Inflation Expectations in the U.S. in Fall 1933[1]

Andrew J. Jalil and Gisela Rua

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Running Head: Inflation Expectations in Fall 1933

Abstract

We document how inflation expectations evolved in the United States during the fall of 1933 using narrative evidence from historical news accounts and the forecasts of contemporary business analysts. We find that inflation expectations, after rising substantially during the spring of 1933, moderated in the fall in response to mixed messages from the Roosevelt Administration. The narrative accounts and our econometric model connect the dramatic swings in output growth in 1933—the rapid recovery in the spring and the setback in the fall—to these sudden movements in inflation expectations.

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[1] Andrew Jalil: Department of Economics, Occidental College, 1600 Campus Road, Los Angeles, CA 90041 (email: jalil@oxy.edu). Gisela Rua: Board of Governors of the Federal Reserve System, Mail Stop 82, 20th St. and Constitution Ave. NW, Washington, D.C. 20551 (email: gisela.rua@frb.gov). The views in this paper are those of the authors and do not necessarily represent the views or policies of the Board of Governors of the Federal Reserve System or its staff. We thank Adrian Hamins-Puertolas, Arthi Rabbane, Morgan Smith, and Max Xie for exceptional research assistance.

1 Introduction

The Great Depression of the 1930s has gained renewed interest in recent years, as countries throughout the world slipped into deep recessions in the aftermath of the 2008 financial crisis. While the initial focus centered on the magnitude of the crisis and limiting the decline in output (Almunia, Bénétrix, Eichengreen, O'Rourke, and Rua, 2010), the debate has now shifted toward recovery. Moreover, with monetary policy constrained by the zero lower bound, just like in the 1930s, policymakers and economists are looking to history for insights into the forces that have sparked and sustained recoveries in the past.

After four years of depression and deflation, the United States experienced a rapid recovery during the spring of 1933.[2] Economists have argued that a sudden increase in inflation expectations, which was the result of President Roosevelt's various statements and policy actions, sparked the rapid recovery. This argument was first developed by Temin and Wigmore (1990), who connected Roosevelt's new inflationary regime with the economic recovery. In Jalil and Rua (2016), we examined the historical narrative record to provide the still missing evidence that inflation expectations actually increased in the spring of 1933 and played a causal role in catalyzing the initial recovery.

However, after growing rapidly for four months, output fell in August and continued to decline through most of 1933 (see Figure 1).[3] Why did the recovery falter during the second half of the year? Did inflation expectations play a role? Did Roosevelt maintain his commitment to an inflationary set of policies, or did he vacillate?

Take in Figure 1

To answer these questions, we examine the historical narrative record. We begin where our previous study ended. In Section 2 we explain why we use narrative evidence to gauge inflation

[2] The National Bureau of Economic Research dates the trough of the Depression in March 1933. Over the following four months—from March to July 1933, output grew rapidly. Industrial production surged by 57%, the most rapid upswing in economic activity in a four-month period that the U.S. economy has ever experienced. (Source: Board of Governors of the Federal Reserve System, Statistical Release G.17, Revision 2016.)

[3] Industrial production fell by 19% between July and November 1933. (Source: Board of Governors of the Federal Reserve System, Statistical Release G.17, Revision 2016.)

expectations during this period. Section 3 describes the new evidence we gather from the historical news accounts and forecasts of contemporary business analysts. We find that the Administration backpedalled in its commitment to an inflationary regime in the fall of 1933, resulting in a substantial moderation of inflationary expectations. Furthermore, the narrative evidence we examine indicates a causal link between the moderation of inflation expectations and the fall setback. In Section 4, we compile a list of key events that affected the prospects for inflation and show in a daily event study analysis that these events had significant effects on financial markets.

Lastly, Section 5 links the change in inflation expectations with aggregate output effects using an econometric model that builds on the framework developed by Bernanke (1983). We find that the residuals of Bernanke's model for 1933 are consistent with the notion that (1) an increase in inflation expectations stimulated the recovery in the spring and (2) a moderation in inflation expectations halted the recovery in the fall. During the months that coincided with elevated inflation expectations in the spring, output growth was higher by 7 percentage points than what would have been predicted given the normal behavior of money, financial crisis indicators, and output. By contrast, during the months that coincided with a moderation in inflation expectations in the fall, output growth was lower by 4½ percentage points.

2 Benefits of Narrative Evidence

Data limitations make estimating inflation expectations in the 1930s tricky. Today, inflation expectations can be measured using several market- and survey-based measures, however, these measures do not exist for the 1930s. For example, we can now estimate inflation expectations by comparing the difference in yields on a regular Treasury security and a Treasury Inflation-Protected Security (TIPS) of similar maturity—the "breakeven" inflation rate. However, this measure is not available for 1933 since TIPS were only first auctioned in January 1997. Inflation expectations can also be estimated using the Michigan Survey. These estimates are obtained from survey responses of consumers to questions about their expected inflation rate over the next one- and 5-to-10 year time horizons. Again, this widely used measure of inflation expectations is not available for 1933 since the Michigan Survey was first published in January 1978. The Federal Reserve Bank of Philadelphia publishes another survey measure of inflation expectations, which focuses on professional forecasters (SPF). The estimates are based on the responses from private sector economists—who produce regular forecasts of economic variables as part of their

jobs in the business world or on Wall Street—on the probability they attach to different outcomes. This survey started in the fourth quarter of 1968 and cannot therefore be used to estimate inflation expectations in 1933.

Nonetheless, two prior studies, Cecchetti (1992) and Hamilton (1992), have constructed empirical measures of inflation expectations during the Depression. Cecchetti's estimates, which are based on retrospective time-series forecasts for inflation using data available to contemporary observers, are not applicable in the context of dramatic regime shifts. On the other hand, Hamilton's estimates, which are derived from the prices of futures contracts for a variety of commodities, are more relevant. They show a swing from deflationary to inflationary expectations during the spring of 1933—specifically, between the first and second trimester (from -6.12 to 6.21 percent)—and a moderation during the fall—specifically, between the second and third trimesters (from 6.21 to 3.96 percent). These findings bolster the conclusions of Temin and Wigmore (1990), who argue that expectational changes—the byproduct of Roosevelt's actions and statements—explain both the rapid recovery during the spring and the setback in the fall: An increase in inflation expectations spurred the recovery during the spring, and a decline in inflation expectations choked off the recovery in the fall.[4] Indeed, for their argument to hold, it must be the case that (1) inflation expectations increased during the spring and moderated during the fall and (2) Roosevelt's actions caused the swing in inflation expectations.

Are the narrative accounts consistent with this interpretation of events? Do they reflect a moderation in inflation expectations in the fall? And if so, do they attribute this moderation to Roosevelt's actions? The narrative record can shed crucial insights because the writings of contemporary observers contain the thoughts, forecasts, and beliefs of market observers in real time. For example, in previous research, Nelson (1991) carefully examines the historical news record during the onset of the Depression and finds overwhelming evidence in the financial press that market participants expected deflation. Furthermore, narrative evidence may be able to reveal the causes of any shifts in inflation expectations. For instance, Romer and Romer (2013) examine the historical narrative record to identify the source of deflationary expectations during the onset of the Depression. According to Romer and Romer (2013), for a monetary explanation

[4] For example, regarding the recovery in the spring, Temin and Wigmore (1983) argue, "The initial phase of the 1933 recovery was dominated by a rise in investment, caused in turn by a reversal of expectations" (p. 494). Regarding the setback in the fall, they write, "We suggest that an apparent weakening of Roosevelt's commitment to devaluation halted the expansion…The value of the dollar had become a key index of the Roosevelt administration's commitment to its new policy regime. When he hesitated, expectations fell and production faltered" (p. 500).

of the Great Depression to hold, it must not only be the case that market participants expected deflation, but also that the deflationary expectations were driven by monetary contraction. By carefully analyzing the historical news record, Romer and Romer show that deflationary expectations in 1930 and 1931 were indeed the result of monetary contraction, thereby reaffirming the role played by monetary forces in causing the Depression. Likewise, identifying the sources of any shifts in inflationary expectations in 1933 is important for understanding the recovery from the Depression. If the beginning of the recovery in the spring of 1933 was linked to Roosevelt's commitment to an inflationary regime, as argued by Temin and Wigmore (1990) and Jalil and Rua (2016), does a subsequent change in the Administration's inflationary policies explain the setback in the fall?

3 Narrative Evidence for the Second Half of 1933

Between April and July 1933, several pro-inflation actions and announcements created the general notion that prices were going to rise: for example, the abandonment of the gold standard; the passage of the Thomas Inflation Amendment in Congress, which granted Roosevelt broad powers to inflate; the announcement of open-market purchases of government securities by the Federal Reserve to increase the money supply; and a reduction in the rediscount rate of the Federal Reserve Bank of New York to encourage bank lending. Moreover, Roosevelt repeatedly pledged to raise prices to their pre-Depression levels, nullified the gold clause, and declared in a message to the World Economic Conference that, given his Administration's program to raise prices in the United States, he rejected the measures for currency stabilization being discussed at the meeting. Together, these events supported a dramatic increase in inflation expectations during the spring of 1933, as presented in Jalil and Rua (2016).

