Loan Flows and Monetary Policy

Richard Robinson, Marwan ElNasser, Mary Ann Robinson*

ABSTRACT

Various Statements by Federal Reserve Governors have indicated considerable degrees of pessimism with respect to the power of monetary policy to control economic conditions. The unconventional tools utilized by the Fed during the 2008-09 crisis were aimed at and effective in maintaining (stimulating) loan flows in particular markets. These new tools demonstrated considerable potency for achieving immediate results, although they were abandoned after the peak of the crisis. In this paper, long-term-historical and recent evidence shows that loan flows provide a more efficacious monetary policy target than the Federal-funds rate utilized since 1954.
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INTRODUCTION

In recent reviews of the history of Federal Reserve monetary policy, Reinhart and Rogoff (2013) point out the inconsistency of the monetary authority's targeting interest-rates with its announced coincident policies of also controlling consumer credit. Also, Romer and Romer (2013) review the history of various statements by Federal Reserve Governors that indicated their considerable degree of pessimism with respect to the power of monetary policy to control economic conditions particularly during several critical periods: the 1930's depression, the inflation of the 1970s, and the credit collapse of the post-2007 crisis and following stagnation. The 2008-09 crisis, however, manifested considerable development of "unconventional tools" that included, among other actions, direct interference in the commercial paper market in early 2009 so as to maintain its functioning, and also the direct purchases of mortgage-backed securities (MBS) - which started in 2009, but continues to the current date (January, 2014).

Since the post WWII period, the Fed has targeted interest rates (Federal Funds rate after 1954) as its primary indicator of monetary policy, and does so through open-market purchases of securities (currently through Treasuries and MBS). Targeting interest rates is, however, akin to observing only a price to reach a conclusion about the quantity traded rather than measuring the quantity directly. Interest rates fluctuate as both the demand and supply of credit fluctuates: interest rates can increase either because the

*Richard Robinson, PhD, and Marwan ElNasser, PhD, are Professors of Finance and Economics respectively, School of Business, SUNY at Fredonia University, E336 Thompson Hall, Fredonia, NY, 14063. Richard.Robinson@fredonia.edu, Marwan.ElNasser@fredonia.edu. Prof. Mary Ann Robinson, PhD, is former Professor of Finance, Eastern Kentucky University, and is currently CFO of Mardi Gras Gaming, 831 North Federal Highway, Hallandale Beach, FL 33009. marobinson@mardigrascasinofl.com.

demand for credit has increased, or the supply of credit has tightened; interest rates can decrease either because the credit demand has collapsed, or because the supply has increased.

The resulting quandary for monetary policy is that if interest rates rise as a result of increased credit demand, and the monetary authority targets interest rates, then a response of monetary ease will follow, and loan flows will further increase. The Fed, as it did in the 1970s, could end up unintentionally feeding inflationary conditions. Similarly, a collapse in the demand for credit would result in lower interest rates, but this does not indicate easy credit conditions. Countercyclical policy requires offsetting stimulation or dampening of loan markets accordingly. This is partially the Fed's response to the financial crisis of 2008-2009 when it created unconventional tools to reestablish credit flows in several loan markets.

It may well be that the debate concerning whether monetary policy should target interest rates or loan flows actually has its roots in the late 1930's controversy of *loanable funds versus liquidity preference models of interest rate determination*. (See Cardim de Carvalho, 1996, for a review of this debate between J.M. Keynes, D. Robertson and B. Ohlin which took place through a series of published articles in the *Economic Journal* in 1937.) Liquidity preference theory envisions interest rates as being the price charged for becoming illiquid, and is therefore a key indicator of economic sentiment. Following Hicksian IS – LM analysis, the interest-rate defined as liquidity premium is determined in a general equilibrium model. Any changes are viewed as resulting from differing comparative static equilibriums. There is no real time dimension to these changes since we envision the equilibrium in one period to flow seamlessly to the next period's equilibrium. The time length between equilibriums is not measured. There is no time derivative, or rate of change, revealed in this macro-static model.

