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U.S. Monetary and Fiscal Policy in the 1930s
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ABSTRACT

The paper provides a survey of fiscal and monetary policies during the 1930s under the Hoover and Roosevelt Administrations and how they influenced the policies during the recent Great Recession. The discussion of the causal impacts of monetary policy focuses on papers written in the last decade and the findings of scholars using dynamic structural general equilibrium modeling. The discussion of fiscal policy shows why economists do not see the New Deal as a Keynesian stimulus, describes the significant shift toward excise taxation during the 1930s, and surveys estimates of the impact of federal spending on local economies. The paper concludes with discussion of the lessons for the present from 1930s monetary and fiscal policy.

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Economists and economic historians generally agree that the Federal Reserve made several decisions about monetary policy between 1929 and 1937 that worsened the Great Depression. The Federal Reserve allowed the money supply to fall and did too little, too late in trying to stave off the bank failures of the early 1930s. The Fed then reduced the money supply again by raising reserve requirements three times in 1936 and 1937 in an attempt to prevent inflation by soaking up excess reserves. As a broad brush explanation of the reasons for the Federal Reserve's choices, most scholars agree that the Federal Reserve's attempts to maintain the international Gold Standard between 1929 and 1933 explain a significant amount of why they followed their policy actions. Week-by-week accounts of the timing of bank failures and the Federal Reserve's policy moves, however, suggest a complex set of motives for the actions of the Fed and regional Reserve Banks that add a great deal more nuance to the story.

The largest debates about monetary policies during the 1930s arise over how effective they were in driving real GDP and unemployment. Nearly all agree that the Federal Reserve policy interacted with other negative shocks in ways that caused the Depression to deepen. The question remains how much? Estimates from a variety of models suggest that the impact of monetary policy explains a range of 20 to 70 percent of the decline in real output between 1929 and 1933. Some scholars argue that the recovery that started in mid-1933 was driven by Roosevelt administration's adoption of a new "reflationary" policy regime that simultaneously freed the U.S. from the "golden fetters" of the Gold Standard, shifted to a looser monetary policy, and ramped up government spending just after the inauguration in 1933. The shock of a new policy dogma reversed deflationary expectations that contributed to most of the recovery. Later efforts by the Federal Reserve to combat potential inflation through increases in reserve

requirements and cuts in federal spending signaled another policy regime change that contributed to the downturn of 1937-38.

How effective was fiscal policy? A nationwide Keynesian fiscal stimulus was never really attempted in the 1930s. During the Hoover Presidency Congress doubled federal spending and ramped up federal lending through the Reconstruction Finance Corporation. The Roosevelt Congresses then spent nearly double the Hoover levels. But both administrations collected enough taxes in a variety of new forms to maintain relatively small deficits throughout the period. Relative to a Keynesian deficit target designed to return to full employment, the deficits were miniscule. State governments also ran deficits in the early 1930s and then expanded taxation and ran surplus in the late 1930s. Even if fiscal deficits had been run, Christina Romer's (1992) estimates of fiscal and monetary policy multipliers from 1921 and 1938 imply a weak effect of fiscal policy. Studies of the impact of government spending at the state, county, and city level suggest that impact on real variables differed by program. Public works and relief spending contributed to increases in economic activity, while the farm programs were explicitly designed to reduce output. Preliminary estimates of the impact of net federal spending using annual data for 48 states between 1930 and 1940 suggest that a marginal increase of \$1 in net federal spending was associated with an increase of \$1 to \$1.50 in per capita personal income in the states.

The insistence upon raising tax rates during the 1930s also likely retarded growth. The Hawley-Smoot Tariff of 1930 touched off a series of protectionist responses from other countries that cut world import activity by two-thirds by 1933. Increases in income tax rates, particularly spikes in the top marginal rates to 58 and 67 percent, likely contributed to tax avoidance and inhibited economic activities at the top of the income distribution. A series of taxes on capital,

dividends, and undistributed profits led to relatively small amounts of revenue at the cost of chilling some forms of investment activity. New excise taxes on bank checks, autos, electricity, pipelines, gasoline, and communications likely slowed growth in the leading technological growth sectors in the economy. The new excise taxes along with renewed collections on alcoholic beverages after the end of Prohibition account for a significant part of the rise in tax revenues during the 1930s.

Modern policy makers have clearly sought to avoid making the macroeconomic policy mistakes of the 1930s. In contrast to the 1930s, the Federal Reserve, guided by Depression scholar Benjamin Bernanke, has flooded the banking system with liquidity since fall 2008. The Bush and Obama administrations fought the downturn with tax rebates in 2008 and 2009. The new Obama administration and the Democratic Congress pushed through a fiscal stimulus package that has driven the federal deficit near 10 percent of GDP, the largest peace-time deficit in American history.

On the microeconomic side, policy makers followed several strategies that mimic the activities of the Reconstruction Finance Corporation in the 1930s. Bernanke and Treasury Secretaries Henry Paulson and Timothy Geithner orchestrated mergers, bailouts, and ownership stakes in major financial institutions to stave off anticipated financial disaster if an institution that was too big to fail went under. As the RFC did with the railroads and other industries, the Bush and Obama administrations made substantial loans to GM and Chrysler.

The paper follows the path laid out in the introduction. I describe the monetary policies under the Hoover Administration, discuss why the policies were chosen, describe the shift in monetary policy under Roosevelt, and then discuss extraordinary banking policies that set

precedents for the bailouts, bank investments, and stress tests introduced in 2008 and 2009. I then address the modern versions of the debates over the causal impact of monetary policy with particular attention to dynamic structural general equilibrium modeling. Following an examination of the fiscal policies of Hoover and Keynes in the light of Keynesian economics, I discuss estimates of the impact of federal spending on local economies, describe the supply-side aspects of the rise in tax rates, and conclude with further discussion of the lessons for the present from 1930s monetary and fiscal policy.

Monetary Policy under the Hoover Administration

Nearly everybody agrees with Milton Friedman and Anna Schwartz (1963) that the Federal Reserve's monetary policy contributed to making the Great Contraction worse between 1929 and 1933. At the time the Fed had two effective tools for influencing the money supply, open market operations and the discount rate at which the Fed allowed member banks to borrow (or discount bills to the Fed) to meet reserve requirements. The open market operations involved the purchase or sale of existing bonds. Reductions in the discount rate and purchases of bonds could be used to reduce the probability of bank failures in a panic and both contributed to increases in the money supply. Thus, if the Fed had focused on combating bank failures and unemployment within the U.S. economy, the appropriate strategy was to lower the discount rate and purchase bonds.

Yet, the Federal Reserve also paid close attention to the international gold standard, which was essentially a promise that the Federal Reserve and U.S. banks would pay out an ounce of gold for every \$20.67 in Federal Reserve notes. To remain on the gold standard, the Federal Reserve was required to provide adequate U.S. gold reserves to make this promise credible. If

changes in the relative attractiveness of the dollar led the U.S. supply of gold to fall below the appropriate level, the Fed was expected to take actions to make the dollar more attractive. At the time the standard policies in response to gold outflows included raising the discount rate and selling (or at least reducing purchases) of existing bonds.

Figures 1 through 4 and Table 1 show the monthly movements over the period from January 1929 through February 1933 of series representing two of the major dilemmas for monetary policy-- the nominal volume of deposits in suspended banks (diamonds in the figures) and the change in the U.S. gold stock (circles in the figures). Each figure shows how specific measures of Federal Reserve activity were changing in response to these dilemmas, including changes in the Federal Reserve's holdings of U.S. Securities (squares in Figure 1), the level of the New York Fed's discount rate (squares in Figure 2), changes in the Fed's holdings of bills purchased (squares in Figure 3), and changes in the member bank borrowing at the Fed (squares in Figure 4). The bills purchased refer to short term credit instruments known as bankers' acceptances and trade acceptances that Federal Reserve banks could purchase in the open market. These are the types of "real bills" discussed in the real bill's doctrine described below. At the founding of the Federal Reserve, changes in bills purchased were expected to be a major aspect of policy, as they were in England at the time. In the 1920s, however, open market purchases and sales of U.S. securities became the main source of adjustment and policy operations (Meltzer 2003, 270).

The Federal Reserve's attempts to slow the speculative boom in stocks contributed to slowing the money supply between 1928 and 1929. Soon after the recession started in August 1929, the Dow Jones Stock Index peaked in early September. For most of October the Fed had been selling U.S. securities, but this policy changed swiftly when the Dow Jones Index dropped

24 percent on Monday October 28 and Black Tuesday October 29. The New York Fed responded immediately by purchasing \$115 million in U.S. securities. Two days later the Federal Reserve Board agreed that it was the proper move. The entire Fed system purchased \$157 million in U.S. securities the last week of October and then purchased on net another \$161 million in November and \$131 million in December in Figure 1 and Table 1. The New York Fed lowered its discount rate in Figure 2 and Table 1 from 6 to 5 percent on November 1 and then to 4.5 percent by November 15 after the Dow dropped to roughly two-thirds of its October 25th level by November 11 (Meltzer, 2003, 284-288).

The Fed's response to bank failures over the next three years varied from crisis to crisis. Over most of the year 1930 the Fed made policy adjustments in response to gold flows and seasonal demands for credit. The spike in suspended bank deposits (diamonds in the figures) in November and December 1930 in Figure 1 and Table 1 led the New York Fed to purchase \$100 million in U.S. securities and \$75 million in bankers' acceptances (bills purchased in Figure 3) between November 30 and December 17th. It then sold \$50 million in the middle of the month. The New York Fed then lowered its discount rate from 2.5 to 2 percent in Figure 2 and Table 1 and purchased more than \$100 million in bankers' acceptances and \$85 million in U.S. securities in the last week of December (Meltzer 2003, 325). The rest of the regional Federal Reserve banks were leaning the other way, however, as the Fed systems' stock of U.S. securities rose by only \$45 million in December in Figure 1 and Table 1 and the stock of acceptances rose by only \$73 million that month.

The Fed faced its ultimate dilemma between August and October of 1931 in Figures 1, 2, 3, and 4 and Table 1 when the volume of deposits suspended spiked again and a dramatic outflow of gold occurred after Britain left the gold standard in September of 1931. Until October

the Fed's primary focus was international. During the first part of the summer the Fed worried about a flight of gold out of Eastern Europe and Germany into the U.S. associated with possible coups and the rise of Hitler. In response, the Fed participated in loans to banks in Hungary, the German Reichsbank, and the Austrian National Bank. In late July, the Fed approved a purchase of \$125 million in prime commercial bills guaranteed by the Bank of England to aid a crumbling situation in Britain. After Britain left the gold standard on September 20 and gold started flowing out of the country, the Fed followed the standard responses. First it purchased U.S. securities, although the holdings of U.S. securities in Figure 1 and Table 1 changed very little relative to the changes in gold stocks or in bank suspensions during this period. The New York Fed then raised its discount rate in Figure 2 and Table 1 from 1.5 percent to 2.5 percent on October 9 and then to 3.5 percent on October 16 (Meltzer 2003, 332-48).

The memo for the Open Market Policy Committee (OMPC) meeting on October 26 finally focused more attention on the bank failures than the gold outflows, but this did not lead to much of a change in OMPC policy. The OMPC chose not to make any major open market purchases of U.S. securities. Instead, the OMPC recommended that member banks should be encouraged to lend to banks in difficulty and then rediscount those loans to the Federal Reserve system banks. Most of the action was driven by the decisions of the member banks. Despite the higher discount rates in October, member banks sharply increased their borrowing at the Fed's discount window in Figure 4 and Table 1 and sold a large amount of bankers' acceptances to the Fed (Figure 3 and Table 1). Meltzer (2003, 348) argues that the Fed did more to prop up the Bank of England than it did for the American banking system.

The wave of bank failures over the summer led President Herbert Hoover to call for a new set of extraordinary measures outside the Federal Reserve. He met with bankers in October

1932 to establish the National Credit Corporation (NCC). The NCC was designed as a way for commercial banks to pool resources voluntarily to purchase marketable assets of insolvent banks and to provide alternative borrowing facilities for the banks based on assets that the Fed could not accept as collateral.

At the November 30 OMPC meeting, the committee members expressed satisfaction at their handling of the gold outflow. Essentially, they felt that they had stemmed the tide of the gold flow and meanwhile had done the right thing for the bank failures by lending a great deal at high discount rates, as seen in Figures 2 and 4 and Table 1. They had not purchased securities to stave off the banking crisis, but seemed satisfied that that was the right course (Meltzer 2003, 348-9). They approved the capacity to purchase \$200 million in U.S. securities in open market operations but then sell them again in response to the seasonal demands for credit.

A new wave of bank suspensions hit in December 1931 and January 1932, but not much was done. The NCC made \$155 million in loans to 575 banks but December 1931 still had the third highest monthly volume of deposits suspended in the early 1930s. The Hoover administration started developing the plans for the Reconstruction Finance Corporation (RFC), which would become a government corporation with the authority to lend to banks and businesses and the Glass-Steagall Act of 1932, which expanded the range of assets on which the Fed could provide credits to member banks. Despite the authority to make \$200 million in U.S. security purchases, the Fed did not respond to the bank failures with purchases of U.S. securities. Instead, they sought to time purchases to the passage of the Reconstruction Finance Corporation and the Glass-Steagall Act of 1932 (Meltzer, 2003, 357-361).

Finally, between February and June 1932 the Federal Reserve purchased slightly more than \$1 billion in U.S. government securities. Meanwhile the RFC seemed to be much more active in trying to prevent prevent bank failures by making \$784 million in loans to more than 4,000 banks between February and November of 1932.¹ Friedman and Schwartz (1963) argue that had the \$1 billion in open market purchases of U.S. securities been completed during the first wave of bank failures in late 1930, the move would have been effective at stemming the crisis in 1930 and stalling the drop in the money supply that followed. The economy would have been in a much better position when the next crises hit, or some of the later crises would have been prevented or softened significantly. In their view, the \$1 billion purchase in 1932 was “too little, too late.”

After the major open market purchases ended in the summer of 1932 Fed policy was relatively passive. When a new wave of bank failures hit in December 1932 and the first two months of 1933, the Fed did little. Meanwhile, President Hoover and President-Elect Roosevelt could not come to an agreement on how to deal with the latest wave of suspensions of over 500 small banks between December and February. Hoover pressed Roosevelt to join him in developing a policy to counteract the bank failures but demanded that Roosevelt promise to stay on the Gold Standard and run a balanced budget. Roosevelt did not want to make such commitments or accept responsibility for a joint policy until he had actual authority. Meanwhile, state governments took action to prevent the failures, as 35 states declared bank holidays and the remaining states put strong restrictions on withdrawals (Meltzer 2003, p. 379-380).