In this section, we gather similar evidence after July to get a sense of how inflation expectations behaved during the second half of the year. Specifically, we read an array of historical newspapers—*Business Week*, the *Economist*, the *New York Times*, and the *Wall Street Journal*—and forecasts of contemporary business analysts, published in the *Magazine of Wall Street*, *Moody's Investment Survey*, Standard Statistics Company's *Standard Trade and Securities*, *Business Week*, the Harvard Economic Society's *Review of Economics and Statistics*, and Irving Fisher's *Trade and Money Index*. We find that inflation expectations moderated substantially as a result of mixed messages from the Roosevelt Administration regarding its commitment to an inflationary regime. We present this evidence below.

3.1 Inflation Expectations

At the end of July, news broke that Roosevelt no longer planned to use his powers to generate inflation. On July 31, the *New York Times* published an article, entitled "Money Inflation Declared Unlikely," with the caption: "President's Advisers Say the Recovery Program Will Be Tested to Full Without It." According to the *New York Times*, Administration officials revealed that because the recovery had enjoyed four months of solid growth and the National Industrial Recovery Act (NIRA) was about to be implemented, inflation might no longer be necessary to achieve the Administration's aims:

> The policy of the administration is to test to the full extent the Industrial Recovery Act program before even seriously considering entrance upon any inflationary currency program, advisers of the President declare… Before he left on his vacation the President privately expressed the opinion that inflation of the currency did not appear as a necessary companion of the Recovery Acts. ("Money Inflation Declared Unlikely," *New York Times*, July 31, 1933)

A few days later, on August 3, the *New York Times* reported that inflation had been 'called off': "Talk of inflation has, in the parlance of the markets, been 'soft-pedaled' lately. There had been reports that, for the time being, inflation had been 'called off.'"[5] The next day, the *New York Times* ran an article, entitled, "Inflation Put Off, Officials Suggest." The article characterized inflation as only a distant possibility:

> The government does not contemplate entering upon inflation of the currency at present and will issue cheaper money only as a last resort to stimulate trade, according to a close adviser of the President who discussed financial policies with him this week. This official asserted today that the President was well satisfied with the business improvement and the government's ability to borrow money at cheap rates. These are interpreted as good signs, and if the conditions continue as the recovery program broadened, it was believed no real inflation of the currency would be necessary. The President's attitude is represented to be that more money need not be put into circulation if the recovery plan succeeds. If it is apparent after a thorough test of the recovery plans that additional stimulation to trade is necessary, then the President, it was said, will not hesitate to try some form of real currency inflation. But viewing the situation today, this official said that inflation appeared to be far distant and may never be made a part of the Roosevelt administration's policies. ("Inflation Put Off, Officials Suggest," *New York Times*, August 4, 1933)

Thus, during the business week of Monday July 31 to Friday August 4, the press accounts interpreted the Administration's actions as indicating that inflation was no longer forthcoming.

[5] "Inflation Rumors Send Dollar Down," *New York Times*, August 3, 1933.

As a result of these signals, the forecasters began to express doubts about the Administration's commitment to an inflationary regime. In mid-August, the *Review of Economics and Statistics*, one of the first forecasters to predict inflation during the second quarter of 1933, backpedalled, voicing uncertainty about the prospects for inflation:

> The government has at its command the power to inflate our currency, an expedient which, so far, it has not actually resorted to and has only threatened to employ. It may be that the President is on this point more conservative than most of his supporters, and will resort to measures of active inflation only as a last resort. ("General Economic Conditions," *Review of Economics and Statistics*, August 15, 1933, p. 122)

Later, toward the end of August, when the recovery began to show signs of faltering, the Federal Reserve Banks increased their purchases of government securities, and Roosevelt authorized the Treasury to buy newly mined gold at the world price—two actions that were interpreted as inflationary.[6] Nonetheless, shortly thereafter, the Administration continued to signal a retreat from inflation, according to the news accounts. In mid-September, Senator Thomas, the author of the Thomas Inflation Amendment, led a charge in the U.S. Congress, reportedly representing more than one hundred members of Congress, for additional inflationary measures—for what the news accounts termed "outright currency inflation."[7] However, in response to this movement, Secretary of Agriculture Henry Wallace declared that the Administration was "flatly opposed to currency inflation."[8]

Due to these developments, perceptions regarding the Administration's commitment to an inflationary regime continued to waver in September. *Moody's* reported, "the Administration itself appears to act as though it were 'afraid' of inflation, at least, of any drastic inflation."[9] The *Magazine of Wall Street* noted the existence of "inflationary doubts"[10] among the public. In addition, *Moody's* described Roosevelt's policies as "confusing"[11] and reported that inflation expectations among farmers—an important subset of market participants—had subsided due to these confusing messages: "The more radical protagonists of higher prices (farmers, for instance) are dissatisfied with the credit inflation steps thus far taken, because they do not understand

[6] *Standard Trade and Securities* described these actions as "[inflationary] stimulants" and explained why they were perceived as inflationary: "Treasury purchase of gold for sale at the world price is not, apse facto, devaluation of the American dollar. But it is the one absolutely essential initial step if ultimately the gold content of the dollar is to be officially reduced. To the present owner of dollars, the move is important, therefore, as indicating that the gold value of these dollars will later officially be lowered." ("The Business Prospect," *Standard Trade and Securities*, September 1, 1933, pp. 389-90)
[7] "A Week of Confusing Influences," *Moody's Investment Survey*, September 25, 1933, p. 461.
[8] "A Week of Confusing Influences," *Moody's Investment Survey*, September 25, 1933, p. 461.
[9] "Forces Behind the Stock Market," *Moody's Investment Survey*, September 11, 1933, p. 505.
[10] "Bond Prices Hold Firm," *Magazine of Wall Street*, September 16, 1933, p. 523.
[11] "A Week of Confusing Influences," *Moody's Investment Survey*, September 25, 1933, p. 461.

them."[12] The forecaster reports shared the prevailing confusion, at times expressing the view that Roosevelt's price level target remained unchanged, but other times expressing doubt. *Moody's* summarized this uncertainty, by noting, "The Administration has been steering a middle course between these two semi-hostile fronts, and has failed to clarify its monetary policy even for the near future."[13]

By October, the forecasters began to conclude that the Roosevelt Administration had taken a definite turn toward more conservative inflation policies. *Moody's* noted, "the Administration [has turned] for the time being toward somewhat more conservative monetary theories and practices"[14] and concluded, "A clearer shift in the direction of more conservatism in the Administration's monetary policy was revealed by President Roosevelt's two addresses, in Chicago and New York."[15] The *Magazine of Wall Street* corroborated this assessment, reporting "Curiously enough, some of the President's advisors are telling him that the surest way to get plenty of money into circulation and raise prices is not to print any more but to announce resolutely that none will be printed and to proclaim triumphantly a new gold standard now, once and for all."[16] A new term for the Administration's policies—"conservative inflation"—began to appear in the press; however, *Moody's* reported that it only served to confuse the public:

> The Administration's latest moves have apparently been calculated to reassure long term capital. At the same time, however, Washington is committed to a policy of raising the price level considerably and is pursuing a lavish credit expansion program. These conflicting efforts of the Government at what may be termed 'conservative inflation' may well continue to confuse business and capital until either a purely conservative course or one of consistent inflation is determined upon. ("Positions of Industries," *Moody's Investment Survey*, October 19, 1933, p. 409)

Toward the end of October, however, Roosevelt appeared to embark on a reversal of his course of action by embracing the notion of inflation once again, perhaps as a result of continued weakness in economic activity. On October 22, Roosevelt gave a radio address, pledging to raise prices by reducing the gold content of the dollar via purchases of newly-mined gold by the government. The *Magazine of Wall Street* concluded that this action by Roosevelt "re-introduces the factor of inflation."[17]

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[12] "A Week of Confusing Influences," *Moody's Investment Survey*, September 25, 1933, p. 461.
[13] "A Week of Confusing Influences," *Moody's Investment Survey*, September 25, 1933, p. 461.
[14] "The Outlook," *Moody's Investment Survey*, October 9, 1933, p. 443.
[15] "Review of the Week," *Moody's Investment Survey*, October 9, 1933, p. 443.
[16] "'When, As and If' We Inflate," *Magazine of Wall Street*, September 30, 1933, p. 564.
[17] "The Trend of Events," *Magazine of Wall Street*, October 28, 1933, p. 5.

These mixed messages differ substantially from Roosevelt's steadfast public embrace of inflation during the second quarter of 1933. Indeed, the *Magazine of Wall Street* summarized the Administration's post-July communications strategy as "alternating rumors and denials of inflation."[18] Most importantly, these mixed signals caused market participants to reevaluate the Administration's commitment to an inflationary regime. By the end of the year, the *Review of Economics and Statistics*, which had confidently predicted inflation in its May, June, and July issues, declared that it could no longer venture a forecast: "The great uncertainty created by the Administration's currency measures renders scientific forecast impossible."[19] *Moody's* noted a decline in public discussions about inflation: "Inflation talk may well continue to be subdued."[20] Thus, according to the historical narrative record, due to mixed messages from the Roosevelt Administration, inflation expectations moderated during the second half of 1933.

3.2 The Causal Link

The narrative accounts connect the evolution of inflation expectations in 1933 to both the recovery in the spring and setback in the fall. For example, the *Magazine of Wall Street* notes that the anticipation of higher prices in the near future induced consumers and producers to change their behavior quickly—to buy and produce now, before prices and input costs increased—during the spring:

> With rising prices, of course, is associated business activity. This is perfectly logical. When manufacturers know that their inventory is constantly becoming more valuable they stock up. Individuals do the same on clothes and household necessities. When anyone believes that it will cost more tomorrow to do something, he does it today. And so comes the increase in business activity. ("How Industrials Will Be Affected by Inflation," *Magazine of Wall Street*, May 13, 1933, p. 78).

