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Fiscal Dominance and US Monetary: 1940–1975

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This narrative investigates the frictions that existed between the Federal Reserve's monetary policies and the US Treasury's debt-management operations from the onset of the Second World War through the end of the Federal Reserve's even-keel actions in mid-1975. The analysis suggests that three factors can help explain why the Federal Reserve compromised the attainment of its statutorily mandated monetary-policy objectives for debt-management reasons: 1) the existence of an existential threat, 2) the fear that to do otherwise would create instability in the banking sector, and 3) the vulnerability of Treasury financing operations to monetary-policy actions that existed when the Treasury did not auction its debts.

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1. Introduction

At least since the end of the Great Inflation, economists have recognized that keeping central banks independent of their fiscal authorities is important for the attainment of price stability. Nevertheless, the concept of central bank independence contains an inherent tension. Central banks are accountable for their actions to the governments that created them, and these governments sometimes have monetary objectives that take precedent over price stability. The most well-known of these objectives relate to debt-management operations, where the tension arises between a central bank's monetary-policy decisions and the Treasury's debt-management operations because the former affects the costs of the latter. The tension, at least in the Federal Reserve's experience, has not been unrelenting. It has been episodic, raising questions about the circumstances under which an otherwise independent central bank will risk its monetary-policy goals for debt-management purposes.

In hopes of answering these questions, this paper investigates the interactions between US monetary and debt-management policies beginning at the start of the Second World War and ending in mid-1975, when the Fed terminated its even-keel operations. The narrative suggests three conditions under which the Fed either abdicated or modified its monetary policy goals to accommodate debt-management objectives: First, a well-known necessary condition is that the cost of servicing the outstanding debt is large relative to the country's economic or political ability to maintain a primary budget surplus. An important sufficient condition, however, seems key—the presence of an existential crisis, such as war. Such a crisis allows the Fed to disregard its main statutory macroeconomic responsibilities. Second, the Fed has supported debt-management operations—for example, immediately after the Second World War—when to do otherwise threatened the stability of the banking system. Finally, if the Treasury does not auction its debt, but instead sells it under a fixed price, the Fed can cause the operation to be undersubscribed, if it alters its monetary policy or fails to add reserves to the banking system during the operation. When this was case, fear of political reprisal caused the Fed to maintain the market on an "even keel."

This paper proceeds as follows: Section 2 discusses the Fed's behavior during the Second World War, when it abdicated its responsibility for monetary policy in favor of helping the Treasury finance the conflict, and during the years immediately following the war, when it tried to regain control over monetary policy. Section 3 explains how the Fed attempted to distance itself from debt-management operations after the Treasury-Fed accord in 1951 and why it nevertheless undertook even-keel operations to the detriment of its monetary-policy objectives until mid-1975. Section 4 draws the three conclusions from the narrative.

2. The Second World War to the Accord: 1939 – 1951

During the Second World War, the Federal Reserve abdicated its responsibility for monetary policy, despite a concern about wartime inflation, and focused instead on helping the U.S. Treasury finance the conflict. The Fed pegged the Treasury bill rate and capped yields on all other securities, creating a stable yield curve that was both low and relatively steep.[1] The low rates kept the Treasury's borrowing costs down, while the firmly harnessed term structure convinced investors that waiting for higher yields was pointless and that the risk of capital loss from holding longer-term securities was small. Setting interest rates in this manner, however, allowed the Treasury to expand bank reserves by issuing more bills than the public wished to hold since the Fed then had to purchase them.

After the war, two developments constrained a speedy move toward monetary-policy independence. First, and by far the most important, the Treasury did not want to relinquish control over interest rates fearing that it could not possibly finance its large debts at reasonable rates without the Fed's direct support. Second, while the Fed wanted to regain control over monetary policy, it worried about commercial-bank balance sheets. During the war, commercial banks shifted their portfolios toward long-term Treasury securities, despite the Fed's attempts to prevent such a move. A sharp rise in rates would create capital losses, damage bank balance sheets and prevent them from lending as the peacetime economy gained momentum. The conflict that ensued, especially after the latter constraint weakened, led to the famous Treasury-Federal Reserve accord in March 1951. The accord, however, did not completely resolve the frictions between monetary and debt-management policies.

War Finance

In the late 1930s, as Europe edged ever closer to war, the FOMC understood that events would seriously test its ability to prevent inflation, even if the United States managed to stay out of the conflict. Ever since the Roosevelt administration devalued the dollar in 1934, gold had generally flowed into the United States (see Romer 1992). In 1938, 1939, and 1940, reflecting capital flight and payments for war materials, unprecedented amounts of gold—$2.0 billion, $3.6 billion, and $4.7 billion, respectively—moved into the United States and expanded bank reserves (figure 1).[2] The Federal Reserve's balance sheet grew, reaching a high relative to GDP of 22.6 percent in 1940, over a year before the Fed became heavily involved in war finance (figures 2 & 3). Neither the Treasury nor the Federal Reserve completely sterilized the gold inflows, and, as a consequence, member banks held record excess reserves of nearly $6.9 billion by the end of October 1940, more than a three-fold expansion since late 1938 and enough to expand bank credit nearly 2.8 times (figure 4).[3] In addition, member-bank borrowings from the Federal Reserve were minimal, implying that as economic activity accelerated, banks could still acquire additional reserves from the Fed's discount window if necessary.[4] In its Annual Report for 1940, the Board noted that banks "had more money available for loans and investments than ever before, and far more than enough to meet probable credit needs" and fretted that reserves "had risen beyond the System's power to restrain an inflationary credit expansion should one develop" (Annual Report 1941, 2).[5]

On 31 December 1940, as the United States ramped up its military preparations, the Federal Reserve System sent a *Special Report to the US Congress* recommending a program "to forestall the development of inflationary tendencies attributable to defects in the machinery of credit control" and asking Congress to provide "adequate means … to combat the dangers of overexpansion of bank credit due to monetary causes."[6] Most importantly from a monetary-policy perspective, this unprecedented report asked Congress to allow the Fed to raise reserve requirements—then subject to statutory limits set in the Banking Act of 1935—and to extend reserve requirements to non-member banks (Annual Report 1941, 69).[7] Higher reserve requirements would reduce the enormous amounts of excess reserves held by member banks and the inflation potential that these reserves represented. In addition, the report asked Congress to limit sources of reserve growth beyond the FOMC's control by not devaluing the dollar or issuing greenbacks[8] or monetizing silver, and by sterilizing future gold inflows.[9] The report also recommended financing expenditures, as much as possible, from taxes and limiting the Treasury's ability to borrow from banks.[10]

At this stage in the war's progression, debt-management issues had not overwhelmed the System's concerns about inflation. As Europe edged toward war and as investors became progressively uncertain about the prospects for yields in the United States, however, the Fed began buying government securities to stabilize financial markets (Eccles 1951, 352). In September 1939, when war broke out in Europe, US Treasury bond prices fell sharply, and the System bought the entire portfolio of government bond dealers, about $60 million, to cushion their decline (Murphy 1950, 20).[11] The System's operations did not attempt to fix security prices; they sought only to prevent "panicky conditions" from spilling over to the broader capital market (Annual Report 1940, 1 – 2). When markets calmed and security prices rose, the System took the opportunity to reduce its bond holdings; consequently, these operations had no significant balance-sheet effects. At the time, the Fed also allowed Treasury bills, whose yields were essentially zero, to mature out of its portfolio without replacement. On balance, the System's open-market portfolio at the end of 1939 was $80 million lower than at the beginning of the year (Annual Report 1940, 2). Over the next two years, while US Treasury credit demands remained fairly subdued, the Federal Reserve often engaged in small open-market purchases to maintain orderly bond-market conditions and continued to reduce its holdings of Treasury bills. The System's portfolio of US government securities declined slightly in 1940 and 1941 and remained smaller than at any time since 1933 (figure 5).[12]

Nevertheless, the FOMC was aware that the military situation was changing and debt-management issues might eventually come to the fore. Between fiscal year (FY) 1940 and FY1941, total government expenditures increased by a substantial $4.1 billion with all of the increase stemming from defense outlays.[13] In his January 1941 budget message to Congress, President Roosevelt anticipated deficits of $6.2 billion in FY 1941 and $9.2 billion in FY1942, as compared with $3.9 billion in the previous two years (Studensky and Krooss 1951, 438). Roosevelt correctly estimated the 1941 deficit, but erred dramatically on the low side for 1942. The deficits over the subsequent war years came in at unprecedented levels, and debt-management needs supplanted the Fed's goal of price stability.

The December 1940 *Special Report to Congress*, which epitomized the Fed's recommendations for financing the war with little inflation, created frictions between the Fed and the US Treasury (Eccles 1951, 352 – 357). To minimize the impact of credit demands on inflation, the Fed maintained that the Treasury should finance as much of the war as possible from taxes. In addition, the Treasury should concentrate its securities sales on the nonbank public. In doing so, the Treasury would finance the war out of income and existing savings with little inflationary consequences. In contrast, selling securities to the banking system drew down excess reserves and could potentially create a multiple expansion of the money supply with substantial inflationary consequences.[14] The Fed understood that the savings of the nonbank sector could not meet all of the government's demand for financing, and that a "substantial" residual amount of borrowing from banks would inevitably create excess money growth and inflation (Sproul 1951, 300 – 301; Eccles 1951, 349; Annual Report 1946, 2). Still, it urged this course of action as minimally inflationary. The Treasury, however, viewed war-time inflation as inevitable and wanted only to finance the war debt at the lowest possible cost. The Treasury looked to excess reserves as the vehicle for doing so.[15] In Eccles' (1951, 354) assessment: "Uncontrolled excess reserves offered the Treasury an easy way to dispose of government bond issues. As long as bonds were sold, Treasury officials showed little concern over the inflationary consequences arising from the means used…" Reflecting its inflation fear, the Fed hiked reserve requirements on 1 November 1941 to the maximum allowed under the Banking Act of 1935.