Why was the Federal Reserve so recalcitrant?

¹ See Mason and Mitchener (2010) and Mason (2001) for discussions of the effectiveness of the NCC and RFC in preventing bank failures.

A significant amount of the Fed's actions can be understood by examining its international role in defending the gold standard (Eichengreen 1992, Temin and Wigmore 1990, Temin 1989). Until 1933 the Fed maintained a commitment to the international gold standard, a commitment that tied its hands to some degree. Even though the money supply and the economy was continuing to decline, outflows of gold when Britain left the gold standard in 1931 and during the banking crisis in March of 1933 led the Fed to raise the discount rate. Once the U.S. left the gold standard in 1933, it was freer to focus on domestic policy and the money supply.

Friedman and Schwartz argued that the Federal Reserve lacked the right type of strong leadership. Benjamin Strong, a powerful advocate for use of open market purchases of U.S. securities during recessions in the 1920s as the head of the New York Federal Reserve Bank, had died in 1928. Even though his replacement George Harrison and several others argued for expansive bond purchases at various times in the early 1930s, they were overridden by the rest of the Fed policy makers, who tended to hold the view that Fed interference would either prolong the problems or have little agreement. .

Not all agree that the Fed had changed directions with the death of Benjamin Strong. When Alan Meltzer (2003, 284-411) wrote his majestic history of the Federal Reserve System, he had access to many internal documents that had not been available to Friedman and Schwartz. He draws more nuanced conclusions about the internal policy debates within the Fed, as well as the attitudes of Strong's replacement as head of the New York Fed, George Harrison. Between 1929 and 1933 the most common view held by the Fed policy makers was a combination of the

“real bills doctrine” and the Riefler-Burgess framework.² Under the real bills doctrine increases in credit should be provided by the Federal Reserve by purchasing commercial bills of exchange or bankers’ acceptances because they arise from the financing of trade or production. The idea was that credit and output would expand together and thus not be inflationary. Credit expansion based on Fed purchases of government securities was considered to be speculative credit because no new production resulted. Real bills analysts wanted the member banks to initiate the demands for credit and to avoid having the Fed provide “redundant” or “speculative” credit (Meltzer 263, 411)”

The Riefler-Burgess framework “explained that banks were reluctant to borrow, borrowed only if reserves were deficient, and repaid promptly. To repay borrowing, banks called loans, raised lending rates, and sold government securities....A rise in the discount rate lowered the level of member bank borrowing, reduced credit and money, and raised market interest rates (Meltzer 2003, 161).” Meanwhile, open market purchases of U.S. securities supplied reserves and encouraged banks to repay borrowing, offer more loans, and reduce interest rates; open market sales drove banks to borrow, restrict lending, and raise interest rates. The doctrine suggested that the key variables to look at were member bank borrowing and interest rates. If both were low, policy was easy. If the two were high, policy was tight. The cut point was \$500 million for borrowing (Meltzer 2003, 734-5). Meltzer found that the Fed leaders spent very little time looking at the sharp decline in the money supply, although in late 1931 and 1932 they began to note signs of currency hoarding and the holding of excess reserves by banks.

² Winfield Riefler was an economist at the Federal Reserve Board and W. Randolph Burgess was at the New York bank.

There were disagreements among the members of the Board of Governors and the OMPC. At various times one or more members advocated expansionary open market purchases of U.S. securities. Yet, in most situations there were always real bills and Riefler- Burgess advocates who saw low member bank borrowing and low interest rates and felt that monetary policy was sufficiently easy. Several of the decisions makers argued that prior attempts to promote recovery with open market purchases of U.S. securities had had little effect in the 1930s and had promoted speculation in the 1920s. Even during the \$1 billion open market purchase of U.S. securities in 1932 some members of the OMPC were not fully on board. Most of the regional banks allowed the New York Fed to make most of the purchases. The members of the OMPC went ahead with the purchases in part because banks were already borrowing a great deal, so that Fed officials saw the purchases as a means of allowing the member banks to replace borrowing without promoting inflation. Further, Fed officials were worried that if they did not act, Congress might pass much more inflationary acts in the form of the World War I Veterans' Bonus and a new bill to expand the printing of greenbacks (Meltzer 2003, 358-361).

One reason so many officials thought the policy was easy is that they did not adjust nominal interest rates for the high rate of deflation. Meltzer (2003, 411) finds no mention of officials adjusting the nominal rate for deflation and discussing the implications of a high real rate of interest. The Fed cut the nominal discount rate shown in Figures 2 and 5 and Table 1 in eleven steps from 6 percent in October 1929 to 1.5 percent in 1931. But in that same time span, the Consumer Price Index inflation rate in Figure 5 was near zero in 1929, and then became a deflation rate of -2.4 percent in 1930 and -9 percent in 1931. This meant that the ex-post real discount rate, the discount rate minus the inflation rate, rose slightly from 4.5 to 4.77 percent in 1930 and then jumped to 10.5 percent in 1931. The Fed raised the discount rate back to 3.5

percent in late 1931 to stem the outward flow of gold when Britain abandoned the gold standard. Then the Fed allowed it fall to 2.5 percent for most of 1932. Yet, the 10 percent deflation rate that year caused the real ex-post discount rate to rise to 12.5 percent. Even though low nominal interest rates led Fed officials to believe the monetary policy was easy, the effects of deflation drove the real interest rates to levels that were than two times as high as any real interest rate experienced in the U.S after 1933.

Karl Brunner and Meltzer (1968) and Elmus Wicker (1966) argue that the Fed's policy objectives were similar in the 1920s and the early 1930s. David Wheelock (1992) builds on their work by combining narrative discussions with time series regressions to estimate the relationship between Federal Reserve policy tools and various economic targets. He then uses the regressions to identify the Fed's policy regimes and shows that the Fed responded to changes to the domestic and international changes of the 1930s with largely the same proportionate responses as they had in the 1920s.

Wheelock argues that the Fed policy makers did not realize that the same proportionate responses were not enough to offset the drastic downturn that was taking place. For example, the Federal Reserve and state bank regulators allowed an average of 630 banks per year to suspend operations between 1920 and 1929 because they believed them to be weaker banks that normally would not survive in a market economy. Analyses of individual bank failures in the 1920s and 1930s by Charles Calomiris and Joseph Mason (2003) and Kris Mitchener (2005) suggest that most of the failures in the early 1930s also fit this pattern as well. As a result, many of the regional Federal Reserve banks felt comfortable in following the same lender of last resort policies they had followed in the 1920s. The difference between the early 1930s and the 1920s was the sheer scale of the failures and the economy-wide problems. The number of banks fell

from 25 thousand to 17.8 thousand between 1930 and 1933. The shares of deposits in suspended banks rose to 2 percent in 1930, 4.5 percent in 1931, 2.4 percent in 1932, and 11 percent in 1933. It was likely that the banks failing in the early 1930s, having already survived through the 1920s, were generally stronger, but they were hit by far worse circumstances in the 1930s as output dropped sharply in every state. Thus, the Federal Reserve policy rules were not enough to prevent failure due to the extraordinary circumstances of the 1930s.³

Monetary Policy During the Roosevelt Administration

After taking office on March 4, 1933, Roosevelt made sweeping changes. Within two months he had taken the U.S. off of the Gold Standard. The removal of the “Golden Fetters” and the devaluation of the dollar to \$35 dollars per ounce of gold combined with political events in Europe to cause a flow of gold into America. The economy began to recover. This same pattern was repeated throughout the world. In country after country as central banks sought to maintain the gold standard, their domestic economies continued to sink. As each left the gold standard, their economies rebounded (Temin and Wigmore 1990; Eichengreen 1992).

The New York Fed cut the discount rate from 3.5 to 3 percent in early April. Eugene Black, the Governor of the Atlanta Federal Reserve bank became the Chair of Federal Reserve Board in May 1933. The Atlanta Fed was known for providing more liquidity during bank runs than most of the other regional Feds between 1930 and 1932 (Richardson and Troost, 2009).

Under the new leadership the Fed cut the discount rate again in May 1933 from 3 to 2.5 percent. The rate in Figure 5 fell to 2 percent by the end of the year, to 1.5 percent in 1934, and then to 1

³In some cases increased state enforcement and monitoring activity actually made the situation worse for some banks. Richardson and Van Horn (2009) find that a change in monitoring activity by New York state banking officials may well have contributed to the failure of a number of banks in New York in the summer of 1932.

percent in 1937, where it stayed for the rest of the decade. The rates stayed low in real terms as well. The highest ex-post real rates occurred at around 2 and 3 percent in the deflationary years of 1938 and 1939. In 1934 an inflation rate above 7 percent led to a real discount rate of negative 6 percent, while a 4-percent inflation in 1937 led to a negative 2.5 percent rate. In terms of open market operations, the Federal Reserve's holdings of securities were roughly steady around \$2.5 billion dollars between 1934 and 1939 (Wheelock 2006, 3-624 to 3-629).

The Federal Reserve was given direct administrative control over the reserve requirements of member banks when it was reorganized under the Banking Act of 1935. Under the fractional reserve system member banks were required to hold a share of deposits in reserve at the Federal Reserve. By 1935 the economy had been moving through two years of recovery. Real GDP growth was very rapid, in large part because the economy was starting from a base that was 36 percent below the level in 1929. The number unemployed had dropped significantly, although they still composed over 15 percent of the labor force. Noting that banks were holding large reserves above and beyond the required reserve requirements, the Fed began worrying about the possibility of inflation. If the banks started lending out their excess reserves, the Fed worried that the rise in the money supply would lead to rapid inflation that would halt the recovery. The Federal Reserve doubled the long standing reserve requirements in three steps on August 16, 1936, March 1, 1937 and May 1, 1937. The Fed had not recognized that the banks were holding so many excess reserves to protect themselves against bank runs. The experience of the past decade had given the banks little confidence that the Fed would act as a lender of last resort. Therefore, the banks increased their reserves to make sure that they retained some excess

reserves as a cushion. These changes were followed by a spike in unemployment to 19 percent, and a decline in real GDP growth in 1937-38.⁴

Extraordinary Banking Policies in the 1930s

Banking policy in the 1930s was not confined to the actions of the Federal Reserve. Precedents were set for Treasury Secretary Paulson to establish government ownership stakes in banks 2008 and for Secretary Geithner to seek extra certifications of the quality of bank assets before allowing banks to buy back the government's ownership positions.

In February 1932 the Hoover administration established the Reconstruction Finance Corporation (RFC). Its first moves included making loans to 4,000 banks, railroads, credit unions and mortgage loan companies to provide assets that would jumpstart commercial lending. Among the most important programs was the provision of loans to troubled banks to seek to provide them with enough liquidity to survive bank runs. Recent studies suggest that these initial loans were not successful because the RFC loans were given first priority over depositors and other lenders in situations where the bank failed. As a result, banks had to hold the assets that they could sell most easily to insure repayment of the RFC loans. These assets could not then be used to repay depositors when the bank failed. When the RFC began to accept more risk by purchasing preferred stock in the troubled banks, it was more successful at staving off bank failures (Mason 2001; Mitchener and Mason 2010).

⁴This description is based on Friedman and Schwartz (1963) and Meltzer (2003). For a view that puts less emphasis on the Fed's role, see Romer (1992).

During a series of bank runs between October 1932 and March 1933 30 states declared bank holidays and the remaining states put restrictions on deposits. Under the national Bank Holiday all banks and thrift institutions were temporarily closed. Government auditors were then sent in to evaluate the banks and allow them to reopen if they were sound. Conservators were appointed to improve the positions of the insolvent banks and the Reconstruction Finance Corporation was given the power to subscribe to stock issues from the reorganized banks. These seals of approval conferred on the reopened banks helped change expectations about the solvency of the bank system.⁵

The Causal Impact of Monetary Policy

While the vast majority of economists agree that the Federal Reserve policies were flawed, there has been substantial debate about how much causal impact the monetary policies had on real GDP and unemployment. In *A Monetary History of the United States, 1867-1960* Milton Friedman and Anna Schwartz saw the Great Depression as one of many episodes in which changes in the money supply strongly influenced the path of inflation and growth in real output, typically measured by real Gross National Product (GNP). The basic equation showing the multiplicative relationship between the money supply (M), velocity (V), the price level (P), and Real output (Q) is

$$MV = PQ \quad 1),$$

The growth rate version of the equation with growth rates in lower case letters is

$$m + v = p + q \quad 2)$$

⁵See Mitchener and Mason (2010) for more detail on these extraordinary policies.

These equations always hold in hindsight because velocity (V), the number of times the money supply turns over in the purchase of final goods and services, is calculated as the ratio of the money supply (M) to Nominal GNP (PQ).

In Friedman and Schwartz's monetarist model the equation has analytical force because they argue that velocity moves in predictable ways. Thus changes in the money supply will lead to changes in price (P) and real output (Q) in the same direction and the only question is how much of the change in the money supply is allocated to changes in price and real output. Figure 6 shows the strong relationship between indexes (1929=100) of the most liquid form of money ($M1$) and real output from 1929 through 1940 in level form. The price level has a weaker relationship with the money supply during the period. Monthly indexes (1923-1925=100) of the money supply and industrial production of consumer goods in Figure 7 also show the same strong relationships over time. The annual growth rate version of the variables in Figure 8 shows an even stronger visual relationship between the growth rate of the money supply and the growth in real GNP. The fit between $M1$ growth and the inflation rate is not so good for 1930, 1935 and 1936.

The strong correlations are consistent with the monetarist view, but correlation does not guarantee causation. The debates in the macroeconomic literature center on the "causal" impact of the monetary policy on real output. How much of the drop in real output into 1933 was caused by the failure to loosen monetary policy? How much of the rise in output from 1933 through 1937 is attributable to the reflationary monetary policy and how much of the drop in output from 1937 to 1938 was determined by the Fed's increases in reserve requirements?

Friedman and Schwartz argued that most of the changes in the measures of the money supply were caused by changes in monetary policy. On the other hand, macroeconomists of all stripes are aware that changes in real GDP also can cause changes in money supply measures. Increases in income lead people to hold more money for transactions and as assets, and vice versa. Even though the velocity measure in the monetarist equation is seen as a money demand parameter, the money supply, prices, output, and velocity all can be seen as endogenous to the system, so that it is very difficult to sort out causality with ordinary least squares regressions. Keynesians, in particular, argued that the strong correlations between the money measures and real GDP were as likely to have been driven by a causal relationship that moved from a drop in output to a lower amount of money used in the economy. When Peter Temin (1976) asked “Did Monetary Forces Cause the Great Depression,” he argued strongly for unexplained drops in consumption as a primary cause of the Depression. There are plenty of other culprits that have been identified.

