

STOCK MARKET SPECULATION AND FEDERAL RESERVE POLICY: LESSONS FROM THE GREAT BULL MARKET¹

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ABSTRACT

A debate about the appropriate role of monetary policy during periods of high stock prices has accompanied the spectacular rise of U.S. equity returns during the late 1990s. Some economists argue that the Federal Reserve should attempt to deflate share values, while others recommend non-intervention. This paper addresses this issue by examining the Fed's reaction to the "Great Bull Market" of the 1920s. The findings suggest that because uncertainty about policies toward speculation may depress real activity, officials should only employ activist measures to attain clearly defined goals like price stability.

Introduction

Perhaps the most vexing problem confronting the Federal Reserve during the late 1990s is how to respond to developments that threaten macroeconomic conditions without disrupting securities markets. Many analysts argue that as U.S. equity values continue to set new records, the stock market becomes increasingly vulnerable to small disturbances in fundamentals. For this reason, the Fed may forgo necessary interest rate adjustments to avoid either a market crash or encouraging speculation.²

This paper claims that the Federal Reserve was similarly concerned about the stock market in the late 1920s, and it considers whether its response to this situation provides useful lessons for officials today. Like many contemporary analysts, some observers argued seventy years ago that the spectacular stock market surge was justified because share prices reflected a new era of economic growth driven by the commercialization of promising technologies. Other respected commentators, however, thought that because euphoric expectations boosted equity values, a market correction was imminent. Although Federal Reserve officials from both periods contend that speculation may have adverse economic consequences, there has been little agreement on how to control it without depressing real activity.

Because multiple objectives could not be addressed simultaneously, disagreements over policy plagued Federal Reserve leaders during the late 1920s. By lowering interest rates in 1927 to help restore the gold exchange standard, the Fed unintentionally fueled stock market speculation. Because the Federal Reserve Act did not address securities market activity, Fed officials had no guidelines to follow when developing a policy response. Moreover, the death of Federal Reserve Bank of New York president Benjamin Strong in October 1928 left the Fed without firm leadership. These factors set

the stage for a feud between the Federal Reserve Board, who wanted to ration credit to the securities industry, and officials at the Federal Reserve Bank of New York who thought selective credit controls would be ineffective and favored higher discount rates instead.³

I argue in this paper that these conditions increased uncertainty about monetary policy, which may have contributed to the onset of the Great Depression. Although it seems likely that the public was unaware of this conflict, there is evidence that many people were troubled by the policy impasse. For example, E. K. Burger and A. M. Leinbach concluded the following about the spending slowdown in early 1929: "Undoubtedly, a good deal of the restricted buying interest of the public may be attributed to the uncertainties of the credit situation and the Federal Reserve Board."⁴ To measure uncertainty, I estimate the risk (or term) premium on government securities, and find that it rose during this period. Moreover, I show that the behavior of this variable was inversely related to investment spending during the late 1920s. Thus, the experience of the 1920s suggests that monetary officials should concentrate on unambiguous objectives like price stability or full employment rather than deliberating about stock market speculation.

Federal Reserve Policy and Uncertainty in the Late 1920s

A: Historical Narrative

Federal Reserve policymaking in the late 1920s was a contentious process. By 1928, Fed officials were unable to pursue several objectives simultaneously, forcing them to compromise and set priorities. Perhaps the most notable example was a disagreement over how to control stock market speculation without depressing real activity. This section describes this conflict and the paper later shows that Federal Reserve discord may have increased interest-rate uncertainty and disrupted spending plans.

Most studies of Federal Reserve policy during the 1920s attempt to interpret the Federal Reserve's objectives. For example, Milton Friedman and Anna J. Schwartz argue that domestic goals were most important, despite the Fed's frequent referral to international considerations when explaining their policy choices.⁵ Elmus Wicker, however, concludes that because Federal Reserve cooperation in reconstructing the gold standard was necessary for international monetary stability, Fed policy addressed this objective despite its domestic consequences.⁶ Finally, Lester V. Chandler points out that the Federal Reserve targeted both goals by attempting to promote economic growth and price stability, curbing the use of credit for stock market speculation, and helping to restore the gold standard.⁷ David C. Wheelock provides econometric support for Chandler's position by showing that all three objectives were consistently targeted by the Fed's open market, discount, and acceptance rate policies.⁸

Before 1928, the Fed could simultaneously address domestic and international goals. In 1927, for example, the Federal Reserve Bank of New York lowered its discount

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rate from 4 percent to 3.5 percent and purchased \$230 million in government securities to aid Britain's return to the gold standard. Because the U.S. economy was in a recession at this time, these measures also improved domestic conditions.⁹ Some officials at district Federal Reserve banks, however, worried that easing credit conditions would fuel stock market speculation. When officials at the Chicago Fed refused to lower their discount rate for this reason, the Federal Reserve Board reversed this decision on September 7, 1927, setting the stage for the dramatic conflict that would characterize Fed policymaking for the rest of the decade.