The loanable funds model, however, measures the flow of credit, and this flow-measure has a natural time dimension. This approach is not one of general, but rather one of partial equilibrium, i.e. only in the loan market. As either demand or supply of credit change over the time-period, the measure of loan-flow per-period also changes, as well as the interest-rate price. Envisioning the macro model used as being built upon loanable funds rather naturally changes the target of the monetary policy to loan flows, perhaps combined with interest rate targets, but not just the singular price of illiquidity.

For practical purposes, however, one must note the ease of actually conducting open-market operations as based upon targeting an interest rate such as the federal-funds rate, which is a simple target for the central bank's trading desk to observe and control. In today's electronic information age, however, estimates of daily, weekly, and monthly loan-flow are obtainable and perhaps fairly accurate. (Note that weekly flows are reported on *Table H.8* by the Board of Governors at *www.federalreserve.gov*.) As a result, any task assigned to the trading desk to meet some loan-flow targets, which are certainly more difficult to measure than the Federal Funds rate, is more problematic than meeting the single interest rate target. Nonetheless, for purposes of macro-economic control (the ultimate challenge for monetary policy), the loan-flow targets might be more worthy of pursuit as compared to the simple federal-funds target. This worthiness might exist because of the loan-flow's greater macro effects.

The *unconventional tools* utilized by the Fed during the 2008-09 crisis were directly aimed at maintaining (stimulating) loan flows in particular markets. In this paper we examine using total loans as a target of monetary policy rather than solely using the simple interest-rate target (Federal Funds rate).

VIEWS OF MONETARY TRANSMISSION

The current conventional view of the monetary transmission process deemphasizes the loan-flow channel. Mishkin (2007, p. 60-71) for example, provides the conventional view that monetary transmission relies on relative prices and wealth effects. The asset price effects are envisioned to work through (1) debt instruments, (2) equity securities, (3) real estate, and (4) foreign exchange. The first two of these affect business demand for investment via the cost of capital. The fourth impacts the values of domestically owned foreign assets, as well as the foreign demand for domestically produced goods, and the domestic costs of foreign produced supplies to the production process. The wealth effects of monetary policy on asset prices primarily impact household aggregate expenditures indirectly. Much of the relative price effects must work through loan flows, i.e. (i) through business raising capital from debt and equity markets, and (ii) through households obtaining loans for real estate or consumer durables.

It is clear that not all of these monetary transmissions have their primary impacts on aggregate demand through credit markets, but much do. As an illuminating illustration, consider a Fed open-market purchase of Treasury bonds from either households or financial institutions. As we know, immediately after the purchase, the Fed's check is deposited into bank accounts, and abstracting from small currency and coin amounts that might be held by the public, total reserves held at the Fed increase by the amount of the check. These reserves (deposits at the Fed plus vault cash) can either (1) remain in excess reserves, (2) be loaned to households or businesses, or (3) be used by the financial institutions to purchase other securities from secondary markets. If in general, banking institutions pursue the second option, then total loans increase by a multiple of the Fed's OMO purchase. If in general, banking institutions pursue the third option, then the demand for secondary security-market purchases also increase by a multiple of the Fed's OMO purchase.

To further elaborate, allow P to be the amount of the OMO purchase. Also allow r to be the banking sector's fraction of deposits kept in the form of both legally required and excess reserves, and allow ΔL to be the change in loans made from the banking sector. If banks decide to loan rather than purchase other secondary market securities, then equation (1) presents the loan expansion assuming $0 < r < 1$. Note that the loan-expansion process of (1) is similar to (the *flip side* of) the deposit-expansion process of the money multiplier mechanics.

$$\Delta L = (1\text{-}r)P + (1\text{-}r)^2P + (1\text{-}r)^3P + \cdots \quad (1)$$

$$= [\tfrac{1-r}{r}]P$$

If, on the other hand, banks decide to spend all of the excess reserves on secondary market purchases, then allow ΔS to be this total increase in secondary market purchases as given by (2).