In the 1970s and 1980s numerous scholars debated the impact of the money supply using IS-LM frameworks to predict the impact of monetary policy on interest rates, prices, and output and then provided empirical tests with the extant data. Since my charge in this paper is to examine the scholarship of the past two decades, I cannot cover these debates adequately. Jeremy Atack and Peter Passell (1994) and Gene Smiley (2002) provide readable surveys of the debates. Other excellent resources on past and current debates include Randal Parker’s (2002, 2007) interviews with the leading scholars of the Great Depression.

Rational expectations economists argued that if enough people recognized that the changes in the demand they witnessed were due to changes in the amount of money available, they would respond by changing price but not real output. Thus, people had to mis-estimate

changes in monetary policy for changes in monetary policy to have a causal effect on real output and unemployment. This has led scholars to focus on expectations. For example, James Hamilton (1987) argues that the impact of contractionary monetary policy that started in 1928 operated through unanticipated deflation, and after 1930, through the disruption of the real services of intermediation on the part of the financial sector as a consequence of banking panics. In Hamilton's (1987, 145) view "it would have been difficult to design a more contractionary policy than that adopted in January 1928." As \$307.8 million dollars in gold flowed to France in 1928, the Federal Reserve raised the discount rate from 3.5 to 5 percent, sold \$393 million in securities between December 1927 and July 1928 and cut its holdings of bankers' acceptances in half by raising its buying rates from 3 to 4.5 percent. Despite Fed leaders' claims to the contrary, Hamilton is convinced the Fed was trying to slow the stock market boom. Meanwhile, the stock boom led to an increased demand for loans and banks found it profitable to replace unborrowed reserves with borrowed reserves. Hamilton cites evidence that many policy makers did not anticipate deflation, that regression models with data from 1900 to 1940 fail to predict deflation, and that the deflation in commodity prices caught speculators by surprise.

More recently, Real Business Cycle theorists have argued that a combination of large negative productivity shocks and ill-advised microeconomic policies designed to prop up wages and prices caused the downturn. Most recent tests of the impact of monetary policy in the Depression have been performed in the context of macroeconomic models based on microeconomic foundations. These Dynamic Stochastic General Equilibrium (DSGE) models start with a dynamic scenario where representative households with infinite lives choose consumption and asset levels to maximize the expected utility of their long run stream of consumption subject to their anticipated long run income stream. The firms that hire the household members

maximize their expected stream of profits. There is typically a capital accumulation law for the economy.

The models then incorporate factors that would create inefficiencies in the operation of a competitive economy. Many modern scholars build on Keynes's emphasis on "sticky wages" in the form of long term labor contract provisions or government policies designed to promote high wages. Depression-Era policies include Hoover's jawboning with manufacturers to get them to maintain higher nominal wages and the Roosevelt Administration's pressure to keep wages high while industry established their Codes of Competition on the National Industrial Recovery Act (Bordo, Erceg, and Evans 2000; Cole and Ohanian 2004; Chari, Kehoe, and McGratton 2002 and 2005; and Eggertsson 2009) Like Hamilton, Benjamin Bernanke (1983) argues for a causal role for inefficiencies in credit markets caused by an increase in the cost of credit intermediation. In particular, unanticipated deflation may have caused lenders to see many previously sound borrowers as un-creditworthy. In the modern period, scholars add inefficiencies derived from sticky prices and some forms of regulation.

The scholars pick or estimate a set of parameters in the model that best fit a series of stylized facts about features of the economy. The model is then used to perform simulations to show how well the time paths associated with different policy regimes fit the actual Depression era data on real output, prices, investment, interest rates, and other variables of interest.

As one leading example, Michael Bordo, Christopher Erceg, and Charles Evans (2000) (henceforth known as BEE) develop a model with sticky wages to incorporate the common claim that manufacturing wages did not fall as much as people anticipated they should have during the Great Depression (Ohanian 2009, Taylor 2009). The BEE analysis finds that contractionary

monetary shocks account for 50 to 70 percent of the decline in real GNP between 1929 and the first quarter of 1933. They find a much weaker effect of expansionary monetary policy after the move off of the Gold Standard in mid-1933. They argue that the expansionary monetary policy had much weaker effects because the National Industrial Recovery Act raised nominal wages in ways that limited production and hours worked.

V. V. Chari, Patrick Kehoe, and Ellen McGratton (2002, 2005) reexamine the issue in the context of their “wedges” model of the factors that lead to Depressions. They use simulations to develop measures of three wedges: a labor wedge, an efficiency wedge, and an investment wedge. Their labor wedge includes the combination of sticky wages and monetary policy shocks analyzed by BEE as well as the inefficiencies from NRA policies and failures to enforce antitrust described by Cole and Ohanian. They describe the efficiency wedge as a result of poor government policy interacting with shocks. Finally, the investment wedge is associated with gaps between consumer’s rates of substitution between current and future consumption and the marginal product of capital that might arise due to agency costs (Bernanke and Gertler 1989). This investment wedge might be associated with the types of extra costs of capital intermediation described by Bernanke (1983) for the Depression.

The wedge model analysis tells a mixed story about the effect of monetary policy. The simulations from the model do not show as strong an effect for monetary policy as the BEE (2000) model does. The labor wedge, which incorporates the combination of monetary policy shocks and sticky wages analyzed in the BEE model, accounts by itself for about half of the decline in real output from 1929 to 1933. Unlike the BEE model findings, the wedge model matches up well with the post 1933 period. The combination of efficiency and labor wedges together seem to fit the output data from 1929 to 1933 very closely. Meanwhile, the investment

wedge, which might be associated with Bernanke's emphasis on the costs of credit intermediation related to bank failures, has very little explanatory power in the 1930s. Cole and Ohanian (2005, 32) argue that the BEE (2000) model overstates the impact of monetary policy because it includes only the sticky wage-monetary policy shock channel and does not incorporate the other wedges included by Chari, Kehoe, and McGratton (2005, 2002). Meanwhile, Cole and Ohanian (2005) analyze the experience of 17 countries during the Depression using a real business cycle model. They find that about one-third of the international Depression is accounted for by monetary shocks and two-thirds by productivity shocks.

Lawrence Christiano, Robert Motto, and Massimo Rostagno (2003) build a DSGE model to account for the Depression using data from the 1920s and 1930s. They argue that economic actors shifted their preferences in favor of more liquidity, which led them to shift away from holding time deposits to holding cash. They develop a monetary rule that would have called for a temporary increase in the money growth in periods after a negative shock. The rule could not call for money growth in the same period as the negative shock because short term interest rates were near zero. The zero-bound made contemporaneous money supply growth an ineffective policy tool. Their simulations suggest that this post-shock monetary growth response rule would have prevented about 80 percent of the decline between 1929 and 1933 and improved the rate of the recovery. They also ran simulations of a monetary growth rule in which the growth rate was held constant over the period. The results suggest that following a consistent growth rate rule would have done little to lessen the Depression. Finally, they do not find support for Friedman and Schwartz's claim that the Fed could have staved off most of the Depression by preventing the drop in M1 in 1930 seen in Figure 6.

Gauti Eggertsson (2009, 2007) builds another DSGE model based on the insights of Peter Temin and Barry Wigmore (1990). The scholars argue for a strong role for deflationary shocks as a major cause of the Great Depression. To turn the economy around, the Roosevelt administration and the Federal Reserve had to change course sharply with a combination of new policies that would lead to inflation. This shock to the public's expectations could cause the economy to recover.

To promote recovery and have a causal effect, it was not enough to announce new efforts by the Fed to raise the money supply. Interest rates on short term Treasury bills were near zero and could go no lower. Further, the Fed's past actions meant that there were no guarantees that it would not reverse the policy in the future. Only a complete reversal of the policy dogma of the day would work as shock therapy to convince the public that future policy would no longer be deflationary. Expectations about future policy were the key. The move off the Gold standard freed the Fed and the economy from the "Golden Fetters" that had prevented an inflationary policy. The willingness to ramp up government spending signaled that the money supply would have to be raised further to monetize the new federal debt to be issued. Eugene Meyer, the new leader of the Fed, was known for his prior actions in combating bank failures.

The timing of changes in output fits the story. Seasonally-adjusted industrial production in Figure 7 spiked in April, May, June, and July, although it then declined in the latter half of the year. Real GNP returned to its 1929 peak in 1937 in Figure 6. In Eggertsson's (2009) dynamic stochastic general equilibrium (DSGE) model, a continuation of the Hoover administration policies of small government, adherence to the Gold standard, and balanced budgets would have implied that real income would have dropped from 30 percent below the 1929 level in 1933 to 49 percent below in 1937. The simulation with the new policy regime leads to a rise in real output

that can account for as much as 80 percent of the difference between the extremely low counterfactual prediction in output in 1937 and the actual output in that year.

Given that short-term nominal interest rates remained very close to the zero bound between 1933 and 1938, Eggertsson and Benjamin Pugsley (2006) argue that they can use a similar DSGE model with low interest rates to explain why the U.S. fell back into recession in 1937-1938. They argue that the recession was the result of the public's perception that the Roosevelt administration was returning to a deflationary policy. Anybody paying attention might have thought so. The Fed raised reserve requirements in 1936 and 1937 and the federal government reduced government spending between in the fiscal years 1937 and 1938. Simulations from their model suggest that the sharp change to deflationary expectations driven by the new policies was a prime contributor to a GNP reduction of 9 percent and a deflation of 11 percent.

The most recent development in the study of the causal effects of monetary policy has been a focus on the impact of monetary policy on individual banks and the impact of bank failures on economic activity. Using state level information and an instrumental variable strategy to control for endogeneity, Thomas Garrett and David Wheelock (2006) find that changes in per capita income have a strong positive correlation with bank failures across states in the 1920s.

Meanwhile, Gary Richardson and William Troost (2009) have used quasi-experimental techniques to examine the effects of different policy regimes followed by the Atlanta and the St. Louis regional Federal Reserve Banks in the state of Mississippi. Atlanta, which oversaw southern Mississippi, followed Bagehot's rule for banking panics. This meant acting quickly as

a lender of last resort to provide liquidity to prevent solvent banks faced with deposit runs from failing and dragging healthy banks with them. St. Louis, which oversaw northern Mississippi, followed the “real bills” doctrine that the supply of credit should contract in recessions because less credit was required to sustain economic activity. During panics through July 1931 the St. Louis Fed tended to limit lending and demanded extra collateral for loans.

Richardson and Troost (2009) use a variety of methods to ensure that banks in both Fed districts in Mississippi were similar on all dimensions, so that only differences in the Fed policies would lead to differences in bank failure rates. They show that during the banking crisis of November 1930 bank failures rates were significantly higher under the St. Louis Fed’s tighter policy regime in northern Mississippi than under the Atlanta Fed’s looser regime in southern Mississippi. When the St. Louis Fed shifted to follow policies more consistent with the Atlanta Feds in mid-1931, the difference in failure rates went away. They then show a causal link to real measures of output by showing that declines in wholesale trade in Mississippi tend to follow closely behind a set of bank failures.

Federal Fiscal Policy: Spending and Taxation at the National Level

Nearly all of the discussion of macroeconomic policy by macroeconomists focuses on monetary policy because the Hoover and Roosevelt Administrations ran relatively small deficits throughout the 1930s. Both administrations increased government spending. However, tax revenues also increased markedly during both administrations.

Most observers do not realize how much the Hoover administration increased government spending. One reason is that Hoover remained a staunch advocate for balanced budgets throughout his Presidency. Unlike Roosevelt, Hoover did not trumpet spending

increases through *new* work-relief programs and public works programs. Instead, he expanded existing programs by doubling federal highway spending and increasing the Army Corps of Engineers river and harbors and flood control spending by over 40 percent.⁶ Hoover dam, which was set in motion before the Depression hit, also contributed a great deal to enhanced public works spending. The Hoover administration and Congress ramped up nominal federal expenditures in Figure 9 by 52 percent from \$3.1 billion in fiscal year 1929 to \$4.7 billion in 1932 and \$4.6 billion in fiscal year 1933. After adjusting for the deflation in the early 1930s in Figure 10, real government spending in the Hoover era peaked at over 88 percent above the 1929 level in 1932 and 1933. In these figures 1933 is considered a Hoover year because the spending and taxes are reported for a fiscal year that ran from July to June and Roosevelt's spending did not ramp up until July 1933.

As the Hoover administration raised spending, tax revenues fell, and the federal budget fell into its first deficits since World War I. The Hoover administration ran deficits because nominal and real tax revenues fell after 1930, largely because the economy was falling apart and despite Hoover's desire to maintain a balanced budget. Congress and the Hoover Administration tried to reverse the drop in tax revenues, partly by a "soak the rich" tax increase under the Revenue Act of June 6, 1932. Less than 10 percent of households earned enough to pay income taxes throughout the 1930s because individuals with less than \$2000 in income and families of

⁶Nominal road spending under the Agriculture Department rose from \$95 million in 1929 to \$207.2 million in 1932, while spending on rivers and harbors rose from \$83 million in 1929 to \$121 million in 1931 to \$118 million in 1933 (U.S. Bureau of the Census Statistical Abstract of the United States for the years 1931 (pp. 180-182), 1933 (pp. 165-7), 1934 (pp. 165-7); U.S. Department of Treasury 1931, pp. 435-42). In many cases the new Roosevelt agencies built roads and performed work on rivers, harbors, and flood control that could have just as easily been assigned to the highway departments and the Army Corps of Engineers.

four with less than \$5,000 were exempt. Those who were required to pay saw their tax rates jump sharply. For example, individuals earning between \$2,000 and \$3,000 saw their rates rise from 0.1 percent to 2 percent. The rate rose from 0.9 to 6 percent for incomes from \$10 to \$15 thousand, and the top rate rose from 23.1 to 57 percent for those earning over a million. Families of four did not pay taxes until their incomes reached \$5,000. Those above \$5,000 saw their rates rise across income categories in a similar fashion. The tax on corporations rose from 12 to 13.75 percent (U.S. Bureau of the Census, 1975, pp. 1111; Revenue Act of 1932).