Because leaders at the Chicago Fed continued to worry about inflation and speculation, they proposed a discount rate increase in January 1928. The Board approved this proposal rather than return to the acrimonious exchange of the previous summer.¹⁰ Although other district banks followed Chicago's lead, there was considerable disagreement within the System about the impact of higher discount rates on commercial activity.¹¹ Board members, especially Governor Roy Young, advocated a policy of "moral suasion" in which banks would be discouraged from making loans to speculators while reserving credit for commercial borrowers. Chicago Fed officials responded by arguing that attempts to channel credit to worthy borrowers would be ineffective.

Following the death of Benjamin Strong in October 1928, the rift between the Federal Reserve Board and the regional banks intensified.¹² The Board attempted to diminish the influence of the northeast and midwest banks by proposing to reorganize the Open Market Investment Committee (OMIC). This initiative failed, and the Board tried to reassert its authority by overruling an OMIC recommendation for the first time in history.

This power struggle eventually erupted into what Friedman and Schwartz call an "open feud" between the Board and the Federal Reserve Bank of New York in early 1929. When the directors of the New York Fed unanimously voted to raise its discount rate on February 14, 1929, the Board asked them to delay the measure for one day. Angered by this decision, officials in New York threatened to remain in the building until they received a response. The Board reacted to this "act of insubordination" by vetoing the petition. Over the next four months, the Board vetoed ten requests by the New York Fed to increase its discount rate. Several New York Fed directors threatened to resign during this period, greatly disturbing officials at other regional banks. Finally, the Board capitulated in August 1929 and approved a rate hike.

Although the details of this conflict may have been hidden from public view, concerns about policy inaction were widely publicized. For example, *The New York Times* published several articles in early 1929 highlighting uncertainty about Fed policy.¹³ Moreover, *The New York Times* reported in its year-end financial review that "Fed watching" took on unprecedented importance during 1929 as investors sensed the difficulty of trying to limit speculation while avoiding a recession.¹⁴ The question of whether these perceptions disturbed financial markets is examined in the next section.

B. The Risk Premium in the Late 1920s

To determine whether Federal Reserve policy increased uncertainty in financial markets during the late 1920s, I calculate the risk premium embedded in the term structure of interest rates. The risk premium is the incremental yield required by risk-averse investors to hold long-term government securities, relative to the average yield expected from "rolling-over" a series of short-term bonds.¹⁵ Because an unexpected interest rate increase by the Fed would disproportionately depress longer-term bond values, uncertainty about monetary policy should raise the risk premium on these securities. Specifically, I calculate the risk premium as difference between the yields on three-month Treasury bills and the expected return on sixteen-year Treasury bonds held for three months. Because the market's expectation of long-term rates is unobservable, this series is generated by assuming that interest rates are mean-reverting and that expectations are formed regressively.¹⁶

Risk premia for the interwar period are shown in Figure 1. Note that the risk premium declines throughout most of 1927, suggesting that investors perceived little interest-rate risk during this period. Moreover, the fact that the risk premium is negative during the third quarter of 1927 indicates that investors expected interest rates to decline further since inflation fears were negligible and because both international and domestic goals could be accomplished with lower discount rates.

The fact that the Fed could not simultaneously address each of its objectives may have contributed to the sharp rise in the risk premium in late 1928 and early 1929. The vertical line in Figure 1 marks the month of Benjamin Strong's death, which according to Friedman and Schwartz, left a leadership vacuum at the Fed and may have increased uncertainty about future Fed policy.¹⁷ Whether the behavior of the risk premium resulted solely from concerns about the feud within the Fed or from perceptions of the incompatibility of policy objectives is difficult to determine. The important question of whether this uncertainty adversely affected real activity is addressed in the next section.

