Credit Owned and Securitized, and CPI-U YOY % change and Federal Funds Effective Rate multiplied by 10 for readability from 1970-1983 (BOG 2022; BLS 2022)

It is evident that consumer credit increased at elevated rates during the 1970s, and it appears that this increase was fueled by credit expansion. There are several factors that could explain why so much of the newly created money was used for consumer credit. First, access to consumer credit had been growing throughout the postwar period. Banks and department stores increasingly offered credit cards and revolving accounts for consumers through the 1950s and 1960s. By the end of the 60s, credit card holders numbered in the tens of millions (Ryan, Trumbull, Tufano 2011, 474). Additionally, access to credit was increasingly expanded to groups which previously had limited access, such as women and minorities, beginning in the late 1960s (Ryan, Trumbull, Tufano 2011, 483-485). Second, price inflation may have induced consumers

to borrow money to buy consumer goods in response to higher prices. Both of these factors contribute to an increased demand for consumer credit.

An example from a downturn that did not become an extended recession can help to demonstrate how significant this factor may be in determining how effective the Fed's credit expansion is in stimulating a boom after a downturn. During the brief recession in 2001, the Fed increased the rate of credit expansion. The r_{FF} fell from 6.40% in December 2000 to 1.73% in January 2002 and remained below 2% until the end of 2004 (BOG 2022). During this period consumer credit did not begin to increase at higher rates. From January 1996 to January 2000, total consumer credit increased at an average annual rate of 8.25% (BOG 2022). From the beginning of the increased credit expansion in January 2001 to January 2005, consumer credit increased at an average rate of only 6.75% each year (BOG 2022). It appears that relatively little of the newly created money during and after the downturn in 2001 went to consumer credit, so the early 2000s did not see consumer price inflation comparable to the amount of consumer price inflation in the 1970s.

More evidence that the new money created by credit expansion in the 70s was largely directed toward consumer credit can be found by comparing consumer price inflation with producer price inflation. If much of the new money was in fact used for consumer credit, one could predict that because of increased demand for consumer goods, CPI would increase significantly as well as PPI, and perhaps CPI would even increase relative to PPI. Further, to the extent that CPI increased relative to PPI, reflecting an increased demand for consumer goods relative to demand for producer goods, one would expect that credit expansion would be less effective at stimulating a boom in production. The data reflects this prediction. In the first half of the 70s, while PPI grew relative to CPI, CPI grew significantly nonetheless. From January 1971,

shortly after the increase in credit expansion began, to January 1975, the consumer price index increased 31%, while the producer price index increased 54% (BLS 2022). The increase in PPI was 74% higher than the increase in CPI. The production-stimulating effect of this credit expansion appears to have been blunted by the amount of new money that went to consumer credit instead of loans for production, but some effect can still be seen in the data. After peaking at 6.1% in August 1971, the unemployment rate fell slowly to 4.6% in October 1973, averaging at 5.53% from 1971 to 1974 (BLS 2022). Real GDP per hour worked, as a measure of productivity, increased by an annual average of 2.19% from 1971 to 1975 (BLS 2022).

The credit expansion in the second half of the decade fared worse in its success in stimulating production. CPI grew relative to PPI during this period: CPI increased 49% from January 1975 to January 1980, while PPI grew 48% (BLS 2022). Unemployment averaged at 7.06% from 1975 to 1979, while RGDP/hour worked grew at an annual average of only 0.95% from 1975 to 1980 (BLS 2022). Throughout the 70s, especially in the latter half, the Fed's attempt to stimulate a boom in production through credit expansion was largely thwarted by a significant proportion of the new money being used for consumer credit instead of production, which prevented demand for higher order goods from increasing relative to demand for consumer and lower-order goods.

In contrast, during the 2000s prior to the financial crisis, PPI increased greatly relative to CPI after the credit expansion in response to the 2001 downturn. From January 2002 to October 2007, the consumer price index increased 17.72%, while the producer price index increased 35.95% (BLS 2022). The increase in the PPI was 102.8% higher than the increase in the CPI. After the 2001 downturn, the Fed's credit expansion appears to have stimulated a boom in production without an offsetting boom in consumer credit as in the 70s.