The rise in income tax rates did little to stem the drop in tax revenues because receipts from household and corporate income taxes and estate taxes fell 37 percent from \$1.1 billion to 780 million between 1932 and 1933. The only reason total tax collections in Figure 9 stayed roughly the same in 1932 and 1933 was an extra \$311 million in revenue delivered by the 1932 Revenue Act's new excise taxes on oil pipeline transfers, electricity, bank checks, communications, and manufacturers—particularly, autos, tires, oil, and gasoline (U.S. Bureau of the Census 1975, 1107 and 1111; Commissioner of Internal Revenue, 1933, 14-15).

After the Roosevelt's landslide win, the Roosevelt administration and the new Democratic Congress proceeded to raise annual nominal government spending in Figure 9 by \$2 billion to roughly 6.5 billion in both fiscal 1934 and 1935, and then reached a temporary peak in 1936 at \$8.4 billion. After a reduction to \$6.8 billion over two years, the spending ramped up again to \$8.8 billion in 1939. Yet, only the deficits of 1934, 1936, and 1939 in Figures 9 and 10 are much larger than Hoover's 1932 and 1933 deficits.

Why? Tax receipts in Figure 9 rose steadily from 1933 through 1938 before tailing off slightly. Much of the rise reflects an increase in income tax and excise tax collections

associated with the recovery. Income tax rates largely remained at the new higher levels. The Roosevelt administration readjusted the household income tax rates slightly in the Revenue Act of 1934 by lowering the rates paid by individuals earning between \$2,000 and \$20,000 by a few tenths of a percent and raising them a few tenths for people between \$20,000 and \$1 million with similar adjustments for families. In the Revenue Act of 1936 the tax rate was raised from 31.4 to 33.4 on individuals and families earning more than \$100,000 and from 57.2 to 68 for individuals and families with more than \$1 million in income. In fiscal years 1934 and 1935, the administration temporarily collected 23 and 16 percent of its revenues from Agricultural Adjustment Act processing taxes used to pay farmers to take land out of production. By the time the AAA was declared unconstitutional in 1936, excise taxes on new alcohol sales after the end of Prohibition had risen to \$505 million, roughly 14 percent of tax revenues. (Commissioner of Internal Revenue 1934, 76-77; 1935, 82-83; 1936; U.S. Bureau of Census 1975, 1107).

The Hoover and Roosevelt administrations ran deficits in most years, but economists do not consider them to be Keynesian stimulus attempts because the deficits were small relative to the economic declines during the 1930s. At the time John Maynard Keynes was introducing his theories that the economy could be brought out of a low employment equilibrium by increasing government spending and lowering taxes and thus increasing government budget deficits. Even though Roosevelt had ramped up spending, Keynes chastised him for not doing enough to stimulate the economy. In an open letter carried in several newspapers in December 1933 Keynes announced that more spending was not enough. Roosevelt needed to reduce taxes and run large federal budget deficits.⁷ Writing in 1941, Alva Hansen, a major figure in aiding the

⁷In the *Los Angeles Times* on December 31, 1933 Keynes wrote. Thus, as the prime mover in the first stage of the technique of recovery, I lay overwhelming emphasis on the increase of national purchasing power resulting from governmental expenditure which is

diffusion of Keynesian thought in the economics profession stated. “Despite the fairly good showing made in the recovery up to 1937, the fact is that neither before nor since has the administration pursued a really positive expansionist program...For the most part the federal government engaged in a salvaging program and not in a program of positive expansion (quoted in Brown 1956, p. 866).”

E. Cary Brown (1956) and Larry Peppers (1973) carefully examined whether the deficits were large enough to help the economy reach a target of full employment in a Keynesian model, and concluded that they fell well short. The magnitudes of the federal government spending and the federal deficits compared with the size of the income drop shown in Figure 10 show why. The income drop is measured as the difference between real GNP (in \$1958) in each year and the 1929 full-employment peak of \$203.6 billion. The 1933 Real GNP was \$62.1 billion below its 1929 level in 1958 dollars, while the real budget deficit was only \$2 billion. In 1934 a \$5 billion dollar deficit was matched with a GNP shortfall of \$49.3 billion; in 1935 the \$4.5 billion dollar deficit was offsetting a \$34.1 billion shortfall. The figures look strongest in 1936 when a 7.5 billion deficit was matched with a \$10.6 billion GNP shortfall. Keynesians argue that budget deficits have multiplier effects. For these deficits to be meaningful at returning to full employment, the multiplier effects would have had to have been much larger than the multiplier estimates of two proposed by the most ardent Keynesians.⁸

financed by loans and is not merely a transfer through taxation from existing incomes. Nothing else counts in comparison with this.” Barber (1996, pp. 52, 83-4) discusses the relationship between Keynes and Roosevelt and the economic thinking of Roosevelt’s Brains Trusters. Among Roosevelt’s advisers, there were several who also argued for using government programs as a stimulus but they followed a different logical path for their arguments.

⁸ The extent to which fiscal policy is stimulative involves more complex calculations than the ones described here. E. Cary Brown (1956) and Larry Peppers (1973) find that the New Deal

There still remains a question as to whether large federal deficits would have done much to increase real output and reduce unemployment. Christina Romer (1992) estimated fiscal and monetary multipliers for the period using a simple equation where

$$\text{Output Change}_t = \beta_M (\text{Monetary Change})_{t-1} + \beta_F (\text{Fiscal Change})_{t-1} \quad 3)$$

She argues for a year lag in the impact of policy and then picks two years where she could plausibly argue that monetary and fiscal policies were not designed to offset declines in the real economy. Romer picks output years 1921 and 1938 and thus policy years 1920 and 1937. In both cases she argues that Federal Reserve policy was independent and not focused on the economy. There was much less federal spending in 1937 than in 1936 because of the one-time payout of the veterans' bonus in 1936 over Roosevelt's veto. After plugging values in for these two years she finds a monetary multiplier of 0.823 that is much larger in magnitude than the fiscal multiplier of -0.233. The fiscal multiplier is negative because a stimulatory policy would be a situation where the spending minus taxes is negative, hence a deficit. Based on these calculations, the fiscal deficit would not have done much.

deficits were even less stimulative than the raw numbers shown here suggest. In fact, Peppers argues that Hoover was following more stimulative fiscal policies than Roosevelt. Any impact that the federal government deficits had in promoting recovery had to compete with the contractionary changes in state and local government budgets after 1933. Prior to 1933, state and local governments generally held nearly full responsibility for relief of the indigent and the unemployed. By 1933 state and local governments were overwhelmed by these and other responsibilities in the midst of a sharp decline in their revenues. A number were forced to run short-term deficits in the early 1930s. Yet state constitutions generally require balanced year-to-year budgets. To repay the budget shortfalls and also the debt issued during the early 1930s, state and local governments began raising taxes and establishing new taxes after 1933. The problem was further exacerbated when the federal government dumped responsibility for direct relief to "unemployables" back onto the state and local governments in 1935 after two years of extensive spending. Thus, in the latter half of the 1930s, state and local governments were often running small surpluses.

Eggertsson (2009, 2008) sees Roosevelt's shift to a fiscal deficit in 1933 as having large effects because it is part and parcel of the overall program to reflate the economy by going off of the gold standard and using more expansionary monetary policy. In his view the deficit serves as a commitment device that aids in convincing the public that the government will continue to run expansionary monetary policy to monetize the debt created. Thus, the deficit is a contributor to a change in expectations about future policy that will have large real effects. It is important to note, however, that Eggertsson's deficit arguments have to rely on the federal spending and deficit changes being part of a larger package with changes in Federal Reserve monetary policy. If spending more and running larger deficits were enough to reverse deflationary expectations by themselves, Hoover's doubling of spending and the presence of federal deficits in 1932 and 1933 should have helped boost the economy before Roosevelt was inaugurated.

Federal Spending and Its Impact on State and Local Economies

In the past few years there has been an explosion of work about New Deal spending policies that address the impact of the New Deal spending programs at the state, local, and county level. The results of these studies are reported in Table 1. One key insight to the papers is the importance of thinking about the purpose of the federal grants distributed and the terms on which they were distributed. For example, Fishback, Horrace, and Kantor (2005, 2006) find that public works and relief grants contributed to increases in economic activity and to net in-migration into areas while AAA farm payments had slightly negative effects. The public works and relief grants had positive effects because they simultaneously provided employment, extra income, and public goods that raised productivity in the areas. The AAA payments automatically had a crowding-out feature to them because they were designed to take agricultural land out of production in an attempt to lower output and raise farm prices nationally. The

farmers who received the payments may have benefited, but this likely came at the expense of farm workers and croppers who lost employment or saw their wages decline due to the drop in demand for labor.

A series of papers offer conflicting pictures of the impact of relief programs on private employment in the 1930s. Studies of cross-sectional data using Instrumental Variable estimation by Robert Fleck (1999) for county data in 1937 and 1940 and by John Wallis and Daniel Benjamin (1981) using city data in 1934/1935 suggest that areas with higher relief employment did not experience a reduction in private employment. On the other hand, studies using panel data sets, which allow the research to take advantage of variation across time within locations while controlling for nationwide shocks in different years, find some degree of crowding out that varies across time. In the early years of the decade when unemployment was at its peak above 20 percent, Kent Matthews and Daniel Benjamin (1992) find that the addition of one work relief job reduced private employment by about one-third of a job, while Todd Neumann, Price Fishback, and Shawn Kantor (2010) find a slight positive effect of relief spending on private employment. After 1935, when unemployment rates fell below 20 percent, both studies find that an additional work relief job was associated with a reduction of up to nine-tenths of a private job.

Fishback and Valentina Kachanovskaya (2010) recently have estimated a New Deal fiscal multiplier at the state level. They examine the impact of net federal spending per capita (federal spending minus taxes) on state personal income per capita in an annual panel of states for the years 1930 through 1940. In estimates that control for the endogeneity of the distribution of funds using state and year fixed effects and state-specific time trends, the results show a slight negative relationship between net federal spending and per capita income. They then add to the analysis an instrument for net federal spending that uses a combination of trends in spending

outside the region and measures of swing voting. The multiplier estimates using the IV procedure with state and year effects range from 0.91 to 1.72, depending on how federal spending is defined. The multiplier for federal grants was 1.45, but only .91 when federal spending includes both grants and loans. When effects are estimated separately for AAA farm grants and nonAAA farm grants the multiplier for the farm grants is -0.57 and the multiplier for the nonAAA grants is 1.72.

Tax Rates and the Supply-side

The supply-side features of fiscal policy changes involving tax rates in the 1930s have not been investigated in great depth. Nearly all of the changes called for increased tax rates, which likely retarded the growth of the economy. The Hoover administration has been rightfully tarred for its attempts to raise tax rates. Although less than 10 percent of households paid income taxes, the rise in income tax rates for households with more than \$1 million in earnings in 1932 was confiscatory and likely led to extensive tax avoidance. Given that the economy was falling further in 1932 and 1933, it is hard to sort out how much of the drops in income tax and estate tax collections were caused by the economy declining and how much were due to tax avoidance. Some of the decline in the economy might well have been driven by the high rates (Piketty and Saez, 2003). The Roosevelt administration did little to reduce the tax rates in 1934 and then jacked the top rate still higher in 1936.

Other new federal taxes created additional distortions. The new excise taxes on manufacturers established in the 1932 act contributed to inefficiencies in the economy. William Lastrappe and George Selgin (1997), for example, find that the two-cent tax on checks from 1932 to 1934 led households to shift significantly toward holding money in the form of currency

rather than in the form of checking accounts in banks. The National Industrial Recovery Act of 1933 instituted a tax on capital stock, dividends, and excess profits that was collected through the rest of the 1930s. These taxes typically led to the collection of roughly \$100 million to \$150 million in revenue, about 2 to 3 percent of total federal receipts (Commissioner of Internal Revenue, 1934, 1935, 1936, 1937, Table 1). In 1936 the federal government added a surtax on profits not distributed as dividends. It rose progressively as a function of the percentage of earnings retained out of corporate income, from 7 percent on the first 10 percent retained up to 27 percent on retentions above 60 percent of income. The surtax was reduced in 1938 and expired in December 1939. The undistributed profits tax delivered \$145 million in tax revenue in 1936 and \$176 million in 1937 (Calomiris and Hubbard 1993).

Although the amounts of revenue collected were relatively small, all of these taxes likely led to distortions in investment spending. Calomiris and Hubbard (1993) studied the investment and cash flow decisions of 273 publicly-traded manufacturing firms. As might be expected the share of income retained as earnings by companies fell from 23 percent in 1935 to 15 percent in 1936 and 1937. However, nearly one-fourth of the companies held enough earnings to pay the highest marginal rate of 27 percent. These companies tended to be smaller firms in the fastest growing industries who faced more difficulty in finding external financing. Thus, it appears that the undistributed profits tax led to significant distortions in investment decisions.

The final tax to consider is one that was clearly not designed to raise revenue. The Smoot-Hawley Tariff Act of 1930 raised taxes on imports substantially on top of an earlier rise in 1922. The goal was to protect American manufacturers from competition from foreign imports. International trade was a small enough percentage of the American economy at the time that most economists ascribe the tariff a secondary role as a contributor to the Depression in the

U.S. However, it had far worse implications at the international level. The Smoot-Hawley tariff was matched by a series of protectionist measures by countries throughout the world. As each nation tried to protect its home production interests through higher tariffs and restrictions on imports, world trade spiraled downward. By 1933 the total imports for 75 countries had fallen to roughly one-third of the level seen in 1929 (Kindleberger 1986).

The Roosevelt administration contributed to a recovery in world trade by relaxing these tariff barriers. The Reciprocal Trade Agreement (RTA) Act of 1934 freed the Roosevelt administration to sign a series of tariff reduction agreements with key trading partners. Agreements with Canada, several South American countries, Britain and key European trading partners loosened the trade restrictions markedly. As a result, American imports rose from a 20-year low in 1932-1933 to an all-time high by 1940.⁹

Current Policy in Light of 1930s Policy

Nearly all agree that the Federal Reserve's monetary policy was disastrous on a variety of dimensions. The only disagreements relate to why the Federal Reserve followed the path it did and how large the causal effects were. On the fiscal side, the Hoover and Roosevelt administrations both increased federal spending, but tax revenues rose enough that they ran

⁹For historical comparisons of the impact of tariff rates, see Irwin (1998). Kindleberger (1986, 170) and Atack and Passell (1994, 602) describe the international trade developments in the 1930s.

relatively small deficits. Since less than 90 percent of households paid income taxes, most of the supply-side distortions came from the extraordinarily high tax rates of over 57 percent paid by households with over one million dollars in income (roughly 16 million in today's dollars) after 1932. The capital stock, dividend, and undistributed profits taxes contributed to distortions in investment decisions that have not been explored very fully. Meanwhile, the Hawley-Smoot tariff is largely considered to be a major mistake that greatly harmed world trade.