Interest Rate Uncertainty and Real Activity

Figure 2 shows that investment spending peaked in early 1929 and declined steadily until 1932.¹⁸ To what extent was this behavior related to interest-rate uncertainty? Barrie A. Wigmore notes that despite the public's fascination with the stock market in the late 1920s, the bond market was more important for raising capital.¹⁹ Accordingly, uncertainty in the bond market may affect real activity through several channels. One possibility is by increasing liquidity preference, which if not countered by monetary expansion, raises real interest rates and depresses spending.²⁰ Another explanation is that heightened uncertainty raises the option value of making irreversible investment expenditures, causing managers to take a "wait and see" approach.²¹ Because of data limitations, it is impossible to determine which of these channels was operative. However, the influence of uncertainty on investment may be gauged by estimating an unrestricted vector-autoregression (VAR) model that will be described in the next section.

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A. Model Specification

An analysis of the effects of uncertainty on investment is undertaken by estimating a four-variable VAR model. The variables are: total business investment expenditures (INVEST), the risk premium (RISK), the monetary base (BASE), and the M1 money multiplier (MULT).²² The money stock variable has been split into its base and multiplier components to focus on the effects of monetary policy (reflected in the base variable) and the behavior of the public and banks (the multiplier variable) separately.

Tests for first-order unit roots and cointegration were conducted before specifying the model. Augmented Dickey-Fuller (ADF) tests were employed to detect unit roots, and the results suggest that first differences of the logs of investment and the two monetary variables be used along with first differences of risk premium levels. Moreover, tests for cointegration found no evidence of cointegrating vectors. Finally, lag lengths of four quarters were chosen based on Akaike's (AIC) criterion.

B. Empirical Results

The VAR model is estimated over the sample period 1923:3-1940:3. Choleski factorization is used to orthogonalize the variance-covariance matrix. Since the results are sensitive to the ordering of the variables under this approach, the most conservative route has been taken. Specifically, the order is: INVEST, BASE, MULT, RISK. By placing the risk premium last in the system, all contemporaneous correlation between the risk premium and the other variables is absorbed by the other variables, lessening the impact of risk premium shocks on investment.

Figure 3 shows the impulse response functions, which gauge the effects of a one-standard-deviation shock in the errors of a variable on the other variables in the system. Since our concern is with the effects of uncertainty on investment, we would expect that shocks to the risk premium would have a significant, negative effect on future investment spending. The results support this prediction as shocks to the risk premium adversely impact investment, and are significant for the three- and four-quarter horizons.²³ These results seem plausible given the average lag time between decisions to invest and the incidence of capital expenditures. Thus, the rise in the risk premium in late 1928 may have helped depress investment by mid-1929.²⁴

Results of the VAR may be further analyzed by examining variance and historical decompositions.²⁵ The variance decomposition shows the percentage of forecast error variance that is attributed to innovations in the variables. The results show that most of the variation in investment is due to investment innovations. In fact, nearly two-thirds of investment innovation is explained by its own innovations at the eight-quarter horizon. This finding is consistent with structural explanations of the Great Depression that emphasize factors such as overbuilding. Results for the monetary variables suggest that BASE innovations explain little of the percentage of variance, but that the multi-

plier is more significant. Twenty-percent of the variance in investment is associated with multiplier innovations at the eight-quarter horizon. These results support the Friedman and Schwartz hypothesis that changes in the money multiplier associated with banking panics played an important role in the Depression.

Again, the results for the risk premium show that it has its largest impact on investment at the three- and four-quarter horizons, during which approximately thirteen percent of the investment variance is due to risk premium innovations. Moreover, only investment innovations explain a larger percentage of variance at the four-quarter horizon. These results suggest that uncertainty, as measured by the risk premium, significantly altered investment plans during the Great Depression.

To focus on the late 1920s, a historical decomposition is calculated for the period 1925:1-1930:4. The historical decomposition accounts for the difference between the actual series and a base projection derived from a moving-average representation of the VAR. This difference between the two series results from shocks to each of the system's variables. The impact of a variable on investment spending is gauged by the extent to which the forecast error of the base projection is reduced by the inclusion of shocks to this variable. The results show that shocks to investment and the risk premium reduce the root-mean-squared error of the base projection. The largest effect is from shocks to investment, which reduce the root-mean-squared error by nearly 50%. Shocks to the risk premium reduce the forecast error by 7%. Each of the monetary variables raises the root-mean-squared error of the base projection. Although the results for BASE are consistent with the variance decompositions and impulse response functions, those for MULT are not. A possible explanation is that shocks to the multiplier did not become significant until the first wave of banking panics in late 1930 - the last quarter of the sample period. This finding implies that nonmonetary variables played an important role in the onset of the Great Depression.