Yet, when inflationary expectations subsided in the fall, this stimulus faded. In August, the *New York Times* reported, "The flood of buying unleashed through fears of inflation and price advance is ebbing,"[21] and in October, the *Magazine of Wall Street* concluded:

> In view of the fact that spectacular gains in foreign exchange rates, staple commodities, common stock prices and business activity during the second quarter were prompted largely by expectations of inflation, it is easy to understand why reaction set in as soon as doubts over the imminence of inflation began to appear on the horizon. ("Taking the Pulse of Business," *Magazine of Wall Street*, October 28, 1933, p. 35)

[18] "Taking the Pulse of Business," *Magazine of Wall Street*, September 30, 1933, p. 585.
[19] "The United States: Index of General Business," *Review of Economics and Statistics*, December 15, 1933, p. 201.
[20] "The Outlook," *Moody's Investment Survey*, October 9, 1933, p. 443.
[21] "Topics in Wall Street," *New York Times*, August 13, 1933.

The stimulative effects of higher anticipatory prices during the spring withered in the fall.[22]

Furthermore, the moderation in inflation expectations may have reduced growth by undermining confidence. After four years of deflation and depression, many contemporary observers associated deflation with depression and conversely, inflation with recovery. As such, Roosevelt's commitment to an inflationary regime triggered not only expectations of inflation, but also, of recovery, delivering a powerful boost to confidence (see Jalil and Rua (2016)). Yet, according to the narrative accounts, confidence experienced a setback in the fall, due at least in part, to the confusion surrounding the Administration's monetary platform. The *Trade and Money Index* reports:

> A statement from President Roosevelt outlining a definite monetary policy is considered necessary to stimulate business confidence and effect another major rise in operations…It may be possible that the Buy Now Campaign will have sufficient public support to start the upward movement but it is certain that the present lack of confidence, due to industrial unrest and confusion, must be broken.[23]

Indeed, the narrative record contains frequent references to a "lack of confidence"[24] in the fall. As such, the narrative accounts provide evidence not only that inflation expectations moderated, but also that the decline in expectations, via anticipatory and confidence effects, played a causal role in both the spring recovery and fall setback.

In addition to causing a moderation in inflation expectations, Roosevelt's backpedalling on his monetary platform likely raised policy uncertainty. A number of studies, including Alexopoulos and Cohen (2009), Baker, Bloom and Davis (2015), Bloom (2009), Higgs (1997), Mathy (2014), Mayer and Chatterji (1985), Romer (1990), Shoag and Veuger (2014), and Voth (2002) have examined the effects of uncertainty on economic activity. Some of these studies—perhaps most prominently, Baker et al. (2015) and Higgs (1997)—have found evidence that an increase in policy uncertainty has contractionary effects. As a result, the increase in policy uncertainty, brought on by both the implementation of the NIRA and Roosevelt's backpedalling on inflation, may have also played a role in the fall setback. For example, in late 1933, the Harvard Economic Society directly noted, "The great uncertainty created by the Administration's currency measures"

[22] It is possible that a decline in output was inevitable after such rapid rates of growth in the spring. The backpedalling of the Administration from its commitment to inflation may have hastened an inevitable reaction. The *Trade and Money Index* reported, "An adjustment was natural and the Administration should not be charged too heavily with the responsibility. The February-June pace of recovery could not have been maintained" ("Index of Business Conditions," November 6, 1933, p. 1).
[23] "Index of Business Conditions," October 9, 1933, p. 1.
[24] *Trade and Money Index*, "Government's Credit Position Questioned," November 20, 1933, p. 2.

("The United States: Index of General Business," *Review of Economics and Statistics*, December 15, 1933, p. 201).

Finally, the setback in the fall was largely unanticipated. Klug, Landon-Lane and White (2004) analyze forecasts of carloadings by railroad shippers during the Depression. These forecasts provide contemporaneous survey estimates of future economic activity and, as such, shed insights on whether contemporary observers expected the setback in the fall. Forecasted carloadings did not decline until after the contraction was underway in the fall (Figure 1, p. 32).[25]

4 Event Study Analysis

In this section, we investigate the evolution of inflation expectations by conducting an event study analysis through the fall of 1933. Specifically, we read the daily news accounts to identify the dates of events that were perceived by contemporaries to either raise or lower the prospects for inflation. We then analyze the effects of these news shocks on financial markets (stock and exchange rate markets) within a less than twenty-four hour window.

We define an inflationary news shock as an event that *raises* the prospects for inflation in the eyes of contemporary observers and an anti-inflationary news shock as an event that *lowers* the prospects for inflation. These definitions allow us to identify both positive and negative inflationary news shocks. In addition, we classify cases where the news reports express some doubt about the appropriate interpretation of the event as weak news shocks. This classification permits us to separate news shocks that are clearly inflationary or anti-inflationary, from more ambiguous cases.

To assemble a list of news shocks, we read the "Topics in Wall Street" section in the *New York Times* and the "Abreast of the Market" section in the *Wall Street Journal*. These sections provide detailed coverage of financial and economic news at a daily frequency. These are the same

[25] However, Klug, Landon-Lane and White (2004) note that the relationship between carloadings and industrial production changed in the 1930s due to the growing importance of trucks and pipelines, relative to railroads, in total production. This evolving relationship may make it difficult to draw definitive conclusions on the degree to which contemporaries predicted movements in aggregate output in 1933 using data on carloadings. Indeed, whereas weighted carloadings track industrial production closely prior to 1933, the two series display less synchronicity in 1933 and 1934.

sources and definitions as in Jalil and Rua (2016); here, we extend the event study analysis in our previous work from the spring into the fall of 1933—that is, from August 1 to November 1, 1933.

4.1 News Shocks

Table 1 presents the events, separated into inflationary and anti-inflationary news shocks. It includes the newly identified shocks between August 1 and November 1, along with the shocks identified in Jalil and Rua (2016) for the earlier period. We identify weak news shocks with an asterisk next to the date.

Take in Table 1

Between April 1 and November 1, 1933, we find nine inflationary news shocks and six anti-inflationary news shocks. Interestingly, whereas most of the news shocks are inflationary before July 30 (5 inflationary versus 2 anti-inflationary), there is a roughly equal mix of inflationary and anti-inflationary news shocks afterwards (4 versus 4). This increase in the share of anti-inflationary news shocks reflects the mixed inflationary signals from the Roosevelt Administration, noted in Section 3, and provides further evidence of a waning in inflation expectations. Below, we describe each of the new shocks that occurred in the fall of 1933 (between August 1 and November 1). For the earlier news shocks, see Jalil and Rua (2016).

Based on our reading of the historical news record, we identify the following inflationary and anti-inflationary news shocks between August 1 and November 1, 1933: (1) a dispatch from Washington that new inflationary measures would be forthcoming (August 2: inflationary news shock), (2) a rejection from Administration officials of the previous day's dispatch (August 3: anti-inflationary news shock), (3) the announcement of an acceleration in open market purchases by the Federal Reserve (August 25: inflationary news shock), (4) Roosevelt's announcement of his plan to establish a controlled gold market (August 29: weak inflationary news shock), (5) the declaration of Secretary Wallace of his opposition to uncontrolled inflation and Roosevelt's refusal to clarify his position to a group of inflationists (September 20: weak anti-inflationary news shock), (6) the announcement of a bond conversion program (October 13: anti-inflationary news shock), and (7) the authorization of the Reconstruction Finance Corporation to purchase newly mined gold at above the world price (the night of October 22 into October 23: inflationary news shock). We discuss each of these episodes below.

August 2 – Inflationary News Shock: Dispatch from Washington about Inflationary Measures

On July 30, Administration officials declared inflation to be unlikely. According to these officials, the President was pleased with the state of the recovery and believed that the newly implemented National Industrial Recovery Act would be sufficient to sustain the recovery, with inflation being reserved as a last resort. Yet, three days later, on August 2, a dispatch from Washington—indicating that despite official statements to the contrary, inflationary measures would soon be enacted—appeared on the Dow Jones financial ticker. The *New York Times* reported: "There appeared yesterday on the Dow Jones financial news ticker a dispatch from Washington stating that, despite an apparent official desire to 'soft-pedal' the subject of inflation for the moment, direct inflationary moves will be adopted by the administration within a space of weeks—perhaps sooner."[26]

This development was perceived as inflationary. The *New York Times* interpreted this news as "new inflationary possibilities" and wrote that the dispatch was "accepted by the financial district, apparently, at face value."[27] The *Wall Street Journal* also noted "vague Washington reports of new inflationary possibilities."[28]

August 3 – Anti-Inflationary News Shock: Rejection of Previous Day's Inflationary Reports

The next day, on August 3, Administration officials reiterated the view, first articulated on July 30, that the President no longer planned to pursue inflation, except as a last resort. The news of this day counteracted the news of the previous day and was perceived as anti-inflationary. Specifically, the *New York Times* reported:

> The government does not contemplate entering upon inflation of the currency at present and will issue cheaper money only as a last resort to stimulate trade, according to a close adviser of the President who discussed financial policies with him this week…this official said that inflation appeared to be far distant and may never be made a part of the Roosevelt administration's policies ("Inflation Put Off, Officials Suggest," *New York Times*, Aug 4, 1933).

As such, the news of August 3 represented an anti-inflationary shock.