There is no doubt that the policies of the 1930s are influencing the policies developed during the financial meltdown of 2007-2008 and the Great Recession of 2008-2009. Federal Reserve Chairman Benjamin Bernanke has long been known for his work on the macroeconomics of the Great Depression. Bernanke and Treasury Secretaries Henry Paulson and Timothy Geithner have followed strategies that were the antithesis of Fed policy in the 1930s. The Federal Reserve of the 1930s did lower discount rates, but the high rates of deflation left real interest rates at double-digit levels not seen since. The Fed waited for three years, as unemployment rose above 10 percent, then 16 percent, and then 20 percent, before making a large-scale open market purchase of \$1 billion. In contrast, Bernanke ran open market operations that expanded liquidity and drove the federal funds rate close to zero before the unemployment rate passed seven percent in 2008. The Fed has continued the liquidity expansion by buying large amounts of mortgaged backed securities.

To prevent shocks from failures that they believed would topple the financial system, the Fed and Treasury tore pages out of the Reconstruction Finance Corporation (RFC) playbook. They brokered mergers and bailouts of Bear Stearns, AIG, Fannie Mae, and Freddie Mac. They used Temporary Asset Replacement Program (TARP) funds to take investment stakes and guarantee assets in banks, made loans to auto companies and then developed stress tests of the

banks similar to those of the 1933 Bank Holiday before allowing banks to buy out the government's interest. Given descriptions by the principals of how close to failure these institutions were, the monetary policy changes and emergency policies seem necessary and may well have staved off a financial meltdown that could have touched off a severe Depression. We will never know for sure because so many events occurred in such a short time frame that there is not enough variation to identify what the counterfactual would have been had the Fed and Treasury not acted.

It will take some more time before we see the actual cost of these moves, but the losses will likely be small relative to the reserves promised, and the government might even earn a profit on the transactions. There are two major issues to address associated with these moves. First, do we want the federal government so heavily involved in financing the economy? Fannie Mae and Freddie Mac, which were supposed to have been independent corporations since the 1970s, are now essentially government-owned enterprises that finance or guarantee the vast majority of new mortgage loans. Second, the bailouts and backing provided for the Great Recession have likely created moral hazard problems, in which financial institutions take more risks in the future while anticipating another government bailout. Congress continues to struggle with this issue in trying to set regulations to insure that no financial institutions are too big to fail. Arguments have been made to limit the size of commercial banks, or instead limit the types of investments, or even just leave the banks alone. It is a thorny issue and well-known economists have argued for each of the positions (Wessel 2010).

On the fiscal side, Great Depression scholar Christina Romer is the current head of the President's Council of Economic Advisors. Here again, the Obama administration and the Democratic Congress has gone in the opposite direction from the Hoover and Roosevelt

administrations. The new leaders built on a deficit that had been rising under George Bush by passing a sizeable fiscal stimulus package that raised the deficit to 9.9 percent of GDP in 2009 from 3.3 percent in 2008. Even after excluding the budget impact of the Troubled Assets Relief Program (TARP) the 2009 deficit was roughly 8.9 percent of GDP.¹⁰ The anticipated deficit for fiscal 2010, ending on September 30, 2010 is 10.6 percent. The U.S. is flying blind with a deficit of this size because previous experiments with large fiscal deficits have been on the order of five to six percent of GDP.¹¹ In the case of the Reagan-Bush era of 1980-1992 the economic logic underlying the deficits was an emphasis on the supply-side effects of lower tax rates on income.

Some think that World War II offers an example of a situation where fiscal stimulus worked. But the World War II analogy is highly misleading for any discussion of a peace-time economy. The deficits were run during an all-out war when 40 percent of GDP was spent on munitions, the military made most of the allocation decisions in the economy, over 15 percent of the workforce was in harm's way in the military, there were widespread wage and price controls, and rationing ruled the day. In essence, the World War II deficit experience tells us more about

¹⁰The bailouts and ownership stakes taken by the Treasury and Fed are not easily measured in the budget figures. Since the assets and ownership stakes have value and many of the loans will likely be repaid, the actual Treasury costs could be quite low or the government could turn a profit. The listed federal outlays under the TARP in fiscal 2009, October 1 2008 to September 30, 2009, were \$151 Billion, which was about 1 percent of GDP or roughly 10 percent of the budget deficit. The outlay was substantially less than the earlier forecast outlay of \$247 billion. The Obama administration predicts that the net cost to the Treasury will fall further once loans are repaid and assets resold. See Office of Management and Budget (2010, 152 for the actual 2009 figure and Office and Management and Budget (2009, 117) for the forecast. It is hard to see signs of the bailout of Freddie Mac, Fannie Mae, and AIG in the budget figures.

¹¹ Deficit figures were downloaded on June 11, 2010 from the U.S. Office of Management and Budget website, <http://www.whitehouse.gov/omb/budget/historicals/>.

fiscal stimulus in the Soviet Union's command economy during the Cold War than it does about the modern U.S. mixed economy.

Even as an exercise in pure government spending the current situation looks quite different from the Great Depression. A large share of federal government spending in the 1930s was spent on income maintenance programs and work relief, and the federal government spending started at only 4 percent of GDP at the start of the decade. With a much larger safety net already in place in the current era, federal spending has risen from 20 to 25 percent of GDP. The most famous program of the 1930s, the Works Progress Administration, would not be acceptable today, because most people today receive unemployment insurance benefits that pay roughly the same share of income as the WPA, but without the WPA's requirement that they work construction to get the benefits.

There is no doubt that the Great Recession has been one of the two most serious post-war recessions. Unemployment rates have exceeded 9 percent for more than a year, and real GDP went through a year-long decline between the peak in the second quarter of 2008 and the trough in the second quarter of 2009. However, the current fiscal stimulus response seems to be out of proportion to the problem, especially when the lost output and unemployment are compared with the Great Depression. The U.S. in 2007 started at average GDP per capita levels that were five times higher than in 1929. Inflation rates are as low as they have ever been, and the U.S. is not experiencing the large non-neutral deflation of the 1930s. By the time the fiscal stimulus package was passed in February 2009, the impending financial disaster of fall 2008 had largely passed. Real GDP turned upward in the second quarter of 2009 before very much of the fiscal stimulus money had been passed out. By the first quarter of 2010 real GDP had reached 99.4

percent of the GDP peak in second quarter 2008, and it is likely that more than half of the stimulus money had still not been distributed.

The major problem is that unemployment rates remain near 10 percent in May 2010. Yet only a small part of the stimulus money is going toward expanded unemployment benefits.

There are growing worries that the government expansion may be partially crowding out private activity. Many multiplier estimates are significantly less than one, implying that deficits lead to crowding out of private employment. The current fiscal stimulus program seems to be the size of response a Keynesian would have called for in the Great Depression, while the changes in the size of the federal deficits during the Great Depression seem more like the changes we might expect policy makers would make in response to the Great Recession of 2007-2009.¹² Over ten years in response to unemployment rates ranging between 10 and 25 percent the Hoover and Roosevelt administrations raised the federal debt as a percentage of GDP by 28 percentage points, from 16 percent in 1929 to 44 percent in 1939. In response to unemployment rates ranging from 5 to 10 percent, the U.S. government has achieved a similar rise in the federal debt as a percentage of GDP in just three years, from 36 percent in 2007 to an anticipated 64 percent at the end of fiscal 2010.

Going forward, macroeconomic policy makers face two major challenges. As the economy continues its recovery, the huge amount of liquidity in the banking system has

¹² Unemployment figures were downloaded on June 11, 2010 from the Bureau of Labor Statistics website <http://data.bls.gov/PDQ/servlet/SurveyOutputServlet> and real GDP was downloaded the same date from the Bureau of Economic Analysis site <http://www.bea.gov/national/nipaweb/TableView.asp?SelectedTable=6&FirstYear=2009&LastYear=2010&Freq=Qtr>.

everybody anticipating a rise in inflation at some point. Can the Fed effectively soak up this liquidity to prevent a raging inflation without causing the kind of second dip recession that occurred in 1937 and 1938?

On the fiscal side, the deficit has risen markedly and the federal government still has not yet effectively addressed the long run funding problems with the pay-as-you-go Social Security and Medicare programs. Everybody expects the new health care entitlements to add to those funding problems, particularly because Congress is currently trying to restore Medicare payments to doctors that were cut in the health reform act to make the act look like it would not add to the deficit. We know that budget deficits at 10 percent of GDP are not sustainable.

So when will the U.S. start dealing with these budget issues? Based on Obama's fiscal 2011 budget proposal announced in February 2010, it will not be fiscal year 2011. The budget calls for a freeze on discretionary non-security spending, which account for less than one-sixth of spending. Tax rates will rise for high income households, as the Bush tax cuts expire for that group. Financial institutions and investment managers will pay higher taxes, and subsidies for oil and gas companies will be reduced. Based on the experience with the 1932 tax rate increases, do not expect a substantial rise in tax collections. As has been promised in numerous other budgets, the administration will attempt to cut waste in government, close loopholes, increase IRS enforcement, and create a fiscal commission. Congress will return to PAYGO rules requiring each new spending program to be offset by spending cuts elsewhere, but these have been routinely ignored over the past three years. Meanwhile, the budget offers new tax breaks for small business investment and job creation, no expiration of the Bush tax cuts for middle and low income people, and subsidies for sustainable energy (Office of Management and Budget

2010; Geithner 2010). The proposed budget looks more like “government business as usual” rather than a serious response to dealing with deficits.

Table 1
Monthly Measures of Key Aspects of Federal Reserve Policy and Factors that Might Have Influenced Federal Reserve Policy, January 1929-February 1933

Month/Year	Value of Banks Deposits Suspended in Millions of Dollars	Change in Gold Stock in U.S. in Millions of Dollars	Change in Federal Reserve System's Holdings of U.S. Securities in Millions of Dollars	Change in Bills Bought by the Federal Reserve System in Millions of Dollars	New York Federal Reserve Bank Discount Rate (Percent per Year)	Change in Member Bank Borrowing in Millions of Dollars
Jan-29	18.5	-14	-34	-9	5	-154
Feb-29	24.1	26	-45	-88	5	30
Mar-29	9.2	35	13	-120	5	80
Apr-29	10.4	72	-32	-109	5	35
May-29	15.6	41	-12	-11	5	-48
Jun-29	25.4	23	26	-46	5	22
Jul-29	60.8	17	-32	-24	5	118
Aug-29	6.7	19	8	49	6	-53
Sep-29	9.7	12	10	105	6	-74
Oct-29	12.5	14	-11	108	6	-84
Nov-29	22.3	-20	161	-41	4.5	68
Dec-29	15.5	-82	131	24	4.5	-150
Jan-30	26.5	9	39	-6	4.5	-302
Feb-30	32.4	62	-5	-29	4	-123
Mar-30	23.2	68	60	-39	3.5	-104
Apr-30	31.9	68	-10	20	3.5	-43
May-30	19.4	26	-1	-84	3	16
Jun-30	57.9	18	42	-41	2.5	4
Jul-30	29.8	-18	12	13	2.5	-25
Aug-30	22.8	-16	16	-1	2.5	-12
Sep-30	21.6	10	-2	44	2.5	-25
Oct-30	19.7	24	5	-12	2.5	7
Nov-30	179.9	36	-3	-1	2.5	25
Dec-30	372.1	22	45	73	2	117
Jan-31	75.7	50	3	-51	2	-85

Feb-31	34.2	12	-44	-104	2	-37
Mar-31	34.3	42	1	21	2	-40
Apr-31	41.7	29	-4	50	2	-21
May-31	43.2	72	-1	-29	1.5	8
Jun-31	190.5	158	11	-23	1.5	25
Jul-31	40.7	-7	64	-42	1.5	-19
Aug-31	180.0	46	38	56	1.5	53
Sep-31	233.5	-254	24	124	1.5	58
Oct-31	471.4	-449	-3	433	3.5	333
Nov-31	67.9	122	-6	-132	3.5	82
Dec-31	277.1	46	50	-220	3.5	79
Jan-32	218.9	-45	-18	-119	3.5	54
Feb-32	51.7	-62	-16	-70	3	20
Mar-32	10.9	37	66	-46	3	-134
Apr-32	31.6	-23	205	-53	3	-109
May-32	34.4	-215	399	-11	3	-119
Jun-32	132.7	-233	284	9	2.5	9
Jul-32	48.7	55	121	10	2.5	28
Aug-32	29.5	114	32	-23	2.5	-72
Sep-32	13.5	105	-2	-3	2.5	-64
Oct-32	20.1	71	3	0	2.5	-59
Nov-32	43.3	76	0	0	2.5	-15
Dec-32	70.9	173	3	0	2.5	-31
Jan-33	133.1	40	-48	-2	2.5	-27
Feb-33	62.2	-174	-2	70	2.5	52

Sources: All values except Fed discount rate are in millions of nominal dollars. Value of Deposits Suspended is from *Federal Reserve Bulletin* (September 1937, 909). Change in Federal Reserve System Holdings of U.S. Securities, Change in Bills Bought by the Fed, Changes in Member Bank Borrowing, and Change in U.S. Gold Stock come from *Federal Reserve Bulletin* (February 1930, 59; March 1931, 127; October 1931, 560; May 1932, 292; June 1932, 352; October 1932, 634; March 1933, 136; September 1933, 541; January 1934, 14). New York Federal Reserve Discount Rate is from Federal Reserve Board of Governors (1943, 493).