By early 1941, war seemed ever more unavoidable, and the Treasury and Fed started to plan for financing the conflict. By March 1942, both had agreed to a 2.5 percent cap for long-term—25 years or longer—Treasury issues, setting that as the maximum rate at which Treasury would finance the war (FOMC Minutes 2 March 1942, 6). This rate was equal to the coupon rates on a recent set of successful Treasury bond offers, for which the Fed provided some minimal support (Murphy 1950, 90-91). The Treasury and Fed both agreed that borrowing should be done at "stable, not rising rates of interest" (Sproul 1951, 300; Eccles 1951, 350). Left unclear, however, was how stable the rest of the term structure should be. The FOMC indicated that it would "support the Treasury bill market at *approximately* the present rates" (FOMC Minutes 8 May 1942, 3, emphasis added).[16] Even so, the Fed believed that rates should fluctuate with more variation on the shorter end of the yield curve than at the longer end. The Fed would use its "best judgment" about the behavior of the Treasury bill rates, "which *might* include beginning our support if and when the rate on Treasury bills reaches ¼ of 1 per cent, and supporting with increasing strength as the rate approaches 3/8 of 1 per cent" (FOMC Minutes 8 May 1942, 3, emphasis added). The Fed, nevertheless, viewed the current level of short-term yields as too low—a depression era anomaly unfit for a fast growing, fully employed, war-time economy. For his part, Chairman Eccles thought that the 90-day bill rate should go as high as 0.50 percent, and throughout the war, the Fed pushed for a higher bill rate (Wicker 1969, 453). Neither the Treasury nor the Fed looked to fix short-term rates in early 1942. Many at the time doubted that the Fed could actually do so (Murphy 1950, 23).

Treasury Secretary Morgenthau, despite a March 1942 agreement, did not accept the Fed's approach. Rather that intervene *ad hoc* in specific segments of the market if and when necessary, Morgenthau wanted the Fed to maintain the 2.5 percent cap on long-term rates by dramatically increasing banks' excess reserves, much as the Fed did during the First World War, and by allowing all other market rates to find their own (low) levels.[17] Banks, the Treasury figured, would gladly hold liquid, short-term Treasury securities that earned interest, instead of excess reserves that earned no interest. The Treasury recommended that the Fed adopt an excess reserve target (Eccles 1951, 358).[18] After the Fed balked at a reserve target, the Treasury suggested cutting reserve requirements. The Fed again refused, believing that the Treasury's approach was much more inflationary than its own approach of selectively intervening along the yield curve.

The Treasury—in a stunning, but brilliant, about face—then proposed that the FOMC cap the Treasury bill rate at 0.25 percent. On 30 April 1942, the Fed compromised at 0.375 percent with a recommendation that the Treasury issue a sufficient amount of Treasury bills to quickly push their yield to the 0.375 cap (figure 6) (FOMC Minutes 8 May 1942, 3).[19] This approach, the Fed reasoned, would increase excess reserves more moderately, would allow the Desk greater control of the bill rate, and would be less disruptive to the market than an excess-reserve target. In August 1942, the FOMC also gave banks and others the option of repurchasing Treasury bills that they previously sold to the Fed at 0.375 percent (FOMC Minutes 3 August 1942, 14). The repurchase option made Treasury bills even closer interest bearing substitutes for excess reserves. Indeed, as anticipated, excess reserves fell from $3.4 billion in December 1941 to roughly $1 billion throughout 1944 and 1945, but part of this decline resulted because of the growth in deposits and money in circulation as the war-time economy expanded.[20] In August 1942, the Fed and Treasury also agreed to cap the rate on certificates of indebtedness at 0.75 percent, and the Fed began maintaining rates on all other government securities in correspondence to those on bills, certificates, and bonds (Eccles 1951, 359).[21]

In the end, behind this thin façade of compromise, the Federal Reserve capitulated and provided the Treasury with a mechanism to freely expand bank reserves. The Treasury increased its weekly bill offering to $50 million by 1 July 1942 and to $1 billion by a year later. With the bill rate at its cap, the arrangement required the Fed to buy any bills that the public did not wish to hold. "After October 1943, the net market demand for Treasury bills evaporated and new issues of bills were acquired by the Federal Reserve" (Wicker 1969, 454). The Treasury could now increase reserves in the banking system by issuing Treasury bills to the market. The Fed must have understood and tacitly approved of this mechanism, which the Treasury fully exploited (Walker 1969, 27; Wicker 1969, 453 – 454).[22]

In early 1942, no one knew if the agreed interest-rate policy would work. Treasury Secretary Morgenthau, the only official with authority to announce the program, never did so, fearing embarrassment if the Fed could not maintain the rate structure. The program could collapse if investors, fearing inflation, sought higher interest rates than the policy offered. Then the Fed would either have to buy every security that the Treasury issued—an unlikely outcome—or allow rates to rise. To contain inflation and inflation expectations, the Roosevelt administration began introducing limited price controls as early as May 1940 (Rockoff 1984, 85-126). The controls grew thereafter and by June 1942 were both far-reaching and rigorously enforced (figure7). The public—including the business sector—generally approved of the price controls. The broad, publicly supported controls remained in place until 1946 and appear to have contained inflation expectations.

By mid-1943, with the yield curve essentially fixed and with virtually no risk of capital loss, banks and other investors sold bills and certificates to the Fed and used the funds to buy higher yielding, longer-term Treasury securities. These securities were now as liquid as Treasury bills. The Treasury and the Fed had hoped to prevent banks from climbing the yield curve in this manner. Starting in May 1942, commercial banks were largely prevented from participating in war-bond drives (Annual Report 1945, 3). The restrictions may have reflected concerns about excess reserves and the money multiplier, but they also stemmed from a desire "that banks preserve a maximum liquidity" because "a frozen [illiquid] banking system trying to become unfrozen after the war by selling long-term Government securities might create a bad situation."[23] Banks, that is, might incur capital losses, damaging their balance sheets and their capacity to lend. Nevertheless, banks acquired long-term securities. Because the Fed set very low short-term rates, as already-issued long-term securities matured, their prices would rise. Non-bank investors would sell these "bank-eligible" securities at a premium—often to banks—and buy newly issued, "bank-ineligible" securities yielding a higher return.

Besides capping interest rates, the Federal Reserve undertook other minor steps consistent with the Treasury's desire to maintain a substantial volume of excess reserves in the banking system. The Fed eventually cut reserve requirements on demand deposits at the money center banks in New York and Chicago (central reserve city banks) by 2 percent on 20 August 1942, 14 September 1942, and 3 October 1942, bring their reserve ratio down from 26 percent to 20 percent. These cuts established a unified reserve requirement for demand deposits across all classes of bank. The Fed took this action because, as the Treasury reduced their bank deposits to finance the purchase of war materials, key money center banks lost reserves while banks throughout the rest of the country generally gained reserves (Annual Report 1943, 17 – 19; Whittlesey, 1945, 47). Murphy (1950, 119) suggests that the cuts in required reserves also looked to help offset the decline in excess reserves within the entire banking system.[24] In April

1943, the FOMC eliminated reserve requirements on government accounts held in commercial banks.[25] The Federal Reserve also established a uniform discount rate of 1 percent by April 1942. Previously, discount rates had varied across the Reserve banks between 1 percent and 1½ percent. As an overly optimistic counterweight to these reserve expanding actions, the Federal Reserve Banks set a preferential discount rate of ½ percent on advances secured by Treasury securities maturing within a year in October 1942. The Fed hoped that the preferential rate would encourage banks to hold short-term, instead of long term, Treasuries with the prospect of obtaining temporary funds without selling short-term securities to the Fed. Given that even the preferential discount rates exceeded the yield on Treasury bills, discount-window activity remained miniscule prior to 1944. Congress also gave the Federal Reserve authority to purchase up to $5 billion in securities directly from the Treasury (FOMC Minutes 8 May 1940, 6 – 7).

Portfolio and Balance Sheet: 1938 – 1945

The Second World War was the most expensive war that the United States has ever fought. Between FY1940, the eve of the defense buildup, and FY 1945, federal government expenditures rose nearly ten-fold, with 82 percent of the increase attributable to outlays for national defense. Although the Treasury relied more heavily on taxes than in previous wars (Studensky and Kroos 1952, 436), it still financed more than one-half of its enormous outlays by borrowing. As a consequence, gross federal debt rose from roughly $43 billion, or 42 percent of GDP, in FY1940 to $269.4 billion, or 118 percent of GDP, in FY1946 (figure 8).[26] As a percentage of GDP, borrowing in 1946 was the highest in US history, and the debt-ratio would not drop below 50 percent until 1964. Commercial banks acquired 30 percent of the total public debt issued over this period, and the non-bank public acquired nearly 60 percent.[27]

In its efforts to maintain a cap on interest rates, the Fed acquired $20.3 billion in US government securities, or 10 percent of the debt that the Treasury issued between March 1942 and August 1945.[28] In 1943, as the rate structure became apparent, investors began selling Treasury bills and certificates to the Federal Reserve and buying the higher yielding longer-term Treasury securities (figure 5). To maintain its peg on Treasury bill yields, the Federal Reserve acquired $13.3 billion of the securities, or nearly 87 percent of all Treasury bills issued during the war. The System also bought nearly $6.4 billion in Treasury certificates over the same period. Initially, the Federal Reserve also bought a considerable amount of longer-term Treasury notes and bonds, but, after 1942, the Federal Reserve did not have to support these markets. Private demand for Treasury notes and bonds remained sufficiently strong through the duration of the war, that the Federal Reserve generally reduced its holdings of long-term Treasury securities. Yields on long-term bonds remained below their caps after 1944 in part because the strong demand for these—now liquid—securities.

Over the course of the war, the Federal Reserve's balance sheet grew by 85 percent, from $24.4 billion in 1941 to $45 billion in 1945.[29] The acquisition of Treasury securities more than accounted for the growth in Fed assets, as a $2.6 billion drop in gold after 1942 partially offset the acquisition of the Treasuries. Expressed as a percentage of GDP, the Fed's balance sheet reached a peak of 22.6 percent of GDP in 1940. By the end of 1945, the balance sheet had contracted to 19.7 percent of GDP. A three-fold ($16.5 billion) increase in currency accounted for 80 percent of the growth in Fed liabilities. Member bank reserve grew $3.5 billion, accounting for 17 percent of the growth in Fed liabilities during the war years. On average over 1943, 1944, and 1945, money growth exceed real output growth by 9.7 percent, indicating that

the Fed's debt-management operations offered a significant impetus to inflation, which the monetary authorities managed through price controls.[30]

Toward an Accord

The Federal Reserve accepted its role in wartime finance, but as the war in Europe began to wind down, the System became increasingly persuaded that its policy focus needed to shift from managing debt to preventing inflation.[31] With the move away from a war-time economy, private demand for goods and services would rise. Bond holders would liquidate holdings of government securities to fund current spending and credit expansion, forcing the Fed under current arrangements to create reserves (Annual Report 1952, 98). Excess-money growth—the rate at which money growth exceeds real output growth—reached 9.9 percent in 1944 and 15.7 percent in 1945,with only price controls preventing its manifestation as inflation.