$$\Delta S = (1\text{-}r)P + (1\text{-}r)^2P + (1\text{-}r)^3P + \cdots \quad (2)$$
$$= [\tfrac{1-r}{r}]P$$

If we further allow α to be the fraction of the Fed's OMO purchase that is dedicated by the banking sector to loans, and therefore (1-α) to be the fraction used to purchase other secondary market securities, then equations (3) and (4) present ΔL and ΔS.

$$\Delta L = [\tfrac{1-r}{r}]P\alpha \quad (3)$$

$$\Delta S = [\tfrac{1-r}{r}]P(1\text{-}\alpha) \quad (4)$$

Of course, loans and secondary security-market purchases can be made by the non-banking sectors. Since these variables do not originate in the banking sector, they are not in the aggregate directly controlled by monetary policy. Therefore, ΔL and ΔS measure only the levels stimulated by the Fed's open-market operations. Note that if r = 1, then ΔL = ΔS = 0. Also note that if $0 < r < 1\text{-}r < 1$, then $[\tfrac{1-r}{r}] > 1$, and there is a multiplier impact on the aggregate of ΔL + ΔS. We can term this combination of loan flows and secondary market expenditures *the primary effect of open-market operations*. It is, of course, recognized that *subsequent effects* on wealth and relative prices also impact aggregate demand.

For the most direct impact on aggregate demand, the Fed would desire its OMO actions to entirely impact ΔL, the loan flow measure. Impacting secondary market value by ΔS, however, indirectly stimulates aggregate demand through wealth and relative price effects. In a latter section, we argue that the Fed should monitor the total loan/GDP ratio as an indicator of monetary policy, but this total loan measure is impacted by the fraction α. We argue that when this ratio collapses to excessively low levels, subsequent economic growth suffers. Also, when the ratio reaches very high levels, speculative bubbles might occur. Prior to this analysis, however, we review the Fed's view of its unprecedented but temporary interventions in loan markets during the financial crisis.

THE EFFICACY OF THE UNCONVENTIONAL TOOLS

Romer and Romer (2013) document a significant degree of pessimism with respect to the effectiveness of monetary policy, a pessimism that pervaded the Fed during critical times in its history, especially during periods of financial crisis: the 1930s, the 1970s, and post 2008. Recently, Governors Janet Yellen (Associate Chair and incoming Chair) and Ben Benanke (current Chair) indicated (1) in general the power of monetary tools is limited for stimulating the economy into a more robust growth period, and (2) the new nonconventional monetary tools all have economic costs. Bernanke (August, 2012) specified 4 potential costs associated with these unconventional tools:

i) These new tools are likely to impair the efficiency of the conventional securities markets.
ii) The new tools might reduce confidence in the Fed's ability to smoothly exit from its crisis management positions, i.e. the drawdown in excess reserves if and when the economy becomes overheated.

iii) The new tools develop risks of developing new speculative bubbles, and hence they risk financial stability.

iv) The Fed could incur financial balance-sheet loses due to these new positions.

In particular, Bernanke (October, 2012) indicated that the Fed has developed a rather high hurdle for future adoption or expansion of nonconventional tools. This indication followed the Fed's September, 2012, more aggressive policy of expanded purchases of MBS (up to $45 billion per month through 2013). Gagnon (2009) also documents Bernanke's and Yellen's public requests for a more aggressive fiscal policy to stimulate an enhanced robust economic growth, and associated statements of pessimism as to monetary policy's ability to accomplish the same. This theory is that since loan demand collapsed during the crisis, and stayed low during the subsequent period of stagnation, the economy needed further fiscal stimulus for loan demand to recover. Any further central bank purchase of private loans from the secondary markets – say commercial and industrial loans – would not stimulate investment.

