

RECOVERY OF 1933*

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ABSTRACT

When Roosevelt abandoned the gold standard in April 1933, he converted what had been effectively real government debt into nominal government debt to open the door to *unbacked fiscal expansion*. We argue that he followed a state-contingent fiscal rule that ran nominal-debt-financed primary deficits until the price level rose and economic activity recovered. Theory suggests that government spending multipliers can be substantially larger when fiscal expansions are unbacked than when they are tax-backed. VAR estimates find that primary deficits made quantitatively important contributions to raising both the price level and real GNP from 1933 through 1937. The evidence does not support the conventional monetary explanation that gold revaluation and gold inflows, which were permitted to raise the monetary base, drove the recovery independently of fiscal actions.

Keywords: Great Depression; monetary-fiscal interactions; monetary policy; fiscal policy; government debt

JEL Codes: E31, E52, E62, E63, N12

*March 18, 2019. We would like to thank Bob Gregory, Nobu Kiyotaki, Adrian Pagan, Tom Sargent, Ellis Tallman, Andrew Scott, and particularly Mike Bordo, Tom Coleman, and Chris Sims. We especially thank Tao Zha for both code and VAR counsel. We also thank George Hall and Tom Sargent for providing their government debt data. Any opinions, findings, and conclusions or recommendations in this material are those of the authors and do not necessarily reflect the views of the National Science Foundation. Jacobson acknowledges support from the National Science Foundation Graduate Research Fellowship Program under Grant No. 2015174787. Preston acknowledges research support from the Australian Research Council, under the grant FT130101599.

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1 INTRODUCTION

Franklin D. Roosevelt’s monetary and fiscal policies helped to pull the United States out of the Great Depression. His first step was monetary: America reduced the gold content of the dollar, abandoned the promise to convert dollars to gold, and abrogated the gold clause on all current, past, and future contracts. This paper emphasizes his second, fiscal, step: his administration expanded government spending, financed that spending with nominal bonds, and convinced people that the bonds would not be fully backed by future taxes until the economy recovered. Because the monetary components—devaluing the dollar and revoking convertibility—were necessary for the fiscal step to work, this narrative is about *joint* monetary-fiscal actions.

When Roosevelt shucked off the gold standard’s straightjacket, he was freed to exploit the nominal nature of government debt. If dollars are convertible to gold, even dollar-denominated government liabilities are *real* obligations. Credibility of the gold standard rested on government standing ready to raise real taxes to acquire the requisite gold [Bordo and Kydland (1995)]. By revoking convertibility, Roosevelt enhanced his policy options. He could decide to continue the orthodox policy that new debt begets new taxes or to break from the past and allow prices to revalue outstanding bonds. Early in his presidency, Roosevelt chose the latter option.

Our thesis challenges the conventional wisdom that recovery had little to do with fiscal policy. Scholars from Brown (1956) to Romer (1992) to Fishback (2010) maintain that fiscal deficits during Roosevelt’s first term were too small to close the gaping gap in output.¹ Those economists base their conclusion on a narrowly construed fiscal transmission mechanism. The government raises real spending, directly increasing real aggregate demand. Higher demand propagates through higher real expenditures and income, eventually to raise output by a multiple of the initial fiscal expansion. We call this mechanism “Keynesian hydraulics,” Coddington’s (1976) evocative label.

Nominal debt doubled before the end of Roosevelt’s second term. Under Keynesian hydraulics, the resulting expansion in *nominal* demand provides no additional economic stimulus. Brown (1956) and the studies that followed explicitly exclude government borrowing from their analyses. Keynesian hydraulics implicitly assume that higher taxes extinguish all wealth effects from higher nominal debt. That assumption effectively continues to treat government debt as a real obligation, denying that the suspension of gold convertibility fundamentally altered the nature of government debt and the fiscal options available to policy makers after 1933.

We broaden the perspective on fiscal transmission to include both Keynesian hydraulics and a vehicle by which government debt dynamics affect economic activity. When nominal government debt expands without raising expected taxes, private-sector wealth and aggregate demand increase via a conventional Pigou-Keynes-Patinkin effect. Roosevelt exercised this option—“unbacked fiscal expansion”—to implement a state-contingent policy: run debt-financed fiscal deficits until the American economy recovers.

Our perspective complements and elaborates Eichengreen’s (2000) conclusion that “. . . the fundamental change in policy making in the 1930s was not the Keynesian revolution, but the

¹See also Chandler (1971), Peppers (1973), Beard and McMillin (1991), Raynold, McMillin, and Beard (1991), Eichengreen (2000), Steindl (2004), and Hausman (2016).

‘nominal revolution’—the abandonment of the gold standard for managed money.” To reach our perspective, broaden “money” to “nominal government liabilities.” Nothing compels policy makers to back expansions in either component of nominal liabilities—base money or bonds—with higher taxes. When they don’t, debt-financed fiscal expansion becomes a potent policy tool.

1.1 THE POLICY PROBLEM

By the time Roosevelt was sworn in as the 32nd president of the United States in March 1933, the economy had been declining for over three years. Relative to the third quarter of 1929, real GNP was 36 percent lower while current-dollar GNP was 57 percent smaller; industrial production had fallen by half; unemployment had increased 22 percentage points; bank deposits and the money supply had contracted about 30 percent; and government debt had grown from 16 percent to over 40 percent of output. Although his first acts salvaged a banking system left reeling by three consecutive banking crises, Roosevelt’s focus never strayed far from those macroeconomic facts.

One fact figured prominently in his thinking: the precipitous decline in overall prices bankrupted the farmers and homeowners who had incurred nominal debts at elevated price levels. Those citizens were also among Roosevelt’s strongest supporters. Figure 1 encapsulates the policy problem. FDR felt that the key to economic recovery lay in returning overall prices to their 1920s levels, to achieve “...the kind of a dollar which a generation hence will have the same purchasing power and debt-paying power as the dollar we hope to attain in the near future” [Roosevelt (1933c)]. The problem was that in the 1920s the price level was 60 percent above the long-run average to which it had to revert to maintain gold convertibility at the parity that prevailed over the previous century.

Roosevelt’s objective to return the price level permanently to that high level was inconsistent with remaining on the gold standard at the historical conversion rate. FDR pursued a triple-barreled approach to the problem. The executive branch—with Congressional approval—took control of monetary policy from a Federal Reserve that by all accounts had been “inept” since the depression started.² The monetary component sharply reduced the gold content of the dollar; it then evolved into complete abandonment of the gold standard and abrogation of gold clauses on all public and private contracts.

The second barrel ran “emergency” fiscal deficits financed by new issuances of nominal Treasury bonds. Emergency spending served two purposes. It provided much-needed relief through a vast array of works programs and infrastructure projects. But the modifier “emergency” also communicated the temporary and state-contingent features of the fiscal program.

Political strategy, which was crucial to establish the unprecedented fiscal program was credible, composed the third barrel. Roosevelt made recovery *the* policy priority; higher, for example, than the last century’s fiscal orthodoxy. The president found innovative ways to persuade people that the stakes of recovery were unprecedentedly high. On the domestic front, he feared “agrarian revolution” and “amorphous resentment” of economic institutions.³

²Friedman and Schwartz (1963, p. 407) characterize their adjective “inept” for monetary policy as a “plain description of fact.” Also see Wicker (1965) and Meltzer (2003) for similar assessments.

³In October 1933, FDR told a group of financial advisors that the gold-buying policy the Administration

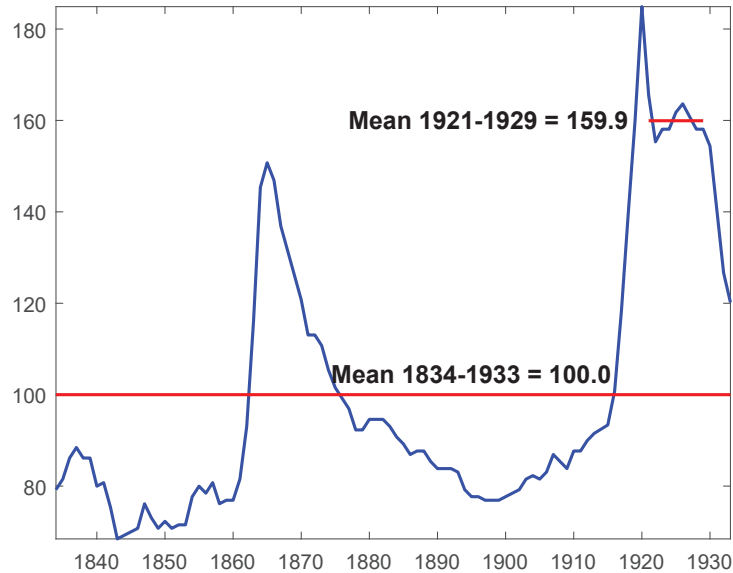


Figure 1: Consumer price index since the 1834 Coinage Act set the price of one ounce of gold at \$20.67. Rescaled to make mean from 1834–1933=100. Sample includes periods when convertibility was suspended. Source: Officer and Williamson (2018) and authors’ calculations.

Internationally, FDR conjured images of European fascism. In advisor George F. Warren’s words, Roosevelt faced “a choice between a rise in price or a rise in dictators.”⁴ The president framed economic recovery as “a war for the survival of democracy” [Roosevelt (1936a)].⁵ Jalil and Rua (2017) present evidence that in the second quarter of 1933 inflation expectations picked up rapidly. That evidence suggests the third barrel succeeded to convince people that Roosevelt would experiment with selling bonds that do not portend higher taxes, at least temporarily.

1.2 WHAT WE DO

The paper places FDR’s policy actions in the political and intellectual context of the times. That context drives the narrative. Desperate times can engender creative measures. Despite running for office on his belief in sound finance, Roosevelt was at root a pragmatist, willing to experiment with the economic levers at his disposal—and even some levers that were not.

Several theoretical results underpin our narrative:

pursued averted “an agrarian revolution in this country” [Blum (1959, p. 72)]. Leuchtenburg’s (1963) aptly-titled chapter, “Winter of Despair,” documents that by the winter of 1932–33, economic despair transformed into “amorphous resentment” of the economic institutions that people blamed for the depression.

⁴This quotation is found in Rauchway (2014, p. 4) and Rauchway (2015, ch. 5), who lays out Warren’s influence in context. See also Sumner (2001).

⁵Authorities other than the president communicated the high stakes. As early as February 1933, Marriner Eccles, in his capacity as a private banker, testified to the Senate Finance Committee that in the absence of federal government intervention into the economy, “we can only expect to sink deeper in our dilemma and distress, with possible revolution, with social disintegration, with the world in ruins, the network of its financial obligations in shreds, with the very basis of law and order shattered” [Eccles (1933, p. 705)].

1. Under a classical gold standard with fixed parity, monetary and fiscal policies cannot achieve any desired price level.
2. Unbacked fiscal expansion is infeasible under a classical gold standard.
3. Unbacked fiscal expansion permanently raises the price level.
4. Government spending and transfer impacts from unbacked fiscal expansion generally exceed those from tax-backed fiscal expansion.

We bring both informal and formal empirical evidence to bear on the thesis. Surprise inflation significantly reduced the value of government debt. Over the seven years after America left the gold standard, nominal debt rose 30 percent more than real debt. Negative real returns on the government bond portfolio became more prevalent in that period. Government debt, which was 16.4 percent of GNP in the last quarter of 1929, rose to 42.3 percent by the first quarter of 1933. Although nominal debt doubled over the next seven years, it averaged only 41.6 percent of GNP to belie the critics' hysteria about fiscal sustainability. Nominal economic growth stabilized debt.

Identified VAR evidence finds that temporary fiscal expansions produce persistent increases in output, the price level, the monetary base, the market value of nominal government debt, and the monetary gold stock. Fiscal disturbances are also important sources of fluctuations in those variables and account for significant fractions of the forecasts errors in real GNP and the price level. Although the VAR recovers the patterns of correlation that underlie conventional monetary explanations of the recovery, the VAR points to fiscal, rather than monetary or gold, shocks as the genesis of those comovements.

2 POLITICAL AND INTELLECTUAL CONTEXT

Roosevelt's decision to leave the gold standard and reflate arose against a backdrop of growing political and intellectual consensus that higher retail and wholesale prices were critical to recovery of wages, employment, investment, and consumption. The banking crisis of February–March 1933 heightened expectations of a dollar devaluation as political pressure mounted against maintaining gold convertibility at the existing parity.⁶ To avoid capital losses from the banking panic, foreign depositors in U.S. banks liquidated their dollar balances and converted them to gold, pushing gold reserves close to their statutory minimums, particularly at the New York Fed. Rebuilding dwindling gold reserves required the bank to raise its discount rate in the middle of a banking panic. To avoid further strain on the beleaguered financial sector, Senator Elmer Thomas advocated issuing unbacked currency to raise the price level to its 1920s level and Senator Tom Connally proposed reducing the gold content of the dollar by one-third. Financial and political forces were aligning against the gold standard.

Those realignments were echoed by a camp of economists who agitated for reflation. Irving Fisher's (1932; 1933b) debt-deflation theory argued that when the private sector is over-indebted, a falling price level triggers a sequence of events—lower asset prices, higher real interest rates, contraction of bank deposits, decrease in profits, reduction in output, rising

⁶This exposition draws on Eichengreen (1992), particularly chapter 11.

unemployment, bank runs, and so on—that drives the economy into depression. Viewing nominal income through the equation of exchange, Fisher advocated government policies designed to raise the money supply and velocity.

Fisher carried on extensive correspondence with the president and met with him several times to discuss his economic proposals. In an April 30, 1933 letter to Roosevelt, Fisher (1933a) wrote, “No one is happier than I over the prospect of the passage of the reflation legislation,” referring to the Agricultural Adjustment Act, which included the Thomas Amendment giving the president unprecedented powers to reflate. George F. Warren, though, had the ear of the president. “George F. Warren was the first person who ever advised a President of the United States to raise the price of gold,” begins Pearson, Meyers, and Gans (1957, p. 5598), a detailed description of Warren’s role in Roosevelt’s inner circle.

Keynes (1933) wrote an open letter to Roosevelt, published in the *New York Times*, calling for the U.S. government “. . . to create additional current incomes through the expenditures of borrowed or printed money.” Although today Keynesian stimulus often is narrowly construed as the real mechanisms of Keynesian hydraulics, Keynes’s emphasis in this letter is on “governmental loan expenditure” as “the only sure means of obtaining quickly a rising output at rising prices.” Keynes prescribed unbacked fiscal expansion: nominal-liability-financed deficits with no promise to raise future taxes to pay off the debt.

We do not claim that Roosevelt consciously engineered an unbacked fiscal expansion. Nor do we believe that he had in mind the precise economic mechanisms that we identify as critical to the recovery. There were false starts, such as the National Industrial Recovery Act of 1933, which in addition to being ruled to contain unconstitutional features, likely slowed recovery [Cole and Ohanian (2004)]. But his “try anything” macroeconomic approach contained the essential ingredients for an unbacked fiscal expansion: suspension of the gold standard, a commitment to run debt-financed emergency deficits until specified parts of the state of the economy improved, and a policy decision not to sterilize gold inflows, which permitted the monetary base to grow without further increases in government indebtedness for monetary reasons.

The paper does not try to use a formal model to reproduce recovery-period data, as Cole and Ohanian (2004) and Eggertsson (2008) do. In that tumultuous period, economic agents confronted an entirely new and ever-evolving economic structure. Interpretations that rely on modeling conventions like well-understood policy rules and rational expectations are difficult to align with the historical facts. Instead, we use theory to frame the issues and to interpret the history and the data.

3 CONTACTS WITH LITERATURE

Our argument that the *joint* monetary-fiscal mix that underlies an unbacked fiscal expansion spurred recovery in the 1930s contrasts with existing explanations, which frequently attribute diminished roles to both monetary and fiscal policy. Existing studies argue that the combination of dollar devaluation, the departure from the gold standard, regime change, expansion of the monetary base, and rising inflation expectations account for the recovery. Our unbacked fiscal expansion interpretation broadly agrees with many of these arguments, but links them to the monetary and fiscal policies of the 1930s.