Two situations, however, hampered a shift in the Fed's policy focus. First, the outstanding, and still growing, public debt and the System's agreement with the Treasury on interest rates prevented the FOMC from tightening. The Treasury maintained—and would continue to believe—that it could not possibly finance its unprecedented levels of public debt at reasonable interest rates without the Fed's continued participation in the government securities market. The supply of loanable funds was too small and inelastic to do so. In addition to these overriding debt-management issues, the Federal Reserve worried about the effects of higher interest rates on commercial banks. In 1945, member banks held $78.3 billion in US government securities, which equaled more than half of their total assets. Approximately $36.2 billion of these securities, or 26 percent of bank assets, matured in more than five years.[32] Capital losses from declines in security prices could damage banks' balance sheets and their capacity to lend.[33]

The Fed's desired strategy called for gradually increasing the yields on Treasury bills and certificates, which the Fed had viewed throughout the war as too low. Besides offering an initial step toward a tighter policy, higher short-term rates would encourage banks to shift their portfolios back to a more traditional configuration of mostly shorter-term securities. In the process of readjusting their portfolios, banks would stop financing their acquisitions of long-term debt by selling bills and certificates to Fed, and the Fed could then stop monetizing the bills and certificates. Bank portfolios would become less sensitive to the interest-rate consequences of a tighter policy.

The Fed's strategy, however, would have to wait for two years. Raising interest rates "to be an effective anti-inflationary influence" in 1945 seemed impossible because of the "inevitable repercussions on the economy generally and on the Government's financing operations in particular" (Annual Report 1946, 1). Real economic activity fell nearly 13 percent between 1944 and 1947.[34] The administration noted that cooperation between the Fed and the Treasury had "made it possible to finance the most expensive war in history at low and stable rates of interest" and that "[t]his cooperation will continue" (Treasury 1946, 6). This was a shot across the Fed's bow—a command, not a request or suggestion. In lieu of raising rates, the Federal Reserve recommended that Congress grant it some additional policy tools, including the ability to place limits on the amount of long-term securities—public and private—that banks might hold relative to their demand deposits, to impose secondary reserve requirements on banks to be held in the form of Treasury bills and certificates, and to temporarily raise reserve requirements in general.[35] Congress approved none of these options.

During 1946, excess money growth reached 23 percent, and price pressures were rapidly building. Price controls ended in June of that year, and by August, inflation reached double digit rates (figure 7). The Fed's debt-management obligations continued to prevent any shift toward a tighter monetary policy. The Federal Reserve banks did eliminate the preferential discount rate over the Treasury's objections, but this had no perceptible effect (Murphy 1950, 219-220; Meltzer 2003, 638- 640). The Treasury, however, did retire approximately $23 billion of its outstanding $280 billion debt, using funds accumulated during the Victory Loan Drive and held in Treasury's loan accounts at commercial banks. The operations also drew down $4.5 billion in Treasury securities held by Fed (Annual Report 1947, 1-2). On balance, these debt reductions lowered total bank reserves, raised required reserves, and slowed money growth somewhat (Annual Report 1947, 1-6). To satisfy their required-reserve needs, banks temporarily refrained from buying long-term Treasury debt and sold Treasury securities to the Fed. Consequently, the Fed's *net* holdings of Treasury securities fell by only $900 million. Holdings of Treasury certificates, notes, and bonds dropped by $2.8 billion, but the Fed acquired $1.9 billion in Treasury bills. Longer-term Treasury securities, nevertheless, remained an attractive investment for commercial banks. Consequently, the Federal Reserve continued to look for an increase in short-term interest rates and again unsuccessfully asked Congress for the auxiliary powers mentioned in the Board's 1945 annual report.

In 1947, as economic activity began recover, banks and private investors financed growing credit demands by selling Treasury securities to the Federal Reserve.[36] The sales offset much of the restraining effects of continued Treasury security purchases from banks and the Federal Reserve. Inflation peaked at a twentieth-century record, 19.7 percent (year-over-year), in March 1947 and averaged 15 percent over the entire year. With the Treasury's endorsement, the Federal Reserve stopped pegging the yield on Treasury bills at 0.375 percent in early July 1947 and ended its ceiling on Treasury certificates a month later (figure 6).[37] The System, however, stated that it would buy bills if necessary to maintain orderly market conditions (Chandler 1949, 411). The Federal Reserve and the Treasury subsequently agreed to a series of increases in the yields on bills and certificates, which reached 1 percent and 1.1 percent, respectively, by early 1948 (Board 1976, table 12.7A, 694). The Federal Reserve and the Treasury also loosened yield ceilings on other instruments, save long-term Treasury bonds. Both the Federal Reserve and the Treasury thought that maintaining the ceiling on long-term Treasuries was needed to keep the Treasury's cost of debt low and to prevent capital losses that might damage the market for government debt (Chandler 1949, Hetzel and Leach 2001, 36). Yields on longer term Treasury securities, which remained well below their caps, had begun to rise after March 1946. In June 1947, member banks held a war-time high of $2.4 billion in US government securities maturing in more than 20 years (Board 1976, Table 2.1D, 68).

Despite allowing short-term rates to rise gradually, the Treasury continued to maintain considerable leverage over the Fed, even in the bills market, because the Treasury set coupon rates on all of the securities that it offered. The Federal Reserve, consistent with its promise to maintain order in the government-securities markets, felt obliged to maintain the price of securities on offer at, or above, par. If the Fed failed to do so, the issue might "fail," that is, the issue might be undersubscribed, and the administration or Congress might blame the Fed. Any monetary operations to raise rates in the bills or certificate markets could interfere with rates further out on the yield curve (Walker 1954, 37). Hence, the Fed sought the Treasury's approval for any action.

With the gradual rise in short-term rates, individuals and banks began to liquidate their holdings of long-term securities while the Treasury was still selling substantial amounts of them (Annual Report 1948, 6). Bond prices fell and long-term yields began to rise sharply, requiring the Federal Reserve to enforce its yield cap by buying long-term Treasuries after October 1947 (Walker 1954, 41 – 42). Over the next twelve months, the System added nearly $10.5 billion of long-term Treasury bonds to its portfolio.[38] Thereafter, it reduced its holdings of long-term bonds somewhat, but continued to maintain a significant amount in its portfolio. To minimize the impact of these bond purchases on its balance sheet, the Federal Reserve simultaneously sold nearly an equal amount of short-term securities. The balance sheet remained fairly flat on balance from 1947 through 1949 (figures 2 and 5).

The constraints on any anti-inflation monetary policy remained unchanged in 1948, but the Fed, nonetheless, began to take tentative steps toward a tighter policy. The Treasury ran a substantial budget surplus in FY1948. Instead of holding the surplus at commercial banks, the Treasury moved its balances to the Fed and used them to retire short-term debt from the Fed's balance sheet as it matured. The shift in Treasury balances from commercial banks to the reserve banks reduced bank reserves (Meltzer 2003, 653-4). Public sales of securities to Fed, however, more than offset the balance-sheet effects of the Treasury's actions (Annual Report 1949, 9-10). In January, with inflation hovering around 9 percent, the Board raised the discount rate from 1 percent to 1.25 percent. In August 1948, the Federal Reserve again raised the discount rate by 25 basis points, but with member banks having little need to borrow, discount rate hikes remained a marginally effective tool at best. With the Treasury's permission, the FOMC then allowed the yields on Treasury certificates to increase to 1.25 percent and permitted yields on Treasury bills to rise in step. In return, the Treasury asked the Federal Reserve to reaffirm its commitment to a 2.5 percent ceiling on Treasury bond yields and to postpone any increase in reserve requirements until after September (Meltzer 2003, 665). In late September 1948, the Federal Reserve increased required reserves for all classes of banks in hopes of further curbing inflationary pressures. Banks often met these higher reserve requirements by selling Treasury securities—noticeably long-term debt—to the Federal Reserve, not by curtailing their lending activity (Chandler 1949, 420, Abbott 1953, 57). Still, money growth fell in 1948 for the first time since 1933. Meltzer (2003, 653) saw these events as a turning point of sorts: "Banks, insurance companies, and other holders of long-term debt perceived these changes as a first step toward increased rates on long-term bonds. Bonds no longer seemed as riskless as before, so banks, insurance companies, and other sold bonds and bought bills and certificates."

Simmering tensions between the Treasury and the Federal Reserve increased in March 1949 as the economy slipped into recession and prices generally fell. The Treasury refused to approve an increase in the rates on bills and certificates or even to retire debt on the Fed's books early in the year. In mid-1949, when it belatedly recognized that the economy was in recession, the System cautiously allowed short-term interest rates to fall as it began a series of substantial reserve requirements cuts. The Fed lowered reserve requirements on demand accounts by 4 percentage points and on savings accounts by 2½ percentage points at all member banks. Banks—in the recessionary environment—tended to use the newly freed reserves to buy short and intermediate government securities, which the Fed, by and large, supplied from its portfolio (Annual Report 1950, 6-9).[39] By accommodating banks' demand for securities, the Fed hoped to limit the impact of reserve requirement cuts on yields. The Federal Reserve was reluctant to lower interest rates, having pushed for higher interest rates—and received a Treasury veto—as recently as March 1949. In part, the FOMC viewed policy as currently easy (Meltzer 2003, 667),

but the Federal Reserve also feared that if rates fell, the Treasury would try to lock in lower rates (Chaurushiya and Kuttner 2003, 8-9). As a consequence of the System's willingness to sell securities, its portfolio of government securities shrunk by $4.4 billion in 1949. At most, three-month Treasury yields fell only 16 basis points, from 1.16 percent in February 1949 to 1.0 in July 1949. By the end of the year, the Fed had guided short-term Treasury bills to only 1.1 percent. [40]

Two events then stiffened the Federal Reserve's resolve to push for greater independence over monetary policy. In fall 1949, a subcommittee of the Joint Committee on the Economic Report, which Senator Paul Douglas (Illinois) chaired, opposed the continued subordination of monetary policy to debt management and supported the System's position with respect to interest rates (Meltzer 2003, 685-690). Then, in June 1950, the Korean War began and caused a surge in speculative buying. The FOMC worried about inflation, which was accelerating and would eventually reach 9.4 percent in February 1951. With the war, the Treasury would no longer run a surplus or buy outstanding debt from the Federal Reserve (Meltzer 2003, 681). Moreover, the war triggered the selling of government securities, resulting in large-scale Fed security purchases to stabilize the market. The Fed was creating reserves that would accommodate inflation (Annual Report 1952, 99).