[26] "Topics in Wall Street," *New York Times*, August 3, 1933.
[27] "Topics in Wall Street," New York Times, August 3, 1933.
[28] "Topics in Wall Street," New York Times, August 3, 1933.

August 25 – Inflationary News Shock: Fed Accelerates its Open Market Purchases

On August 25, news broke that the Federal Reserve had increased the pace of its open market purchases to $35,000,000 per week. The news accounts report that the decision was the result of an attempt to aid the NRA recovery drive and "placate the rising clamor of the inflationist bloc."[29]

The action was perceived as inflationary. The *New York Times* noted that this development triggered "talk of inflation,"[30] and the *Wall Street Journal* reported a revival of "inflation interest."[31] Furthermore, while rumors did circulate in the preceding days about a potential acceleration of the Fed's open market purchase program, the *New York Times* nonetheless reported, "The action of the Reserve System was a surprise to bankers."[32] As such, the event was not fully anticipated.

August 29 – Weak Inflationary News Shock: Roosevelt Announces his Plan to Create a Controlled Gold Market

On August 29, Roosevelt announced a plan to establish a limited gold market in which gold newly mined in the United States could be purchased and sold in foreign markets under certain restrictions. As a result, Roosevelt declared his intention to partially lift the embargo on gold exports that had been in effect since the spring.

This action was perceived as inflationary by many contemporary observers who viewed Roosevelt's decision to modify the gold embargo as a precursor to an official reduction in the gold content of the dollar. The *New York Times* explains:

> What appears to be of more importance is that the administration has, in a roundabout way, recognized that the statutory price of $20.67 an ounce for gold is no longer a true price for gold. Once that has been done it will appear to many persons that a step has been taken toward a subsequent legal change in the price of gold. To the extent it may properly be said that the order is a step toward the kind of currency inflation which the law authorizes upon Mr. Roosevelt's responsibility.[33]

The *New York Times* further noted that "many regarded [this announcement] as an inflationary step,"[34] and the *Wall Street Journal* reported, "The President's step revived the inflationary urge

[29] "Credit Expansion Suddenly Trebled," *New York Times*, August 25, 1933.
[30] "Rise in Grain Aided By Inflation Talk," *New York Times*, August 26, 1933.
[31] "Abreast of the Market," *Wall Street Journal*, August 26, 1933.
[32] "Credit Expansion Suddenly Trebled," *New York Times*, August 25, 1933.
[33] "The Gold Ruling," *New York Times*, August 30, 1933.
[34] "Topics in Wall Street," *New York Times*, August 31, 1933.

for securities."[35] In addition, the event was unanticipated. The *New York Times* reported, "the President's order [was] announced unexpectedly."[36]

However, we label this event as a weak inflationary news shock because some disagreement existed over whether the action was truly inflationary. The *New York Times* described this uncertainty:

> The President's order…will be variously interpreted. The advocates of currency inflation will read into it a purpose to devalue the dollar eventually. Possibly it is a step in that direction, but it would be rash to assume, on the basis of such information as is contained in the official announcement, that so drastic a change in the country's monetary policy is contemplated."[37]

As such, we label the event as a weak inflationary news shock.

September 20 – Weak Anti-Inflationary News Shock: Secretary Wallace's Statement and Roosevelt's Silence

In the days leading up to September 20, a movement, consisting of more than one hundred members of Congress and led by Senator Thomas, clamored for additional inflationary measures. On the night of September 19, this group sent a letter to the President, demanding that he publicly reply to their calls and define his stance on inflation. On September 20, Roosevelt declined their offer to discuss his views. In addition, on the same day, Secretary of Agriculture Henry Wallace, in an address to the National Grain and Feed Dealers Association in Chicago, denounced inflation as "not a cure-all"[38] and declared his opposition to "uncontrolled inflation."[39]

These two actions—Roosevelt's refusal to clarify his position on inflation and the statements of Secretary Wallace—were perceived as anti-inflationary by some observers. The *New York Times* reported, "Washington dispatches broke the spirit temporarily yesterday of the more clamorous advocates of inflation. What the government spokesmen had to say was most discouraging to the inflationists."[40] Over the following days, the news accounts reported, "The inflation campaign seemed to have stalled"[41] and made references to "accumulating evidence that currency inflation is not part of the recovery program."[42]

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[35] "Abreast of the Market," *Wall Street Journal*, August 30, 1933.
[36] "Financial Markets," *New York Times*, August 30, 1933.
[37] "Financial Markets," *New York Times*, August 30, 1933.
[38] "Wallace Decries Inflation Cure-All," *New York Times*, September 21, 1933.
[39] "Abreast of the Market," *Wall Street Journal*, September 21, 1933.
[40] "Topics in Wall Street," *New York Times*, September 21, 1933.
[41] "Topics in Wall Street," *New York Times*, p. 27
[42] "Topics in Wall Street," *New York Times*, September 24, 1933.

Yet, we classify this event as a weak anti-inflationary news shock for two reasons. First, though Roosevelt's refusal to define his position was perceived by some observers as indicating hostility toward inflation, he remained silent and gave no new indications of his views on September 20. Second, while Secretary Wallace described inflation as "not a cure-all" and stated his opposition to uncontrolled inflation, he voiced support for controlled inflation and predicted that the measures of the National Industrial Recovery Act would raise prices within weeks or months. Specifically, the *Wall Street Journal* reported, "Mr. Wallace reiterated his stand favoring controlled inflation,"[43] and the *New York Times* reported:

> Some uncertainty…was occasioned by the address made today by Secretary Wallace of the Department of Agriculture before the National Grain and Feed Dealers Association here. He intimated that inflation was not a cure for economic conditions and then expressed the belief that higher [price] levels would be experienced within a few months, or weeks, depending on how rapidly certain plans matured.[44]

Indeed, later in the week, the *New York Times* described the uncertain nature of these events:

> For the time being Wall Street—as its opinion was reflected by the scattered comment—is convinced that currency inflation, if it ever actually was seriously considered, has been put far into the future…But the best judgment, as voiced in the financial district, is that the problem has not been entirely solved. The belief is that currency inflation still may linger in the background, both as a threat and as an encouragement.[45]

Thus, while some contemporaries perceived Roosevelt's reticence on the topic of inflation and Secretary Wallace's statements as anti-inflationary, the equivocal nature of these events leads us to classify September 20 as a weak anti-inflationary news shock.

October 13 – Anti-Inflationary News Shock: Announcement of Bond Conversion Program

On October 13, the Treasury Department announced a bond conversion program. The program involved the conversion of 30 percent of the Fourth Liberty 4 ¼ percent bonds into twelve-year 3 ¼ percent bonds.[46]

Because inflation, by weakening the currency, would reduce the attractiveness of the bond conversion plan, this event was perceived as a signal that Roosevelt would not pursue any substantial inflation. The *New York Times* explains:

[43] "Abreast of the Market," *Wall Street Journal*, September 21, 1933.
[44] "Grain Lags as Hope of Inflation Ebbs," *New York Times*, September 21, 1933.
[45] "Topics in Wall Street," *New York Times*, September 26, 1933.
[46] See Childs (1920) for a contemporary description of these bonds.

> The United States Government's announcement that it would convert into twelve-year 3 1/4 per cent obligations 30 per cent of the outstanding Fourth Liberty 4 1/4 per cents. This involves the calling of about $1,900,000,000 of the present bonds. The refunding operation is the most extensive one that the government ever has had occasion to undertake. The implications of this gigantic transaction could not have been overlooked by the speculative markets. Obviously the government is pledging itself to preserve the sanctity of its money. Aside from the fact that there is involved the question of a large aggregate saving in interest, the financial community is interested to a greater extent in the promise implicit in this plan that there would be no serious dilution of the currency. The inferences which were drawn from the market yesterday appear to be entirely warranted. ("Stocks and Commodities Decline Sharply as the Dollar Rises on Bond Conversion Plan," *New York Times*, October 14, 1933)

> Whether or not the government intended, by its great bond-conversion program, to pledge itself to the preservation of a sound currency, that purpose was naturally taken for granted in Wall Street. The reasoning is simple: Obviously the administration would not ask investors to participate in a refinancing plan of such scope if there was any immediate likelihood of dilution of the currency. To alter the monetary policy now would be to break faith with the investing public. ("Along the Highways of Finance," *New York Times*, October 15, 1933)

Indeed, both the *New York Times* and *Wall Street Journal* reported that contemporaries perceived this event as an anti-inflationary development:

> The general attitude yesterday was that, after the government's ambitious bond conversion program, the advocates of currency inflation cannot expect to make much headway in the near future…The financial community, as a matter of fact, seems to be reasonably well satisfied that the inflation movement has been defeated. Wall Street commission houses quoted rather widely yesterday the 'sound money' pledges of the President's party and his own assurances on the subject. ("Topics in Wall Street," *New York Times*, October 15, 1933).