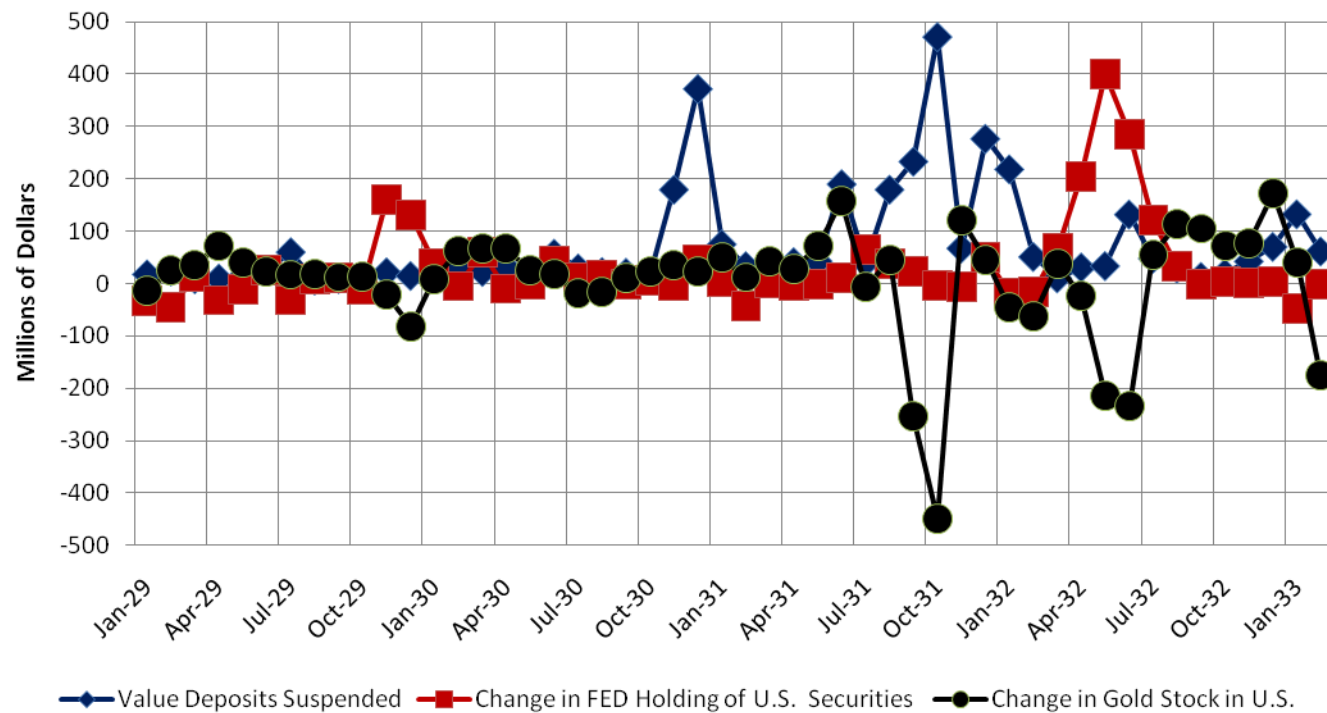
Table 2
Microeconomic Studies of the Impact of Federal Spending Programs at Lower Levels of Aggregation

Program	Citation	Effect	Data	Method
New Deal Relief Spending, 1929-1940	Fishback, Haines, and Kantor (2007)	Death and Birth Rates: About \$2 million (in 2000\$) in additional relief spending associated with reduction of one infant death, half a homicide, one suicide, 2.4 deaths from infectious disease, one death from diarrhea. A one-standard deviation increase in relief spending associated with 0.82 standard deviation rise in general fertility rate	Panel: Annual averages for 114 cities, 1929-1940	Controls for city characteristics, city and year fixed effects, instruments.
New Deal Relief Spending, 1930-1940	Johnson, Fishback, and Kantor (forthcoming)	Crime Rates: Ten percent rise in work relief spending associated with 1.5 percent reduction in property crime rate. Smaller effect of direct relief spending.	Panel: Annual averages for 81 large cities, 1930-1940	Controls for city characteristics, city and year fixed effects, city-specific time trends, and instruments.
New Deal Emergency Relief Employment, 1937, 1940	Fleck (1999)	Private Employment: Increase of one emergency relief job associated with an increase in measured unemployed but little effect on private employment	Separate Cross Sections of County Averages in 1937 and again in 1940	Large number of correlates and instrument for relief jobs.

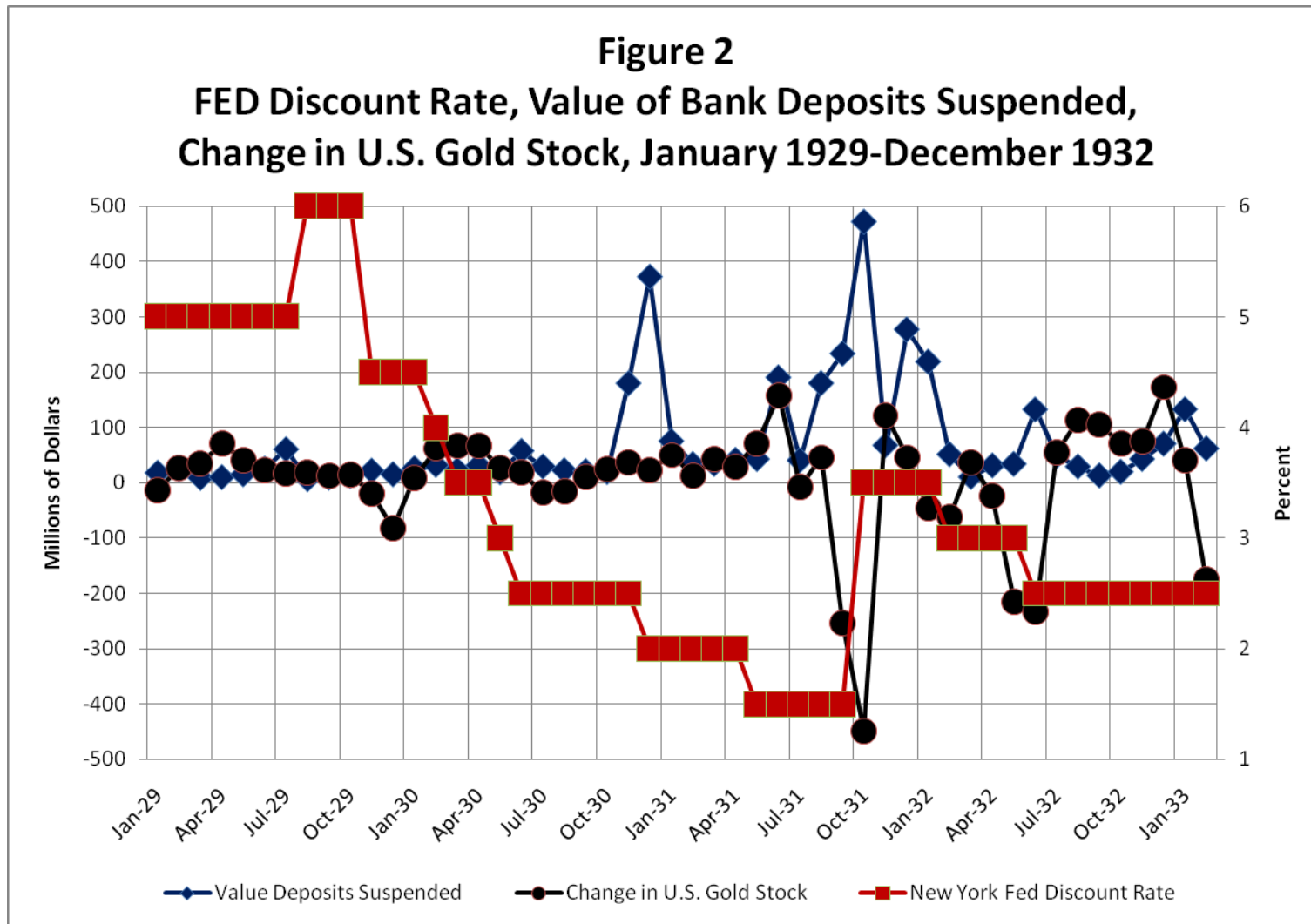
New Deal Federal Emergency Relief Administration Employment, 1935	Wallis and Benjamin (1981)	Private Employment: Little or no effect of FERA cases per capita spending on private monthly wages. Little effect of FERA average benefits on FERA caseloads.	Cross Section of 52 cities in fiscal year, 1934-1935	In wage equation correlates for aggregated demand and prior wages. In case equation correlates and instruments for FERA benefit levels.
New Deal Relief spending, 1932-1940	Neumann, Fishback, and Kantor (2010 forthcoming)	Private Employment: Positive effect of relief spending on private employment prior to 1936. Negative effect of relief spending on private employment after 1936.	Panel of monthly averages from January 1933 through December 1939 for 44 major cities.	Panel VAR with differencing and controls for serial correlation. No endogeneity if there is a one-month or more lag in effects of each variable on other variables.
Relief Spending, 1930s	Matthews and Benjamin (1992)	Private Employment: An additional New Deal relief job crowded out about one-third of a private job in 1933 and about nine-tenths of a private job in 1939	Panel of annual state averages, 1932 Through 1939	Pooled regressions with controls and instruments
New Deal Relief and Public Works Spending, 1933-1939	Fishback, Horrace, and Kantor (2005)	Retail Sales: Dollar increase of public works and relief spending per capita associated with rise in retail sales per capita of roughly 40 cents.	Cross-section of Growth rates for U.S. Counties, 1929-1939, 1929-1935, 1933-1939	Large number of correlates and instrument for public works and relief.
New Deal Relief and Public Works Spending, 1933-1939	Fishback, Horrace, and Kantor (2006)	Net Migration: Increase in public works and relief spending leads to increase in net migration.	Cross-section of county averages during 1930s.	Large number of correlates and instrument for public works and relief.
New Deal Relief and Public Works Spending, 1933-1939	Sorensen, Fishback, and Kantor (2009)	Internal Migration: Public works and relief spending led to 15 percent more internal migration within the U.S.	Cross-section of 460 state economic areas, 1935-1940	Several correlates and instrument for public works and relief in a structural choice model.

New Deal Spending and Loans	Garrett and Wheelock (2006)	State Per Capita Income. New Deal spending associated with higher per capita income.	Cross section of 48 states for growth rate from 1929-1939.	Several correlates and Instrument for New Deal spending and loans
Federal Spending minus Federal Taxes	Fishback and Kachanovskaya (in progress).	State per Capita Income. One dollar increase in net federal spending associated with \$1 to \$1.5 increase in state per capita income.	Panel of annual data for 48 states from 1930-1940	Weather correlates, state and year fixed effects, state-specific time trends, and instrument for net federal spending.

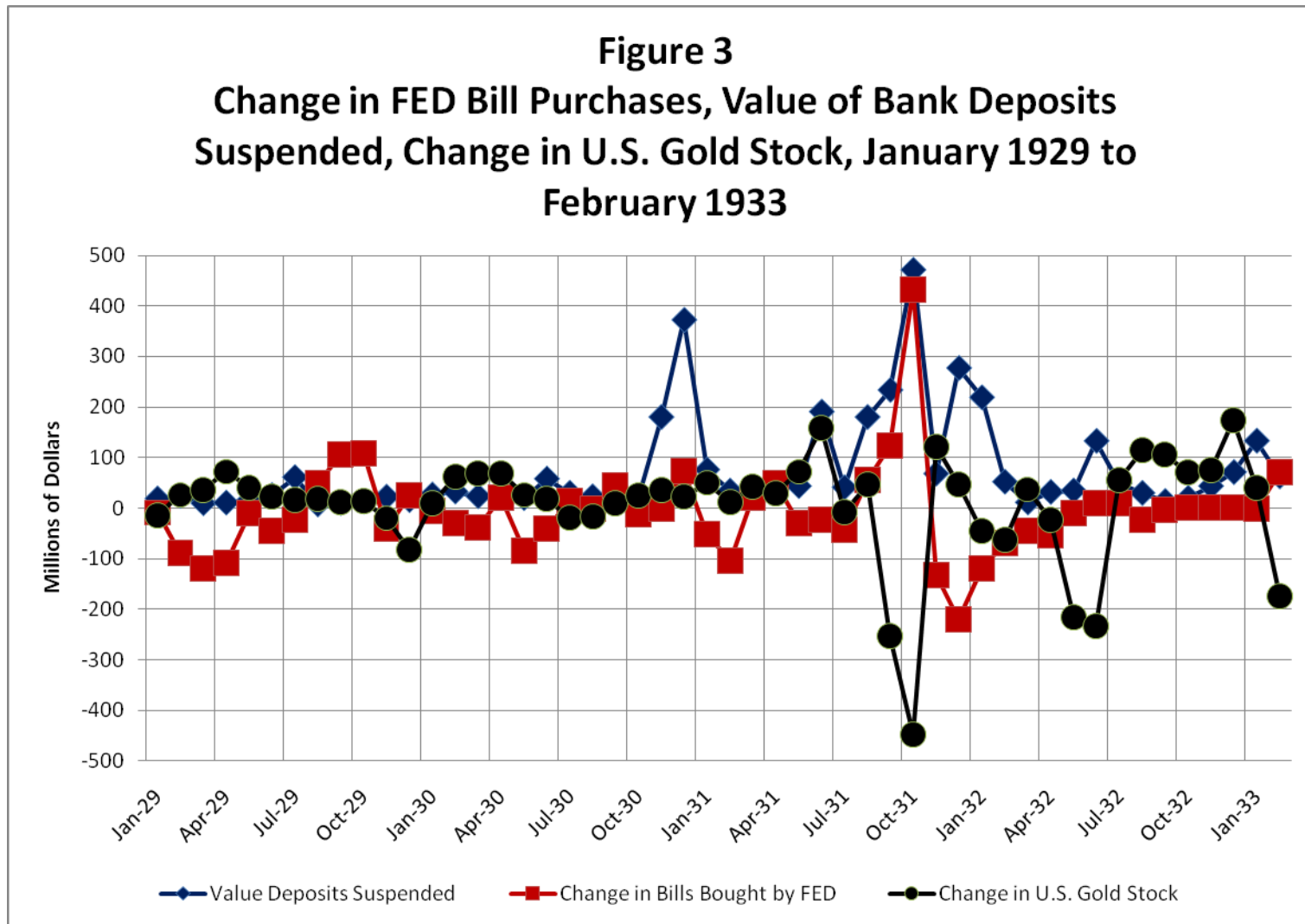
Figure 1
Change in FED Holdings of U.S. Securities, Value of
Bank Deposits Suspended, Change in U.S. Gold Stock,
January 1929-December 1932



Sources: Value of Deposits Suspended is from *Federal Reserve Bulletin* (September 1937, 909). Change in Federal Reserve System Holdings of U.S. Securities and Change in U.S. Gold Stock come from *Federal Reserve Bulletin* (February 1930, 59; March 1931, 127; October 1931, 560; May 1932, 292; June 1932, 352; October 1932, 634; March 1933, 136; September 1933, 541; January 1934, 14).