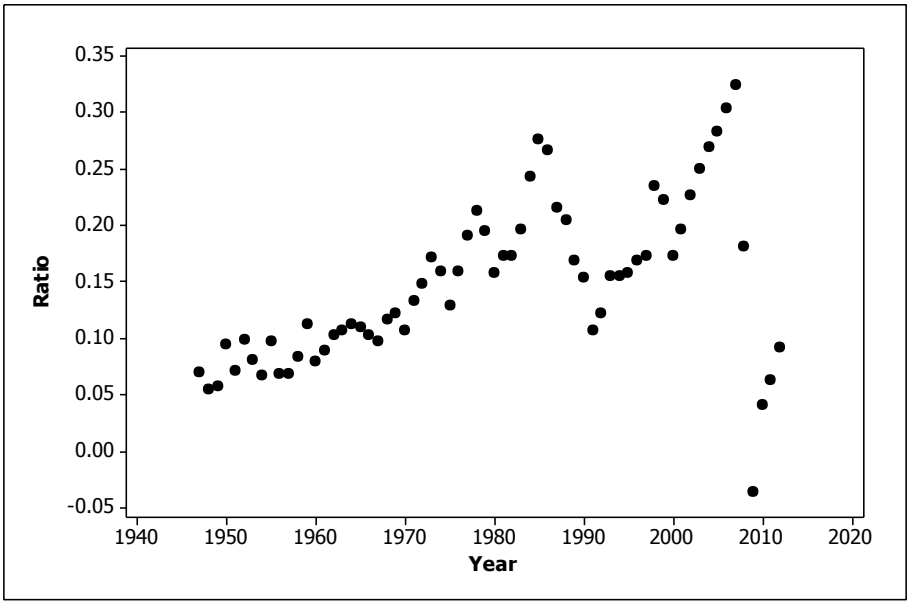
One might consider this pessimism to be warranted, but one must also ponder whether the root cause stems from the vision that conventional policy should work through control of interest rates rather than credit flows. After all, the nonconventional tools all worked directly through the transmission mechanism of loan flows, i.e. they were designed to stimulate credit flows, and the historical analysis reviewed indicates that they were effective in restoring credit flows in commercial paper, security dealer credit, and more recently in mortgage credit flows. In fact, all of the markets targeted by the Fed during the crisis (the dealer liquidity, commercial paper, money-market mutual funds, and MBS markets) maintained their functioning despite being severely threatened with collapse. The business and consumer loan markets, which were supported under TALF, along with the mortgage markets, suffered sustained decreases, but still maintained substantial credit flows. One must wonder if the Fed sustained its broad credit easing policies, would the stimulus to loan flows have helped to avoid the stagnation of 2010-12.

Figure 1 presents a time graph of *US total non-financial borrowings per GDP* during the post WWII era, 1947 - 2012. This ratio shows a gradual rise from approximately 5 percent to a bit less than 15 percent in 1970. Thereafter, the ratio shows a more rapid rise to exceed 25 percent in the mid 1980s just before the S&L home mortgage crisis. By 1990, the ratio had decreased to approximately 10 percent, and it began an even more rapid rise to exceed 30 percent by 2007 with its sub-prime mortgage crisis. During 2009, the ratio was actually negative as non-financial debt was liquidated while financial sector debt was rapidly expanding, and by 2012 the ratio rose again to its pre 2008 level.

This documents the impact of easy monetary policy as leading to the very high ratios of the early 1980s and the years prior to 2007. For the decade ending in 2008, the monetary base increased by a geometric average growth rate of 4.66 percent per year. Loans initiated by commercial banks increased by a geometric rate of 7.48 percent per year; and securities held by commercial banks increased at 7.26 percent per year. (The monetary base was $854.3 billion in 2008, and $542.0 billion in 1999. Loans by commercial banks were $6,841.7 billion in 2008, and $3,327.0 billion in 1999. See Table 2 for these figures.) The ratios depicted by Figure 1 show the increases prior to these crises because these high

rates of growth in the base and in loans exceed any possible sustained growth rates for the macro economy. The loan ratios therefore rise. It is therefore evident that measuring both the total of loan flows, and the compositions of these flows, would have indicated monetary policy was feeding the speculative booms of these periods. Monitoring these flows should therefore be a practical task of monetary policy. They are measurable in close to real time, although not as easily monitored in actual real time as the Fed Funds rate. It is clear that these flows are more directly and closely related to real economic activity than the Fed Funds rate.