> The government's conversion offer on a part of the Fourth Liberty 4 1/4 s helped to boost the bond market, but it put a final quietus on inflation talk, for the time being, and led to selling of both grains and stocks. ("Abreast of the Market," *Wall Street Journal*, October 14, 1933)

Lastly, this development was not anticipated, with the *New York Times* describing the announcement of the bond conversion plan as "unexpected": "Wednesday's unexpected announcement by the Treasury Department."[47]

Night of October 22 into October 23 – Inflationary News Shock: Authorization of the Reconstruction Finance Corporation to Purchase Newly Mined Gold at Above the World Price

On the evening of Sunday October 22, Roosevelt delivered a fireside chat, in which he made two important announcements. First, Roosevelt announced his plan to establish a government market for gold in the United States, in which the Reconstruction Finance Corporation would be

[47] "Along the Highways of Finance," *New York Times*, October 15, 1933.

authorized to buy gold newly mined in the United States at prices to be determined in consultation with the Secretary of the Treasury and the President. Second, Roosevelt announced the new authority of the Reconstruction Finance Corporation to buy and sell gold on the world market if necessary. Roosevelt argued that such actions would allow his Administration to take control over the gold value of the dollar and provide the Administration with an additional tool to promote the recovery of commodity prices. In the next business day—Monday October 23, Roosevelt authorized the Reconstruction Finance Corporation to begin purchasing newly mined gold, at prices that were presumed to be above the world price.

These actions were described as a deliberate attempt to devalue the dollar and raise the prices of commodities. As such, the events of October 22–23 were perceived as inflationary. The *New York Times* reported, "There seemed to be no doubt in most official circles that the immediate activities would be of an inflationary character, in the hope that they would send prices up,"[48] and "It was the view of nearly all experts that the consequences of resorting to the plan outlined by Mr. Roosevelt could only lead in the end to inflation."[49] Indeed, the *New York Times* further noted, "For two days the financial community has been analyzing the probable immediate effect of the gold-buying policy of the Federal Government upon the prices of commodities and securities. The consensus is that it will be effective in bringing about an advance in the prices of both in the near future."[50] Moreover, this action was not anticipated. The news accounts, in the days leading up to Roosevelt's announcement, contain no references or indications of a prospective shift in monetary policy.

4.2 Event Study Analysis

Armed with this list of inflationary and anti-inflationary news shocks, we investigate the effects of these events on financial markets using an event study analysis. Since we have daily data on stock prices and exchange rates, we can analyze the impact of these events within a narrow range—specifically, in less than twenty-four hours.[51]

[48] "Dollar Plan Is Speeded," *New York Times*, October 24, 1933.
[49] "Bankers View Plan With Deep Concern," *New York Times*, October 24, 1933.
[50] "Analyzing Gold-Buying Policy," *New York Times*, October 25, 1933.
[51] The stock price data are from Standard Statistics Company's *Standard Trade and Securities* and the exchange rate data are from the *New York Times*.

Table 1 presents the percentage change in stock prices (measured using Standard's Daily Stock Price Index) and exchange rates (the dollar-to-British pound and the dollar-to-French franc) on the dates of inflationary and anti-inflationary news shocks. The table quickly reveals that, in general, on the dates of inflationary news shocks, stock prices increase and the dollar depreciates. By contrast, on the dates of anti-inflationary news shocks, stock prices decrease and the dollar appreciates.[52]

To statistically assess the effects of these inflationary and anti-inflationary news shocks on financial markets, we estimate the following regression:

$$\Delta y_t = \alpha + \beta_0 I_t + \beta_1 I_{t-1} + \beta_2 A_t + \beta_3 A_{t-1} + \epsilon_t \ , \qquad (1)$$

where Δy represents daily changes in stock prices, the dollar-pound exchange rate, or the dollar-franc exchange rate (in log units). We include two dummy variables: I and A, which equal one on the dates of inflationary and anti-inflationary news shocks, respectively.[53] The contemporaneous dummies measure effects within a less-than-24-hour window, whereas the lagged dummies capture any spillover effects into the subsequent day. Because we have already analyzed the news shocks prior to July 31 in earlier work, we restrict our event study analysis in this paper to the newly identified news shocks after August 1. As such, the sample period spans August 1 to November 1, 1933.[54]

[52] The two exceptions are the anti-inflationary news shock of August 3, where the dollar-to-franc exchange rate remains unchanged, and the weak inflationary news shock of August 29, where stock prices fall slightly. In the case of the latter news shock, however, the *New York Times* explains that the announcement had little impact on stock prices because it came so near to the close of the stock exchanges that day: "The announcement of the order did not become know in Wall Street until shortly before the close of the stock market, consequently, its sentimental influences were scarcely reflected there…In the foreign exchange market, where there was more time for the news to take effect, the dollar cheapened rapidly" ("President Aids Miners," *New York Times*, Aug 30, 1933). In addition, the *Wall Street Journal* notes that stock prices rose after Roosevelt's announcement on August 29, but that it followed larger stock price declines earlier in the day: "The stock market travelled over a wide range of prices. The mid-session sell-off came without warning, and carried stocks off as much as 6 points from the early highs. The market met buying on the reaction, steading in the early afternoon, and then started a slow recovery which was speeded up by the President's announcement" ("Abreast of the Market," *Wall Street Journal*, Aug 30, 1933).

[53] For news shocks that occurred after the close of the markets, the dummy equals one on the first day the markets can process the news (e.g. Oct 23 for the inflationary news shock of Oct 22-23).

[54] As a robustness check, we estimated the regression for the full sample period from April 1 to Nov 1, 1933, including all inflationary and anti-inflationary news shocks. If anything, the results become even stronger over the full sample period. Furthermore, the regression results that we report in this paper exclude the weak news shocks, but the basic results hold with the inclusion of the weak news shocks.

Table 2 presents the regression results. The dependent variables in each specification are: stock prices (column 1), dollar-to-British pound exchange rate (column 2), and the dollar-to-French franc exchange rate (column 3).

Take in Table 2

Consider first the results for the inflationary news shocks. On the date of an inflationary news shock, stock prices rise and the dollar depreciates. The coefficient estimates on the contemporaneous news shock dummy are significant for the first two specifications (p-values < 0.05 and 0.01, respectively). These estimates reveal that stock prices increase by roughly 4 percent and the dollar depreciates, relative to the pound, by 2 percent in a less-than-24-hour window. In addition, the third specification suggests a roughly 2 percent depreciation of the dollar, relative to the franc, though the coefficient is not precisely estimated. Furthermore, the coefficients on the lagged news shock dummy are positive in all three specifications, suggesting that stock prices continued to increase and the dollar continued to depreciate on the day following an inflationary news shock.

For the anti-inflationary news shocks, stock prices and exchange rates both move in the opposite direction. Stock prices fall by roughly 4 percent, and the dollar depreciates against the pound by roughly 2 percent on the date of an anti-inflationary news shock, movements that are statistically significant (p-values < 0.10 and 0.01, respectively). The dollar also depreciates against the French franc by roughly 4 percent on the date of an anti-inflationary news shock, though this movement is statistically insignificant at conventional levels. However, we find a statistically significant 11 percent depreciation of the dollar against the French franc on the day after an anti-inflationary news shock (p-value < 0.05).

In column 4, we replace the dependent variable with the change (in log units) in the number of news articles containing the terms "inflation" or "inflationary" across five daily national newspapers: the *New York Times*, the *Wall Street Journal*, the *Washington Post*, the *Chicago Tribune*, and the *Los Angeles Times*. Figure 2 displays the series on inflation news coverage for the period between January 1929 and December 1937. The coefficient on the lagged inflationary news shock dummy is positive and significant (at the p < 0.10 threshold). It reveals an increase of roughly 70 percent in the number of news articles containing the terms "inflation" or "inflationary" on the date following an inflationary news shock—an unsurprising delayed effect

since newspapers report developments with a lag of one day. Interestingly, however, the anti-inflationary news shocks are not followed by statistically significant changes in news coverage about inflation.

Take in Figure 2

Table 3 presents the results from a weekly event study analysis using data on disaggregated stock prices from Irving Fisher's *Trade and Money Index*.[55] We divide these stock prices into durable and nondurable goods industries.[56] During the week of an inflationary news shock, while stock prices rise strongly and significantly for both durable and nondurable goods industries, the increase is larger for durable goods industries, which tend to be more sensitive to changes in real interest rates. During the week of an anti-inflationary news shock, we find that stock prices fall only for durable goods industries, although these results are not precisely estimated.

Take in Table 3

These results are generally similar to those reported in Jalil and Rua (2016), where we restricted our event study analysis to the critical four months in which inflation expectations remained elevated based on the narrative evidence—that is, from April to July. In both sets of results, inflationary news shocks raised stock prices, depreciated the value of the dollar, and had larger effects on the stock prices of durable goods industries. Anti-inflationary news shocks had opposite effects. Overall, the results show that the inflationary and anti-inflationary news shocks that we identify had large and immediate effects on financial markets in the spring and fall of 1933. Most notably, the list of inflationary and anti-inflationary news shocks that we have compiled sheds light on the key policy statements and actions that affected inflation expectations throughout 1933.

5 Aggregate Effects of the Regime Shift

[55] Due to data constraints, we are only able to conduct an event study analysis with disaggregated stock price data at a weekly frequency. Nonetheless, the findings that we describe shed interesting insights.
[56] The durable goods industries are "agricultural equipment," "auto accessories," "aviation," "building supplies," "coppers & miscellaneous metals," "electrical equipment," "household goods," "machine & railroad equipment," "motors," "office equipment," and "steels." The nondurable goods industries are "chemical," "foods & sugars," "miscellaneous oils," and "tobaccos."

In this section, we develop an econometric framework for estimating the output effects of the Roosevelt inflationary macroeconomic policy regime shift. Our model quantifies the degree to which output growth differed from normal during the months that coincided with elevated inflation expectations and the months when inflation expectations waned.