Gross Private Domestic Investment data also shows that much of the newly created money in the 1970s went to consumer and lower order goods rather than to higher order goods. Higgs (1997, 583) uses three components of GPDI—investment in new structures, producer durables, and additions to business inventories—to measure investment in different stages of production. Investment in these stages of production in the 1970s can be measured using these components, now labeled as private fixed investment in new structures, private fixed investment in equipment, and change in private inventories.

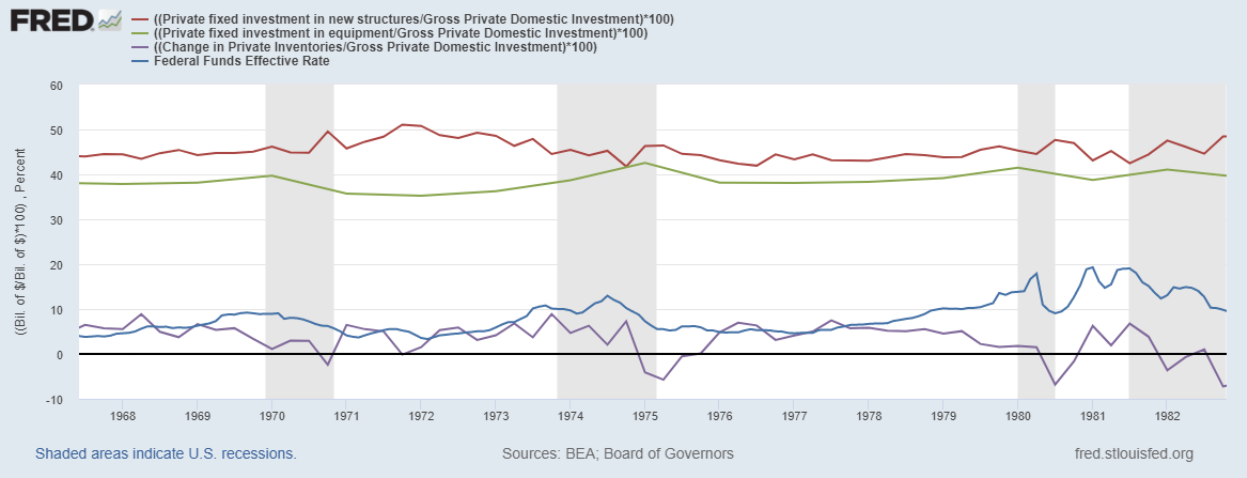

Fig. 5: Percentages of GPDI made up by investment in new structures, investment in equipment, and change in private inventories, and the Federal Funds Effective Rate (BEA 2022; BOG 2022)

In response to the first downturn of the 1970s, the Fed increased credit expansion by gradually cutting the r_{FF} from 8.98% in February 1970 to 3.72% in February 1971, and kept the rate below 6% until 1973 (BOG 2022). The proportion of GPDI made up by private fixed investment in new structures, as a measure for investment in higher stages of production, initially rose from 46.34% in 1970 to 48.16% in 1971 and 49.18% in 1972, but fell to 46.79% in 1973 (Bureau of Economic Analysis, 2022). The proportion of GPDI made up by the change in private

inventories, as a measure for lower order stages of production, rose from an average of 1.18% in 1070 to 4.19% in 1971, 3.99% in 1972, and 5.95% in 1973 (BEA 2022). The proportion of GPDI made up by private fixed investment in equipment, as a measure for intermediate stages of production, fell from 39.7% in 1970 to 35.74 in 1971, 35.25 in 1972, 36.27 in 1973 (BEA 2022). Thus, following the increase in credit expansion in response to the first downturn of the 1970s, investment in intermediate stages of production decreased as a proportion of total private investment while investment in higher and lower stages increased. This would be the expected result if the newly created money went both to consumer credit, thus increasing demand for consumer goods and inducing entrepreneurs to invest in stages of production closer to consumption, and to loans for production, thus artificially reducing interest rates and inducing entrepreneurs to invest in higher stages of production.