Between June 1950 and March 1951, the Federal Reserve attempted to raise interest rates after informing the Treasury of its intentions, but without seeking the Treasury's confirmation for doing so.[41] To counter the Fed, the Treasury persistently overpriced its security offerings, thereby forcing the System to support the operations through security purchases or be blamed for allowing the financing operation to fail. By late 1950, the Fed was buying longer-term Treasury securities—notes, and bonds—and, despite some offsetting sales of shorter-term instruments, the balance sheet expanded (Annual Report 1952, 3). The Board raised the discount rate ¼ percentage point to 1.75 percent in August 1950 and hiked reserve requirements 1 percentage point in early 1951, but inflation continued to rise and bank credit grew at an "unusually rapid rate" (Annual Report 1952, 3).

President Truman found it necessary to intervene in the conflict between the Treasury and the Federal Reserve, particularly in light of the growing Congressional support for the Fed's position. He invited the entire FOMC to the White House for a conference on 31 January 1951 to discuss the issue. On 2 February 1951, in a public letter, President Truman thanked Federal Reserve Chairman for 'your assurance that the market on Government securities will be stabilized and maintained at present levels in order to assure the successful financing requirements…" (quoted in Abbott 1953, 104 and Eccles 1951, 492). The Federal Reserve had made no such agreement. To counter this blatant attempt to secure control over the Fed, Governor Eccles then released an internal memorandum of the meeting. The memorandum showed that the FOMC had not pledged to fix the yield curve (Eccles 1951, 492-498). Treasury sales of government securities continued, and the Federal Reserve again found it necessary to acquire over $1 billion worth.

On 26 February 1951, at a meeting including the relevant administration and Fed officials, the President proposed that the group study way to provide stability to the government securities market and curb inflationary pressures. On 28 February 1951, Senator Douglas attacked the Treasury's position. On 4 March 1951, even before the study group got going, the Secretary of the Treasury and the Chairman released the following statement: "The Treasury and the Federal Reserve System have reached full accord with respect to debt-management and

monetary policies to be pursued in furthering their common purpose to assure the successful financing of the Government's requirements and, at the same time, to minimize monetization of the public debt" (Annual Report 1952, 4).

By agreement, the FOMC did not immediately withdraw from Treasury debt operations after the accord. Its directive to the Executive Committee kept the requirement of "maintaining orderly conditions in the Government securities market" (Annual Report 1952, 101). To minimize bondholders' losses, as long-term yields rose after the accord, and to discourage a broader sell-off of bonds maturing in 1967-72, the Treasury substituted nonmarketable bonds yielding 2.75 percent for these long-term marketable bonds then yielding 2.5 percent. Holders of these nonmarketable securities could subsequently redeem them before maturity for marketable 5-year bonds (Annual Report 1952, 100). The Federal Reserve agreed to facilitate the exchange, which took place between 26 March 1951 and 6 April 1951, by supporting the price of 5-year bonds up to a limit of $200 million dollars. The Fed reached that limit in the first three days, and thereafter yields rose (Hetzel and Leach 2001, 50 – 52).

The Federal Reserve continued to support the bond market when necessary throughout the first half of the year, but at declining prices (Annual Report 1952, 4 – 5, 100). During Treasury refinancings, the Federal Reserve steadied the market for short-term Government securities (Annual Report 1952, 6), setting a precedent for its "even-keel" operations. "More than a billion dollars of securities were purchased by the Federal Reserve in June in this type of operations, and more than half a billion in September and October combined. There was only slight support of refunding operations in December but the Federal Reserve made large purchases late in the month to meet seasonal needs in the money market" (Annual Report 1952, 7-8). In all cases the transactions were subsequently sterilized through the sale of short-term securities.

3. Orderly Markets from Bills Only to Even Keel, 1951 – 1975

The accord ostensibly resolved the conflict between monetary policy and debt-management operations by ending the FOMC's obligation to defend a specific price for Treasury securities, but it did not end frictions between Treasury debt-management concerns and Fed monetary-policy objectives. Instead, they became more subtle. The Fed began operating under a "bills preferable" framework to convince markets that it was no longer setting—or influencing—the price on long-term Treasury securities. Nevertheless, the Fed continued to assist the Treasury with its debt operations. At the time, the Treasury set a price on all of its securities offerings, except bills. To help ensure that an offering was fully subscribed, the Fed effectively froze policy and added a small amount of reserves when the Treasury came into the market. The Fed worried that Congress or the administration might blame the Fed should an issue remained undersubscribed. Only after mid-1975, when the Treasury began auctioning all of its debt, was monetary policy generally independent of Treasury debt-management operations.

Bills Only 1953 - 1960

The federal debt shrank significantly after its 1946 peak, but still equaled 73 percent of GDP in 1951. The Treasury still worried about the costs of financing the debt. Sensitive of its precarious political position, the Fed continued to support Treasury funding operations by offering advice—sometimes "forcefully" (Rouse 1958, 16)—about security prices, security types, and maturity dates. The Treasury's acceptance of this advice implied that the Federal Reserve would see "the financing through, more or less regardless of the effect on bank reserves

or other aspects of general credit conditions" (Rouse 1958, 16).[42] Moreover, the FOMC had directed the Desk to maintain orderly conditions in government securities markets, and so the Desk—at least through September 1952—purchased substantial amounts of securities during Treasury refinancing operations, fearful that absent such support, investors might not take up the entire offering (Annual Report 1954, 8). As a consequence, monetary-policy operations at the time were largely focused on withdrawing unwanted funds placed in the market to support Treasury debt sales (Hearing 1954, 21).

Complicating matters, the manager of Federal Reserve Bank of New York's Desk, which maintained a more active view of "support" than the Board, had considerable leeway in how he executed the FOMC's directives for open-market operations. To be sure, since the accord and, especially, since September 1952, the Desk mostly operated in the short-end of the market, but the manager could, if he thought necessary, buy or sell Treasury issues anywhere over the entire yield curve. By exercising his discretion, the Desk manager could support Treasury debt operations while executing monetary policy. Chairman Martin had only limited control over the Desk manager who was an employee of the Federal Reserve Bank of New York and not directly accountable to the FOMC (Meltzer 2009, 40 – 42, 58 – 59).

Martin wanted to end these practices, assert greater control over the Desk, and further disentangle monetary policy from debt-management operations. His concerns were two-fold, but related: First, he worried that observers might interpret current practices as suggesting that the Fed was still setting yields on long-term Treasury securities, as it had prior to the accord. If so, the System could again find itself under pressure to fix Treasury bond yields. Second, he feared that the System's current practices distorted the financial market by creating a "disconcerting degree of uncertainty" about when, how much, and where on the yield curve the Fed might intervene (FOMC Minutes 4 – 5 March 1953, 31; Hearing 1954, 16). The Fed's activities created inefficiencies by compromising the "depth, breadth, and resiliency" of the longer-term portion of the securities market.[43]

Underlying Martin's concerns were the Board's view of the importance of the government securities market for monetary operations and the monetary transmission mechanism. The FOMC undertook all of its open-market operations in the government securities market—normally in the bills segment—because of the direct leverage that doing so offered the Fed over bank reserves. Treasury bills constituted an interest-earning, substitute for reserves on bank balance sheets. Commercial banks, as well as other financial institutions, typically adjusted their day-to-day reserve positions in the bills market.

The daily turnover in the securities market was "enormous," and the Fed was the largest single player in the market, holding approximately one-sixth of the outstanding Federal debt in 1952 or about ten times more than the next largest portfolio (FOMC Report 1952, 257, 260-261). These holding were heavily concentrated in bills, certificates and short-term bonds. The amount of reserves that the Desk injected or withdrew from the market during ordinary day-to-day operations generally was larger than the average amounts that private market participants bought or sold (Hearing 1954, 17). Consequently, open-market operations quickly affected the money market's "tone"—its tightness or ease—and relatively small operations in bills "ordinarily [found] a response in the market for long-term securities" (FOMC Report 1952, 259); that is, the entire yield curve responded.

The Board believed that open-market operations affected interest rates through three distinct channels (Reifler 1958, Young and Yager 1960). The first, and by far the most important, involved the volume of bank reserves. When the Fed bought or sold securities it either created or destroyed reserves in the banking system, leading to a multiple expansion or contraction of the money stock.[44] Emphasizing this channel's importance, the FOMC primarily gauged the medium-term stance of monetary policy by the amount of net free reserves—excess minus borrowed—in the banking system.[45] The reserve impact of an open-market operation was the same whether the Desk transacted in short-term or long-term government securities; it depended only on the volume of securities that the Desk bought or sold.

In a second channel, open-market operations independently affected interest rates by altering the relative amounts of securities in the market.[46] The price and interest-rate responses to an open-market operation was greatest for the securities directly involved in the transaction, but arbitrage and substitution would transmit the interest-rate effect to some degree along the entire maturity spectrum of securities in the market (Riefler 1958, 1262). The Fed's view was consistent with a quasi-segmented-markets view of the terms structure. Arbitrage and substitutability were pervasive, but not perfect, so targeted open-market operations could affect the term structure at specific points to a limited degree (see Culbertson 1957). One Board document characterized the government securities market as consisting of "separate but overlapping and related sectors" (Analysis 1958, 4). Arbitrage also extended to segments of the money and capital markets beyond government securities.

Open market operations also affect interest rates through a third distinct channel by influencing expectations—especially over the short run—when the Fed conveys private information to dealers and other market professionals about the direction of monetary policy. The Board thought that expectation effects could amplify open-market operations, but embody the danger that the market might misinterpret or over-react to the information (Reifler 1960, 1263-1264). A misinterpretation or overreaction could cause prices and yields to deviate from levels consistent with equilibrium in the market for loanable funds. The Fed thought that this problem—prices deviating from their underlying equilibrium—was likely to be more acute in the thinner, longer-term government securities markets. In that segment of the market, the overreaction of securities prices and yields could stem from two sources: a misinterpretation of the new information about monetary policy and an overreaction to changes in the relative yields on the specific securities involved in open-market transactions. In contrast, operations in bills affect expectations mainly about monetary policy with less chance of a deviation from equilibrium (Riefler 1960, 1264).