Another distinction concerns the view that monetary policy made no substantive contri-

bution to the recovery. Friedman and Schwartz (1963), for example, conclude the immediate recovery “owed nothing to monetary expansion” [p. 433]. Wicker (1965) attributes Fed inaction to a leadership vacuum and the Fed’s incomplete understanding of how monetary policy affects the economy and the price level. Meltzer (2003, p. 273) flatly declares that “...in the middle and late thirties, just as in the early thirties, the Federal Reserve did next to nothing to foster recovery.”

We argue that by ensuring short-term interest rates did not rise with inflation throughout the 1930s, the Fed permitted unbacked fiscal expansion to reflate the economy. Expansions in nominal debt that do not portend higher future taxes raise household wealth at prevailing prices and interest rates. Bond holders convert higher wealth into higher aggregate demand. Some of the increased demand shows up in aggregate price levels, but if prices do not adjust instantaneously, some demand raises real economic activity. If interest rates are pegged, monetary policy prevents the nominal debt expansion from raising debt service enough to put debt on an explosive path. In this manner, Federal Reserve policy fulfilled a critical role: it permitted higher price levels to bring the real market value of debt in line with the expected present value of the primary surpluses that back debt.⁷ Monetary and fiscal policy are equal partners in successful unbacked fiscal expansion.

The economic consequences of the unbacked fiscal expansion that began in 1933 rationalize why concerns that expanding federal debt would threaten the U.S. government’s creditworthiness were not realized. Studenski and Krooss (1952, p.428) summarize a key feature of unbacked fiscal expansion:

“In its early years, the New Deal administration itself believed that the public credit could not sustain continuous budgetary deficits and increases in the public debt. But in practice this also proved incorrect. The public credit did not collapse under the burden of increased public debt. On the contrary, government credit grew stronger, interest rates on new government borrowing declined steadily, and the Treasury found it increasingly easy to finance its operations.”

Unbacked expansions raise prices and real GNP to ensure that higher nominal debt does not transform into a higher debt-output ratio.

The initial impetus for recovery came from dollar devaluation and departure from the gold standard, which signaled a change in policy regime that raised inflation expectations, according to the consensus view. We agree that these elements all contributed to the recovery, particularly in commodity prices, but argue they cannot account for the rapid pick up in the price level and output in isolation. Temin and Wigmore (1990) offer evidence that dollar devaluation in 1933 signaled that Roosevelt had abandoned the deflation associated with adherence to the gold standard and that the lower dollar directly increased aggregate demand and indirectly raised prices and production throughout the economy. Hausman (2013) supports Temin and Wigmore’s hypothesis by showing that increased agricultural incomes bolstered auto sales in rural areas. Hausman, Rhode, and Wieland (2019) offer evidence that the redistribution of income to constrained farmers in the spring of 1933 links devaluation to higher agricultural incomes and aggregate demand. Their framework

⁷Leeper (1991), Sims (1994), Cochrane (1999), and Woodford (2001) describe this mechanism. Bianchi and Melosi (2017, 2018) formally model unbacked fiscal expansion.

abstracts away from macro policies to focus instead on the role of microeconomic channels through which the nominal effects of monetary and fiscal policies operated. Romer (1992), however, makes a forceful case that the dollar depreciation after April 1933 cannot account for the sustained increases in subsequent price levels. We agree with Romer and point out—as do Jalil and Rua (2017)—that both Britain and France experienced similar depreciations in their currencies after leaving gold, yet prices and output did not rise as they did in the United States.

Our work complements Jalil and Rua’s narrative evidence on the role of rising inflation expectations in the recovery of 1933. We ground those expectations in the prevailing monetary-fiscal policy mix.

Our narrative shares some elements with Eggertsson (2008), but the economic mechanisms differ in important ways. Eggertsson emphasizes a regime change in policy dogmas from Hoover to Roosevelt and relies on new Keynesian mechanisms for escaping from the lower bound on the nominal interest rate, with expectations anchored on an eventual return to the conventional active monetary/passive fiscal policy mix.⁸ Eggertsson’s story rests on the coordinated action of monetary and fiscal policy to maximize household utility. In the presence of distorting taxes, higher deficits provide an incentive for the Fed to keep interest rates low for an extended period of time, to manage the value of outstanding debt. Monetary policy mitigates tax distortions by committing to generate inflation when the Fed has the freedom to do so—that is, once the zero lower bound ceases to bind. In this way, the time-consistent policy generates the same stimulatory mechanisms that Eggertsson and Woodford’s (2003) optimal commitment policy delivers.

This interpretation faces two difficulties. First, it requires substantial policy coordination. Eccles (1951) describes a highly decentralized Federal Reserve, both in its operations and in its objectives, an account that Wicker (1966), Wheelock (1991), and Meltzer (2003) confirm. Federal Reserve officials frequently voiced concerns about the prospect of inflation, even during the deflationary years in the early 1930s [Meltzer (2003, p. 280)].⁹ Second, Eggertsson’s mechanism leans heavily on rational expectations at a time when the entire monetary system had no precedent. It is difficult to square that history with Eggertsson’s sophisticated and single-mindedly inflationary Fed behavior. Unbacked fiscal expansion does not require rational expectations, as Eusepi and Preston (2012) and Sims (2016a) show. In this important sense, our mechanism is far less demanding than is Eggertsson’s.

History was not nearly as linear as our unbacked fiscal expansion interpretation makes it seem. Disparate viewpoints about the depression battled for “the soul of FDR,” in Stein’s (1996, ch. 6) memorable phrase. A 1932 “Memorandum” written by three young Harvard economists nicely distills those disparate views. The document denounces “the failure on the

⁸Leeper (1991) defines an active policy authority as free to pursue its objective, while a passive authority is constrained by the behavior of the active authority and optimizing private behavior. In a model like Eggertsson’s, a determinate bounded rational expectations model requires either an active monetary policy with a passive fiscal policy or vice versa.

⁹Some academic economists backed those voices. Eleanor Lansing Dulles (1933, p. V) at the University of Pennsylvania drew on the French experience in the 1920s to write in November 1933 that the United States faced “serious dangers” from inflation: “Inflation takes many forms, Government debt is the most insidious. . . .” Oliver Sprague, a Harvard professor and advisor to Roosevelt’s first treasury secretary William Woodin, opposed leaving gold, warning that America was “in great danger of a great inflation such as Germany had” [Pearson, Meyers, and Gans (1957, p. 5616)].

part of the government to adopt other than palliative measures” to combat the depression [Currie, White, and Ellsworth (2002, p. 534)]. Viewpoints Roosevelt contended with included: (1) economists who believe the depression cannot be stopped and any efforts to do so interfere with the “natural” functions of the economy; (2) those who believe the economy is so poorly understood that government efforts are likely to make matters worse; (3) some who adopt the view that depressions are cleansing and purge inefficiencies; (4) a group, like the Memorandum’s authors, who “believe that recovery can and should be hastened thru [sic] adoption of proper measures.”¹⁰

Roosevelt clearly sided with the fourth group, at least in the early years of the recovery.

4 WHY UNBACKED FISCAL EXPANSION?

Contemporary supporters and critics understood that Roosevelt’s price-level objective entailed a permanent increase in prices to 60 percent above their long-run average. But a permanent revaluation of the dollar price of gold required leaving the gold standard.

Result 1. *Under the gold standard with a fixed parity—the classical gold standard—monetary and fiscal policies cannot achieve any desired price level.*

Straightforward economic logic underlies this result.¹¹ Private holdings of gold, which standard asset-pricing reasoning determines, establish the goods value of gold—the aggregate price level. The Euler equation for private gold demand implies that

$$\frac{P_t^g}{P_t} = E_t \sum_{T=t}^{\infty} q_{t,T} \frac{u_{G,T}}{u_{c,T}} \quad (1)$$

where P_t^g is the dollar price of gold, P_t is the price level, $q_{t,T}$ is the stochastic discount factor, $u_{G,T}$ is the marginal utility of gold holdings, and $u_{c,T}$ is the marginal utility of consumption. When the dollar price of gold is fixed at $P_t^g = \bar{P}^g$, expression (1) implies that the marginal rate of substitution between gold and consumption uniquely determines the equilibrium price level.

Monetary policy must passively adjust to accommodate the price level consistent with the pegged price of gold, according to Keynes’s famous “rules of the gold standard game” [McKinnon (1993)]. Fiscal policy must passively adjust primary surpluses to provide gold backing for outstanding government debt at that price level [Bordo and Kydland (1995)]. This establishes that leaving the gold standard and abandoning convertibility were necessary to achieve FDR’s price-level objective.

Definition 2. *Unbacked fiscal expansion increases government expenditures on purchases or transfers, issues nominal bonds to cover the deficit, and persuades people that surpluses will not rise to finance the bonds.*

¹⁰Two authors went on to play critical roles in policy: Currie at the Federal Reserve Board, Treasury, and the White House; White at the Treasury where, together with Keynes, he created the Bretton Woods system.

¹¹See Barro (1979) or Goodfriend (1988) for details. Appendix B provides a complete model, calculations, and proofs for all the theoretical results in the paper.

Simple theory makes this definition precise and illustrates the price-level consequences of unbacked fiscal expansion. A representative household receives a constant endowment, derives utility from consumption and real money balances, and holds initial nominal wealth in the form of nominal money and bonds, $A_0 \equiv M_{-1} + B_{-1}$. Nominal bonds at t sell at price $1/(1+i_t)$ and pay \$1 at $t+1$; money earns no interest. The household's intertemporal budget constraint at time 0 is

$$E_0 \sum_{t=0}^{\infty} q_{0,t} \left[c_t + \frac{i_t - 1}{i_t} m_t \right] = \frac{A_0}{P_0} + E_0 \sum_{t=0}^{\infty} q_{0,t} [y_t - \tau_t] \quad (2)$$

$q_{0,t}$ is the stochastic discount factor for the date-0 value of goods at t , m_t is real money balances, and τ_t is lump-sum taxes net of transfers. Money demand yields the liquidity preference schedule $m_t = L(i_t, c_t)$.

To close the model, we assume the central bank pegs the nominal interest rate, $i_t = \bar{i}$, to approximate Federal Reserve behavior after 1933. Fiscal policy sets $\tau_t = \bar{\tau} + \varepsilon_t$, where $E_t \varepsilon_{t+j} = 0$ for $j > 0$, and government purchases are zero. Applying these policy rules, imposing goods- and bond-market clearing on (2), and evaluating expectations yields the equilibrium condition

$$\frac{M_{-1} + B_{-1}}{P_0} = L(\bar{i}, \bar{y}) + \tau_0 + \frac{\beta}{1 - \beta} \bar{\tau} \quad (3)$$

The real value of government liabilities equals the expected present value of seigniorage revenues plus primary surpluses.

Lower τ_0 financed by newly issued B_0 is an unbacked fiscal expansion. Higher transfers with no offsetting future taxes shift resources from the government to households. This positive wealth effect induces households to attempt to raise their consumption paths. Higher demand for goods raises their price, P_0 , which reduces the real value of the household's initial nominal assets, A_0/P_0 . This negative wealth effect must be large enough to eliminate the excess demand for goods at time 0, and make households happy to consume their endowments.

Corollary 3. *Unbacked fiscal expansion is infeasible under a classical gold standard.*

Unbacked fiscal expansion requires active fiscal behavior; the government does not use future surpluses to stabilize debt. Condition (3) uniquely determines the price level as a function of the expected present value of primary surpluses including seigniorage revenues—the right side—and outstanding nominal government liabilities. Asset-pricing condition (1) determines the price level as a function of the gold price, \bar{P}^g , and prevailing conditions in the gold market. These two price levels will generally be different.

When the price level consistent with \bar{P}^g is too low to satisfy (3), the real value of debt exceeds its real backing. Households will over-accumulate government bonds to violate their optimality conditions. When the price level under the gold standard is too high, households will refuse to buy bonds, and the government will violate its budget constraint. By either outcome, no equilibrium exists.

Result 4. *Unbacked fiscal expansion permanently raises the price level.*

A one-time unbacked fiscal expansion raises P_0 in equilibrium condition (3). To see that this increase is permanent, examine how nominal government liabilities at time 0 change. Both real money balances, $M_0/P_0 = L(\bar{i}, \bar{y})$, and real debt, $B_0/P_0 = \bar{\tau}/(1 - \beta)$, remain unchanged because they do not depend on τ_0 , and monetary policy pegs the interest rate. With the change in price level, ΔP_0 , given by the equilibrium condition, both M_0 and B_0 expand in proportion to ΔP_0 . In the absence of any further disturbances, nominal liabilities remain at those permanently higher levels, as does the price level.¹²

These theoretical points establish that an appropriately scaled unbacked fiscal expansion could, in principle, achieve FDR’s price-level objective and that ending convertibility of dollars for gold was a necessary first step. But why did Roosevelt take the fiscal step, rather than rely on a purely monetary solution?

4.1 MONETARY POLICY

In the wake of the Federal Reserve’s “inactivity” in the worst years of the depression, Congress feared that any recovery would be stymied by continued Fed inaction [Meltzer (2003, p. 459)]. The Thomas Amendment of May 1933 granted the Executive unprecedented monetary powers, which included fixing the gold value of the dollar, issuing greenbacks, and ordering the Fed to buy Treasury securities. This action aimed to ensure the Fed could not act to thwart the stimulative impacts of fiscal expansion.

Enter Klüh and Stella (2018) who argue that the Gold Reserve Act of 1934 undermined the Fed’s ability to reverse the stimulus through open-market operations. The Act gave to the Treasury legal title to all monetary gold. Treasury bought gold by issuing gold certificates, which could be held only by the Fed and were redeemable *in dollars* only at the Treasury’s discretion. Treasury gold purchases raised the Fed’s monetary liabilities—Treasury deposits at the Fed—without commensurate increases in liquid assets. By the end of 1936, the Fed’s total monetary liabilities were \$10.89 billion, but only \$2.43 billion of assets were liquid: over 80 percent of the Fed’s assets were irredeemable gold certificates.¹³

Klüh and Stella (2018, p. 4) observe that Fed officials “understood they could not win a war of attrition with the Treasury.” The Treasury could undertake gold purchases to expand reserves without limit, secure in the knowledge that it was infeasible for the Fed to sterilize them.

Operational factors combined with institutional features of the Federal Reserve System in the early 1930s to reduce the Fed to “impotence,” according to Eccles (1951). At the time, there was no single Federal Reserve policy; there was a policy for each regional Reserve Bank and the Board of Governors. Eccles emphasizes that Reserve Banks were beholden to their directors, who acted in the private interests of bankers. Before accepting the nomination to chair the Federal Reserve Board, Eccles insisted on institutional reforms that consolidated decision-making power in Washington, D.C. The Banking Act of 1935, among other things,

¹²Because the expansion in M_0 depends on $L(\bar{i}, \bar{y})$, rather than directly on the size of the deficit, this is not conventional money financing of deficits, as in Sargent and Wallace (1981). Instead, the money supply expands passively to ensure the money market continues to clear at the pegged nominal interest rate \bar{i} .

¹³Board of Governors of the Federal Reserve System (1937). Total monetary liabilities are Federal Reserve and Federal Reserve Bank notes outstanding plus bank reserves; total liquid assets are gold reserves plus U.S. Treasuries. Gold certificates remain on the Fed’s balance sheet today.

changed the decision-making process at the Fed, which Eccles describes:

“...before a uniform decision could be reached...there had to be a complete meeting of the minds between the governors of the 12 Reserve banks and the 108 directors of those banks, plus the FRB in Washington. A more effective way of diffusing responsibility and encouraging inertia and indecision could not very well have been devised.” Eccles (1951, p. 170)

While the Fed could not sterilize the Treasury’s gold purchases, monetary policy also did little to advance Roosevelt’s economic agenda. After only minor actions in 1933, the Fed conducted no open-market operations after November 1933. This inactivity occurred against a backdrop of current and former Fed officials publicly expressing concerns about the loss of Fed authority and the possibility of run-away inflation. After leaving his position as Fed Chairman on May 10, 1933, Eugene Meyer wrote that “...the mere fact that the Administration has assumed responsibility for defining our monetary policies and fixing our price goal, indicates a subordinate role for the Federal Reserve System” [Meyer (1934)]. Adolph Miller, one of the original governors of the Federal Reserve System, who served until 1936, was vociferous in calling for a return to gold, fearing the discretion that underlies a “managed currency,” which he called “human nature money” [Miller (1936, p. 4)].