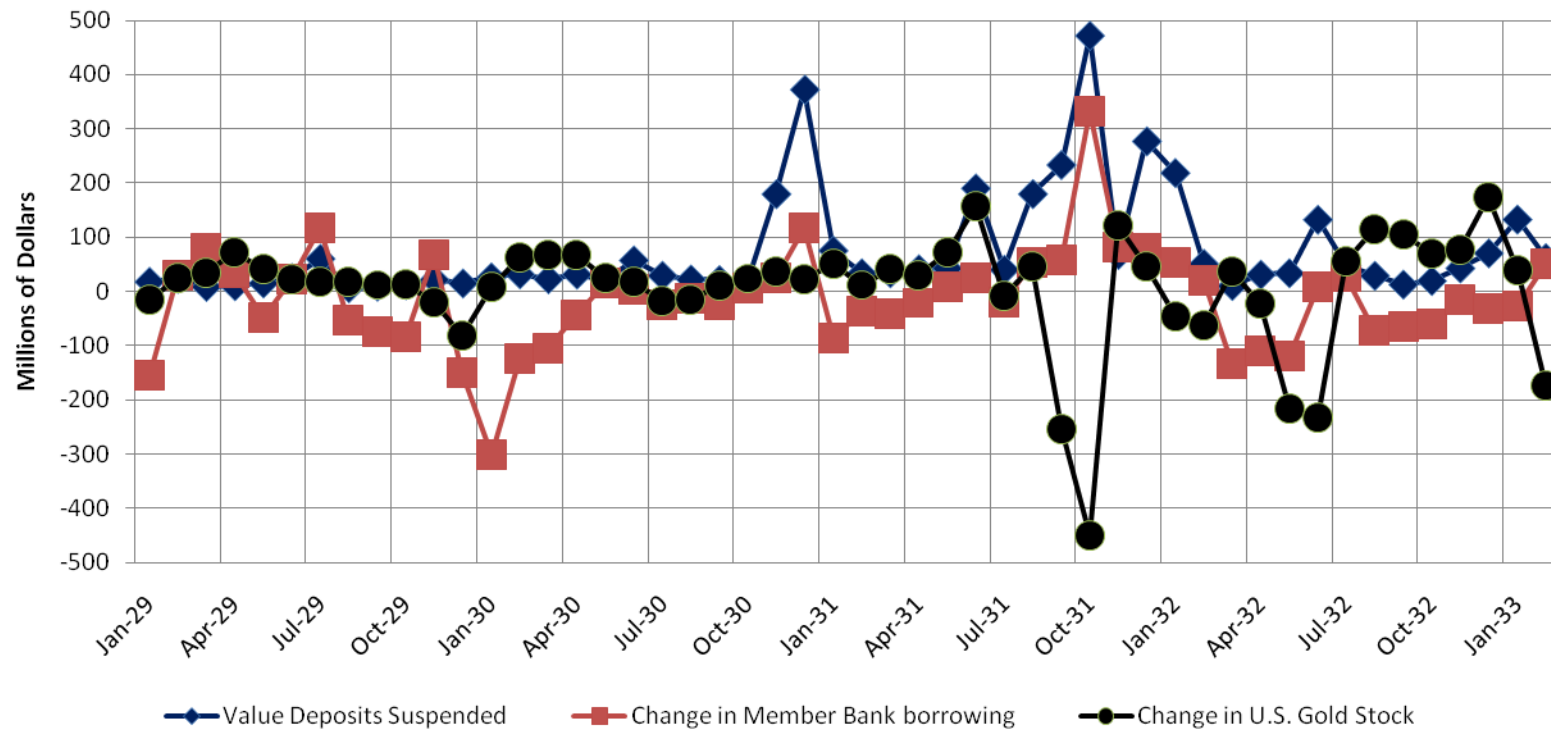


Sources: New York Federal Reserve Discount Rate is from Federal Reserve Board of Governors (1943, 493). For sources of Deposits Suspended and Change in the U.S. Gold Stock, see sources for Figure 1.



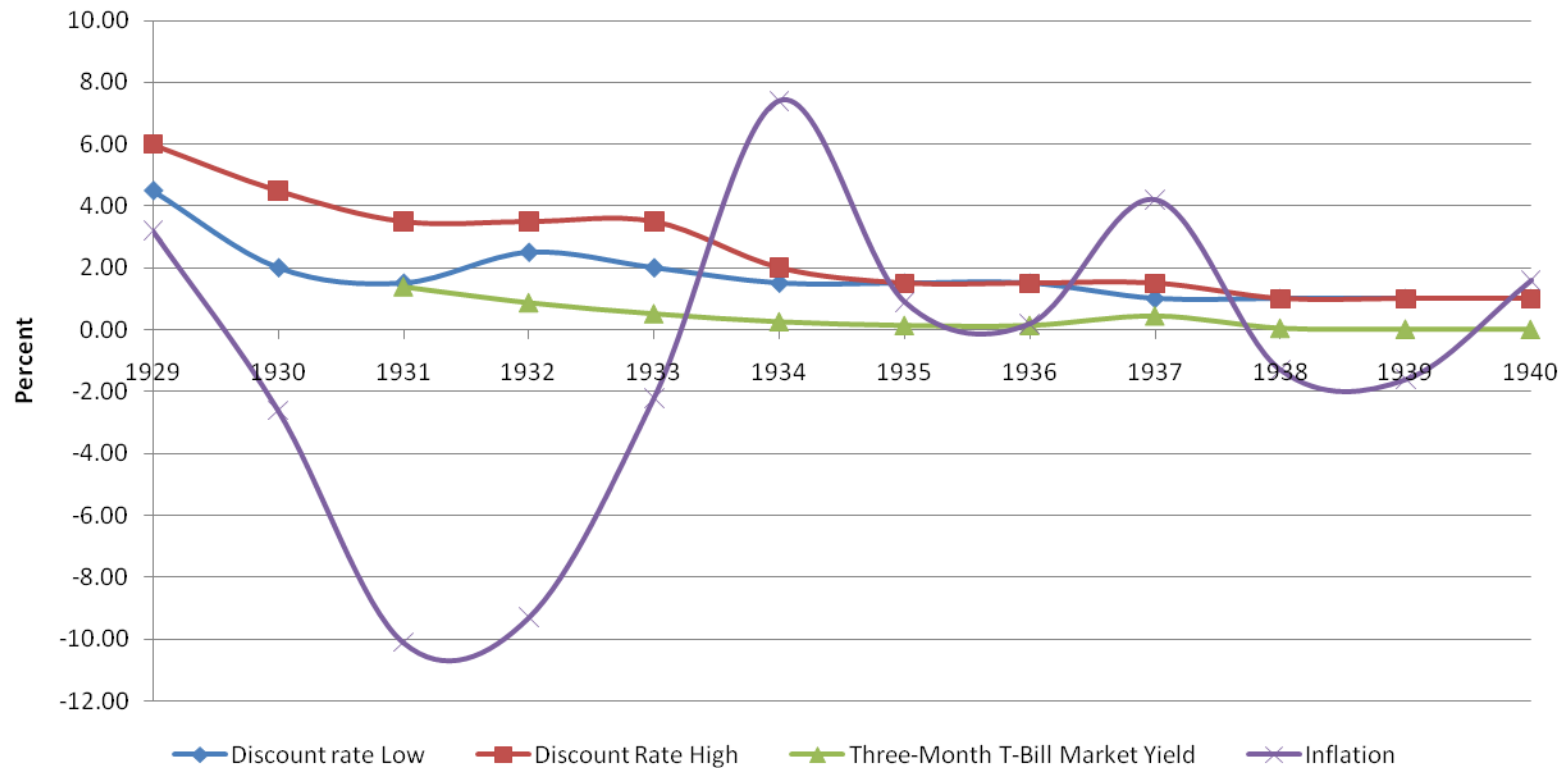
Sources: Changes in Bills Bought by Fed, Deposits Suspended, and Change in the U.S. Gold Stock are all from the same source listed in Figure 1.

Figure 4
Change in Member Bank Borrowing at the FED, Value of Bank Deposits Suspended, Change in U.S. Gold Stock, January 1929 to February 1933

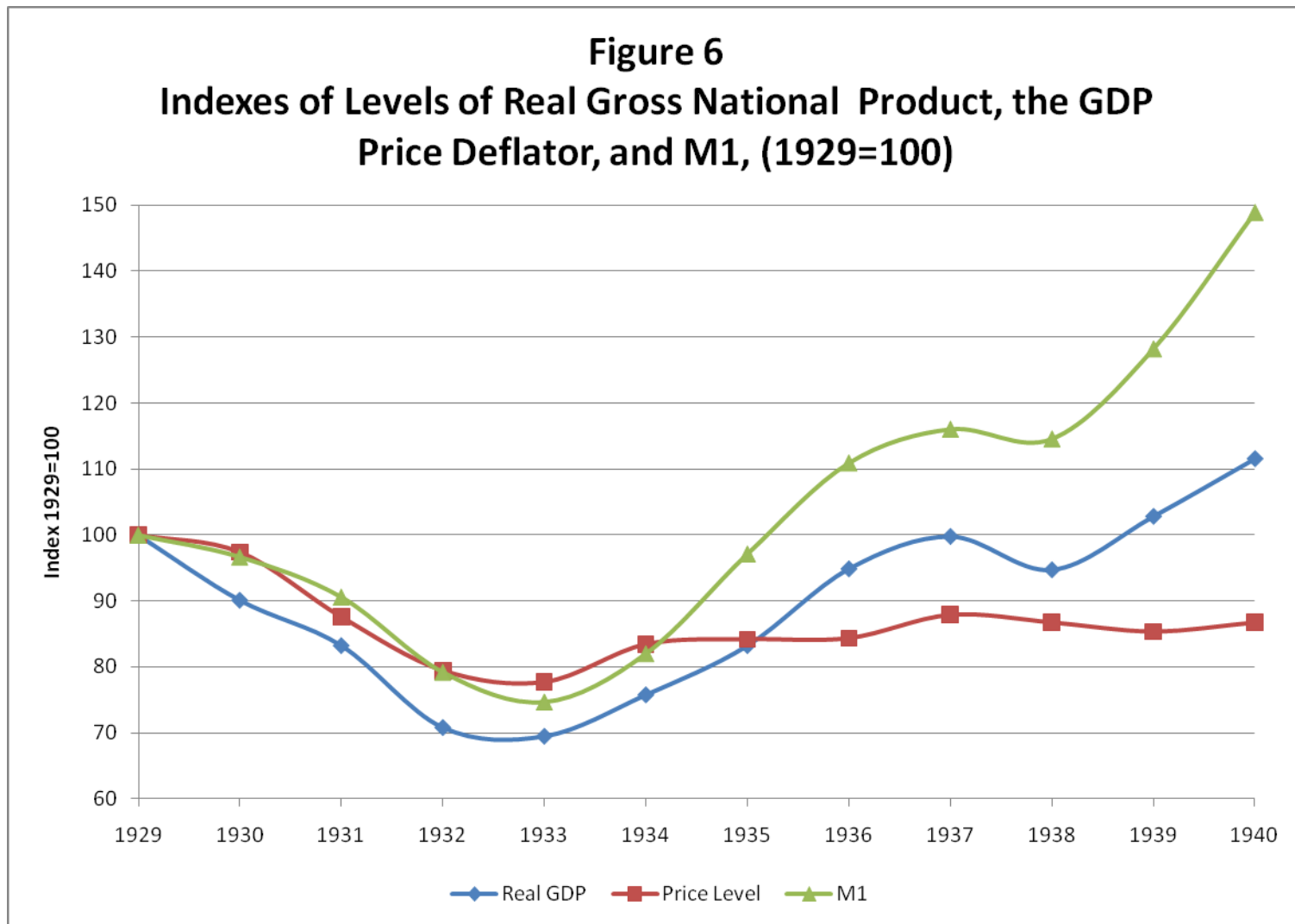


Sources: Changes in Member Bank Borrowing (Bills Discounted by Fed), Deposits Suspended, and Change in the U.S. Gold Stock are all from the same source listed in Figure 1.

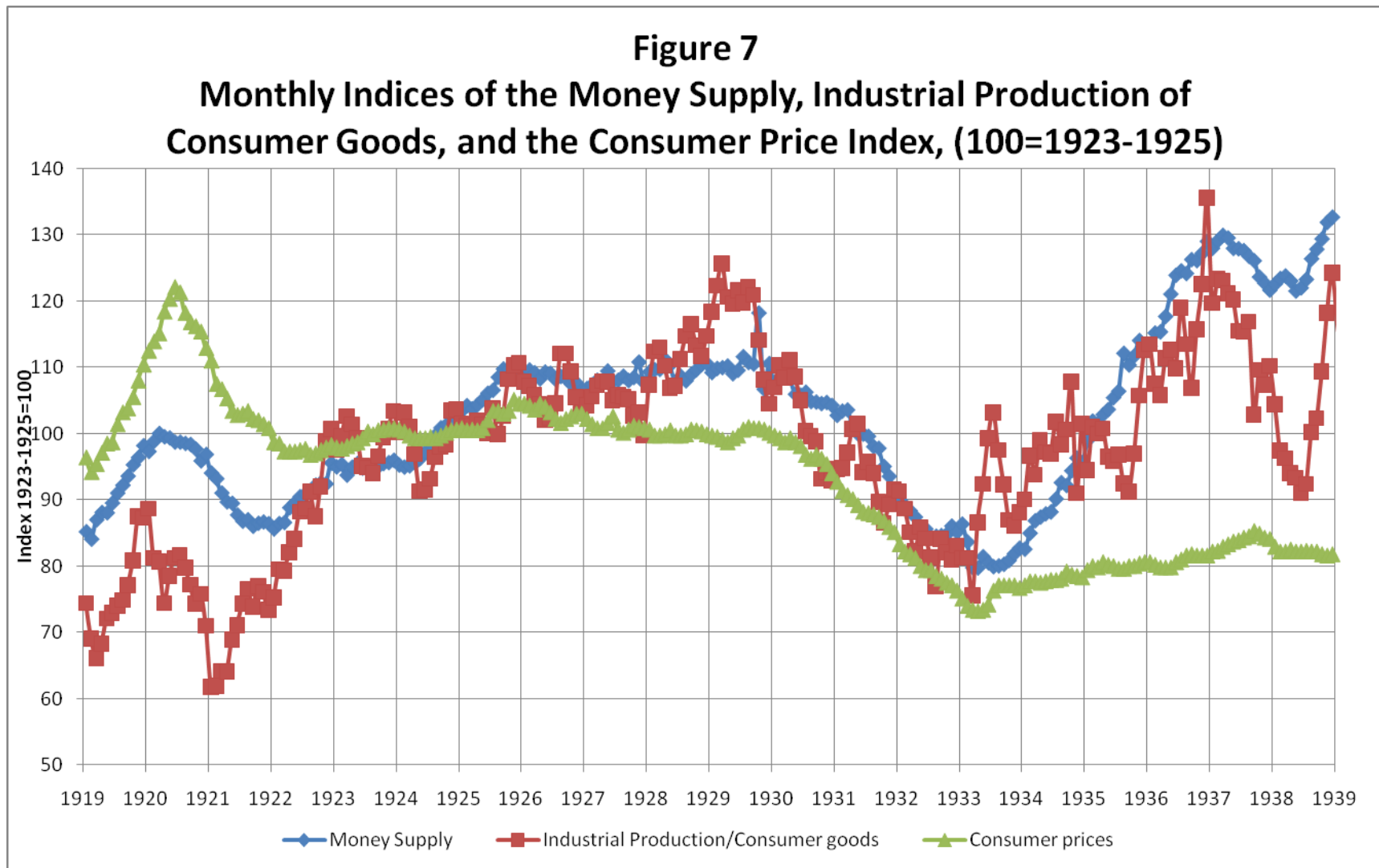
Figure 5
Annual High and Low Federal Reserve Discount Rates, Three-
Month Treasury Bond Market Yield, and Rate of Inflation, 1929-
1940