Chairman Martin believed that the Fed's frequent interventions in the longer-term government securities market during and immediately after the war had robbed the market of its "depth, breadth, and resiliency," characteristics of an efficient market (FOMC Report 1952, 265; Hearings 1954, 18 – 20). A market with these qualities had market makers who continuously quoted bid and ask prices and were willing to hold large quantities of securities for a time. An efficient market also had arbitragers who spread price movement along the yield curve and minimize bid-ask quotes. In such market, the variation in successive quotes is generally small. Open-market operations in the thin, long-end of the market had big price effects, which created uncertainty about the underlying nature and sustainability of price movements. The associated risks might induce professionals to withdraw from the market until the intervention established a clear floor on the price, in which case the Fed was again setting a price and yield on long-term

Treasuries. Alternatively, uncertain dealers might simply trade in concert with the Fed, which would induce even bigger destabilizing swings in bond prices and yields. In either case, yields would not necessarily reflect a fundamental equilibrium between savings and investment and might negatively impact broader capital markets. Martin contended that, instead of market makers and arbitragers, important traders only acted as brokers.

The current FOMC directive requiring the Desk to maintain orderly markets in government securities continued to aggravate the situation, because it contrasted with the FOMC's post-accord monetary freedom. From the dealer's point of view, Martin contended, the directive suggested that the emerging free securities market might still be subject to unpredictable Fed interventions (FOMC Report 1952, 266). To provide the market with the needed depth breadth and resiliency, Martin wanted to confine open-market operations to the short-end of the yield curve.

At its 4 – 5 March 1953 meeting, the FOMC adopted "bills preferable" as a way to focus its open-market operations solely on monetary-policy objectives and away from debt-management.[47] The FOMC rescinded the directive on 11 June 1953, arguing that "conditions had changed" and greater freedom of action was needed, but they reinstated it on 24 September 1953 (Annual Report 1954, 95,99). Henceforth, the Desk was to undertake open-market operations only to add or subtract reserves in the banking system, not to affect specific securities prices or yields. To accomplish this objective, the Committee restricted open-market operations to the short end of the government yield curve, preferably Treasury bills. "Bills preferable" complimented and completed the FOMC's late 1952 decision no longer to directly support Treasury refinancing operations. During such periods, the Desk was not to conduct open-market operations in securities similar to those being offered by the Treasury. This prevented the Desk from directly supporting a specific Treasury yield. Open-market operations were, henceforth, only to add or subtract reserves from the banking system. The FOMC also stopped the Desk from offering funding advice to the Treasury unless the latter specifically requested it and recommended that the Desk manager become an employee of the FOMC, which eventually happened (FOMC Minutes 4 – 5 March 1953, 27 – 30, Hearings 1954, 15).

The FOMC, however, believed that securities markets could occasionally become disorderly and authorized interventions to "[correct] a disorderly situation in the Government securities market." This seemingly subtle but important change from its previous directive, "maintain orderly conditions" in the market, signaled that the Fed would henceforth seldom directly support government securities operations (FOMC Minutes, 4 March 1953, 32). Moreover, Martin believed that the Desk could generally reestablished orderly markets by intervening in the short-end of the yield curve; only rarely would the Desk need to operate in the long end (Hearings 1954, 268).

"Bills preferable" was very controversial within both the FOMC and the economics profession. Federal Reserve Bank of New York President Allan Sproul repeatedly opposed "bills preferable," claiming that most credit-market anxiety stemmed from uncertainty about the future path of interest rates, about the FOMC's monetary policy in general, and about prospective Treasury debt-management operations. It did not reflect confusion about when and where the Fed might intervene on the yield curve (FOMC Minutes 4 -5 March 1953, 35). Luckett (1960, 301-306), using standard definitions of depth and breadth, found no evidence that "bills preferable" improved the efficiency of the market. Most importantly, Sproul claimed that the Fed may sometimes want to intervene at points beyond the short-end of the market to "get

direct effects on the availability and cost of credit in the capital market or the mortgage market, as a means of effectuating credit [monetary] policy" (FOMC Minutes 4 – 5 March 1953, 35 – 36).[48] He found support among private economists who showed that the connection between changes in the short-term rates and long-term rates—the link upon which "bills preferable" relied—was generally weak and often not dependable (Luckett 1960, Fand 1966, Rouse 1958, 4-6). These economists also contended that open-market operations in longer-term securities offered a viable mechanism for affecting the yield curve's shape, which was as important as the level of interest rates.

Chairman Martin's view prevailed. The Desk undertook open-market operations in short-term Treasury securities—usually bills—throughout the remainder of the 1950's. The FOMC, however, followed its mandate to "correct disorderly market conditions," and generally addressed such situations by buying Treasury bills (Rouse 1958, 18). On two occasions, however, the Desk deviated from operating solely in the bills market. In December 1955, the Fed committed to buy $167 million of new Treasury certificates to facilitate a large-scale Treasury refunding operation at a time of stringent money market conditions "not foreseen when the terms of the Treasury refunding were decided upon" (Annual Report 1956, 8). In mid-1958, bond-market participants, who at the time anticipated sharply depressed bond prices and higher interest rates, began selling government securities. The Fed viewed the market as disorderly and bought $1.2 billion worth of Treasury "when issued" securities, including notes and bonds (Annual Report 1959, 6-8).

Operation Twist

Under "bills preferable," the Fed undertook open-market transactions only to supply or absorb bank reserves, and "scrupulously avoided any specific interest rate objective" (Cooper 1967, 19). Despite an emerging federal funds market, a non-borrowed reserve aggregate typically guided the Fed's operations. In late 1960, however, an unfortunate blend of international and domestic economic developments forced the FOMC to focus more closely on interest rates and to abandon "bills preferable."[49]

In late 1960, the US economy was in a mild recession, having never fully recovered from a short, but sharp, recession in 1957 – 1958. The rest of the world, however, was growing and global interest-rate differentials attracted capital from the United States. Complicating developments was a mounting international concern that the United States might devalue the dollar. The international situation called for higher US interest rates to stem the capital flight and to forestall a possible run on the dollar. With the domestic economy persistently operating well below its potential, the FOMC also wanted to avoid a rise in interest rates that might stunt needed investment and growth.

Faced with this situation, the Fed attempted to twist the yield curve. It would lift or at least to minimize further declines in short-term interest rates, thereby stemming the capital outflow. Simultaneously it would lower or at least minimize a cyclical rise in long-term rates, thereby promoting investment and growth. Initially, the FOMC sought to do so by abandoning "bills preferable" and by purchasing securities somewhat further out on the term structure. The Desk thought that this would inject the reserves need for recovery with a minimal impact on short rates (Cooper 1967, 18 – 20). In early 1961, acting now in concert with the Treasury, the Fed began buying intermediate and long-term securities to keep long-term interest rates from rising and selling—often simultaneously—short-term securities to firm short-term rates. The

Fed, however, generally focused operations in the short-to-intermediate range of the yield curve. For its part, the Treasury bought long-term securities for various government investment and trust accounts, and concentrated new offerings in the short end of the yield curve (Bordo and Humpage 2016).

Whether this "operation twist" was successful or not remains controversial. Short-term interest rates rose, but not until after 1961. Long-term yields did not fall, but they remained fairly flat through 1965 in contrast to previous post-war experiences. By 1965, operation twist ended as growing inflationary pressures shifted the policy focus to tightening monetary policy, which would also reduce capital outflows.

Even Keel

Embodied in the 1952 Ad Hoc Subcommittee report advocating "bills preferable" were a couple of paragraphs endorsing a separate policy that eventually became known as "even keel." The report recommended that when the Treasury conducts financing operations, the FOMC "agree to suspend … any open-market operations in which it might be engaged" and "take such steps as might be necessary to prevent a rise in open market Treasury bill rates" above levels that prevail just prior to the Treasury's announcement of its financing operation. Once the Treasury offering was complete, the FOMC "would be entirely free to engage in open-market operations to effectuate whatever credit policies it considered appropriate at the time without regard to the effect of such open-market operations on the prices of the newly offered or any outstanding securities" (Hearings, 1952, 304). Nevertheless, the FOMC was slow to adopt even-keel operations.

In 1953 and 1954, the FOMC expressed occasional concern about Treasury financing—particularly in June 1953 when bills only was temporarily rescinded—but a clear even keel policy was not in force. Even keel may not have been particularly necessary at this time because economic activity contracted throughout the latter half of 1953 and the first half of 1954 and policy eased and remained accommodative during these years (Annual Report 1955, 4-6). .

In 1955, the Fed began "firming" monetary policy, and Treasury offerings—particularly for new cash—increased, creating an atmosphere in which even-keel operations might seem more appropriate. As early as the 25 January 1955 Executive Committee meeting, Chairman Martin suggested that Fed policy actions should have as little effect as possible on Treasury financings scheduled for February and March and certainly "should not do anything in its current operations that would appear to interfere with the success of the Treasury's forthcoming financing" (EC 25 January 1955, 9-10). Rouse, the manager of the System Open Market Account, suggested a substantial injection of reserves and the offer of a "reasonably free" repurchase facility to aid dealers. Governor Robertson thought the "objective ought to be to 'keep an even keel' throughout the Treasury financing" (EC 25 January 1955, 10-11). Robertson offered no definition, but Rouse suggested "leveling off around the current volume [of free reserves]" (EC 25 January 1955, 11). Chairman Martin, however, did not want a policy of "status quo." He interpreted the essential feature of even keel as the "Treasury's offering should not appear either to be floated by the Federal Reserve or hindered by the Federal Reserve. In other words, the Federal Reserve should be 'in absentia' as far as possible" (EC 25 January 1955, 13). Martin lacked a more precise definition, but clearly believed that the "Fed should not influence the market in either direction;" monetary policy should not change and, if anything, desk operations should err on the side of ease (EC 25 January 1955, 14). For the immediate

future, the Desk Manager "would try to keep the free reserve position on an even keel" (EC 25 January 1955, 15).

The February Treasury financing went smoothly "with less [even keel] provision of reserves than might have been thought necessary" (EC 8 February 1955, 12), and the Executive Committee pledged to add reserves during the March Treasury financing to maintain even keel. Complementing the belief that even keel should inject enough reserve to maintain a level of free reserves was the idea that the FOMC should undertake no changes in policy (Markese 1971, 31-54).

After 1955 and through the middle of 1975, under its even-keel operations, the Fed delayed any policy changes—open market, discount rate, or reserve requirements—and added a small amount of reserves "to maintain a steady tone in the money market" (Gustus 1969, 6) for a period beginning slightly before the Treasury announced a security offering and lasting until private underwriters had an opportunity to place the paper. Generally, even keel operation lasted about three weeks (Markese 1971, 65, 82; Gustus 1969, 8). The Fed steadfastly maintained that it did not attempt to peg, *ex ante*, a particular price for Treasury securities or otherwise create artificial market conditions during even-keel events; it just stabilized market-determined conditions.