At a practical level, it was not clear that monetary stimulus would be effective. There was no assurance, particularly on the heels of sequential banking crises, that higher reserves would lead to higher bank deposits. Nor was it certain that higher deposits, if they were forthcoming, would ultimately increase bank loans to finance new investment.¹⁴

As it happened, banks, worried about the Federal Reserve’s failure to fulfill its lender-of-last-resort function, behaved conservatively and expanded holdings of government bonds, rather than loans to the private sector. From March 1933 to June 1940, annual growth rates of narrow money far outstripped those of broad money: reserves (23.1 percent), base (12.8 percent), M1 (7.7 percent), and M2 (5.2 percent). This was a very different pattern from the 1920s when M2 averaged 3.2 percent annual growth and reserves averaged 2.8 percent.

4.2 FISCAL POLICY

Unbacked fiscal expansion served several of FDR’s objectives. Given his strong support in Congress, particularly from “inflationists” like Senators Thomas and Connally, fiscal policy was largely under the president’s direct control. Federal Reserve actions, to FDR’s frustration, were beyond his control.

Fiscal policy also served political objectives. By providing immediate relief to the unemployed, farmers, and the “forgotten man,” federal expenditures tamped down domestic unrest. Direct relief was a highly visible indicator that the federal government had the common man’s interests at heart, helping to re-establish confidence in policy institutions. Finally, economists and politicians alike understood that deflation had redistributed wealth from debtors to creditors. Reflation, and the fiscal actions underlying it, were deliberate

¹⁴Although Bordo and Sinha (2018) argue that the \$1 billion open-market operation in 1932 was stimulative.

efforts to reverse that redistribution.¹⁵ Roosevelt’s attitudes toward redistribution shone through in a letter to Secretary of the Treasury Woodin: “I wish our banking and economist friends would realize the seriousness of the situation from the point of view of the debtor classes—i.e., 90 percent of the human beings in this country—and think less from the point of view of the 10 percent who constitute creditor classes” [Roosevelt (1933a)].

Roosevelt walked a fine line on fiscal policy, seeming to maintain contradictory positions. During the 1932 campaign for president, he harshly criticized Hoover’s deficits and took a “Pittsburgh pledge” to balance the budget by reducing expenditures [Roosevelt (1932a)]. Just six months earlier he delivered his famous speech about “the forgotten man at the bottom of the economic pyramid” [Roosevelt (1932b)]. That speech characterized the depression as a “more grave emergency” than World War I and called on government to restore the purchasing power of farmers and rural communities and assistance to homeowners and farmers facing foreclosure.

Six days after taking office, Roosevelt sent to Congress a proposal to cut federal spending by an amount equal to nearly 14 percent of total expenditures. Cuts eliminated government agencies, reduced federal worker pay, and, most critically in light of the politics of the time, shrank veterans’ benefits by half. When the Economy Act of 1933 was finally signed into law, the spending cuts amounted to a little under seven percent of expenditures, but Roosevelt could point to the legislation to help establish his bona fides as a “sound finance” man.

Just 20 days into his administration, Roosevelt created fresh fiscal nomenclature in a press conference. Asked when it might be possible to balance the budget, the president replied, “. . . it depends entirely on how you define the term, ‘balance the budget’” [Roosevelt (1933b, p. 13)]. His reply spawned the distinction between “ordinary” and “emergency” expenditures, which became institutionalized in Treasury Reports.¹⁶

FDR was more comfortable with deficits by 1936. In the face of precipitous declines in tax receipts, he argued that “To balance our budget in 1933 or 1934 or 1935 would have been a crime against the American people” [Roosevelt (1936b)]. And in response to budget director Lewis W. Douglas’s argument that the only way to project a balanced budget in 1936 was to cut spending, Roosevelt replied, “No, I do not want to taper off [spending programs] until the emergency is passed” [Rosen (2005, p. 85)]. On the other hand, he supported tax hikes in 1935 and 1937.

Why did FDR waffle so on fiscal policy? It is possible, as Stein (1996) suggests, that Roosevelt was tentative and uncertain about fiscal stimulus. But the waffling may have been

¹⁵Fisher (1934, ch. VI) thoughtfully discusses how to arrive at a “just” price level that balances the losses of borrowers and creditors. Eccles (1933) pointed to the redistribution of wealth as a source of the prolonged depression: “During the period of the depression the creditor sections have acted on our system like a great suction pump, drawing a large portion of the available income and deposits in payment of interest, debts, insurance and dividends. . . .”

¹⁶The reply continued: “What we are trying to do is to have the expenditures of the Government reduced, or, in other words, to have the normal regular Government operations balanced and not only balanced, but to have some left over to start paying the debt. On the other hand, is it fair to put into that part of the budget expenditures that relate to keeping human beings from starving in this emergency? I should say probably not. . . You cannot let people starve, but this starvation crisis is not an annually recurring charge. I think that is the easiest way of illustrating what we are trying to do in regard to balancing the budget. I think we will balance the budget as far as the ordinary running expenses of the Government go” [Roosevelt (1933b, pp. 13–14)].

deliberate. His distinction between “ordinary” and “emergency” government expenditures was central to communicating that unbacked fiscal expansion was state-contingent. Linking the state-contingent emergency expenditures tightly to the economic emergency—through both their timing and their labels—Roosevelt drove home their temporary nature. At the same time, by demonstrating fiscally responsible ordinary spending, he could reassure his critics, particularly bankers, that once the crisis passes, he would balance the budget. Roosevelt’s January 1936 budgetary address made this point explicit when he said, “. . .it is the deficit of today which is making possible the surplus of tomorrow” [Roosevelt (1936c)].

5 EMPIRICAL FACTS AND THEORETICAL INTERPRETATIONS

This section presents a variety of facts about the state of the U.S. economy throughout the 1920s and 1930s. It offers some evidence that corroborates the interpretation that unbacked fiscal expansion spurred recovery. In the figures that follow, we contrast the performance of economic variables during the “gold standard” (January 1920 to March 1933) to their behavior during the “unbacked fiscal expansion” (April 1933 to June 1940). Data are quarterly. Vertical bars in the figures at April 1933 mark America’s departure from the gold standard.

The section also lays out a new Keynesian model to contrast fiscal multipliers under Keynesian hydraulics and unbacked fiscal expansion. We then use the theory to interpret government debt dynamics and the returns to debt.

5.1 MACROECONOMIC INDICATORS

The price level, however measured, decreased by roughly 30 percent from the stock market crash in October 1929 to its trough in April 1933 when the United States abandoned the gold standard (right panel figure 2). Although consumer and wholesale prices and the GNP deflator rose through most of the 1930s, they never regained the 1920s levels that various policymakers desired.

Like prices, output also plunged after the stock market crash and rebounded with the abandonment of the gold standard. The left panel of figure 2 shows that real GNP fell by roughly 25 percent from peak to trough, as measured on an annual basis. GNP hits its trough in the first quarter of 1933. Industrial production dropped 45 percent from peak to trough and, like consumer and wholesale prices, began a sustained recovery in April 1933. Unlike prices, GDP and industrial production eventually surpassed their pre-recession peaks.

The left panel of figure 3 shows the dollar-sterling and dollar-franc exchange rates. The first vertical line marks when the United Kingdom left gold in September 1931, which triggered a very large dollar appreciation that was reversed in April 1933. Sterling’s depreciation against the dollar is roughly comparable to its subsequent appreciation.

Figure 3’s right panel plots the level of the GNP deflator along with two interest rates—the commercial paper rate for New York and the New York Fed’s discount rate. Although during the gold standard period interest rates generally followed the decline in the price level, there are also several distinct deviations when rates rose sharply despite a flat or declining price level. For example, in October 1931, concerns about gold outflows induced most Federal Reserve banks to raise their discount rates after Britain left the gold standard, even though prices were in free fall. The Federal Reserve banks aimed to mitigate the gold outflows

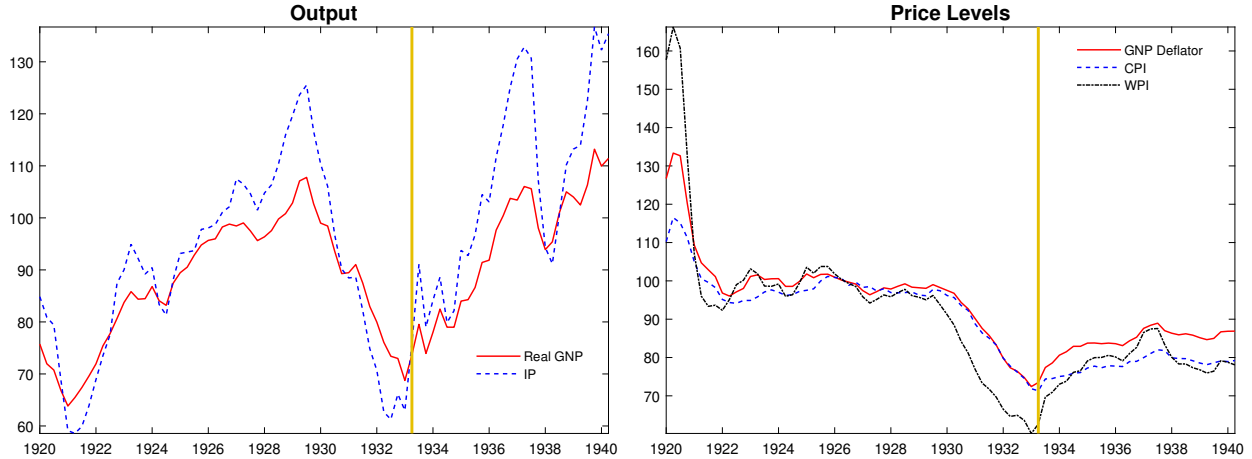


Figure 2: Measures of real economic activity and price levels. All series use 1926 base year. Vertical line marks when the United States abandoned the gold standard. Sources: Balke and Gordon (1986), Federal Reserve Board, BEA and BLS from NBER Macrohistory Database.

that dollar appreciation vis-à-vis the pound triggered. Meltzer (2003, p. 280) claims that Federal Reserve policy decisions were mostly consistent with the Riefler-Burgess and real bills doctrines.¹⁷ But these interest-rate hikes were clear attempts by the Federal Reserve to follow the gold standard’s “rules of the game” [p. 273].

After the abandonment of the gold standard in April 1933, the Federal Reserve pegged the discount rate, changing it infrequently. Meltzer (2003, p. 413) notes that the Federal Reserve made few changes to its market portfolio and discount rates from 1933 to 1941. If anything, rates moved against the price level: the Fed was not adjusting policy to combat higher prices; instead, it was permitting price-level rises to devalue outstanding government bonds.

The top panel of figure 4 plots the monetary base and the monetary gold stock; the bottom panel plots the gold cover ratio. The large jumps in gold stock and the ratio in 1934 stem from the revaluation of gold to \$35 an ounce. Steady increase in the two monetary measures during the unbacked fiscal expansion period reflects the Roosevelt Administration’s decision not to sterilize gold inflows. That decision was reversed in 1937, reducing the growth rate of the base [Irwin (2012)] (see appendix C for more details on sterilization).

For a couple of years before the gold revaluation, the cover ratio was precariously low, imposing a severe constraint on the level of the monetary base. Eichengreen (1992) recounts events during February and March 1933 when the New York Fed was at its statutory 40 percent minimum gold cover ratio, which prevented it from rediscounting bills. Initially, other reserve banks discounted bills on New York’s behalf. By March 3 the Chicago Fed, which held the bulk of the System’s excess gold, refused to provide further assistance to New York for fear that it would be unable to help banks in the Chicago district. These tensions,

¹⁷Meltzer (2003, p. 282) elaborates that under the Riefler-Burgess framework, policymakers focused on borrowed reserves and short-term market interest rates as key signals of bank demand.

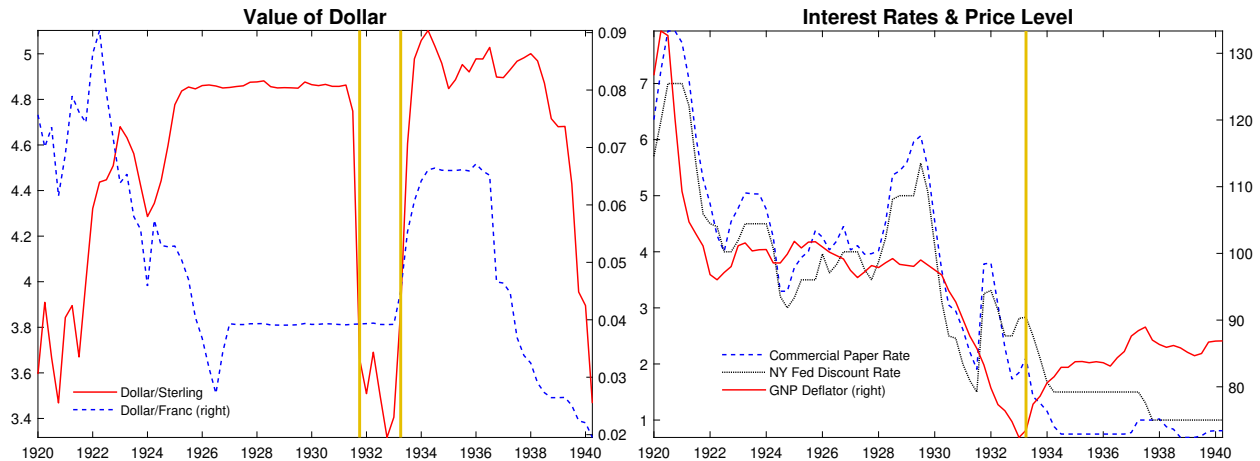


Figure 3: Exchange rates, inflation, and interest rates. Exchange rates in dollars per foreign currency; inflation is annual (quarter over four quarters prior). First vertical line marks when the United Kingdom abandoned the gold standard; second line marks when the United States abandoned the gold standard. Sources: Federal Reserve Board (1943).

which stemmed from the absence of a coherent *national* monetary policy, exacerbated the already tenuous state of commercial banks and raised doubts about the credibility of the System’s commitment to gold parity.

Official revaluation of gold in January 1934, by almost 60 percent, increased the cover ratio sharply and it remained close to 0.90 for the remainder of the decade. Gold no longer constrained policy behavior as it had before April 1933, a point that is central to the theory of unbacked fiscal expansion.

Table 1 reports the highs and lows of GNP and its components. By 1937, constant-dollar GNP exceeded its 1929 high, but investment remained below its high. In current dollars, GNP and its components did not regain their 1929 peaks. Monetary aggregates fell in the early 1930s as financial unrest lead to contractions in deposits and cash hoarding by the public. Total deposits in all banks fell 30 percent between 1929 and the low point in 1932–33. Deposits bounced back to their pre-depression levels by 1937. Loans, which declined over 50 percent never regained their previous level. Bank holdings of U.S. government obligations largely filled the asset void left by loans, tripling between 1929 and 1937.