The theoretical literature has shown that a shift toward higher inflationary expectations can stimulate a depressed economy. When nominal interest rates are near the zero lower bound, expected future inflation allows the economy to achieve the negative real rate of interest that is needed to offset the fall in output (e.g., Krugman, 1998; Eggertsson and Woodford, 2003). Of particular interest to the period of the Great Depression, Eggertsson and Krugman (2012) show that when the output shock is the result of deleveraging, as was the case in the Great Depression, a shift toward positive inflation expectations can have even stronger stimulative effects on output. In this subsection, we develop an empirical framework to quantify the aggregate output effects of Roosevelt's inflationary macroeconomic policy regime shift. This is important since the surge in output growth in the spring of 1933 followed other contractionary developments earlier in the year. Among other things, the U.S. experienced a massive banking panic, which broke out in the final months of 1932 and intensified in early 1933, and the Federal Reserve increased its discount rate in February to defend against gold outflows.

The extraordinary behavior of output in 1933 relates to the early debates in macroeconomics between Friedman and Schwartz (1963) and Romer and Romer (1989) regarding the effects of monetary disturbances. Based on a careful reading of the historical, narrative record, Friedman and Schwartz identify four relatively exogenous reductions in the supply of money and note that each of these episodes preceded large declines in output. On this basis, they conclude that changes in the money supply cause movements in output. In a subsequent study, Romer and Romer (1989) reevaluate the work of Friedman and Schwartz. Though they praise Friedman and Schwartz's contributions as groundbreaking, they argue that Friedman and Schwartz may have suffered from unintentional bias in their identification of monetary shocks, primarily because their definition of an exogenous shock—an unusual movement in money—lacks precision and thereby, leaves too much room for personal discretion. Romer and Romer identify two candidate episodes, 1933 and 1941, not identified by Friedman and Schwartz that underscore these concerns. In both episodes, output growth surged in the aftermath of contractionary monetary developments—a finding that would seemingly be at odds with Friedman and Schwartz's central

argument [57] As a result of these concerns, Romer and Romer (1989) conduct a new test—one that is modeled in the spirit of Friedman and Schwartz's narrative approach, but improves on their methodology by using a more precise definition to identify relatively exogenous monetary shocks from postwar U.S. history. They find that monetary shocks do indeed have substantial real output effects, which is in line with the broad conclusions of Friedman and Schwartz.[58]

Nonetheless, a lagging question remains: if financial crises and contractionary monetary shocks reduce output, why then did output grow so strongly during the second quarter of 1933? And why did output retract in the fall? The findings of Jalil and Rua (2016), Temin and Wigmore (1990), and Eggertsson (2008) indicate that Roosevelt's inflationary regime shift boosted output growth in the second quarter of 1933. This suggests then that the expansionary effects of the regime shift counteracted the contractionary effects of the financial crisis and other monetary shocks earlier in the year. In the fall, when inflation expectations moderated, output growth declined.

Thus, in estimating the output effects of Roosevelt's actions, it is crucial to develop a framework that controls for the effects of the banking crisis and other monetary shocks. Specifically, we construct an empirical model based on the framework developed in Bernanke (1983) that captures

[57] For example, regarding 1933, Romer and Romer (1989) write: "*1933*. A massive wave of banking failures began in the final months of 1932 and worsened in early 1933. In addition, expectations that Roosevelt might devalue or abandon the gold standard on taking office caused large gold outflows and led to an increase in the discount rate from 2.5 to 3.5% in February to defend gold. By February banking conditions had degenerated into panic, causing widespread bank failures. The failures were in turn followed by the declaration of bank holidays in many states. On his inauguration in March, Roosevelt imposed a nationwide banking holiday—a step that, in Friedman and Schwartz's view, was extraordinarily disruptive of the financial system and much more drastic than was needed. (Friedman and Schwartz 1963, pp. 324-32, 349-50, 389-91, 421-34.) The events of these months have the features of what under different circumstances Friedman and Schwartz would be willing to describe as a monetary shock, or indeed as several shocks. At other times widespread banking failures and panic conditions much milder than those of early 1933 are considered to be monetary disturbances. The gold outflow and the increase in the discount rate to defend the gold standard despite the depressed level of real activity clearly represent unusual monetary developments, similar to those of the fall of 1931. And the banking holiday shares with the episodes emphasized by Friedman and Schwartz the feature that it appears to be a major contractionary step arising from an inadequate understanding of the workings of the financial system. In sum, it seems extremely plausible that if the Depression had continued to worsen in 1933, Friedman and Schwartz would have characterized the events of January-March 1933 as a fifth "crucial experiment" (pp. 128-129).

[58] The literature on the contractionary effects of financial crises and declines in the money supply is voluminous. For monetary shocks, see Friedman and Schwartz (1963), Richardson and Troost (2009), Romer and Romer (1989, 2004), and Velde (2008). For financial crises, see Cerra and Saxena (2008), Chodorow-Reich (2013), Jalil (2015) and Reinhart and Rogoff (2009).

the relationship among three variables: money, financial crisis indicators, and output.[59] We then augment this model by including two dummy variables: a regime shift dummy which equals one in the months that coincide with the Roosevelt inflationary regime shift and a fall 1933 dummy which equals one in the months when Roosevelt sent mixed signals about his commitment to inflation. The dummy variables capture the effects of Roosevelt's inflationary actions, conditional on the effects of financial crises and other monetary developments.

The model that we construct mirrors the framework used by Bernanke (1983). To tease out the nonmonetary effects of the financial crises from the effects of changes in the supply of money, Bernanke estimates the following equation:

$$Y_t = \sum_{i=1}^{2} \beta_i Y_{t-i} + \sum_{i=0}^{2} \alpha_i M_{t-i} + \sum_{i=0}^{1} \delta_i DBANKS_{t-i} + \sum_{i=0}^{1} \phi_i DFAILS_{t-i} + \epsilon_t \qquad (2)$$

where Y denotes the growth rate of industrial output (relative to its exponential trend), M represents "M1 monetary shocks" (defined as the residuals from a regression of the rate of growth of M1 on four lags of the growth rates of industrial production, wholesale prices, and M1 itself), and DBANKS and DFAILS are financial crisis proxies that measure the first difference of deposits of failing banks and the first difference of liabilities of failing businesses, respectively.[60] The regressions are estimated at a monthly frequency from January 1919 to December 1941. The monetary shock variables are designed to measure the effects of nominal disturbances, while the financial crisis proxies are designed to tease out the nonmonetary effects of the financial crises, after controlling for the effects of monetary shocks. Because the financial crisis proxies and the monetary shock variables are large and statistically significant, Bernanke concludes that the financial crises had substantial nonmonetary effects on output, apart from the monetary effects identified by Friedman and Schwartz. Based on the findings from his model, Bernanke argues that the nonmonetary effects of the financial crises played a crucial role—alongside monetary forces—in causing the Great Depression.[61]

[59] In his seminal 1983 study, Bernanke argues that the financial crises of the Great Depression raised the costs of credit intermediation and thereby, reduced output through a nonmonetary channel. His work remains one of the leading studies on the causes of the Great Depression.

[60] In a second specification, Bernanke replaces the monetary shocks with price shocks. See Bernanke (1983, p. 268) for more details.

[61] Though Bernanke's analysis focuses on a different channel to account for the output losses of 1929-1933, his work ultimately builds on the Friedman-Schwartz monetary analysis of the Depression.

To identify the effects of Roosevelt's inflationary actions—the regime shift of the spring and the Administration's mixed inflationary signals in the fall—apart from the other developments during the sample period, we augment Bernanke's original model to include two additional regressors. Specifically, we estimate the following regression:

$$Y_t = \sum_{i=1}^{2} \beta_i Y_{t-i} + \sum_{i=0}^{2} \alpha_i M_{t-i} + \sum_{i=0}^{1} \delta_i DBANKS_{t-i} + \sum_{i=0}^{1} \phi_i DFAILS_{t-i} + \lambda_1 R_t^S + \lambda_2 R_t^F + \epsilon_t \quad (3)$$

where R_t^S equals one in the months that coincide with the Roosevelt inflationary regime shift—that is, when there was a widespread perception of an imminent rise in inflation among market participants (April to July)—and R_t^F equals one in the months when Roosevelt's mixed inflationary signals caused inflation expectations to moderate (August to November). We construct the dummies based on the historical narrative evidence presented in Jalil and Rua (2016) and in this paper.[62] By augmenting Bernanke's specification with these dummies, we are able to tease out the effects of Roosevelt's inflationary macroeconomic policy regime shift, while controlling for the monetary and financial crisis effects highlighted by Friedman and Schwartz (1963) and Bernanke (1983) as crucial causes of the Depression.

Table 4 displays the results. Column 1 reports the original Bernanke (1983) specification, whereas column 2 includes the two dummy variables. Though there are small differences between columns 1 and 2, Bernanke's main results still hold. Both the monetary and the financial crises variables are strongly significant, suggesting that the financial crises of the Great Depression had nonmonetary effects, apart from the purely monetary forces highlighted by Friedman and Schwartz. Thus, these results support Bernanke's original interpretation.[63]

Take in Table 4

The key results are the coefficient estimates for the dummy variables in column 2. The coefficient of the inflationary regime shift dummy R_t^S is large, positive, and strongly significant.

[62] McCallum (1990) also used a dummy variable in a time series regression to separate the output movements of 1933 in his study on whether a monetary base rule could have prevented the Depression.

[63] The coefficient estimates in column 1 of Table 4 differ slightly from those in Bernanke (1983). The data series used by Bernanke on industrial production and wholesale prices have undergone revisions since the publication of Bernanke's study. For accuracy, the coefficient estimates that we report reflect the most recent set of revisions and thus differ slightly from the coefficients reported in Bernanke (1983). Nonetheless, the basic findings remain intact.