Even keel was necessary because the Treasury did not auction its securities, other than Treasury bills (Meltzer 2005, 153). The Treasury announced coupon rates on its certificates, notes, and bonds and accepted bids until the issues were fully subscribed. Under such a procedure, an unanticipated increase in interest rates would impose a loss on buyers. This was especially crucial for the banks and security dealers who effectively acted as brokers and underwrote Treasury sales. Capital losses might curtail their future participation in Treasury sales, making it all the more difficult for the Treasury to raise low-cost funds.

The Fed did not extend even keel operations to the Treasury's regular auctions of bills (Markese 1971, 59 -60). Auctions freed the Treasury from having to guess the market clearing price for their securities prior to an issuance.[50] If they guessed wrong, the issuance might fail. The Treasury worried, however, that auctioning longer-dated securities would drive small, unsophisticated investors from the market. As inflation and nominal interest rates increased in the late 1960s and early 1970s, interest-rate volatility also increased and raised the likelihood that a fixed-price offer would fail or otherwise be mispriced (Garbade 2004, 34). In the 1970s, the Treasury began experimenting with auctions, working its way up the yield curve. "By mid-1973, auction sales of notes and bonds had replaced fixed-priced offerings" (Garbade 2004, 37). The Treasury, however, continued to refine its auction operations.

By early 1973, as the Treasury polished its auction techniques, some FOMC participants wanted a looser application of even keel. The Manager of the System Open Market Account Alan Holmes, echoing their sentiments, noted that the Treasury's increasing use of security auctions allowed "even-keel constraints on open market operation [to] be relaxed" (*Memorandum of Discussion* 16 January 1973, 38). The Fed then began to ease out of even-keel operations. They ended after July 1975.

All else constant, an occasional couple-of-weeks delay in the imposition of monetary-policy adjustments and temporary small injections of reserves should not interfere with monetary policy operations, but even-keel events were not infrequent. Between January 1955 and July 1975, 47 percent of the months contained at least one even-keel operation, and 11 months

contained two even-keel events.[51] The 1952 the Ad hoc Subcommittee had originally predicated its recommendation for even-keel-type operations (quoted above) with the admonition: "Assuming that Treasury financings are *sufficiently infrequent*" (Hearings 1952, 304; emphasis added). The Fed understood that even-keel actions could complicate monetary-policy operations, particularly when the FOMC was tightening policy, and some economists contend that the frequent even-keel operation—49% of the months between mid-1965 and mid-1975—significantly contributed to the Great Inflation (Meltzer 2005, 153, 168).

4. Lessons

A tension always exists between the Fed's monetary-policy decisions and the Treasury's debt-management operations because the former affects the cost of the latter. Still, throughout its history, the Fed has *not* faced unrelenting pressures to compromise its monetary-policy objectives to the Treasury's debt-management needs—certainly not over the past 40 years. Fiscal dominance in the United States has been a situational phenomenon. The Fed's experience during and after the Second World War suggest some factors that determine when that pressure is likely to be its strongest and when the Fed is likely to acquiesce. A necessary condition is that the cost of servicing the outstanding amount government debt is large relative to the country's economic or political ability to tax itself or, otherwise, to maintain a primary budget surplus. A sufficient condition, however, may be the existence of an existential crisis, such as war, that allows the Fed to disregard its key statutory macroeconomic responsibilities, notably inflation. The Fed willingly abdicated its monetary policy responsibilities for debt management purposes during the Second World War, but not during the Korean War. The latter war may not have appeared as critical as the former in 1950, and the Douglass committee did not favor a continuation of the world-war relationship between the Fed and Treasury.

A second necessary factor, particularly important during the years immediately following the Second World War, was that the Fed's failure to support debt-management operations threatened the stability of the banking system. Despite the Fed's attempts to prevent banks from accumulating portfolios of long-term debt during the war, they managed to do so. The Fed was slow to raise interest rates after the war in large part because it feared that doing so would damage bank balance sheets and slow bank lending to the emerging peacetime economy. A key Fed policy goal—financial stability—was compatible with the debt-management goals of the Treasury.

A final factor that seemed to bind Fed monetary-policy decisions with the Treasury's debt-management operations was the manner in which the Treasury conducted its financing operations. Prior to mid-1975, the Treasury did not auction any of its securities, except bills. Instead, the Treasury set a price and sold the securities to the public via brokers. If the set price was above its equilibrium value, the quantity of securities demanded would fall below the quantity supplied, and the issuance would fail. The prospects for failure were greatest if the Fed altered monetary policy during an issuance or did not maintain a sufficient amount of reserves in the market. In such cases, the administration or Congress might blame the Fed for its failure and crimp its independence. Consequently, the Fed undertook even-keel policies during Treasury financing operations, viewing such operations as an irrefutable Fed obligation. Only when the Treasury began auctioning all of its debt securities in the early 1970s could the Fed avoid supporting the Treasury's debt-management operations.

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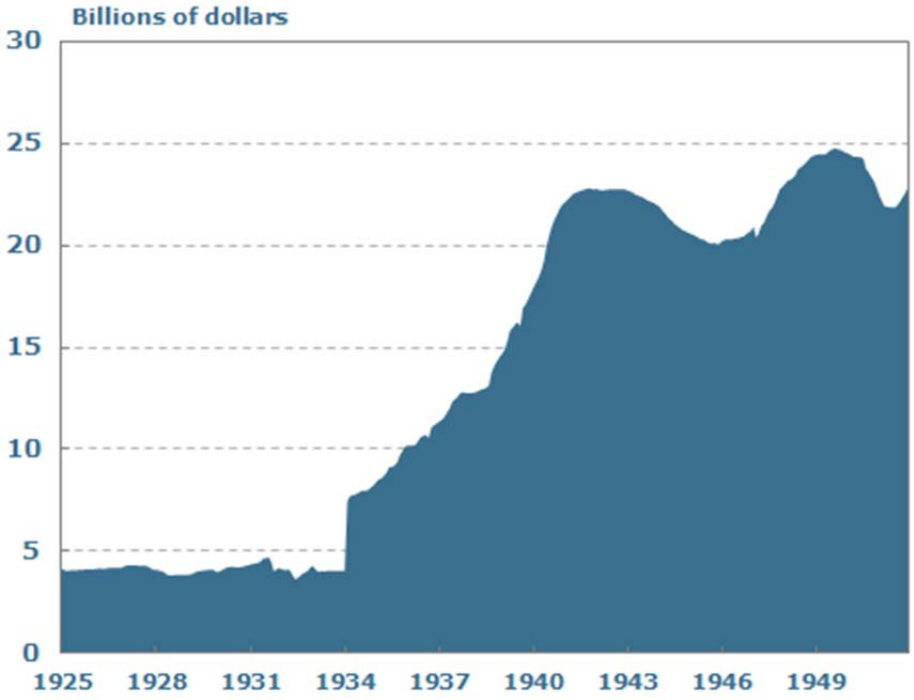
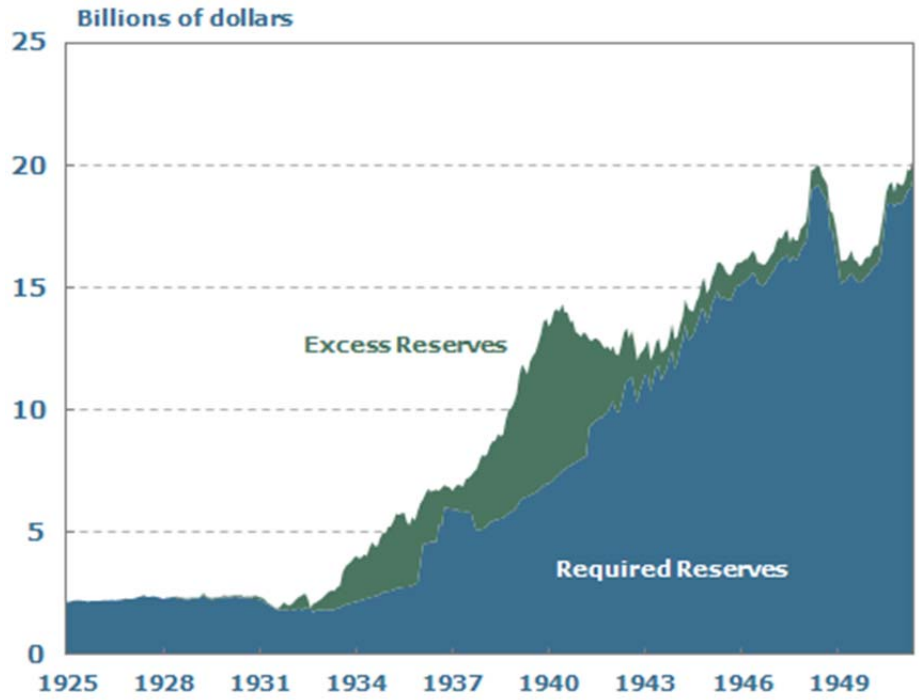
6. Figures

Figure 1: US Gold Stock



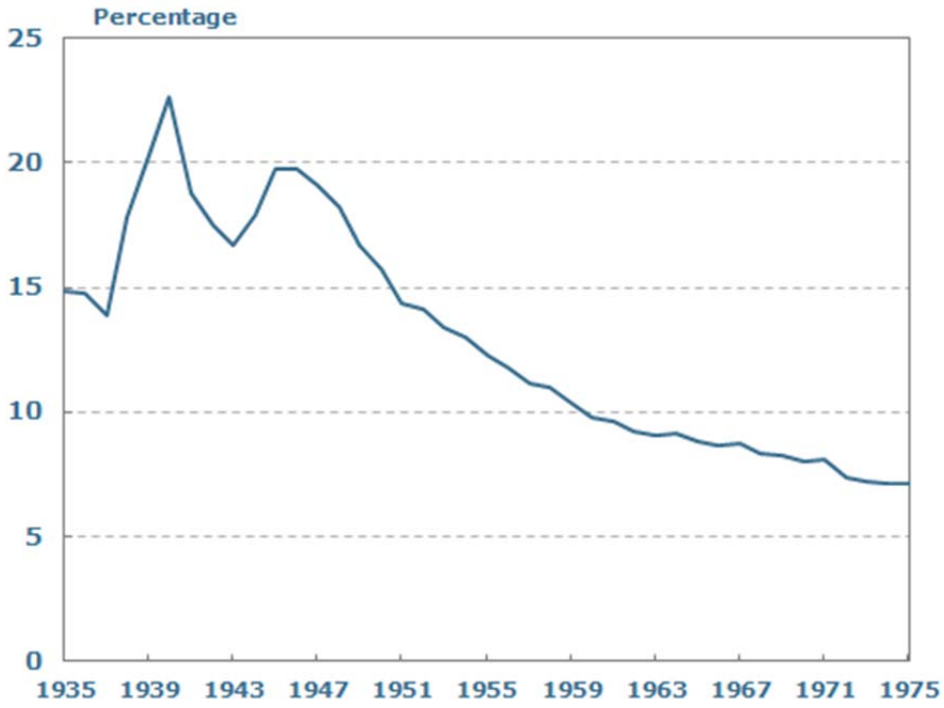
Source: Board (1976a, table 59); Board (1976b, table 14.1).