5.2 POLICY BEHAVIOR

Many authors have noted that adherence to the gold standard imposed severe constraints on monetary and fiscal policies by focusing policy authorities on international considerations at the expense of domestic conditions [see Wicker (1966) for discussions of monetary policy constraints]. Eichengreen (2000) argues that the gold standard prevented governments from reflating: “So long as the gold standard remained in place, the commitment to defend the central bank’s gold reserves and stabilise the gold parity was an insurmountable obstacle to

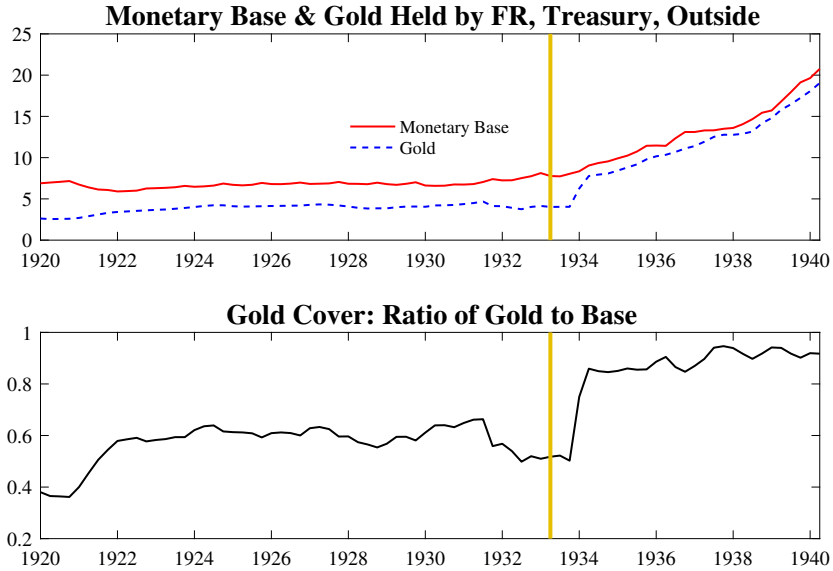


Figure 4: Monetary base and gold held by Federal Reserve banks. Monetary base is currency in circulation plus non-borrowed reserves. Vertical line marks when the United States abandoned the gold standard. Source: Federal Reserve Board (1943) from NBER Macrohistory Database.

	1929	1932-33	1937
	High	Low	High
Annual data			
In 1939 prices, billions of dollars			
GNP	85.9	61.5	87.9
Gross domestic investment	14.9	1.1	11.4
In current prices, billions of dollars			
GNP	103.8	55.8	90.2
Gross domestic investment	15.8	0.9	11.4
Consumption	78.8	46.3	67.1
Biannual data			
All banks, billions of dollars			
Total deposits	59.8	41.5	59.2
Loans	41.9	22.1	22.1
U.S. government obligations	5.5	8.2	17.0

Table 1: Sources: Gordon (1952, p. 390) and Federal Reserve Board (1943).

the adoption of expansionary policies.” Apropos of fiscal policy under the gold standard, when taxes must back government debt, is Eichengreen’s statement: “Deficit spending could not be used. . .if deficit spending could not be financed.”

Figure 5 illustrates precisely the constraint on monetary policy that Eichengreen has in mind. Dashed lines are interest rates and the solid line is the growth rate of the gold stock. A shrinking gold stock usually induced Federal Reserve banks to raise interest rates

to attract gold from abroad, which arrived with a lag. And when Federal Reserve banks lowered interest rates, gold would flow out of the United States. But in the early 1930s, as figure 3 shows, these interest-rate movements occurred in the face of a steadily falling price level. The Fed’s actions aimed to stabilize exchange rates at the expense of domestic prices.

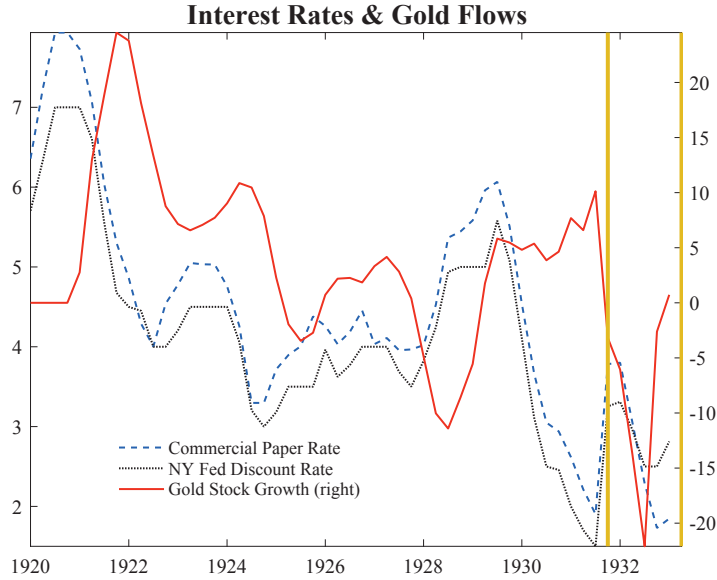


Figure 5: Interest rates and growth rate of monetary gold stock. Growth rate annual (quarter over four quarters prior). The vertical line marks when the United Kingdom abandoned the gold standard. Sources: Federal Reserve Board (1943).

5.2.1 EMERGENCY SPENDING Our interpretation of the 1930s recovery relies on a monetary-fiscal policy mix that was possible only after abandoning the gold standard. The top panel of figure 6 plots three measures of the federal budget surplus: gross, primary, and “ordinary,” defined as total receipts less what are labeled “ordinary” expenditures. All three measures deteriorated sharply as economic activity contracted in the early 1930s. Falling surpluses stemmed from declining revenues due to lower corporate and income tax receipts and rising expenditures due to increased public works spending. Although Roosevelt touted the evils of deficits and was more outspoken than President Herbert Hoover in his promise to cut expenditures, until the second half of the decade he did little to convert primary deficits to primary surpluses.¹⁸

Deficits remained sizeable until 1936, despite growing receipts from 1934 onward [table 2]. To reassure the public that fiscal finances were “sound,” Roosevelt’s Treasury drew a clear line between “ordinary” and “emergency” government expenditures.¹⁹ With the exception of

¹⁸Stein (1996, p. 87) notes that, at least initially, Roosevelt was able to “rise above” his belief in reducing expenditures to do what he considered necessary, which was increasing spending.

¹⁹The annual reports of the Treasury categorize federal government expenditures chargeable against ordinary receipts in “general” and “emergency” categories in fiscal years 1934 and 1935. From 1936 to 1939, these categories are labeled “general” and “recovery and relief.” Before Roosevelt took office, expenditures were divided into “ordinary” and another category to retire public debt. In his annual budgetary messages in 1934

	1929	1930	1931	1932	1933	1934	1935	1936	1937
Total Receipts	4033	4178	3317	2121	2080	3116	3801	4116	5294
Total Expenditures (excluding debt retirements)	3299	3440	3780	4594	4681	6745	6802	8477	8001
Regular	3299	3440	3780	4594	4681	2741	3148	5186	5155
Emergency	0	0	0	0	0	4004	3655	3301	2847
Regular Deficit	-734	-738	463	2473	2601	-375	-653	1070	-139
Deficit	-734	-738	463	2473	2601	3629	3001	4361	2707

Table 2: Millions of current dollars. “Emergency” expenditures are variously labeled as “emergency organization expenditures,” “major expenditures due to or affected by the depression,” “recovery and relief,” or “public works.” Designations of types of spending as “regular” or “emergency” changed over time. A negative deficit is a surplus. Source: Department of the Treasury (various).

1936, when large veterans’ bonuses were paid out, Roosevelt could claim that he balanced the “ordinary” budget [left panel of figure 6].

From 1934 to 1937, emergency expenditures ranged from one-third to over one-half of total federal expenditures [table 2]. Emergency expenditures fall into three categories—public works, relief, and other spending. Table 3 shows that public works expenditures—public highways, Hoover dam, reclamation projects, improvements of rivers and harbors, flood control, and the Tennessee Valley Authority—doubled under Roosevelt. But Hoover also doubled public expenditures from historical averages. Roosevelt’s public works program included \$3.3 billion in funds allocated to the Public Works Administration (PWA) which also made loans for private construction in addition to federal projects.

Roosevelt’s relief spending, a mixture of direct relief and works projects, was the largest emergency expenditure category in most years. The Federal Emergency Relief Administration (FERA) established in May 1933 replaced many of the relief efforts of the Reconstruction Finance Corporation (RFC) implemented under Hoover in January 1932. While the RFC lent primarily to institutions such as states, public entities, or distressed financial institutions, the FERA made direct grants to states totaling \$3.1 billion from 1934 to 1936. States used proceeds from the FERA for direct relief along with relief programs including sanitation improvements, repair or construction of public buildings, national park improvements, and loans and grants to financially troubled farmers. [Studenski and Krooss (1952, pp. 374, 411) and Fishback, Kantor, and Wallis (2003)].

In contrast to the FERA, the Civil Works Administration (CWA) operated directly under the federal government and focused on works projects such as building and improving sewer pipes, roads, schools, playgrounds, and airports as well as employing teachers, writers, and artists.²⁰ From 1934 to 1935, the CWA included \$1 billion in federal relief expenditures and employed four million workers. The Works Progress Administration (WPA) followed the

and 1935 and in a fireside chat on Monday, July 24, 1933, Roosevelt refers to non-emergency expenditures as “regular” expenditures. We use the terms regular and ordinary interchangeably to refer to non-emergency expenditures.

²⁰<https://slate.com/news-and-politics/2009/01/four-million-jobs-in-two-years-fdr-did-it-in-two-months.html>

CWA and also focused on work relief by spending \$8.1 billion between 1936 and 1940 and employing 2.2 million workers per year on average [Studenski and Krooss (1952, p. 412)]. Projects included highways, slum clearance, reforestation, and rural rehabilitation.

The Civilian Conservation Corps (CCC) spent \$2.5 billion to employ three million young men from 1933 to 1942 on works projects relating to the conservation and development of natural resources [Annual Report of the Secretary of the Treasury (1940, p. 27)]. Projects included planting trees and constructing and upgrading trails and facilities at more than 800 parks nationwide. The “other emergency spending” category includes grants to the Agricultural Adjustment Administration for farm subsidies aimed at raising agricultural prices, Reconstruction Finance Corporation loans, and other farm and housing assistance including the Home Owners’ Loan Corporation created in June 1933 to assume mortgage debt of distressed homeowners amounting to \$3.1 billion [Studenski and Krooss (1952, p. 417)].

Regular operating expenditures declined under Roosevelt relative to Hoover, except for the 1936 payout of the veterans’ bonus [Hausman (2016)]. Most of the decline in regular expenditures can be attributed to the shifting of existing RFC and public works expenditures to emergency categories starting in 1934 [Annual Report of the Secretary of the Treasury (1934, p. 5)]. Although the Economy Act of 1933 cut \$243 million of regular operating expenditures by reducing the pay of civilian and military federal workers by 15 percent and decreasing veterans’ benefits by 10 percent, Congress eventually restored 95 percent of the pay cuts [Studenski and Krooss (1952, p. 404)].

5.2.2 MEASURING FISCAL IMPULSES Unbacked fiscal expansion changes the relevant measure of fiscal impulse from the surplus-output ratio to the surplus-debt ratio. In expression (3), the ultimate impact on aggregate demand and the price level depends on total real backing—right side—relative to outstanding nominal liabilities—left side. Consider the flow

	Hoover				Roosevelt			
	1930	1931	1932	1933	1934	1935	1936	1937
Regular Operating	2927.5	3028.4	3231.3	2879.4	2348.7	2676.9	4743.2	3746.0
Social Security	0	0	0	0	0	0	28.4	447.7
Total Emergency	414.4	642.5	1509.7	1801.9	4396.5	4125.4	3704.6	3802
Public Works	256.5	404.1	478.7	458.7	613.1	762.7	912.5	1079.4
Relief	0	0	0	359.5	1852.8	2360.9	2342.4	2466.8
Other	157.9	238.4	1031.0	983.7	1930.6	1001.8	449.7	255.8
Total Expenditures	3341.9	3670.9	4741.0	4681.3	6745.2	6802.3	8476.3	7995.7

Table 3: Federal expenditures by category, millions of dollars. Total expenditures exclude debt and railroad retirements. Emergency expenditures in this table contain some regular expenditures resulting in totals that are 10 to 30 percent higher than the official emergency expenditures listed in table 2. The “other emergency expenditures” category includes net loans, subscriptions to stock and surplus, and the agricultural adjustment program. Source: Annual Report of the Secretary of the Treasury (p. 354, 1937).

government budget constraint written in nominal terms

$$B_t + S_t = (1 + i_{t-1})B_{t-1}$$

where S is the primary surplus. Then the surplus-debt ratio is

$$\frac{S_t}{B_{t-1}} = (1 + i_{t-1}) - \frac{B_t}{B_{t-1}} \tag{4}$$

Declines in surpluses relative to debt raise nominal debt growth. Higher debt growth without correspondingly higher surpluses raises nominal wealth and nominal demand. This expression highlights a key point: lower initial debt, B_{t-1} , implies larger nominal debt growth from a given deficit.

Fiscal stimulus from unbacked expansion hinges on the amount of fiscal backing relative to outstanding debt. Keynesian hydraulics focuses narrowly on the size of deficits relative to the economy, leading to Brown’s (1956) oft-cited conclusion: “Fiscal policy, then, seems to have been an unsuccessful recovery device in the ’thirties—not because it did not work, but because it was not tried” [pp. 863–866].

Figure 6, right panel, contrasts the two measures of fiscal impulse. Data to the right of the vertical line shows that once government debt expansion *could* be unbacked, deficits were very large relative to debt. Between April 1933 and June 1940, primary deficits averaged 5.2 percent of GNP, but 12.5 percent of debt, almost two-and-a-half times larger.²¹

5.3 KEYNESIAN HYDRAULICS VS. UNBACKED FISCAL EXPANSION

Economic theory supports the unbacked fiscal expansion narrative. Unbacked fiscal expansions generally have much larger fiscal spending and tax multipliers than those that arise under Keynesian hydraulics. This section applies the reasoning in Beck-Friis and Willems (2017) to contrast fiscal impacts under the two monetary-fiscal regimes.²²

Consider a new Keynesian model with the aggregate demand and supply relations

$$\begin{aligned} x_t &= E_t x_{t+1} - \sigma (i_t - E_t \pi_{t+1} - r_t^n) \\ \pi_t &= \kappa x_t + \beta E_t \pi_{t+1} \end{aligned}$$

where x_t is the output gap; π_t inflation, i_t the nominal interest rate; and r_t^n the natural real rate of interest. The intertemporal elasticity of substitution and discount factor satisfy $\sigma > 1$ and $0 < \beta < 1$. Giving focus to fiscal disturbances, the natural rate of interest is

$$r_t^n = \frac{1}{\sigma + \omega^{-1}} F_t$$

where F_t is an *i.i.d.* exogenous government purchases shock and $\omega > 0$ the inverse Frisch elasticity.

²¹Aside from World War II, only the decades of the 1970s and 1980s exhibit comparable deficit-debt ratios.

²²To make the exposition transparent, we log-linearize the model around its deterministic steady state. Appendix B provides details, extensions to long-duration debt, and numerical examples.

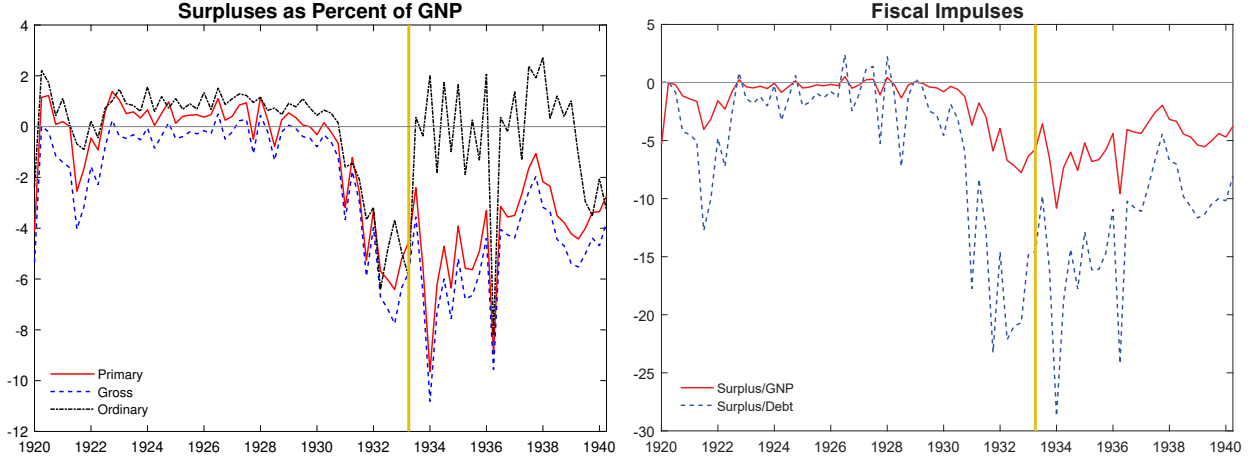


Figure 6: Surpluses defined as total receipts less expenditures, ordinary or total. Primary surplus is gross surplus less net interest payments. Vertical line marks when the United States abandoned the gold standard. Fiscal impulses defined as surplus-GNP, as in Keynesian hydraulics, and surplus-debt, as in unbacked fiscal expansion. Sources: Federal Reserve Board (1943) from NBER Macrohistory Database, and Balke and Gordon (1986). See Appendix A for more details on the data series.