When the Fed began tightening policy, keeping the r_{FF} above 8% from June 1973 until January 1975 (BOG 2022), investment in new structures fell to an average of 44.15% of GPDI in 1974, change in private inventories fell slightly to an average of 5.09% in 1974 and then to -2.43% in 1975, and investment in intermediate stages of production measured by investment in equipment rose to 42.58% in 1975 (BEA 2022). When the Fed reduced the amount of credit expansion during this period, the amount of new money available to extend consumer credit decreased, as well as the amount of new money available in the loanable funds market to use in higher stages of production. Thus, investment in intermediate stages of production increased in relative profitability, which explains why investment in equipment as a proportion of GPDI increased relative to investment in new structures and investment in private inventories.

The Fed then loosened policy in response to the recession in the middle of the decade, dropping the r_{FF} from 12.92% in July 1974 to 5.22% in May 1975, and remaining below 6.5%

until November 1977 and below 10% until December 1978 (BOG 2022). Following the beginning of the increased credit expansion, investment in new structures as a percentage of GPDI fell from 45.34% in 1975 to 42.99% in 1976, slowly growing up to 46.11% in 1980. Investment in equipment fell from 42.58% in 1975 to 38.17% in 1976, remaining mostly stable until the end of the decade (BEA 2022). Change in private inventories grew from -2.43% in 1975 to 5.3% in 1976, remaining mostly stable until declining in 1979 (BEA 2022). As previously mentioned, the credit expansion in the latter half of the decade was less successful at stimulating a boom in production, resulting in worse unemployment and lower growth of RGDP/hour worked. After the increase in credit expansion, investment in stages of production further from consumption measured by investment in new structures and equipment fell as a proportion of total private investment and grew slowly during the second half of the decade. In contrast, investment in stages of production closest to consumption measured by change in private inventories quickly recovered from the low point during the recession and remained fairly stable until the Fed tightened policy toward the end of the decade. This seems to indicate that a large proportion of the newly created money was lent out as consumer credit and used for consumption, increasing the relative profitability of investing in the lowest stages of production and decreasing the relative profitability of investing in higher stages. This explains why the Fed's credit expansion during the second half of the decade failed to stimulate a boom in production and why the credit expansion during the second half of the decade was less successful than the credit expansion during the first half of the decade.

In sum, throughout the 1970s, much of the new money created by credit expansion went to consumer credit instead of higher stages of production, explaining why the Fed's credit expansion failed to stimulate a boom and end the stagnation during the 70s. The first episode of

credit expansion was more successful at stimulating a boom than the second. A larger proportion of the new money seems to have gone to consumer credit in the second expansion than in the first, which explains why the second was less successful. On the other hand, after the brief recession in 2001, it appears that the new money went mostly to higher stages of production, explaining why the downturn in 2001 did not become a prolonged recession and instead the Fed's credit expansion stimulated another boom.

4. Conclusion

In conclusion, the Federal Reserve leads the market in determining the interest rate structure during expansionary booms while the market leads in determining interest rates during busts. The Fed cannot change the originary interest rate, but it can manipulate interest rates in the credit market by expanding credit. However, the Fed faces multiple restraints on its ability to expand credit which prevent it from continuing to stimulate a boom by expanding credit indefinitely. These restraints include inflation, political constraints, people's demand for physical currency, the behavior of banks with respect to their reserves, and the demand for credit by producers. Once the Fed faces these restraints and ends credit expansion, the market is allowed to readjust and determine interest rates. In the 1970s, the Fed attempted to continue expanding credit to stimulate a boom and keep unemployment low, but the credit expansion resulted in ever-increasing price inflation which caused it to eventually end the credit expansion. The credit expansion failed to stimulate a boom because a large proportion of the new money was used for consumer credit instead of loans for production. Once the credit expansion ended to a large extent, the market was allowed to readjust and determine interest rates without an artificially increased supply of credit suppressing interest rates.

Because central bank credit expansion does not actually increase the supply of capital goods, the Fed cannot stimulate sustainable economic growth by suppressing interest rates below their market level and creating the appearance of an increased capital goods supply. Only through the lowering of social time preference and real increased saving and investing can the capital capacity of an economy and thus production grow sustainably.

Research remains to be done concerning the Fed's actions leading up to and in response to recessions. Other business cycles can be investigated to determine why the actions of the Fed in each particular case failed to stimulate a sustained boom and to discover which restraints forced it to end credit expansion. Additional research could be conducted to investigate other possible restraints on the Fed's credit expansion in the 1970s. A similar analysis could also be applied to business cycles and central banks of other countries and at other times in history.

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