Figure 1: Ratio of Total Borrowing to GDP by Year



The FOMC does not currently systematically utilize any quantitative measures of loan flows, either in the aggregate or in any particular credit market, for its considerations of monetary policy. The *Minutes of the FOMC's* periodic meetings do occasionally refer qualitatively to conditions in some particular credit market, as in the minutes of its January, 2013 meeting. As rationale for its bond buying program, at this January meeting, the FOMC cited tight credit conditions in housing, but it also cited an expansion in *commercial and industrial loans*, which during the crisis and its after-period had either dropped or were stagnant in growth, and it also cited an expansion of consumer credit. It cited no measures of credit flows, however, nor did the record of economic predictions contain any such measures.[2] Indeed, even during the height of the Fed's interference in credit markets with unconventional tools, i.e. January, 2009, the Fed cited yield spreads as rationale for its interference. It did not cite any credit-flow data to document the collapse of credit markets such as the commercial paper market. Citing such measures would seem a rather natural way to explain the need for this interference.

POST WW II CREDIT AND MONETRAY BASE MOVEMENTS

Reinhart and Rogoff (2013) cite that during the last three decades, little attention has been paid to the effects of credit on aggregate demand. They also characterize monetary policy during the Fed's 100 year history, and resulting credit conditions as measured by the volume of consumer credit. They show that during NBER classified recessions, interest rates generally rose while credit volume declined. For one-quarter of the years of its 100-year history, interest rates rose, but household credit was either stable or increasing. Also, for one-quarter of these years, interest rates declined, but credit also decreased. In fact, only during one-quarter of the years of the Fed's existence were rates and consumer credit movements consistent.

Proper indicators of the directions of monetary policy are the movements in the monetary base since these are directly impacted through open-market operations. In 32 of the 65 years between 1948 and 2012 inclusive the changes in the monetary base and changes in total US borrowing were in the same direction, i.e. consistent movements.[3] For 51 of these 65 years, the base changes and the changes in total borrowing were consistent. For 39 of the 65 years, changes in the base and changes in household loans were consistent. In only 8 of the 65 years were changes in the monetary base inconsistent with either changes in total borrowing or household credit. Excluding the financial crisis years of 1988-91, and 2007-12 from the sample, the rank-correlation coefficients for these variables are presented by Table 1. The correlations have the expected signs, and are significantly different from zero at higher significant levels than 95 percent. The years of 1988-91 and 2007-12 were not included since the Fed's responses to the crises were to expand the base rapidly but only after the demand for loans had collapsed. Figure 1 also shows that these crisis years had substantial drops in borrowing ratios.

Table 1: Rank Correlation Coefficients: 1948-2013

Variable	Coefficient	p-value
% Change in Base with % Change in Total Borrowing	.292	.029
% Change in Base with % Change in Household Borrowing	.286	.032

Data from *Flow-of-Funds* accounts but without the financial crisis years of 1988-91 and 2007-12.

How do we explain the data presented by Table 1? As indicated by the correlation coefficients, there is a definite positive connection between monetary stimulus and total borrowing, or for that matter between the stimulus and household credit. The magnitudes of these correlation coefficients are, however, relatively low since credit generation can originate outside the banking sector, perhaps in household savings being loaned directly to business or government. Stimulation of credit markets occurs through both monetary stimulus and other sources. To further explore the complexity of this phenomena, we develop a simple loanable funds model that utilizes the analytical equations of (1) – (4).