Figure 2: Federal Reserve's Balance Sheet



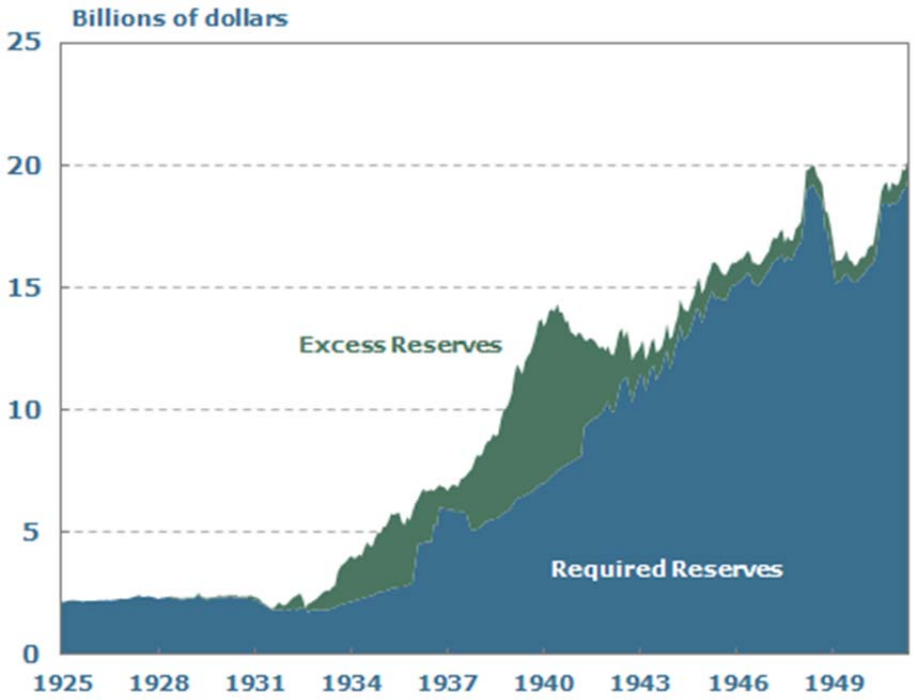
Source: Banking and Monetary Statistics & Annual Statistical Digest, various years.

Figure 3: Federal Reserve Balance Sheet as a Percent of GDP



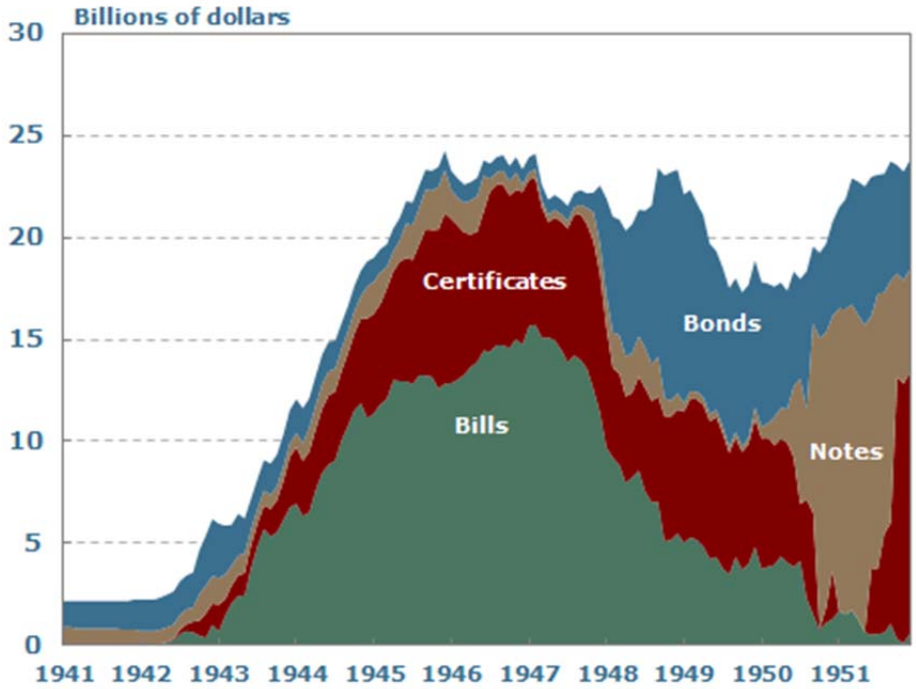
Source: Banking and Monetary Statistics & Annual Statistical Digest, various years.

Figure 4: Member Bank Reserves



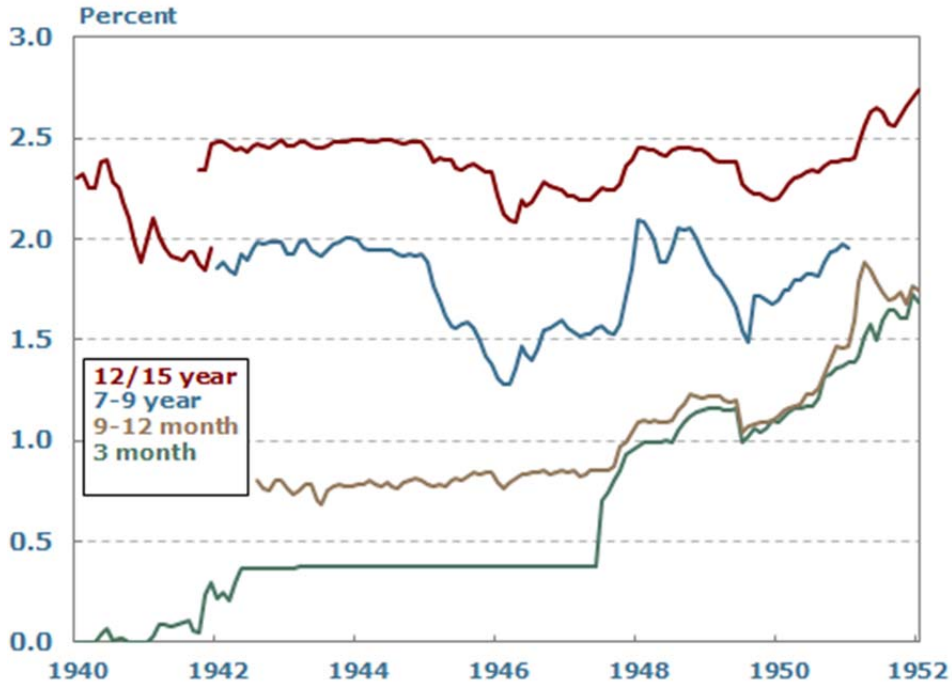
Source: Board (1943, table 101) and Board (1976b, table 10.1)

Figure 5: Federal Reserve's Government Securities Portfolio



Source: Board of Governors (1976, table 9.5(a))

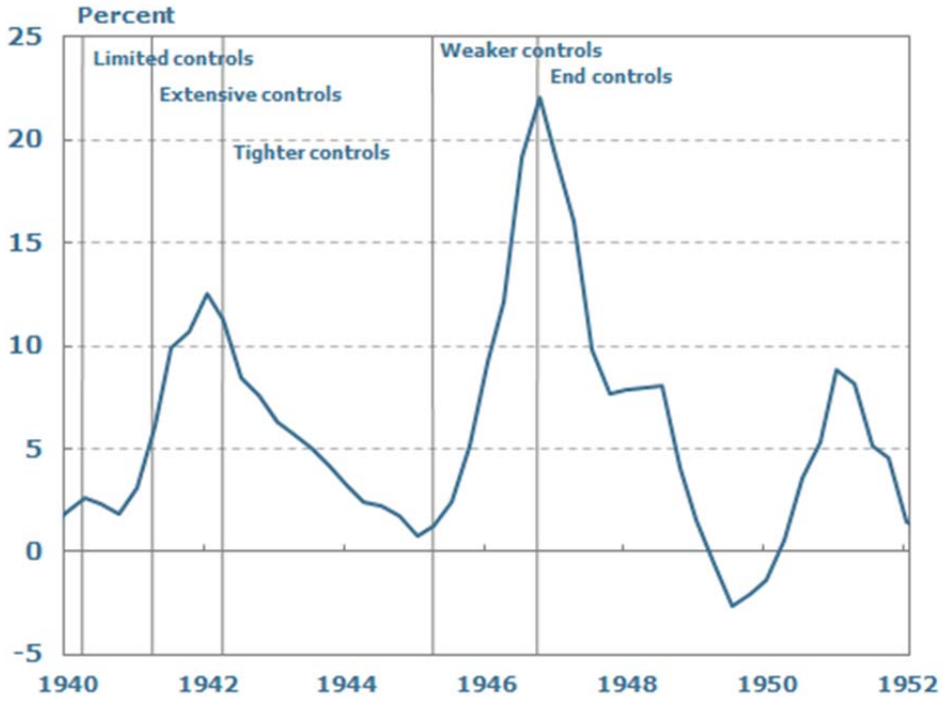
Figure 6: Yields on Key Government Securities



Source: Federal Reserve Bulletin. various issues.