Conclusion

As stock prices soared in early 1999, investors were uncertain about how the Federal Reserve would respond to macroeconomic disturbances. Raising interest rates to prevent inflation could burst the bubble and lowering them to avoid a recession may encourage further speculation. Does the Fed's experience during the "Great Bull Market" provide any lessons to guide central bankers today?

This paper concludes that uncertainty about Federal Reserve objectives may have real effects. Investors in the late 1920s monitored monetary affairs closely and were concerned about the Fed would react when stock market speculation appeared uncontrollable. Moreover, this sense of uncertainty may have been exacerbated by the absence of leadership in the Federal Reserve System following the death of Benjamin Strong in 1928. Econometric evidence shows that interest rate uncertainty rose at this time, and that businesspeople responded by delaying investment expenditures. Although this represents only one of many factors that may have contributed to the onset of the Great Depression, it is a possibility that has been overlooked in the literature.

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These findings suggest that the Federal Reserve should set unambiguous goals and publicly announce its commitment to pursue these objectives. Stock market speculation should continue to be controlled indirectly by setting margin requirements, rather than by employing monetary policy instruments. Although Alan Greenspan has not attempted to dampen stock market activity by raising interest rates, his occasional comments about "irrational exuberance" in the market only increased uncertainty about whether the Fed would resort to such a strategy. Instead, Greenspan should have followed the recommendation of economists like Weiher, who argue that the Fed should focus only on macroeconomic goals like maintaining price stability.²⁶