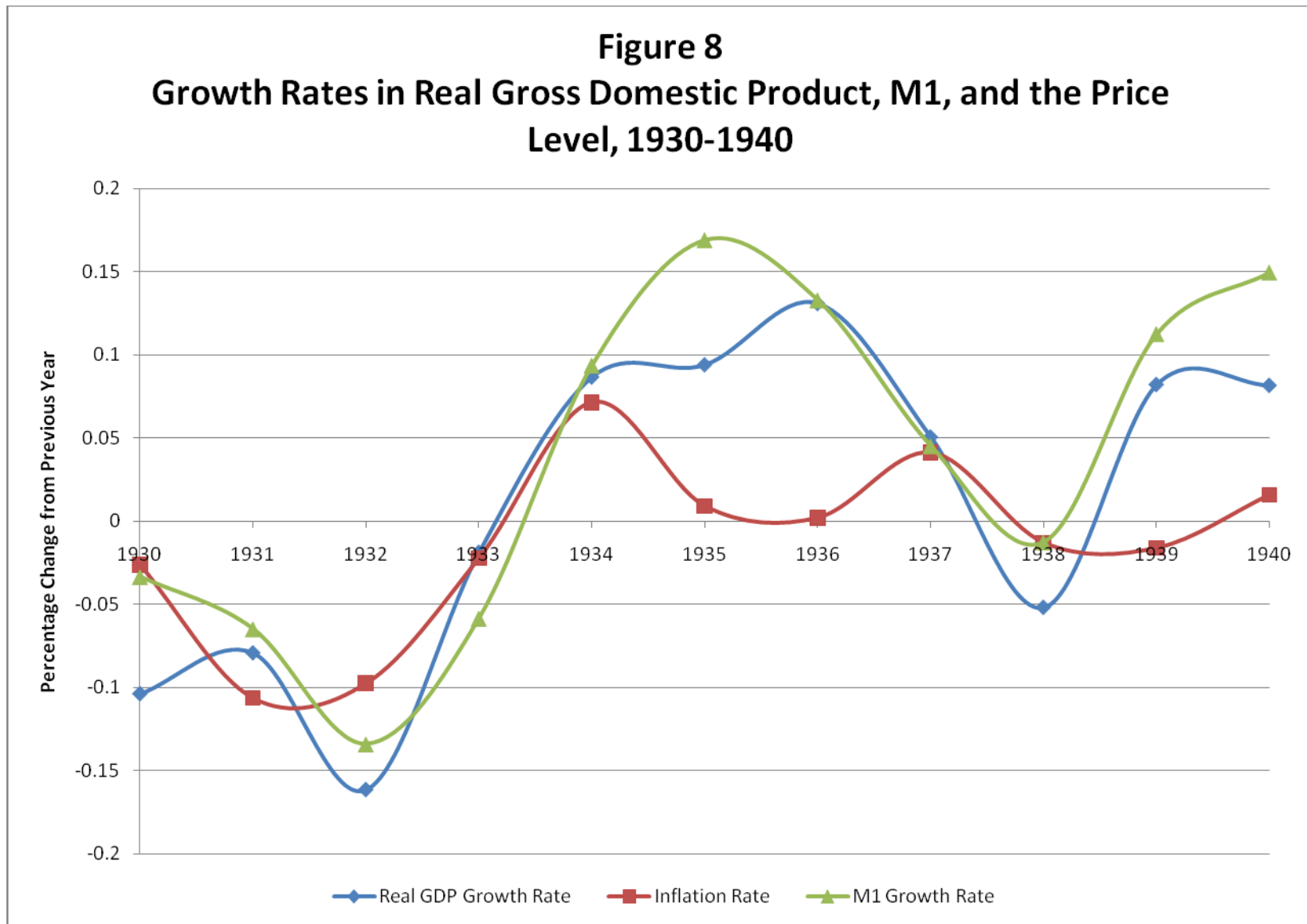
Sources: Federal Reserve Bank of New York discount rate low and high for year are series Cj113 and Cj114 from Wheelock (2006, 3-624); Three-Month Treasury Bill Market Yield is series Cj1232 from James and Sylla (2006, 3-822). Inflation is measured using the implicit price deflator from series F-5 in U.S. Bureau of the Census (1975, 224).



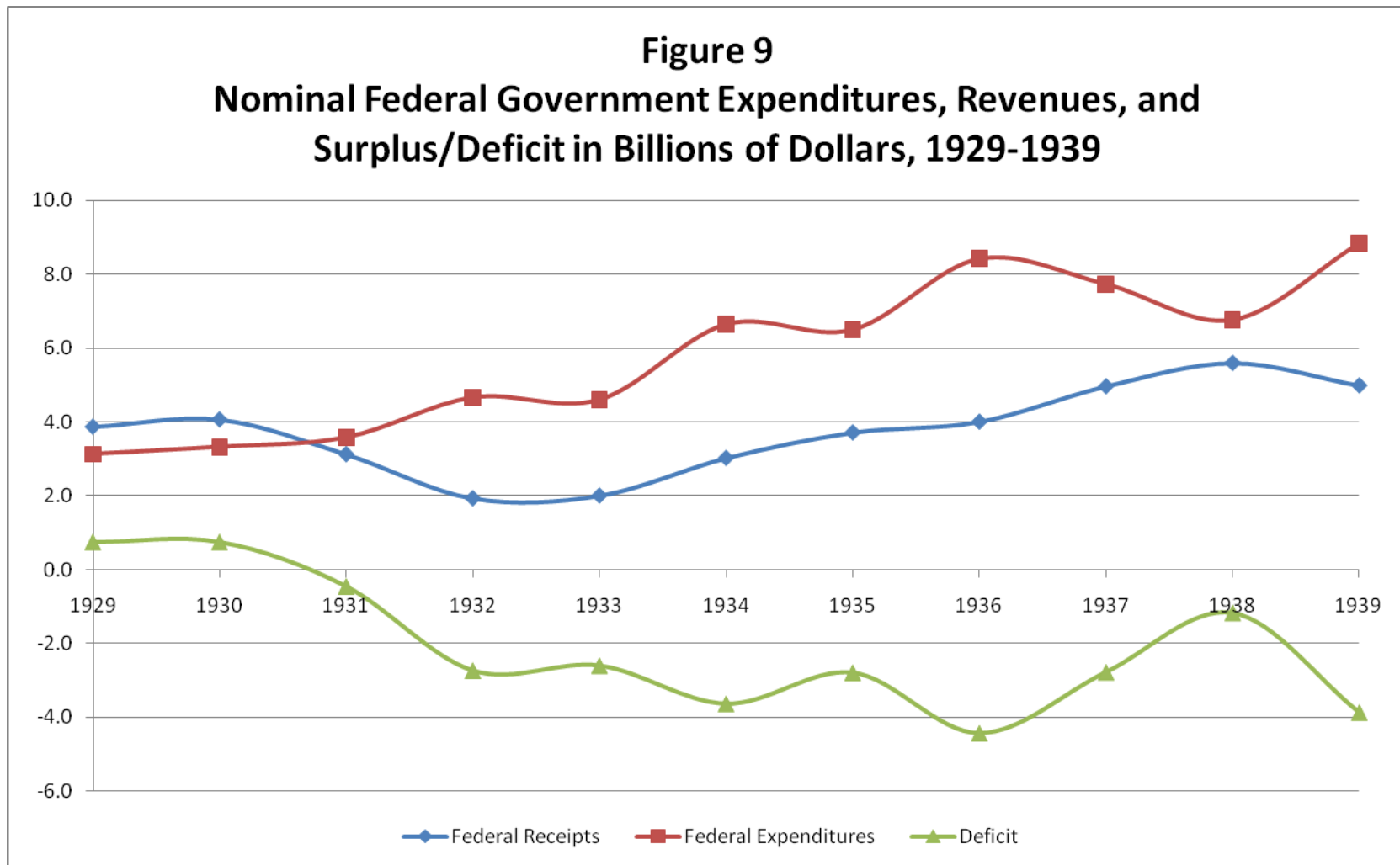
Sources: Indexes with 1929=100 were created based on Gross National Product in 1958 prices and implicit price deflator (1958=100) from series F-3 and F-5 in U.S. Bureau of the Census (1975, 224). The M1 measure of the money supply is series Cj42 from Anderson (2006, 3-604).



Sources: Industrial Production of Consumer Goods is series Cb36, Money Supply is series Cb64, and Consumer Price Index is series Cb74 from Richard Sutch (2006, pp. 3-116 to 3-141).

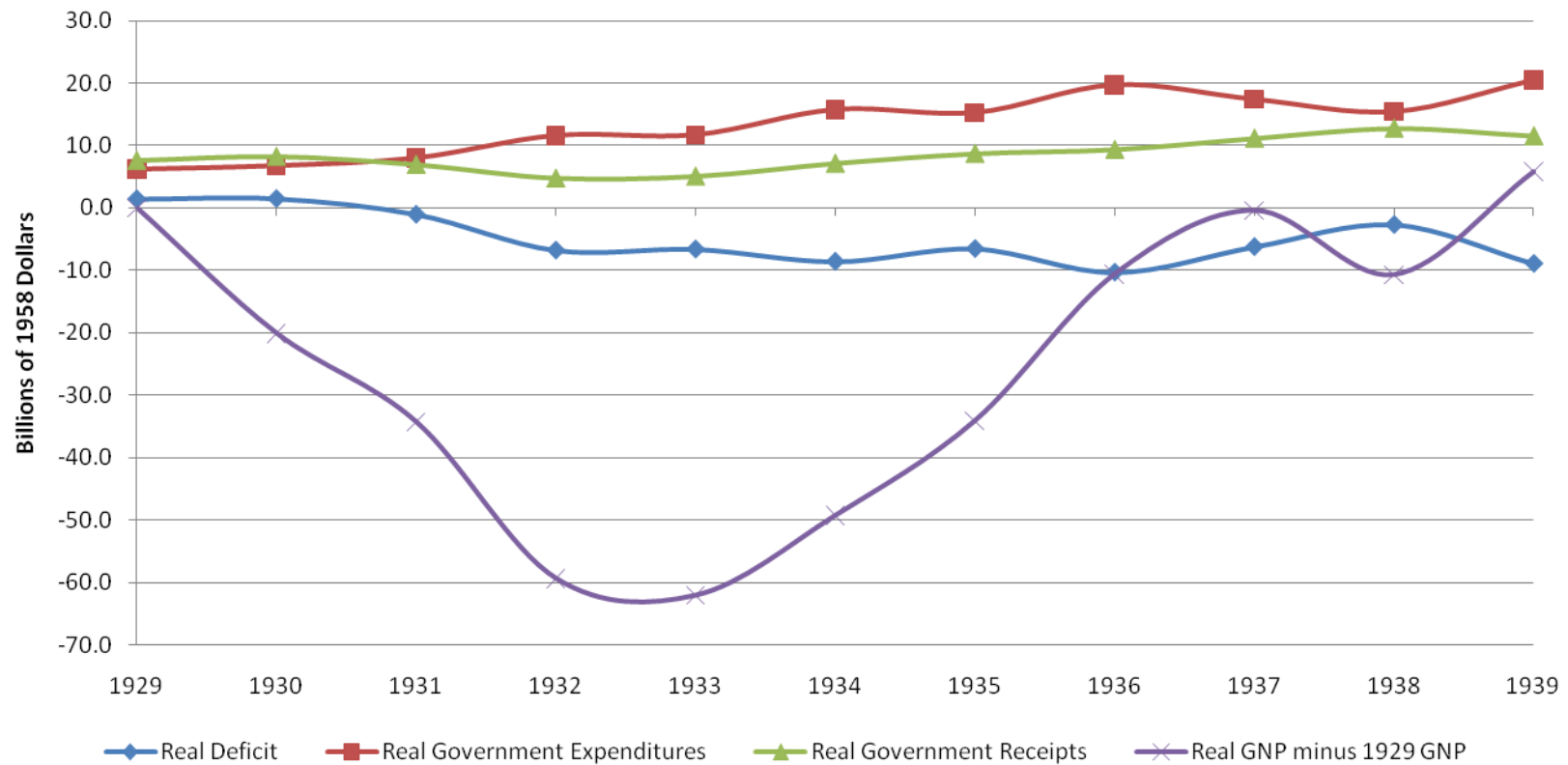


Sources: See sources for Figure 6.



Sources: Federal Government Expenditures, Revenues, and Surplus/Deficit are series Ea584, Ea585, and Ea586 from John Wallis (2006, 5-80 and 5-81).

Figure 10
GNP minus 1929 GNP, and Federal Expenditures, Revenues, and
Budget Surplus/Deficit in Billions of 1958 Dollars, 1929-1939



Sources: Federal Government Expenditures, Revenues, and Surplus/Deficit are series Ea584, Ea585, and Ea586 from John Wallis (2006, 5-80 and 5-81). Real Gross National Product minus 1929 Real GNP in 1958 prices is calculated from series F-3 and the implicit price deflator (1958=100) used to deflate the federal government data is series F-5; both are from U.S. Bureau of the Census (1975, 224).

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