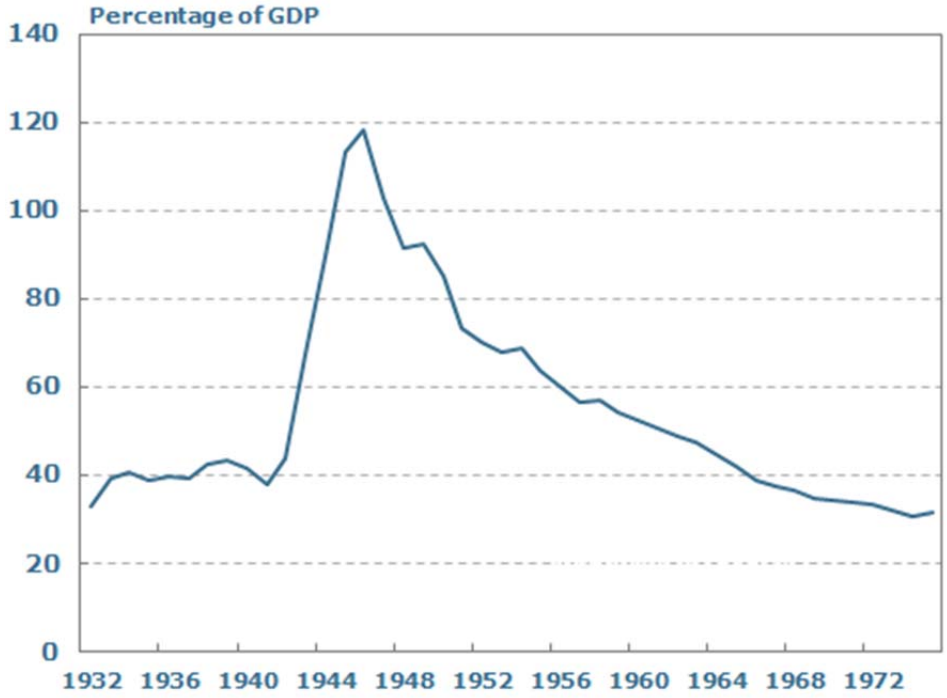
Note: In the early 1940s, the Bulletin switched from using the yield on 12-year Treasuries as representative of long-tern yields to using the yield on 15-year securities.

Figure 7: Inflation and Price Restraints.



Sources: Balke and Gordon 1986, appendix B; Rockoff (1984)

Figure 8: US Government Debt Relative to GDP



Source: Department of the Treasury. 1976. *Statistical Appendix to the Annual Report of the Secretary of the Treasury on the State of Finances for the Fiscal Year Ended June 30, 1975*. Haver Analytics

6. Endnotes

[1] According to Chaurushiya and Kuttner (2003, 4), "under the expectations hypothesis of the term structure, a long-lived peg of the bill rate at [0.375] percent would have implied levels of long-term interest rates considerably below the interest rate caps set by the Federal Reserve and Treasury."

[2] Data on gold are from Board of Governors (1943, 541, table #158).

[3] Data on excess reserves and bank credit are from Board of Governors (1943, 372, table #101)

[4] Discount window data are found in Board of Governors (1976b, 524, table #10.1).

[5] The dates associated with citations to the Board of Governors' Annual Reports are the publications dates and not the dates of the years that the reports cover. That date is the preceding year.

[6] The *Special Report to Congress* is found in (Annual Report, 1941, 68 – 70). See also Eccles (1951, 352 – 357).

[7] The Banking Act of 1935 limited reserve requirements to 14, 20, and 26 percent of demand deposits at country, reserve-city, and central-reserve-city banks, respectively, and to 6 percent on time deposits (Sproul 1951, 298).

[8] The Thomas amendment to the Agricultural Adjustment Act of 1933 authorized the Treasury to issue as much as $3 million in greenbacks under certain circumstances.

[9] The Treasury could sterilize a gold inflow either by not issuing gold certificates to the Fed or by issuing gold certificates but not drawing the funds out of its deposit at the Fed.

[10] Congress took no action on the System's request for a change in its authority over reserve requirements.

[11] The Federal Reserve had also intervened in the Treasury bond market in 1935 when interest rates rose unexpectedly and in 1937 when a hike in reserve requirements reduced demand for bonds (Chaurushiya and Kuttner 2003, 2).

[12] Based on data in Board of Governors (1976b, 527).

[13] The fiscal year ended on 30 June. These data are from Board of Governors (1976b, 864, table 13.1).

[14] Eccles (1951, 360, 420) estimated a money multiplier of roughly 6. The M2 multiplier averaged 6 between 1932 and 1938 and 4.7 between 1939 and 1945.

[15] As Whittlesey (1945, 67) notes, banks had held excess reserves for nearly a decade by 1940 and regarded a "substantial" amount of excess reserves as a normal and desirable practice.

[16] Although the Fed would maintain rates around their present levels, "this [did] not mean special support for issues which may be out of line…" (*FOMC Minutes* 8 May 1942,3)

[17] The Treasury associated the low long-term interest rates during the 1930s with commercial banks' willingness to hold large volumes of excess reserves, assuming that the causal relationship ran from the latter to the former (Murphy 1950, 28-29). In part, however, banks held excess reserves, expecting interest rates soon to rise to more "normal" levels (Murphy 1950, 15).

[18] Wicker (1969, 454) put the excess reserves target at $2.5 billion.

[19] According the Wicker (1969, 452 – 453), the Fed did not believe that the 0.375 percent cap would remain unchanged throughout the war.

[20] The excess-reserve data are from Board of Governors (1976b, 527, table 10.1).

[21] Treasury bills are issued on a discount basis with maturities within 12 months. During the war, most bills matured in three months. Certificates of indebtedness are obligations issued at par plus any accrued interest. Interest is paid at maturity. They mature within one year, typically in eleven or twelve months during the war. Notes are intermediate obligations, with maturities greater than one year but no more than five years, and bonds are longer-term obligations. Both note and bonds were sold at par plus any accrued interest. See Friedman and Schwartz (1963, 562, fn 10 & 12.).

[22] During the war, "[d]ealers in United States government securities tended to confine their operations to the broker function, coming to the Federal open market account for securities when they were in demand in the market and disposing of securities to the Federal open market account when they were in supply. Under these conditions, the account itself performed the function of continuous markets for most maturity sectors even including the very short end of the market" (Hearings 1954, 20).

[23] These quotes are from Undersecretary of the Treasury Bell's speech to the Investment Bankers Association of American on 19 October 1942 and are found in Murphy (1950, 117 – 118).

[24] The biggest offset to the decline in excess reserves with the banking system, of course, was the Fed's acquisition of US Treasury securities (Murphy 1950, 121).

[25] Dropping reserve requirements on government deposits created sharp fluctuation in required reserves around government war bond drives (Whittlesey 1945, 54 – 55; Annual Report 1944, 15).

[26] Federal debt data are from the *Statistical Appendix* (1976, table 19, 63).

[27] Unless otherwise indicated all data in this paragraph are from Board of Governors (1976, tables 13.1; 13.2; 13.4).

[28] Data in this paragraph on the Fed's portfolio of Treasury securities are from Board of Governors (1976, 485, table 9.5A).

[29] Balance-sheet data are from Board of Governors (1976, 486 – 471, table 9.1).

[30] Money and GDP are modern data found in Haver Analytics. They are from Board of Governors of the Federal Reserve System and the Department of Commerce, Bureau of Economic Analysis, respectively.

[31] This paragraph is based on the Annual Report (1946, 1 -15).

[32] Data on member-bank balance sheets are from Board of Governors (1976, Table 2.1 60 – 68).

[33] See also Eichengreen and Garber (1990).

[34] Real GDP are from *Haver Analytics, series: GDPH2@USECON*.

[35] On new Fed powers, see Thomas (1947). Thomas—a Federal Reserve economist—predicated his argument for new powers on the assumption that higher interest rates would interfere with Treasury financing and would not prevent an expansion of bank credit (Thomas 1947, 209-210).

[36] Between early 1946 and late 1949, strong gold inflows added to bank reserves. The Federal Reserve could not sterilize the increase through the sale of Treasury securities as long as it was attempting to support Treasury security prices. Gold data are from Board of Governors (1976, table 14.1, 899).

[37] In return for its new found flexibility, the Federal Reserve agreed to tax its currency notes in a way that effectively returned 90 percent of the System's profits to the U.S. Treasury (Freidman and Schwartz 1963, 578). This helped finance the debt by offsetting the Treasury's increased interest costs (Chaurushiya and Kuttner 2003, 7).

[38] Data from Board of Governors (1976, 485, table 9.5)

[39] Early in the year the Fed sold some long-term bonds from its portfolio to satisfy demands for bonds that resulted from seasonal declines in currency and deposits and in Treasury deposits (Annual Report 1950, 8). In June, the Fed announced that it would no longer sell bonds out of its portfolio. The yield on long and short-term securities fell somewhat (Annual Report 1950, 10-11).

[40] In June 1945, the Fed bought special short-term certificate directly from the Treasury. Congress had granted the Federal Reserve authority to buy up to $5 billion worth securities directly from the Treasury during the war and extended the authority after the war. This was the Fed's first post-war direct loan to the Treasury.

[41] Hetzel & Leach (2001) and Moe (2013) offer interesting blow-by-blow accounts of the events leading to the Treasury-Fed accord.

[42] Robert Rouse was the Manager of the System Open Market Account between 1940 and early 1962.

[43] At the time that the FOMC Report was undertaken, dealers in government securities markets were experiencing a negative carry on their portfolios (FOMC Report 1952, 164).

[44] In 1958, the Board believed the money multiplier equaled approximately seven (Reifler 1958, 1262).

[45] Sometimes the terms "free reserves" or "net free reserves" refer only to the amount by which excess reserves exceeds borrowed reserves, and the terms "borrowed" or "net borrowed reserves" refer to the amount by which borrowed reserves exceeds excess reserves. By this definition free reserves would measure the degree of monetary ease in the banking system, while borrowed reserves would measure the degree of monetary tightness.

[46] On theories of the term structure during this time see (Culbertson 1957).

[47] Martin's decision followed the recommendation of a special Ad Hoc Subcommittee of the FOMC that investigated the government securities market and its interaction with Federal Reserve monetary policy operations (FOMC Report 1952). Martin was the chairman of the Ad Hoc Subcommittee (Annual Report 1953, 48).

[48] Alfred Hays, who replaced Sproul in August 1956, also disagreed with bill preferable. He thought that most open-market operations should be conducted in bills, but some departures, at the Desk manager's discretion, should be permitted.

[49] On operation twist, see Bordo, Humpage, and Schwartz (2015) and Bordo and Humpage (2016)

[50] Garbade (2004) provides an excellent explanation of the Treasury's adoption of securities auctions.

[51] The counts are based on data found in Yohe and Gasper (1970) and Humpage and Mukherjee (2015)