The government issues one-period nominal debt to satisfy the identity

$$b_t = (F_t - T_t) + \beta^{-1} (b_{t-1} - \delta\pi_t) + \delta i_t$$

where

$$\delta = \frac{bP^M}{y}$$

is the steady-state ratio of the market value of debt to GDP; b_t a measure of the real value of debt outstanding, T_t taxes, and bond price $P^M = \beta$ in steady state. We close the model with monetary and tax policy rules

$$\begin{aligned} i_t &= \phi_\pi \pi_t \\ T_t &= \phi_T b_{t-1} + \tau_t \end{aligned}$$

where $\phi_\pi, \phi_T > 0$ and τ_t is an *i.i.d.* exogenous process.

Result 5. *Government spending and transfer impacts from unbacked fiscal expansions typically exceed those from Keynesian hydraulics alone.*

Keynesian Hydraulics. The standard Keynesian view of fiscal expansions assumes

$$|\phi_\pi| > 1$$

and

$$|\beta^{-1} - \phi_T| < 1.$$

This assignment of policy implies monetary policy actively stabilizes inflation, while tax policy passively stabilizes debt. Equilibrium inflation and debt dynamics are

$$\begin{aligned}\pi_t &= \frac{\kappa\sigma}{(\kappa\sigma\phi_\pi + 1)(\sigma + \omega^{-1})}F_t \\ b_t &= (F_t - \tau_t) + \beta^{-1}b_{t-1} - \delta(\beta^{-1} - \phi_\pi)\pi_t.\end{aligned}$$

Inflation rises when government purchases increase. This is the conventional multiplier effect of government spending associated with Keynesian hydraulics. Inflation is independent of debt and tax/transfer policy.

Define the impulse response function for inflation in response to a one percent of GDP *i.i.d.* increase in spending or transfers in period 0 under Keynesian hydraulics as $KH_F^\pi(j)$ and $KH_T^\pi(j)$ for $j \geq 0$. Then the impact effects are

$$\begin{aligned}KH_F^\pi(0) &= \frac{\kappa\sigma}{(\kappa\sigma\phi_\pi + 1)(\sigma + \omega^{-1})} \\ KH_T^\pi(0) &= 0\end{aligned}$$

and

$$\begin{aligned}KH_F^\pi(j) &= 0 \\ KH_T^\pi(j) &= 0\end{aligned}$$

in subsequent periods $j > 0$.

Unbacked Fiscal Expansion. An unbacked fiscal expansion places the restrictions

$$|\phi_\pi| < 1$$

and

$$|\beta^{-1} - \phi_T| > 1$$

on the policy parameters. Assume taxes are purely exogenous so that $\phi_T = 0$. Then aggregate dynamics are

$$\pi_t = \delta^{-1} \left(\frac{(1 - \beta\lambda_2)}{\beta} b_{t-1} + (1 - \beta\lambda_2)(F_t - \tau_t) \right) (\beta^{-1} - \phi_\pi)^{-1} + \beta\lambda_2 KH_F^\pi(0) F_t \quad (5)$$

$$b_t = \lambda_2 b_{t-1} + \beta\lambda_2 (F_t - \tau_t) + \delta((\phi_\pi - \beta^{-1})) \beta\lambda_2 KH_F^\pi(0) F_t \quad (6)$$

where $0 \leq \lambda_2 < 1$ is the model's only eigenvalue inside the unit circle. $KH_F^\pi(0)$ in (5) and (6) is the same function defined above, but evaluated at $|\phi_\pi| < 1$. In contrast to Keynesian hydraulics, an unbacked fiscal expansion makes inflation depend on all aspects of fiscal policy. Debt has monetary consequences, and the timing of taxes and transfers matter.

Consider an *i.i.d.* increase in spending or transfers of one percent of GNP in period 0. Define the impulse response functions for inflation in response to those shocks in an unbacked fiscal expansion to be $UB_F^\pi(j)$ and $UB_T^\pi(j)$ for $j \geq 0$. Then the dynamic impacts of a reduction in taxes or increase in transfers on inflation are

$$\begin{aligned}UB_T^\pi(0) &= \delta^{-1}(1 - \beta\lambda_2)\beta \\ UB_T^\pi(j) &= \lambda_2^j \beta\lambda_2\end{aligned}$$

for $j > 0$. The fact that the impact effect depends on the inverse of the debt-to-GDP ratio is relevant for later results—the smaller is outstanding debt relative to GDP the larger will be the impacts. Equivalently, the larger are deficits relative to outstanding debt, the larger the expansionary effect. Early in the recovery, deficits were almost 30 percent of debt [figure 6]. This measure of impulse is fundamentally different to standard Keynesian hydraulics logic.

We can now express the effects of government purchases on inflation as

$$UB_F^\pi(j) = KH_F^\pi(j) + [1 - \delta(\beta^{-1} - \phi_\pi) KH_F^\pi(0)] UB_T^\pi(j) \quad (7)$$

for $j \geq 0$. The effects of government purchases on inflation—and output, though not shown—in an unbacked fiscal expansion decompose into two components. The first comes from the effects of spending in the standard Keynesian story, $KH_F^\pi(j)$. This is the effect of spending when taxes back debt. The second term comes from the fact that spending does not herald future tax increases: it reflects the wealth effects of nominal debt issuance on aggregate demand. This is why the term depends on the tax multiplier: it captures the implicit reduction in taxes, of magnitude equal to the spending impulse, under an unbacked fiscal expansion.

A sufficient condition for larger impacts from an unbacked fiscal expansion than under Keynesian hydraulics is

$$\delta < \frac{\beta(\sigma + \omega^{-1})}{\kappa\sigma}$$

which standard parameter values easily satisfy. For this same reason, Keynesian hydraulics are small relative to the effects of reduced taxes. This captures the effect of nominal debt dynamics arising from the commitment not to raise taxes—an effect theoretically and empirically large. For example, taking standard parameter values in the new Keynesian model, and a debt-to-GDP ratio of 40 percent in annual terms, the present discounted value of output resulting from a one percent *i.i.d.* increase in spending is 4.14 in an unbacked fiscal expansion versus 0.977 under Keynesian hydraulics. Prices rise by 0.65 in the long run, some 42 times the size of response under Keynesian hydraulics. While only meant to be suggestive, such differences are a robust feature of the model. There are reasons to think these magnitudes are understated relative to the environment of the 1930s. Infrastructure spending and transfers to constrained households with high marginal propensities to consume, as Hausman, Rhode, and Wieland (2019) emphasize, were important features of FDR’s fiscal strategy, and both would deliver larger multipliers [table 3].

5.4 GOVERNMENT DEBT AND UNBACKED FISCAL EXPANSION

The theory of unbacked fiscal expansion just described informs how we interpret government debt dynamics in the 1930s. The expression for equilibrium real debt, equation (6), implies that debt-financed fiscal expansion is consistent with stable debt, even when that expansion does not eventually bring forth higher taxes. Theory explains why significant growth in nominal debt did not undermine public credit, as many contemporaneous critics predicted.

Figure 7 summarizes key features of unbacked fiscal expansion. The figure uses the model in section 5.3 to plot responses to an *i.i.d.* increase in government purchases, with the nominal interest rate pegged in the left panel and responding weakly to inflation in the

right panel. Fiscal policy sets taxes independently of debt. By pegging the nominal rate, monetary policy also pegs bond prices. All debt revaluation arises from a jump in the price level, so even on impact real debt rises less than nominal debt. Higher government spending raises expected inflation, so the real interest rate falls. The combination of surprise inflation and lower real debt service retire real debt back to steady state.

When monetary policy raises the nominal rate with inflation, bond prices fall to introduce an additional debt-stabilizing mechanism. The market value of real debt rises less than the par value. Because monetary policy raises the nominal rate, real interest rates decline less than under a pegged nominal rate.

With no response in future primary surpluses to the fiscal expansion, how can the value of debt rise, as it does in both panels of figure 7? The answer lies in real interest rates. Lower real rates raise the present value of the fixed stream of surpluses to increase the current value of real backing and, therefore, the value of debt.

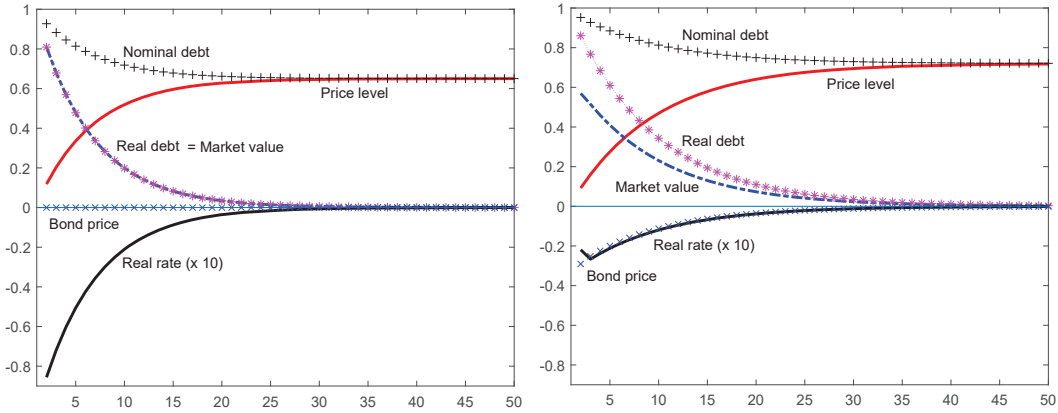


Figure 7: Responses to an *i.i.d.* increase in government purchases under unbacked fiscal expansion in the model of section 5.3. Left panel assumes monetary policy does not respond to inflation; right panel assumes monetary policy responds to inflation with a coefficient of 0.5. Taxes are independent of debt. Market value of debt is $P_t^l b_t$; see appendix B for details.

5.4.1 DEVELOPMENTS IN GOVERNMENT DEBT If FDR had intended to engineer an unbacked fiscal expansion, growth in government liabilities suggests he was successful. Nominal gross debt doubled during his first seven years in office. By comparison, seven fiscal years after the financial crisis in 2008, U.S. gross federal debt increased by a factor of 1.8.

The left panel of figure 8 plots index numbers for nominal and real federal debt. Taken together, the two panels highlight central features of unbacked fiscal expansions: despite increases in nominal debt, real debt rises less dramatically and there may be no increase at all in debt as a share of income. The index equals 100 in 1932Q2 to 1933Q1, the year leading up to America’s departure from the gold standard. After declining for a decade, nominal debt began to rise in 1931; real debt started to increase a year earlier, due to deflation. From 1933Q2 until 1940Q2, the par value of nominal debt rose 112 percent, while real debt

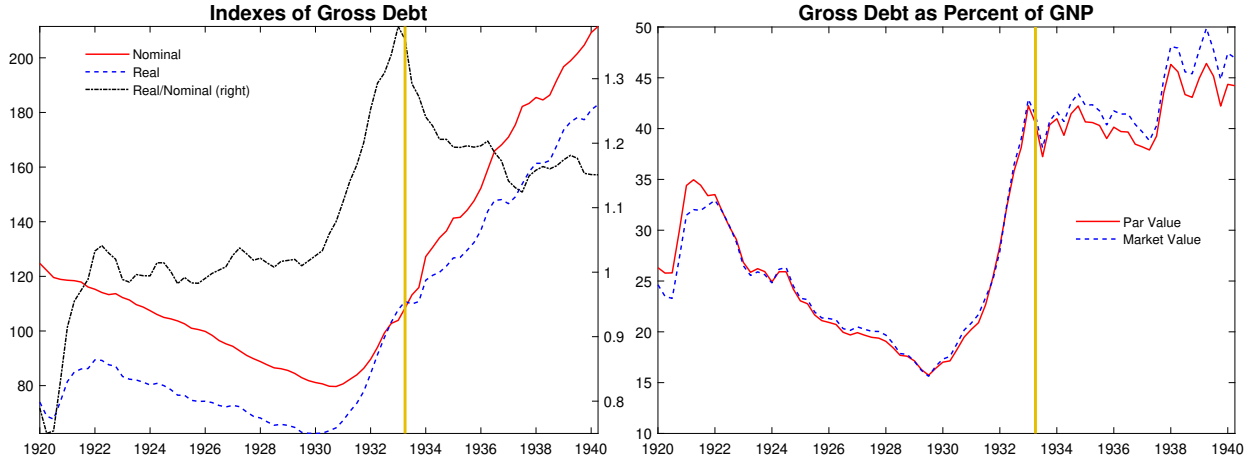


Figure 8: Par value of U.S. gross debt, real debt is par value deflated by GNP deflator. Converted to index numbers 100=1932Q2–1933Q1 (year before departure from gold standard). Nominal/Real is ratio of the two index numbers converted to percent. Par and market values of debt as percentage of nominal GNP. Vertical line marks when the United States abandoned the gold standard. Sources: Authors’ calculations, Balke and Gordon (1986).

rose 82 percent. The ratio of these indexes reached its nadir when the country left gold and then rose 19 percent by 1940Q2, but 22 percent just before the 1937–1938 recession. Those changes in the ratio measure how much debt was devalued by a higher price level.²³

More striking is the right panel of the figure. The debt-GNP ratio, whether measured at par or market value of debt, rose sharply from 15 percent in 1930 to 42 percent at the time gold was abandoned. Then it hovered around 40 percent for the next six years, until the recession raised the ratio. In the last few years of the decade, when Roosevelt abandoned the unbacked fiscal expansion policy, the debt-GNP ratio rose.

Figure 9 performs the accounting exercise that breaks the growth rate of the debt-GNP ratio in figure 8, $P_t^M B_t/P_t Y_t$, into growth rates of the three components. All three drove debt-output in the three years before Roosevelt took office. From the first quarter of 1933 on, nominal debt contributed to driving the ratio higher. That influence, though, was offset by higher prices and real GNP, with the exception of the recession of 1937–38.

5.4.2 RETURNS ON TREASURY BOND PORTFOLIO To interpret data related to the government’s bond portfolio, we require some notation.²⁴ With a complete and general maturity structure, the government’s budget identity is

$$\sum_{j=0}^{\infty} (Q_t^D(t+j) + IP_t(t+j)) B_{t-1}(t+j) = P_t s_t + \sum_{j=1}^{\infty} Q_t^D(t+j) B_t(t+j) \quad (8)$$

²³These numbers are nearly identical when measured in terms of the market value of debt.

²⁴Appendix A.3 details the definitions and calculations that follow.

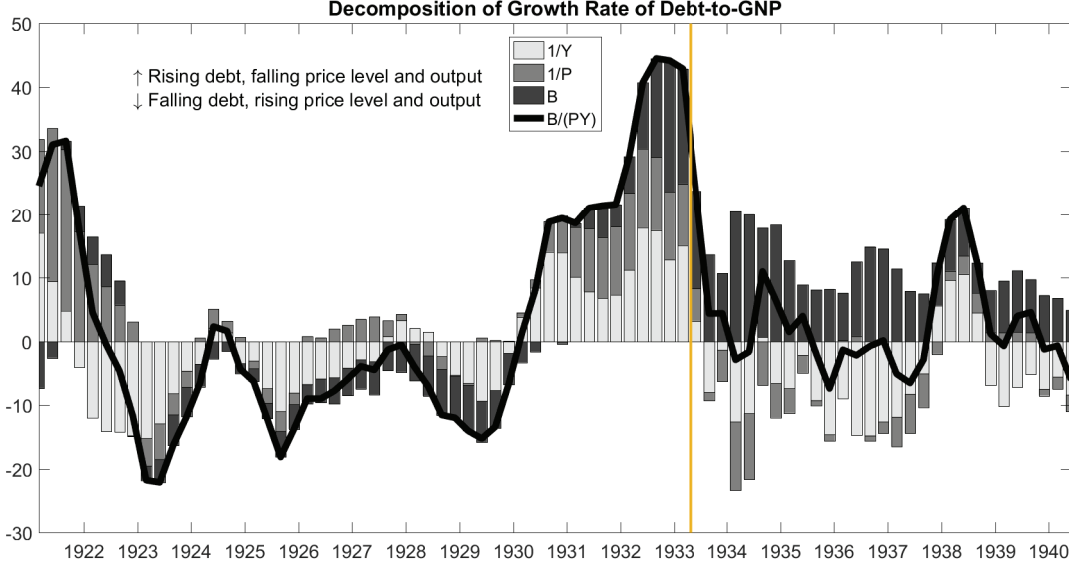


Figure 9: The four-quarter percentage change in debt-GNP ratio (solid line) decomposed into percentage changes of its components: nominal debt, the inverse of the price level, and the inverse of real GNP. Sources: Balke and Gordon (1986), Hall and Sargent (2015), and authors' calculations.

where $Q_t^D(t) \equiv 1$ and $IP_t(t+j)$ is the interest payable on bonds outstanding at t that mature in $t+j$. $Q_t^D(t+j)$ is the dirty price of bonds, defined as the clean price plus accrued interest.