AN EXTENSION OF THE CLASSIC LOANABLE-FUNDS MODEL

The classic loanable funds model specifies an equilibrium interest rate and flow of loans that equates demand with supply of loans. Interest rates and loans can then be subdivided into a vector of rates and quantities that serve various sectors, maturities, or risk classifications. The demand for loans is composed of household demand (HD), business demand (BD), government demand (GD), and foreign demand (FD). The supply of loanable funds stems from household savings (HS), business savings (nonfinancial intermediary savings – BS), government savings (GS),[4] foreign savings invested in US markets (FS), and changes in the money supply (ΔM). For a simple initial analysis, the latter variable is envisioned to occur entirely through loan expansion, a vision that is corrected below. The equilibrium is the quantity of loans and corresponding interest rate that sets total supply equal to demand as specified by equation (5). Equation (5) reduces to the simple loanable funds model of (6) to contain only net figures where H = HD – HS, B = BD – BS, G = GD – GS, and F = FD – FS. The vision here is that monetary policy directly impacts the net quantities loaned and interest rates over the time period of these measurements.

$$HD + BD + GD + FD = HS + BS + GS + FS + \Delta M \quad (5)$$

$$H + B + G + F = \Delta M \quad (6)$$

Given our above analysis, however, we recognize that only a portion of the monetary stimulus feeds the loan market. We therefore can modify model (6) to derive (7). We therefore perceive that only the portion α (0 ≤ α ≤ 1) of OMO purchases impacts the loan market, and even then, this portion is further modified or enhanced by the multiplier $[\frac{1-r}{r}]$ where r is the reserve to deposit ratio. This explains the loose connection between monetary stimulus (changes in the monetary base – P) and changes in the quantity of credit. Note that the left side of (7) was used for the metrics examined on Tables 1 and 2. Note further that for conditions of r = 1 (the approximate condition of the financial crisis when nearly all OMO purchases merely fed excess reserves), there is no stimulus to the loan markets since the multiplier becomes 0. Note also that no additional loan stimulation occurs if α = 0, i.e. if all monetary stimulus is channeled into secondary-market security purchases and not new loan origination.

$$H + B + G + F = [\frac{1-r}{r}]P\alpha \quad (7)$$

LOANS AND SECURITIES HELD BY THE BANKING SECTOR

Table 2 presents the loans and financial securities held by commercial banks, 1996 – 2013 as measured in January of each year. Between 1996 and 2006, the monetary base increased by approximately $400 billion; the securities held in commercial bank portfolios increased by approximately $1.5 trillion; but loans made by these institutions increased by over $4 trillion. Equation (8) gives the overall multiplier for expansion of the monetary base by P (and as derived above). When we add the increase in loans (ΔL) and the increase in securities held (ΔS) and divide by the base expansion (P), we obtain an overall multiplier $[\frac{1-r}{r}]$ of approximately 13.5 for the 1996-2006 period. For the period 2006-13, however, the monetary base increased by approximately $1.9 trillion; securities held by commercial

banks increased by approximately $.44 trillion; but loans held by commercial banks increased by only $2.5 trillion. The overall multiplier is only approximately .13. The unprecedented increase in excess reserves, as documented above, accounts for this anemic commercial bank activity. Furthermore, the financial crisis period of 2008-2009 evidences the most extreme of this lagging activity: the base increased by almost $1 trillion but loans and securities held by commercial banks decreased by $372 billion. In attempts to remedy this, the Fed initiated its direct non-conventional instruments as documented above.