This coefficient estimate indicates that during the months that coincided with Roosevelt's inflationary regime shift of the spring of 1933, output growth was 7 percentage points higher than what would have been predicted, given the normal behavior of money and financial crisis indicators from 1919 to 1941. On the other hand, the coefficient of the fall 1933 dummy R_t^F is large, negative, and statistically significant. Output growth in the fall was 4½ percentage points lower than normal.[64] Moreover, adding the two dummy variables increases the explanatory power of the model. The adjusted R-squared increases from 0.433 to 0.508—a large improvement in the fit of the model given that the two dummies cover only eight months in a sample period of more than twenty years.[65]

Together, these results suggest that Roosevelt's actions contributed significantly to the spring recovery and fall setback. Moreover, the narrative evidence, presented in Section 3, indicates a causal link between the rise and fall in inflation expectations and the rise and fall in output growth. Yet, it would be impossible to conclude that the swing in inflation expectations was solely responsible for the dramatic movements in output in 1933. Other factors likely played an important role.

For one, the financial instability of early 1933, which culminated in a complete shutdown of the nation's banking system in March, may have depressed economic activity. In a recent study, James, McAndrews, and Weiman (2013) provide narrative and econometric evidence that bank suspension periods, by making it difficult for firms to meet payroll demands and other financial commitments associated with internal trade, have contractionary effects on economic activity. As such, the reopening of the banking system in the spring may have bolstered the recovery. Furthermore, it is plausible that any stimulus from the resumption of payments faded later in 1933, helping to slow growth.[66]

[64] The coefficient estimates are very similar if we include each dummy variable separately, 0.0697 for R_t^S and -0.0476 for R_t^F. Moreover, the results are robust to using different lags—between one and eight—for growth in industrial production.

[65] As a robustness check, column 3 adds the dollar exchange rate vis-à-vis the British pound as a proxy for the direct effects of devaluation. However, none of the results change; the dummy variables are still large, and strongly significant, whereas the coefficient for the dollar exchange rate is statistically insignificant.

[66] In addition, the data used in Bernanke's original model, and in our model, do not include banks closed as a result of state and national holidays. Thus, our empirical model may not fully capture the effects of the Bank Holiday of 1933.

For another factor, the implementation of the National Industrial Recovery Act could have derailed the recovery. The NIRA codes began to be implemented during the summer of 1933—toward the end of July and continuing into August, precisely as the setback occurred. Two recent studies suggest that the supply-side policies of the NIRA may have had contractionary effects on output. Taylor and Neumann (2016) find that industries more likely to be affected by the President's Reemployment Program, a subprogram of the NIRA, displayed larger declines in output during the fall of 1933. Likewise, Cohen-Setton, Hausman and Wieland (2016) find that supply-side policies in France, similar to those of the NIRA—though, arguably more extreme—curtailed economic activity in 1936. Furthermore, the narrative evidence that we examined—the historical news accounts and forecasts of contemporary business analysts—suggests that the NIRA may have played a role in the fall setback. According to these sources, the implementation of the NIRA generated uncertainty, causing firms to curtail spending. For example, *Standard Trade and Securities* attributed the slowdown in economic activity to uncertainty generated by these codes:

> The codes, coupled with the aggressive campaign being waged by NRA constitute, in our judgment, the most important single cause for the hesitation in activity which is now becoming evident and which the inflationary moves are designed to combat…It is the widespread uncertainty as to the longer term aspects of the codes which is an essential factor in somewhat curtailing activity at the moment. ("NRA the Chief Cause of Uncertainty," *Standard Trade and Securities*, September 1, 1933, p. 390)

Moody's also cited the introduction of NIRA codes as "one of the original causes of the recession in business since July,"[67] and the *Magazine of Wall Street* echoed this assessment, reporting, "the problem of price uncertainties during the interim while codes are being formulated and put into effect has caused sharp curtailment of incoming business in several basic lines."[68]

Thus, while the results from our empirical model provide an estimate of the extent to which output growth differed from normal during the months that coincided with (1) elevated inflation expectations in the spring and (2) a moderation in inflation expectations in the fall, we cannot disentangle the effects of the rise and fall in inflation expectations from the other developments of the year, including the reopening of the banking system and the implementation of the NIRA. It is likely that these and other factors were at work.

[67] "Position of Industries," *Moody's Investment Survey*, October 19, 1933, p. 409.
[68] "Taking the Pulse of Business," *Magazine of Wall Street*, August 16, 1933, p. 437.

6 Conclusion

This paper provides new evidence on the evolution of inflation expectations in 1933 by examining the historical narrative record. As such, it builds on the work in Jalil and Rua (2016) by extending the analysis into the fall of 1933.

The narrative evidence—reports of contemporary observers contained in the historical news accounts and forecasts of contemporary business analysts—indicate that inflation expectations, after rising substantially during the spring, moderated in the fall. Roosevelt's mixed inflationary signals account for this decline in inflation expectations—the Administration embraced inflation at times; other times, distanced itself. As a result, market participants perceived a higher share of news shocks to be anti-inflationary between the end of July and the beginning of November, relative to the spring.

Our event study analysis also sheds insights into the effects of Roosevelt's policy statements and actions on financial markets. Stock prices and the value of the U.S. dollar were highly influenced by perceptions of Roosevelt's support for inflationary policies. Immediate and statistically significant increases in stock prices and declines in the value of the dollar followed inflationary news shocks, while anti-inflationary news shocks were followed by movements in the opposite direction.

According to our empirical model, output growth was 7 percentage-points higher than what would have been predicted, given the normal behavior of money and financial crisis indicators, during the months that coincided with the Roosevelt regime shift. When inflation expectations moderated in the fall, output growth fell and was about 4½ percentage points lower than normal. Our results bolster the findings of Temin and Wigmore (1990) by providing additional evidence that the Roosevelt regime shift played a major role in both the recovery and setback of 1933.

The dramatic developments in the U.S. in 1933—a rapid four-month spurt in industrial production followed by a decline that reversed a substantial fraction of the earlier gains—is of interest to policymakers today. Importantly, the events of 1933 show how expectational shifts can have large effects on economic performance and that even profound shifts can be easily reversed.

Nonetheless, despite the setback in the fall of 1933, the recovery continued. With the exception of 1936–37, output grew rapidly in the 1930s and early 40s. Indeed, the establishment of a new inflationary macroeconomic policy regime in the spring of 1933 ended the Great Contraction.

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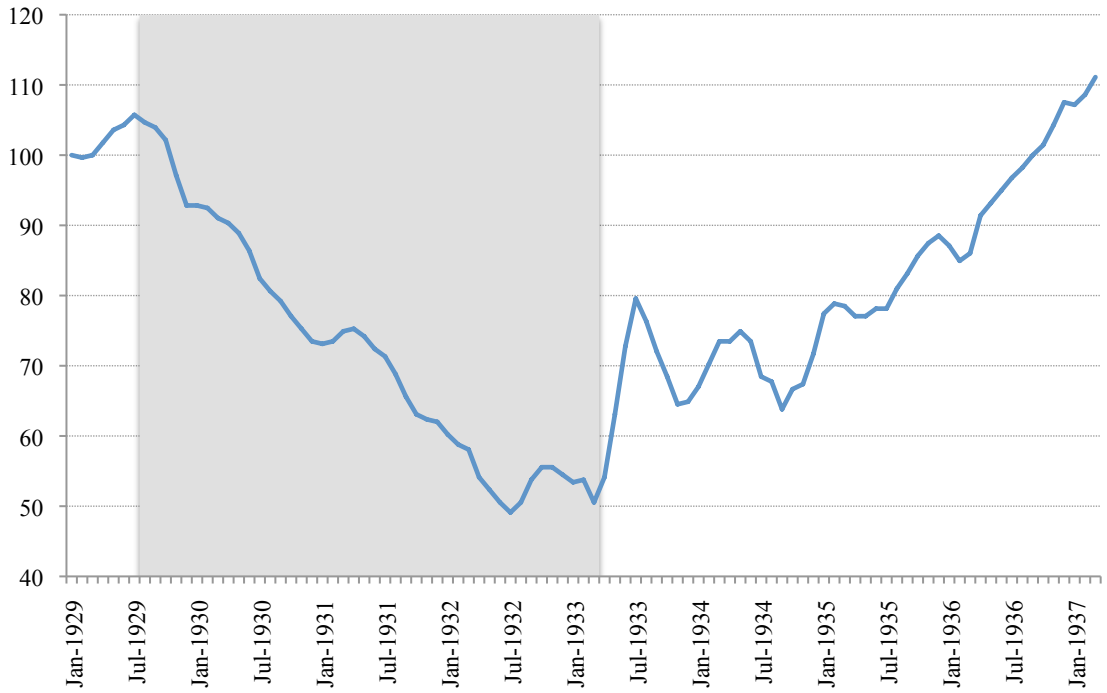
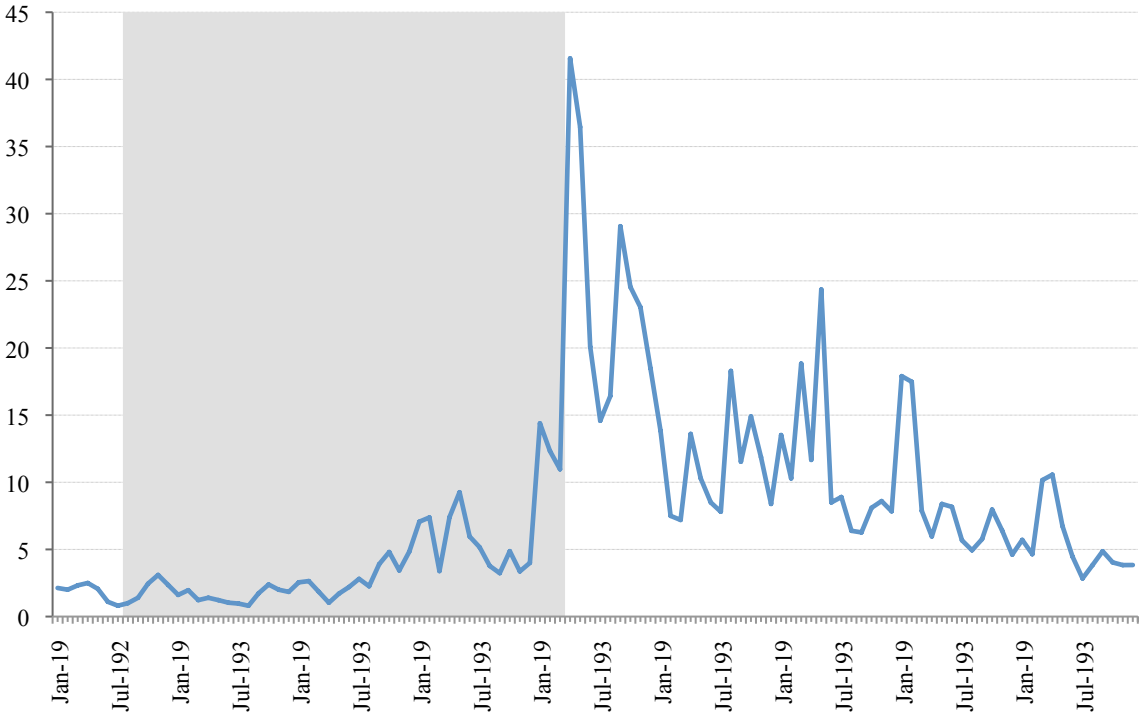
Figure 1. Industrial Production, Seasonally Adjusted (Jan 1929 = 100)