The market value of debt outstanding in period t is

$$P_t^M B_t^M \equiv \sum_{j=1}^{\infty} Q_t^D(t+j) B_t(t+j) \quad (9)$$

so the budget identity may be rewritten as

$$R_t^M P_{t-1}^M B_{t-1}^M = P_t s_t + P_t^M B_t^M \quad (10)$$

or, in real terms

$$r_t^M P_{t-1}^M b_{t-1}^M = s_t + P_t^M b_t^M \quad (11)$$

where $b_t^M \equiv B_t^M / P_t$ is the real par value of debt outstanding at t . The nominal and real rates of return on the portfolio— R_t^M and r_t^M —reflect *ex-post* returns.

With B_t^M the par value of debt and $P_t^M B_t^M$ the market value, $P_t^C B_{t-1}^M$ is the carry-over market value of debt. The growth rate in the market value of debt may be written as

$$\frac{P_t^M B_t^M}{P_{t-1}^M B_{t-1}^M} \equiv \underbrace{\frac{P_t^C B_{t-1}^M}{P_{t-1}^M B_{t-1}^M}}_{\text{nominal rate of return}} \cdot \underbrace{\frac{P_t^M B_t^M}{P_t^C B_{t-1}^M}}_{\text{size ratio}} \quad (12)$$

where P_t^C , defined in the appendix, reflects intermediate coupon payments and is the carry-over price of the portfolio. The first ratio on the right side of (12) is the nominal return,

	Gold Standard		Unbacked Fiscal Expansion	
	<i>Monthly</i>	<i>Annual</i>	<i>Monthly</i>	<i>Annual</i>
Nominal	0.24	2.91	0.23	2.72
Real	0.66	7.86	0.10	1.20
Surprise Real	0.40	4.81	-0.06	-0.76

Table 4: Returns on government bond portfolio at monthly and annual rates.

R_t^M , in (10). An *ex-post* real return simply deflates the nominal return by the inflation rate between $t - 1$ and t to give r_t^M in (11).

The surprise component in the real return on the bond portfolio is

$$\eta_t \equiv r_t^M - E_{t-1}r_t^M \tag{13}$$

This innovation can be decomposed into surprise capital gains and losses on the bond portfolio due to inflation and bond prices as

$$\eta_t = R_t^M \underbrace{(1/\pi_t - 1)}_{\text{due to price level}} + R_t^M \underbrace{\left(\frac{\sum_{j=0}^{\infty} (Q_t(t+j) - Q_{t-1}(t+j))B_{t-1}(t+j)}{P_t^C B_{t-1}^M} \right)}_{\text{due to bond prices}} \tag{14}$$

Because η_t is the surprise revaluation on bonds carried into period t , its dollar magnitude is given by $\eta_t P_{t-1}^M B_{t-1}^M$. To gauge the quantitative importance of these revaluations, we compute them as a percentage of the market value of debt at the end of period t , $P_t^M B_t^M$.

Revaluation effects on nominal debt are a distinctive feature of unbacked fiscal expansion. Several patterns emerge from returns data in table 4. First, nominal returns are comparable across the gold standard and unbacked fiscal expansion period.²⁵ Second, real returns are substantially higher in the gold standard period than in the later period (average annual real returns of 7.86 percent versus 1.20 percent). Finally, on average, surprises in real returns are strongly positive in the early period (4.81 percent), but negative during the unbacked fiscal expansions (-0.76 percent).²⁶ These patterns are fully consistent with surprise inflation devaluing government debt during Roosevelt’s administration.

Surprise real returns on government debt are quantitatively important. Figure 10 shows that as a percentage of the market value of outstanding debt, these revaluations—computed as $\eta_t P_{t-1}^M B_{t-1}^M / P_t^M B_t^M$ —are a central feature of fiscal financing (left panel). After leaving the gold standard, surprise revaluations are both large and frequently negative. With debt at 40 percent of GNP, the revaluations are several percentage points of output, a substantial fraction of primary deficits.²⁷

²⁵Return data start in 1926, so “gold standard” refers to 1926Q1 to 1933Q1.

²⁶Romer (1992, p. 778) estimates the *ex-ante* real commercial paper rate to find that it is negative nearly the entire unbacked fiscal expansion period except the 1937–1938 recession.

²⁷Sims (2013) computes surprise capital gains and losses on U.S. government bonds since World War II to argue that these revaluation effects are important—the same order of magnitude as annual fluctuations in primary surpluses. Of course, *any* stochastic model with monetary and fiscal policy in which inflation and interest rates fluctuate will generate revaluation effects. This holds regardless of the monetary-fiscal

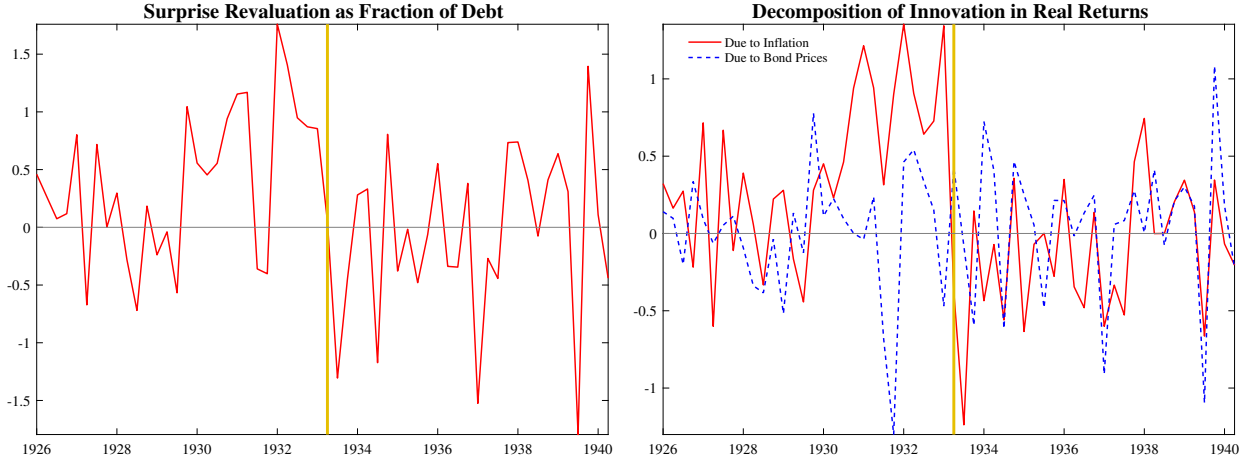


Figure 10: Left panel is surprises in real returns on bond portfolio as percentage of market value of outstanding debt, computed as $\eta_t P_{t-1}^M B_{t-1}^M / P_t^M B_t^M$. Right panel is a decomposition of surprises in real returns on bond portfolio into components due to unanticipated inflation and unanticipated bond prices. See appendix A.3 for details. Vertical line marks when the United States abandoned the gold standard. Source: Hall and Sargent (2015), CRSP, and authors’ calculations.

The decomposition of surprise real returns, graphed in the right panel of figure 10, confirms that before leaving the gold standard, high realized real returns were driven by low inflation. The negative spike due to bond prices in 1931Q4 was created by the Fed’s efforts to defend the gold parity by sharply raising discount rates. In the period of unbacked fiscal expansions, again with the exception of the jump in early 1938, surprise devaluations of debt from inflation dominate the surprise real returns.

The last informal piece of empirical evidence about the unbacked fiscal expansion appears in figure 11, which plots the relative price of the bond portfolio. This relative price is computed as the real market value of debt over the par value of debt, which yields P_t^M / P_t , the goods-price of government bonds. Bonds became increasingly costly in terms of goods throughout the gold standard period, reaching a peak in 1933Q1. With the departure from gold came a steady devaluation of the bond portfolio, bottoming out in the middle of 1937 when the 1937–1938 recession began. This cheapening of bonds is consistent with bondholders substituting out of debt and into buying goods and services—an increase in aggregate demand triggered by unbacked fiscal expansion.

policy regime, so merely finding revaluation effects during the recovery of the 1930s does not imply that the United States experienced an unbacked fiscal expansion. Such an inference requires identifying assumptions, to which we turn in section 6.

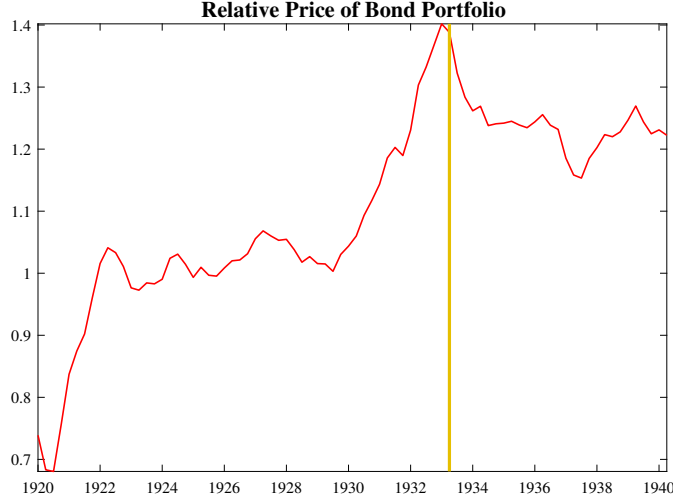


Figure 11: Relative price of the bond portfolio is the ratio of the real market value of debt to the par value of debt, roughly equivalent to the real “price” of the bond portfolio. Vertical line marks when the United States abandoned the gold standard. Source: authors’ calculations.

6 STRUCTURAL VAR ANALYSIS

We turn now to more formal analysis of fiscal and monetary impacts over the period of unbacked fiscal expansions. Because the identified VAR methodology is well understood, we review it only briefly here.²⁸

6.1 VAR METHODS

If y_t is a $k \times 1$ vector of time series, the economic structure is

$$A_0 y_t = A_+(L) y_{t-1} + \varepsilon_t \tag{15}$$

where $E\varepsilon_t \varepsilon_t' = I$ and ε_t is uncorrelated with y_s for $s < t$. The ε_t 's are economically interpretable exogenous disturbances. The reduced-form is

$$y_t = B(L) y_{t-1} + u_t \tag{16}$$

where, assuming that A_0 is invertible, $B(L) = A_0^{-1} A_+(L)$, $u_t = A_0^{-1} \varepsilon_t$, and $E u_t u_t' = A_0^{-1} (A_0^{-1})' = \Sigma$.

6.2 DATA AND IDENTIFICATION

We estimate a seven-variable monthly VAR from April 1933 to June 1940. The seven variables are: the commercial paper rate, i , (NSA), the monetary base, M , (NSA), federal primary surplus, S , (SA), the market value of nominal gross federal government debt, B ,

²⁸See Leeper, Sims, and Zha (1996) or Christiano, Eichenbaum, and Evans (1999) for detailed surveys.

(NSA), the monetary gold stock, G , (NSA), monthly interpolated GNP deflator, P , (100 = 1926), and monthly interpolated real GNP, Y .²⁹

VAR estimates employ the Sims and Zha (1998) prior, which allows for unit roots and cointegration, and probability bands are computed as in Sims and Zha (1999). All variables except the primary surplus and the interest rate are logged; the interest rate is divided by 100 to put it in percentage units. We include six lags and a constant.³⁰

The identification aims to be consistent with actual policy behavior in the post-gold standard period of the 1930s. We impose restrictions only on A_0 , the contemporaneous interactions among innovations in variables, leaving lags unrestricted. With monthly time series, this means every variable responds to past values of every other variable.

Money Supply: The supply of monetary base, M^s , depends on the short-term nominal interest rate, R , and the monetary gold stock, G . The decision about whether or not to sterilize gold inflows lay with the Treasury during this period, but in the case when inflows were not sterilized, there was a direct impact of G on M^s . In addition, the Federal Reserve might decide to adjust supply in order to influence interest rates, so we have the money supply rule

$$a_1 M_t^s = a_2 i_t + a_3 G_t + \varepsilon_t^{MP} \quad (17)$$

Money Demand: The demand for base money is a derived demand. Demand for nominal money balances, M^d , depends on the short-term nominal interest rate, the price level, P , and income, Y

$$a_4 M_t^d = a_5 P_t + a_6 i_t + a_7 Y_t + \varepsilon_t^{MD} \quad (18)$$

Fiscal Policy: Fiscal policy chooses the primary surplus, S . Revenues are procyclical and an unindexed tax code makes revenues depend on the price level. Because surplus movements in the period were dominated by FDR’s “emergency spending” programs, which were a reaction to prevailing economic conditions, there was little contemporaneous reaction of fiscal choices to variables other than measures of the price level and real economic activity. We also permit a contemporaneous response of surpluses to the nominal market value of debt, B . This leads to the fiscal rule

$$a_8 S_t = a_9 B_t + a_{10} P_t + a_{11} Y_t + \varepsilon_t^{PS} \quad (19)$$

Government Debt: We measure government debt as the nominal market value of gross federal debt. Because bond prices react immediately to all shocks in the economy, B is an

²⁹Primary surpluses were seasonally adjusted using the X-11 procedure in RATS. The deflator and real GNP were interpolated from Balke and Gordon’s (1986) quarterly series using the Chow and Lin (1971) algorithm. Monthly series used to interpolate the deflator included M2, the consumer price index, the wholesale price index, the long-term yield on Treasury bonds (NBER Macrohistory Database, m13033a), and index composite wages (NBER Macrohistory Database, m08061c); series used to interpolate real GNP included industrial production, composite index of six roughly coincident series (NBER Macrohistory Database, m16003a); index of factory employment, total durable goods (NBER Macrohistory Database, m08146a), and production worker employment, manufacturing (NBER Macrohistory Database, m08010b). Appendices A.1 and A.2 describe fiscal data in detail and compare our series to three widely used sources—NBER Macrohistory Database, Firestone (1960), and Romer (1992).

³⁰In notation analogous to that in Sims and Zha (1998), these results set the hyperparameters for the prior as $\mu_1 = 0.6, \mu_2 = 0.3, \mu_3 = 1.0, \mu_4 = 1.75, \mu_5 = 2.0, \mu_6 = 2.0$. The prior was chosen based on the model’s marginal data density. See figure 24 in appendix D for the model’s unconditional forecasts under this prior.

“information variable,” in Leeper, Sims, and Zha’s (1996) terminology. The debt equation is

$$a_{12}B_t = a_{13}i_t + a_{14}M_t + a_{15}S_t + a_{16}G_t + a_{17}P_t + a_{18}Y_t + \varepsilon_t^B \quad (20)$$

Gold: With the passage of the Gold Reserve Act in January 1934, the Treasury bought all gold supplied at the price chosen by the Treasury and the President, which was \$34.00 an ounce. This made the demand for gold perfectly elastic at that price. Supply of gold to America, on the other hand, was driven by both exogenous political conditions in Europe and endogenous factors within the United States. Among those endogenous factors were the relative strength of the U.S. recovery, U.S. willingness to buy unlimited quantities of gold at a high price, increased sale of U.S. merchandise abroad as the dollar depreciated, the inflow of capital to the United States, and foreign-owned capital sent to U.S. to build up dollar balances or to purchase American securities [Paris (1938)]. We model the supply of monetary gold as a function of the nominal interest rate and goods-market conditions:

$$a_{19}G_t = a_{20}i_t + a_{21}P_t + a_{22}Y_t + \varepsilon_t^G \quad (21)$$

Goods Market: The remaining variables in the VAR—the price level and real GNP—are “goods market variables.” We treat these as inertial variables that are predetermined and obey a recursive ordering. The limitation in this assumption is that we do not distinguish between the two “goods market shocks,” treating them simply as disturbances unrelated to the behavior identified in other equations

$$a_{23}P_t = a_{24}Y_t + \varepsilon_t^P \quad (22)$$

$$a_{25}Y_t = \varepsilon_t^Y \quad (23)$$

Predeterminedness of goods market variables is not a stringent restriction: it says that the price level and output do not respond to non-goods-market shocks within the month, an assumption that Romer (1992) employs with annual data.