A relevant question remains, "What about the anemic era of 2010-11? Should the Fed have continued its non-conventional interference in loan markets?" During these two years, the Fed increased the monetary base by $262.8 billion. Loans by commercial banks increased by only $138.8 billion, and securities held increased by only $169.8 billion. This presents an overall multiplier of 1.17 which certainly does not approximate the 13.5 multiplier for the decade prior to the crisis. If the Fed had monitored commercial-bank loan creation with the importance and emphasis it placed on maintaining low interest rates, would it have withdrawn its nonconventional stimulus of loan markets so early, i.e., 2009-10?

$$\Delta L + \Delta S = [\frac{1-r}{r}]\text{P} \quad (8)$$

To further explore this issue, consider the ratios formulated by equations (9), (10) and (11). The computations of these ratios for years 1996-2013 (January of each year) are also presented by Table 2. The years leading up to the 2008-09 financial crisis indicate that β_{L+S} rose from 8 to approximately 11. Most of this increase was due to β_L which rose from approximately 6 to over 8 for the 2007-08 years. Securities, as measured by β_S was relatively stable at between 2.1 and 2.9 over this period. With the onset of the crisis in late 2008 and early 2009, β_{L+S} dropped by more than one-half. Both β_L and β_S dropped by approximately one-half. This was largely due to the Fed's dramatic increase in the monetary base ($.8 trillion to $2.7 trillion) while loans and securities held remained stable as shown by Table 2.

$$\beta_L = \frac{Loans}{Base} \quad (9)$$

$$\beta_S = \frac{Securities}{Base} \quad (10)$$

$$\beta_{L+S} = \frac{Loans+Securities}{Base} \quad (11)$$

The Federal Reserve's monetary policy leading up to the financial crisis clearly facilitated substantial increases in commercial bank loans. Post the crisis, the dramatic base increase did not lead to similar loan growth but rather stagnation. The imaginative nonconventional tools developed during 2009 saved various loan markets from complete collapse, but this very salvation begs the question, "What imaginative nonconventional policies could have been utilized to stimulate loans post the crisis?"

Table 2: Monetary Base, Loans and Securities Held by Commercial Banks, 2006-2013 ($ billions)

Year	Monetary Base	Loans	Securities	β_L	β_S	β_{L+S}
2013	$2,741.7	$7,280.9	$2,725.8	2.66	0.99	3.65
2012	2,640.9	6,979.0	2,534.5	2.64	0.96	3.60
2011	2,034.8	6,792.9	2,424.6	3.34	1.19	4.53
2010	1,971.4	6,693.8	2,336.8	3.40	1.18	4.58
2009	1,772.0	6,557.1	2,254.8	3.70	1.27	4.97
2008	854.3	6,841.7	2,473.9	8.00	2.90	10.90
2007	839.8	6,829.7	2,455.2	8.13	2.92	11.06
2006	818.3	6,161.5	2,232.8	7.53	2.73	10.26
2005	785.1	4,863.2	1,937.5	6.19	2.47	8.66
2004	752.6	4,444.0	1,852.5	5.91	2.46	8.37
2003	713.9	4,168.1	1,752.4	5.84	2.45	8.29
2002	669.0	3,931.4	1,385.4	5.88	2.22	8.10
2001	613.6	3,965.4	1,480.4	6.46	2.41	8.87
2000	630.5	3,913.9	1,339.1	6.21	2.12	8.33
1999	542.0	3,327.0	1,227.4	6.14	2.26	8.40
1998	510.9	3,334.4	1,231.4	6.53	2.41	8.94
1997	479.0	3,027.6	1,077.0	6.32	2.25	8.57
1996	456.7	2,813.3	972.5	6.16	2.13	8.29

ENDNOTES

1. Note that both of these simple models envision single homogeneous markets. For purposes of operationalizing the targets, the liquidity preference model must specify various degrees of illiquidity so that term-structures and risk-structures of rates are included. Note the versions of operation twist of the 1960s and of recent years. Similarly, the loanable funds model also needs to explain the rationing of credit flows among various markets of differing risks and maturities.
2. The minutes of the FOMC contains attached appendices which list various economic predictions for real growth of GDP, inflation, federal-funds rate, and unemployment, but not of credit flows.
3. *US borrowing* is defined for this purpose as loans to business, households, both federal and state and local governments, and the rest of the world as borrowed from the US, but excluding the financial-intermediary sector. The data set is from the *Flow-of-Funds* accounts.
4. Savings channeled through various agencies such as Small-Business Administration loans.

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