Source: Federal Reserve Board, Statistical Release G.17, "Industrial Production and Capacity Utilization," 2016.

Figure 2. Daily Average Frequency Over the Month of the Term "Inflation"



Note: The figure displays the daily average frequency over the month of the terms "inflation" or "inflationary" across five national daily news sources: the *New York Times*, the *Wall Street Journal*, the *Los Angeles Times*, the *Chicago Tribune*, and the *Washington Post*. These newspapers are available electronically via ProQuest.
Source: ProQuest Historical Newspapers.

Table 1. Percent Changes in Stock Prices and Exchange Rates on the Dates of Inflationary and Anti-Inflationary News Shocks (April 1 to November 1, 1933)

	Percent Change in		
	Stock Index	Dollar-to-Pound Exchange Rate	Dollar-to-Franc Exchange Rate
Dates of Inflationary News Shocks			
April 19	7.18	5.54	5.83
April 28	6.11	1.78	3.89
May 24	1.97	0.35	0.22
May 26	2.91	0.51	0.38
June 19	7.21	1.90	1.43
August 2	2.33	2.26	2.39
August 25	3.70	2.31	4.00
August 29*	-0.45	0.88	0.49
October 23	5.29	2.16	1.09
Dates of Anti-Inflationary News Shocks			
June 13	-2.89	-1.91	-1.85
June 15	-6.98	-2.07	-1.94
July 30	-4.59	-0.72	-0.42
August 3	-1.20	-0.06	0.00
September 20*	-3.08	-0.16	0.12
October 13	-3.81	-2.86	-4.05
Averages			
April - July	0.58	0.28	0.30
April - Oct	0.29	0.19	0.29

Note 1: For the second inflationary news shock, the table reports the change on April 29—rather than April 28. The Senate passed the Thomas Amendment and adjourned at 7:02 p.m., after the close of markets on April 28. As a result, financial markets could not process the news until April 29, the following day.
Note 2: The events marked with an asterisk (*) correspond to weak news shocks (see text).
Note 3: To provide a benchmark, the last line in the table shows the average daily percent change in stock prices and exchange rates between April and July and between April and October.
Source: The stock price data are from *Standard Trade and Securities,* and the exchange rate data are from the daily issues of the *New York Times*.

Table 2. Regression Results: Daily Response of Financial Markets to Inflationary and Anti-Inflationary News Shocks

	Dependent Variable: Change in Log			
	(1) Stock Prices	(2) Dollar-Pound Exch. Rate	(3) Dollar-Franc Exch. Rate	(4) Inflationary News Coverage
Inflationary News Shock Dummy	0.040*	0.022**	0.021	-0.064
	(0.016)	(0.004)	(0.036)	(0.345)
Lagged Inflationary News Shock Dummy	0.037	0.018**	0.027	0.669+
	(0.022)	(0.005)	(0.039)	(0.375)
Anti-inflationary News Shock Dummy	-0.041+	-0.024**	-0.038	0.605
	(0.022)	(0.006)	(0.048)	(0.457)
Lagged Anti-inflationary News Shock Dummy	-0.007	0.003	-0.111*	0.274
	(0.020)	(0.005)	(0.044)	(0.421)
Constant	-0.003	-0.000	0.004	-0.031
	(0.003)	(0.001)	(0.008)	(0.065)
Observations	70	76	76	91
R-squared	0.14	0.39	0.10	0.09

Note: The dependent variable is the log change in stock prices, the dollar-to-pound exchange rate, the dollar-to-franc exchange rate, or the number of news articles containing the term "inflation" or "inflationary" in five daily newspapers, available on ProQuest (*New York Times*, *Wall Street Journal*, *Los Angeles Times*, *Chicago Tribune*, and *Washington Post*). The stock price data come from *Standard Trade and Securities,* and the exchange rate data come from the daily issues of the *New York Times*. The regressions are estimated from August 1 to November 1, 1933. Standard errors are in parentheses; + $p<0.10$, * $p<0.05$, and ** $p<0.01$.

Table 3. Regression Results: Weekly Response of Financial Markets to Inflationary News Shocks

	Stock Prices		
	(1)	(2)	(3)
	All Industries	Durables	Nondurables
Weekly Inflationary News Shock Dummy	0.100+	0.117*	0.063+
	(0.043)	(0.049)	(0.029)
Weekly Anti-Inflationary News Shock Dummy	-0.003	-0.007	0.006
	(0.049)	(0.057)	(0.033)
Constant	-0.034	-0.040	-0.020
	(0.024)	(0.028)	(0.016)
Observations	10	10	10
R-squared	0.45	0.45	0.42

Note: The dependent variable is the log change in average stock prices of all industries, durable industries, and nondurable industries. The stock price data come from *Trade and Money Index*. The regressions are estimated from August 1 to November 1, 1933. Standard errors are in parentheses; + $p<0.10$, * $p<0.05$, and ** $p<0.01$.

Table 4. Estimated Output Equations

	(1) Bernanke (1983)	(2) With Roosevelt Dummies	(3) With Roosevelt Dummies and Exchange Rate
Monthly IP growth (t-1)	0.611**	0.488**	0.486**
	(0.0625)	(0.0615)	(0.0616)
Monthly IP growth (t-2)	-0.123*	-0.0679	-0.0675
	(0.0606)	(0.0590)	(0.0591)
Shocks to M1	0.350**	0.401**	0.401**
	(0.113)	(0.105)	(0.106)
Shocks to M1 (t-1)	0.0668	0.132	0.131
	(0.114)	(0.108)	(0.108)
Shocks to M1 (t-2)	0.119	0.153	0.151
	(0.115)	(0.109)	(0.109)
Shocks to M1 (t-3)	0.161	0.268*	0.265*
	(0.112)	(0.106)	(0.106)
DBANKS	-0.0000552**	-0.0000369**	-0.0000373**
	(0.0000107)	(0.0000106)	(0.0000106)
DBANKS (t-1)	-0.0000273*	-0.0000227*	-0.0000229*
	(0.0000110)	(0.0000104)	(0.0000104)
DFAILS	-0.0000854	-0.0000488	-0.0000492
	(0.0000653)	(0.0000612)	(0.0000613)
DFAILS (t-1)	-0.000147*	-0.0000975	-0.0000989
	(0.0000651)	(0.0000621)	(0.0000622)

Regime Shift dummy		0.0680**	0.0667**
		(0.0132)	(0.0134)
Fall 1933 dummy		-0.0449**	-0.0460**
		(0.0136)	(0.0137)
ER: pounds per dollar			0.00467
			(0.00643)
Observations	250	250	250
Adj. R-Squared	0.433	0.508	0.507
p-val Breusch–Godfrey LM test	0.98	0.92	0.94

Note: Data are monthly; standard errors are in parentheses; + p<0.10, * p<0.05, and ** p<0.01. Sources: The industrial production index is from the *Federal Reserve's G.17 Industrial Production and Capacity Utilization Statistical Release* (revision 2013); M1 is from Friedman and Schwartz (1963), Table A-1; the wholesale price index is from NBER macrohistory series m04048; deposits of failing banks are from *Survey of Current Business, Biennial Supplement*; and liabilities of failing banks and exchange rates are from the *Federal Reserve Bulletin*. See text for details on construction of variables.