The identification determines the money stock, the nominal interest rate, the gold stock, nominal debt, and the primary surplus simultaneously, with P and Y predetermined.

With 28 distinct moments in the covariance matrix of innovations and 25 freely estimated parameters, the system is overidentified. If data strongly reject the overidentifying restrictions, the estimated exogenous disturbances may not be mutually uncorrelated, muddling the economic interpretations of the shocks.

Table 5 reports posterior modes and 68-percent probability intervals for the estimated parameters. The money supply rule is consistent with the central bank expanding high-powered money in response to surprise increases in the nominal interest rate. Contemporaneous interactions between gold and the base are weak. Money demand has a negative but weak interest elasticity, but positive and significant short-run income and price elasticities. A negative contemporaneous relation between debt and surpluses likely emerges from the government’s flow budget constraint. Primary surpluses are weakly connected to goods market innovations, although over longer horizons real economic activity does affect surpluses. Real income innovations raise the monetary gold stock, which is consistent with the U.S. economic recovery inducing gold inflows from abroad, which are met by an elastic demand for gold by the Treasury. Finally, the nominal market value of government bonds is significantly

associated with contemporaneous innovations in variables, reflecting the responsiveness of asset prices to news. Those contemporaneous relationships make good economic sense: a surprisingly high market value of bonds is associated with negative innovations in the interest rate, money stock, primary surpluses, and the price level, but positive innovations in gold. Strong effects are associated with the interest rate and inflation, as theory would suggest.³¹

$$\begin{aligned}
 1.989R &= .022M^s + .004G + \varepsilon^{MP} \\
 (1.133, 2.101) & \quad (-.014, .037) \quad (-.006, .010) \\
 .073M^d &= -.688R + .028P + .009Y + \varepsilon^{MD} \\
 (.061, .080) & \quad (-1.155, .318) \quad (.004, .044) \quad (.001, .016) \\
 .0050S &= -.023B - .020P - .001Y + \varepsilon^{PS} \\
 (.0045, .0054) & \quad (-.039, -.006) \quad (-.040, .001) \quad (-.009, .006) \\
 .018G &= -.457R + .013P + .010Y + \varepsilon^G \\
 (.013, .019) & \quad (-1.262, .602) \quad (-.010, .030) \quad (.001, .017) \\
 .087B &= -.826R - .027M - .0008S + .005G \\
 (.077, .094) & \quad (-1.061, -.563) \quad (-.035, -.018) \quad (-.0019, .0004) \quad (.003, .007) \\
 & \quad - .028P + .007Y + \varepsilon^B \\
 & \quad \quad (-.048, -.008) \quad (-.001, .014) \\
 .172P &= .015Y + \varepsilon^P \\
 (.159, .186) & \quad (.007, .022) \\
 .065Y &= \varepsilon^Y \\
 (.060, .070) &
 \end{aligned}$$

Table 5: Posterior mode estimates of parameters in the A_0 matrix. 68-percent probability intervals appear in parentheses base on 500,000 draws from the posterior distribution. Coefficients and probability intervals in the table are divided by 1000.

6.3 PRIMARY SURPLUS IMPACTS

Figure 12 reports the dynamic impacts of a surprise decrease in the real primary surplus during the unbacked fiscal expansion period. The one standard deviation initial shock raises the primary deficit by \$0.21 billion, which is about half of the average annualized monthly deficit in the sample. Because the deficit decays rapidly, the total increase over the three-year forecast horizon is only \$0.51 billion. This is a relatively small and transitory fiscal impulse. Higher deficits do not bring forth higher future surpluses, lending support to the interpretation that fiscal expansion is unbacked.

Higher deficits produce Keynesian impacts. Prices and output, which the identification prevents from rising contemporaneously, steadily increase and significantly so. Monetary policy makes no effort to offset the inflationary consequences of the fiscal expansion, suggesting the Fed behaves passively. Nominal interest rates fall slightly in the short run. The lower nominal rates, together with higher expected inflation, drive *ex-ante* real rates lower. Lower real rates induce households and firms to shift demand for goods into the present, as in the new Keynesian model.

³¹Appendix D reports that the exogenous shocks in this model are mutually uncorrelated [see table 4].

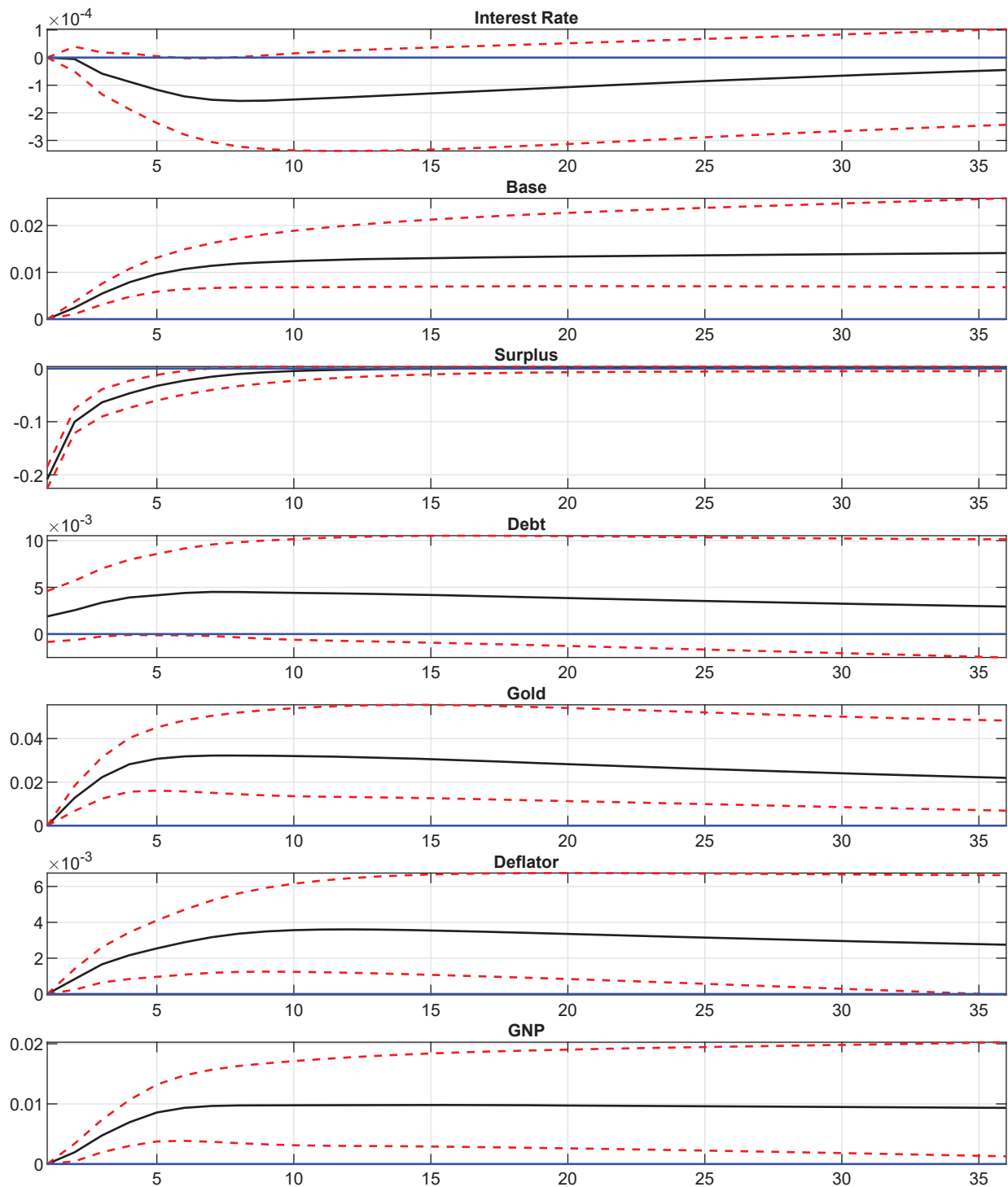


Figure 12: Responses to an unanticipated decrease in the primary surplus in the unbacked fiscal expansion period (April 1933 to June 1940). Solid lines are modes and dashed lines are 68 percent probability bands based on 500,000 draws from the posterior distribution of all the VAR parameters.

New nominal bonds finance the higher deficits. Debt jumps on impact and remains elevated. Economic recovery encourages gold to flow into the United States. By choosing not to sterilize gold inflows, the Treasury allows the monetary base to expand to accommodate rising demand for money.

Looking down the column in figure 12 it is easy to see the conventional monetary narrative of the recovery that Friedman and Schwartz (1963), Romer (1992), and Steindl (2004) recount.³² The initial revaluation of gold, together with the steady inflows of gold largely due to political uncertainty in Europe, were permitted by the Treasury to steadily increase the monetary base. Expansion in high-powered money stimulated real activity and raised prices. At the same time, enhanced confidence in banks after the early 1930s crises reduced cash hoarding and raised the income velocity of money to reinforce the expansionary effects of the growth in the base.

But the impulse responses create a problem for this conventional narrative. How does one reconcile monetary-induced economic recovery with the sharp short-run declines in primary surpluses and the persistent increase in nominal government debt? Existing literature does not address this question, primarily because the fiscal dimensions have not been fully integrated with the monetary interpretations of the recovery.

6.4 MONETARY IMPACTS

Higher deficits generate positive comovements among output, the price level, the monetary base, and the gold stock. But that interpretation ascribes to fiscal policy a causal role. Perhaps those fiscally-induced correlations are but a small part of the story about the recovery. Perhaps other disturbances, unrelated to fiscal policy, generate the same comovements, but account for the bulk of fluctuations in output and prices, as the conventional monetary narrative maintains.

We address these concerns by examining four other impulse response functions. Figure 13 reports the dynamic impacts of four shocks related to the monetary sector—monetary policy, money demand, “government debt,” and the supply of gold. Our identification does not attach any distinct behavioral interpretation to the shock in the equation for debt, but does to the other three disturbances.³³

From early 1933 until December 1936, the Treasury opted not to sterilize gold inflows, which permitted the monetary base to expand along with the gold stock. We view figure 13 with an eye toward shocks that move base money strongly and persistently. The first two columns—a monetary policy contraction and an increase in money demand—generate such movements, but only monetary policy moves the gold stock appropriately, but then does so only insignificantly. In any case, neither shock has significant impacts on the price level or real GNP.

³²Friedman and Schwartz give this narrative a different twist than Romer. Friedman and Schwartz (1963, p. 499) write that “. . . the rise in the money stock [from 1933 to 1937] was produced not by the monetary authorities but by gold inflow. Though accidental gold inflows served the same economic function as compliant monetary authorities would have, it occurred despite rather than because of the actions of unions, business organizations, and government in pushing up prices.” Romer, in contrast, attributes much of the growth in base money to a policy choice—the Treasury’s decision not to sterilize the inflows.

³³Figure 25 in appendix D reports the full moving average representation.

Shocks to the supply of gold—the fourth column of the figure—are the genesis of the conventional monetary narrative. They are an important source of gold-stock fluctuations, but little else. Positive innovations in gold are followed by a higher monetary base, although not significantly higher; if anything, though, higher monetary gold leads to lower prices and real GNP. The prime candidate for the monetary narrative shock does not deliver the required comovements of macro variables.

Innovations to the market value of debt are followed by a higher gold stock, monetary base (insignificantly), and price level (briefly significantly). But the debt innovation also creates a transitory decline in the surplus that arises from the coefficient on B in the third equation in table 5. As we found in figure 12, excursions in variables that look like the conventional monetary narrative arise only in conjunction with significant movement in primary surpluses.³⁴

Only disturbances to the primary surplus generate the full set of movements in assets, the price level, and real GNP that would seem to align with existing monetary explanations of the recovery. Figure 12's responses to a shock that raises the primary deficit are fully consistent with what the theory predicts for the consequences of an unbacked fiscal expansion. We turn now to how important these fiscal disturbances are in generating fluctuations in the variables of interest.

6.5 QUANTITATIVE IMPORTANCE

Variance and historical decompositions help to assess the quantitative importance of fiscal policy for the economic recovery. Those decompositions measure how important each exogenous shock is for future movements in the variables in the VAR. This section also reports output multipliers for several VAR specifications.

6.5.1 VARIANCE DECOMPOSITIONS

Table 6 reports variance decompositions of the seven variables in the VAR at 6- and 36-month horizons. These statistics record how important disturbances in each exogenous shock are for explaining fluctuations in the variables, on average over the estimated sample.

Looking first at the goods market variables, P and Y , in the first two panels, aside from own shocks, the only disturbance that accounts for an important fraction of error variance in those variables comes from fiscal policy. A bit under 20 percent of goods market variables' fluctuations arise from shocks to the primary surplus. Monetary disturbances—monetary policy, money demand, and gold flows—jointly explain at most only 5.5 percent.

Money market shocks together account for substantial fractions of error variances in the monetary base (49 percent) and the commercial paper rate (87 percent). But primary surpluses explain almost all the remaining variance in base money (39 percent), suggesting a strong endogenous response of money to fiscal disturbances.

Primary surpluses—the fifth panel—are largely exogenous, with own shocks accounting for 92 percent of surplus movements at all horizons. This finding is consistent with Roo-

³⁴An identification that excludes B from the S equation does not produce a significant response of the surplus to a debt innovation, and it also does not produce strong responses in gold, money, or the price level. We do not report that result because the identification produces a non-zero correlation between the shocks to surpluses and money demand.

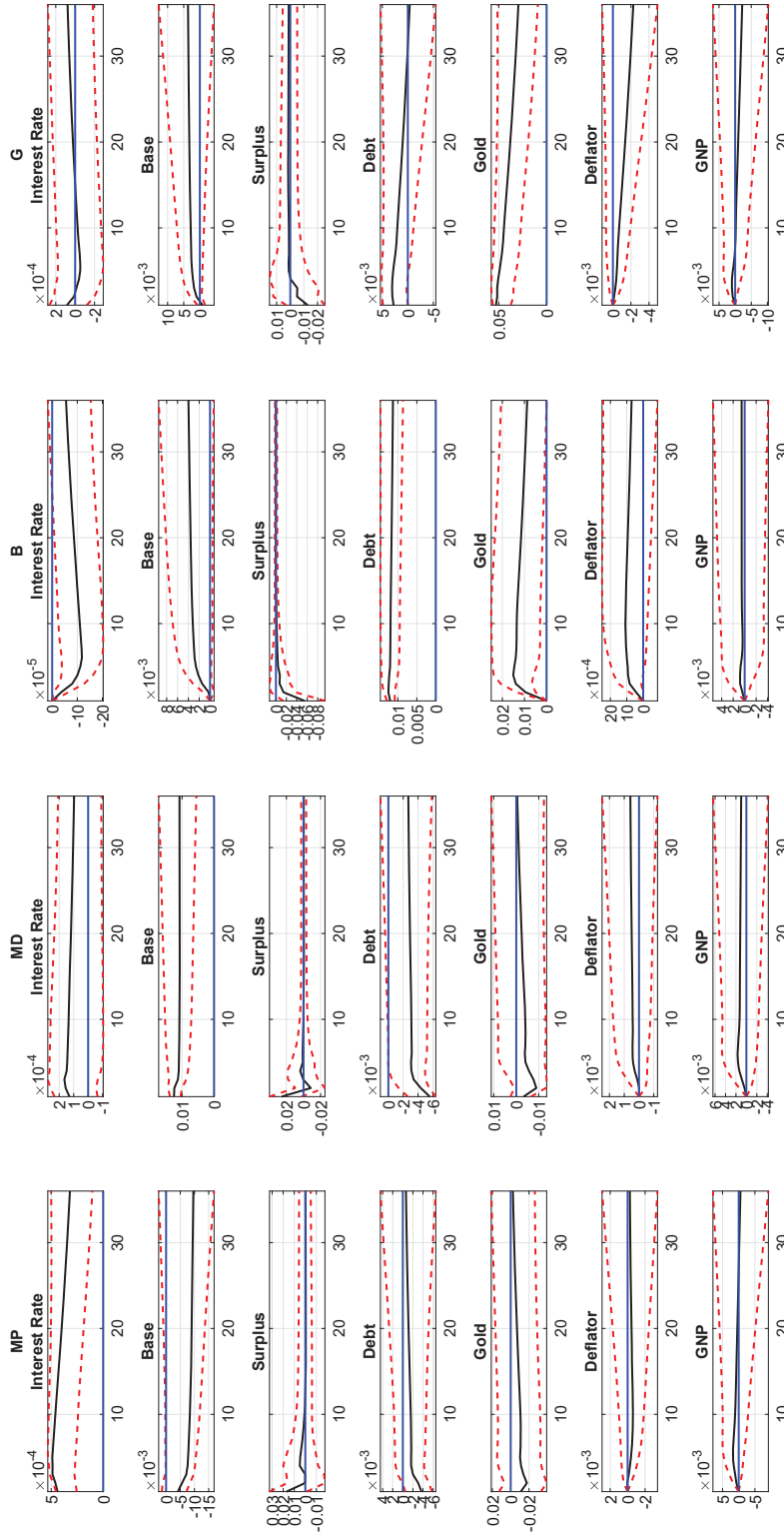


Figure 13: Responses to unanticipated shocks in the “monetary sector,” which includes monetary policy (MP), money demand (MD), government debt (B), and the gold stock (G). Unbacked fiscal expansion period (April 1933 to June 1940). Solid lines are modal estimates; dashed lines are 68 percentile probability bands based on 500,000 draws from the posterior distribution of all the VAR parameters.

sevelt’s “emergency spending” driving fiscal policy in the period. Of course, this spending was most decidedly *not exogenous* in the usual meaning of the term because the spending was an explicit response to economic conditions in the preceding years.

Primary surplus disturbances explain 27 percent of the forecast error variance in gold. This finding belies the argument by Friedman and Schwartz (1963) and others that gold inflows were almost entirely due to European political turmoil and gold discoveries. Of course, a substantial fraction (60 percent) of fluctuations in gold are due to exogenous shocks in demand and supply for gold, which may reflect the factors that Friedman and Schwartz emphasize. As figure 13 reports, though, positive shocks to gold supply do not produce the higher price levels and output associated with recovery.

		Percent of P Due to Shocks in						
Months	MP	MD	FP	B	G	P	Y	
6	0.2	0.2	7.9	1.2	0.2	82.4	8.0	
36	0.3	0.4	16.3	1.4	3.4	70.0	8.2	
		Percent of Y Due to Shocks in						
Months	MP	MD	FP	B	G	P	Y	
6	0.4	0.3	8.9	0.1	0.1	0.2	90.0	
36	0.1	0.3	17.8	0.1	0.3	0.0	81.4	
		Percent of M Due to Shocks in						
Months	MP	MD	FP	B	G	P	Y	
6	17.7	50.9	19.4	1.4	1.4	1.4	7.9	
36	18.9	29.8	39.1	2.8	2.4	0.7	6.3	
		Percent of R Due to Shocks in						
Months	MP	MD	FP	B	G	P	Y	
6	82.8	8.0	2.7	2.7	0.9	1.1	1.7	
36	79.9	7.2	5.2	3.5	1.0	2.1	1.2	
		Percent of S Due to Shocks in						
Months	MP	MD	FP	B	G	P	Y	
6	0.5	1.1	92.2	5.1	0.3	0.2	0.5	
36	0.5	1.1	92.1	5.1	0.4	0.2	0.5	
		Percent of G Due to Shocks in						
Months	MP	MD	FP	B	G	P	Y	
6	4.3	1.0	15.3	4.1	69.3	2.2	3.8	
36	2.5	0.4	26.9	4.9	59.3	3.3	2.6	
		Percent of B Due to Shocks in						
Months	MP	MD	FP	B	G	P	Y	
6	3.0	7.6	6.2	75.1	4.3	1.7	2.2	
36	1.2	5.5	8.1	79.9	1.6	1.4	2.2	

Table 6: Percentage of forecast error variance in GNP deflator (P), real GNP (Y), primary surplus (S), monetary base (M), commercial paper rate (R), monetary gold supply (G), and nominal market value of debt (B) attributable to shocks to each equation. Columns may not sum to 100 due to rounding.

6.5.2 HISTORICAL DECOMPOSITIONS Decompose the vector of variables in the VAR, y_t , into the forecast conditional only on initial conditions using estimated VAR parameters, E_0y_t , and the sum of the realized exogenous shocks, ε_t , as

$$y_t = \sum_{s=0}^{t-1} C_s \varepsilon_{t-s} + E_0y_t \quad (24)$$

Group the shocks into two bins: fiscal policy, $\varepsilon_t^F = \varepsilon_t^{PS}$ and other, $\varepsilon_t^O = (\varepsilon_t^{MP}, \varepsilon_t^{MD}, \varepsilon_t^G, \varepsilon_t^B, \varepsilon_t^P, \varepsilon_t^Y)$, with associated moving-average coefficients C^F and C^O . Then (24) for variable j in period t may be written as

$$y_{jt} = E_0y_{jt} + \sum_{i=1}^t C_j^F(i) \varepsilon_i^F + \sum_{i=1}^t C_j^O(i) \varepsilon_i^O \quad (25)$$

where each summation is the cumulative impact of exogenous shocks on variable j from period 1 to period t .

Figures 14 and 15 decompose the historical paths of the price level and real GNP into the components in (25). After accounting for lags in the VAR estimation, forecasts run from October 1933 through June 1940. Solid lines are actual values, y_{jt} , and solid dotted lines are forecasts, E_0y_{jt} . The remaining three lines are actual values less the contributions of primary surplus disturbances for the model in table 5 and two recursive orderings.

Forecasts of both the price level and real GNP rise monotonically over the period, suggesting that in the absence of shocks, deterministic dynamics over the sample would raise prices and output. The marginal contribution of surpluses appears as the vertical distance between the actual value and the value less that group's addition. A consistent pattern across both figures and all three identifications is that absent fiscal shocks, prices and output would have been lower over most of the sample, except around 1939.³⁵

³⁵Figures 22 and 23 in appendix D separate out goods market shocks to make the "other" group composed of monetary policy, money demand, gold, and debt. Those four shocks have small effects that run counter to Roosevelt's economic objectives: prices and output would be a bit higher in the absence of those disturbances.

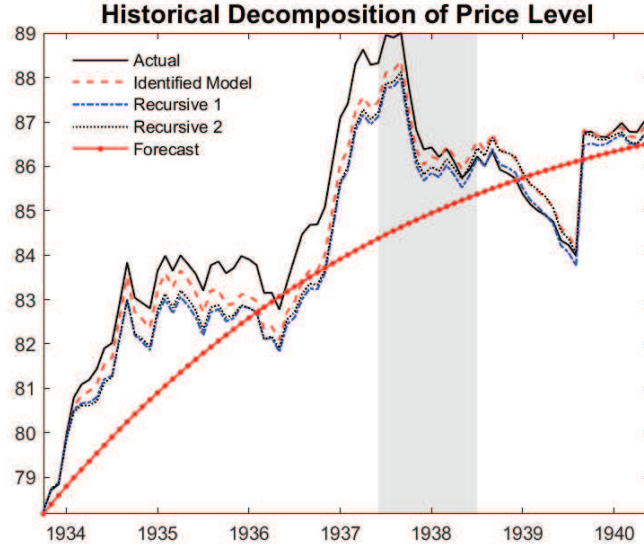


Figure 14: Contribution of primary surplus shocks to the path of the price level. In terms of components of equation (25), Actual is y_{jt} , Forecast is $E_0 y_{jt}$, other lines are $y_{jt} - \sum_{i=1}^t C_j^F(i) \varepsilon_i^F$. Identified Model is from table 5; Recursive 1 orders variables P, Y, S, R, M, G, B ; Recursive 2 orders variables P, Y, R, M, G, S, B .

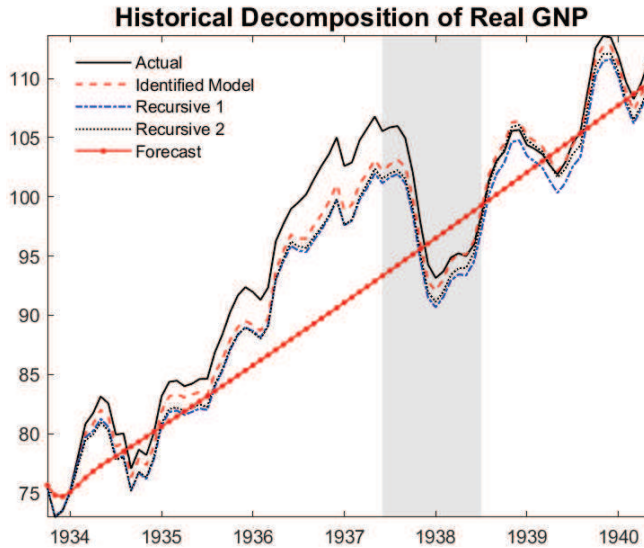


Figure 15: Contribution of primary surplus shocks to the path of real GNP. In terms of components of equation (25), Actual is y_{jt} , Forecast is $E_0 y_{jt}$, other lines are $y_{jt} - \sum_{i=1}^t C_j^F(i) \varepsilon_i^F$. Identified Model is from table 5; Recursive 1 orders variables P, Y, S, R, M, G, B ; Recursive 2 orders variables P, Y, R, M, G, S, B .

6.5.3 OUTPUT MULTIPLIERS VAR estimates imply sizable output multipliers from increases in primary deficits. Figure 16 reports multipliers k periods after an increase in the deficit at time t , calculated as $\Delta Y_{t+k} / \Delta S_t$, as in Blanchard and Perotti (2002). In the VAR, real GNP is in logs, while the surplus is in real dollars, so we scale the impulse response by

the mean of real GNP. Figure 15 makes clear that GNP grew over the sample period, so we compute the multipliers using two different measures of the mean—the full sample period and the first year of the sample.

Output multipliers are large and persistent. Taking the average of output over the full sample—top panel—the multiplier peaks at 4.5 after a year and remains close to that level. Credible sets expand over the forecast horizon, but remain above zero over the three-year horizon in the figure. The peak multiplier falls to 3.6 when the mean of real GNP is based on the first year of the sample. Multipliers are not appreciably different under the recursive orderings.³⁶

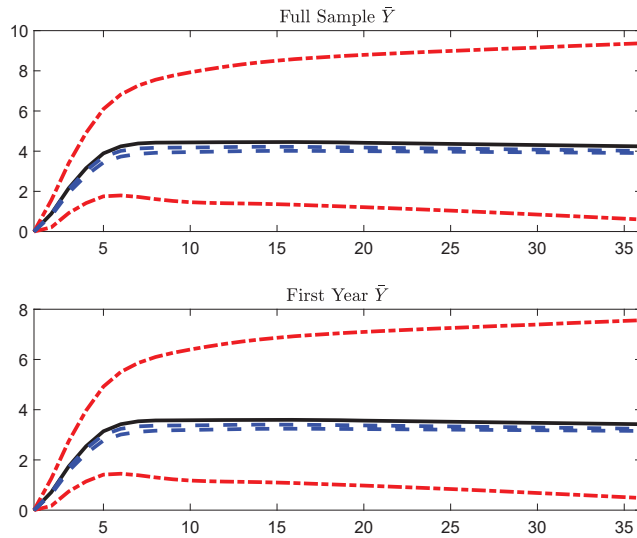


Figure 16: Output multipliers from a \$1 increase in the primary deficit, calculated as $\Delta Y_{t+k}/\Delta S_t$ at horizon k . Solid line is posterior mode from the identified model in table 5, dotted-dashed lines are 68 percent credible sets for that model, and dashed lines are posterior modes from recursive orderings used in figures 14 and 15. Top panel takes the mean of real GNP over the full sample, April 1933 to June 1940; bottom panel takes the mean over the first year of the sample.

7 LESSONS FOR TODAY

We have argued that unbacked fiscal expansion was the critical policy action that contributed to recovery from the Great Depression. Roosevelt’s “try anything” policies produced debt-financed primary deficits that remained in place until recovery was underway. Monetary policy combined with that fiscal policy to stabilize debt by preventing nominal interest rates from rising with inflation. The paper offers a variety of evidence that debt-financed deficits generated gold inflows and expanded the monetary base at the same time that they raised prices and output. Gold inflows and higher base money that are not associated with higher

³⁶Appendix D reports results for a recursively ordered eight-variable VAR that splits the primary surplus into expenditures net of interest payments and tax receipts. Multipliers for government expenditures are comparable to those in figure 16, though less precisely estimated. Tax multipliers are highly uncertain.

deficits and nominal debt contain little predictive power for the GNP deflator and real GNP. Despite rapid growth in nominal debt between 1933 and 1937, the debt-GNP ratio was stable at about 40 percent, the level it had reached before the United States abandoned gold. This leads to the conclusion that unbacked fiscal expansion helped to lift the U.S. economy out of the depression without endangering the creditworthiness of the country.

Roosevelt’s successful, if incomplete, reflation carries two important lessons for policy-makers today. Many countries now suffer from low—below-target—inflation rates and tepid economic growth. Rather than relying on a joint monetary-fiscal attack on the problem, as Roosevelt did, these countries are leaning entirely on monetary policy. Central banks in the Euro Area, Sweden, Switzerland, and Japan have set policy interest rates below zero and undertaken large-scale asset purchases in an effort to reduce real interest rates and stimulate aggregate demand and inflation. This policy relies on intertemporal substitution induced by low real rates, rather than the wealth effects of an unbacked fiscal expansion. Fiscal policies in those areas, meanwhile, have lacked Roosevelt’s initial single-minded goal to stimulate the economy, fluctuating between fiscal stimulus and fiscal austerity. Despite the Herculean efforts of monetary authorities for several years, reflation has been slow to come to those countries.

Ironically, those same countries and the United Kingdom, like the United States in the 1930s, are well positioned to undertake unbacked fiscal expansions. Monetary policies are already passive and central banks are on board to achieve higher inflation rates.³⁷

A second lesson from the Roosevelt policies is that fiscal stimulus and fiscal sustainability need not be in conflict. When the aim is to raise inflation and economic growth, higher nominal government debt—if people are convinced it does not portend higher future taxes—can achieve both the macroeconomic objectives and the goal of stabilizing debt. The two goals go hand-in-hand: higher inflation reduces the real value of the debt and higher economic growth raises surpluses and reduces debt-output ratios. But to engineer an unbacked fiscal expansion, governments must understand that rapid growth in *nominal* debt need not threaten fiscal sustainability, just as it didn’t in 1930s America.

In the current atmosphere of what Sims (2016b) calls “hyper-Ricardian” beliefs about policy in which the public sees higher debt as bringing forth much higher surpluses in the future, it may be difficult for policymakers to credibly commit to an unbacked fiscal expansion. Here, too, FDR may have something to teach. Roosevelt never claimed to be aiming for what even he might have regarded as “irresponsible” fiscal policy. But his communications and actions made clear that he was willing to do whatever it took to bring the country out of the depression. Roosevelt was also agnostic, willing to experiment, even with what at the time seemed to be radical policies. He kept the public’s attention on the policy *objectives*, objectives over which there was nearly universal agreement, rather than on the policy tools. And he made policy actions explicitly state-dependent. Today, state-dependence is *de rigueur* among central banks. It rarely enters the fiscal calculus.

³⁷Because individual Euro Area countries do not control their monetary policy, it would require a coordinated unbacked fiscal expansion across member nations together with the ECB’s pegging of interest rates.

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