Figure 1
Monthly, Regressive Risk Premia

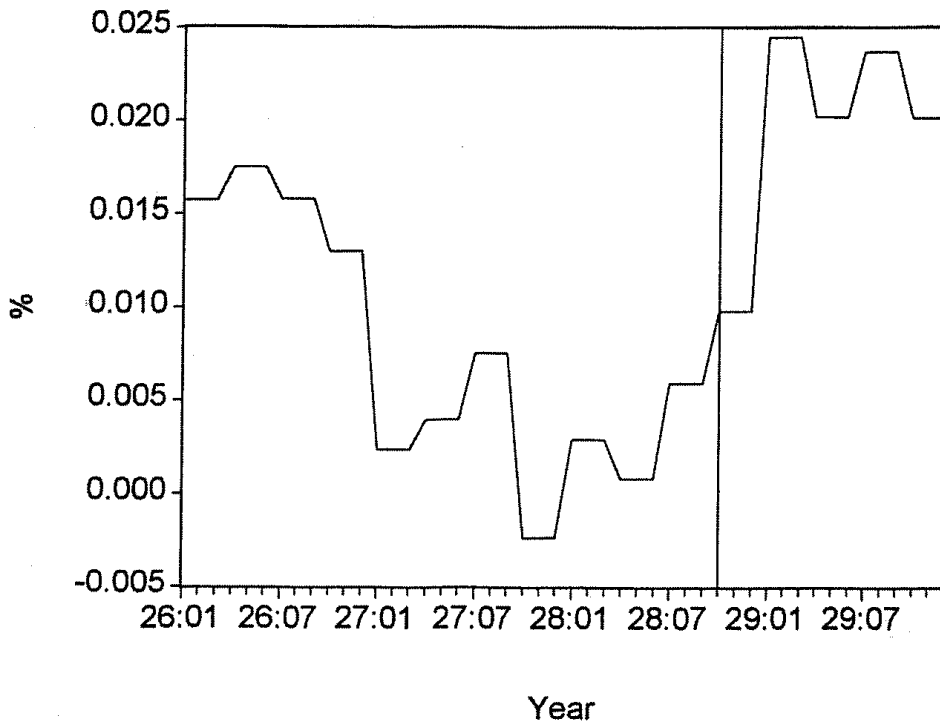


Figure 2
Real Investment Expenditures
1924-1940

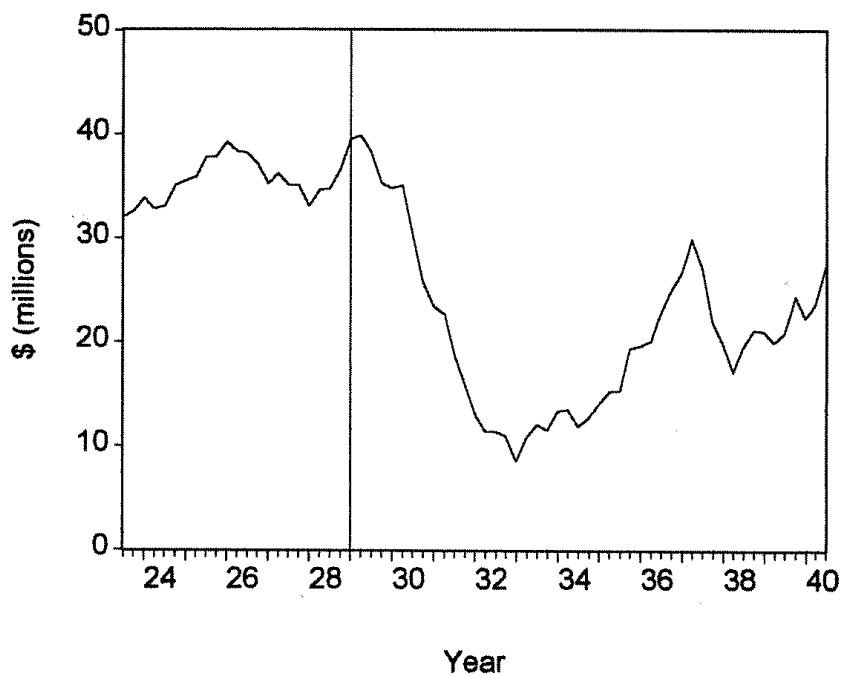
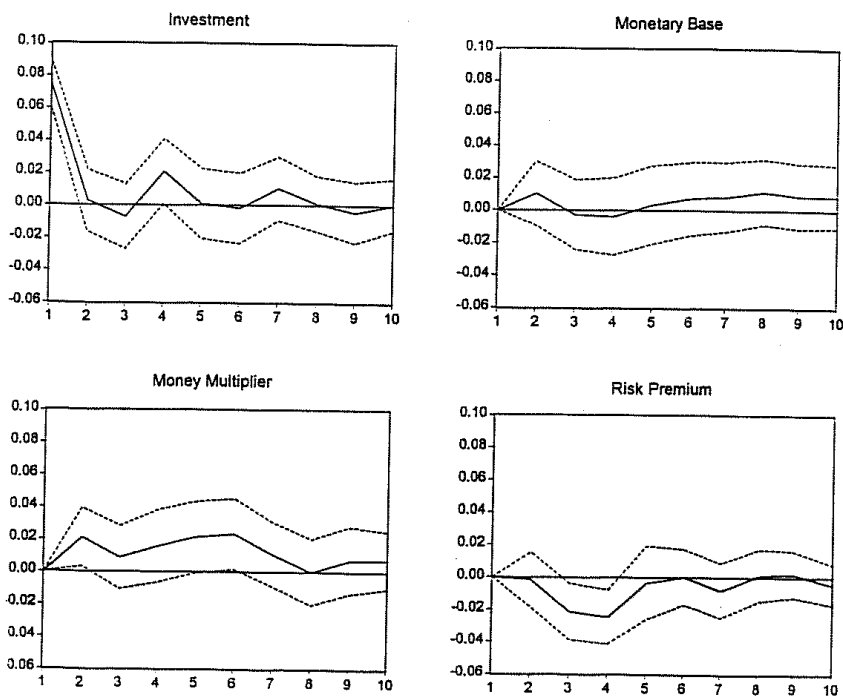


Figure 3
Response of Investment to Innovations in:



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Notes

1. The author would like to thank Margaret Coleman, Andrew Economopoulos, and Thomas Winpenny for their helpful suggestions and comments.
2. Louis Uchitelle, "For the Fed, a Sideshow Takes Center Ring," *The New York Times*, January 10, 1999.
3. George Soule aptly summarized the Fed's dilemma: "They (the Fed) could not, they thought, further restrict credit by the general measures then available without hampering the legitimate needs of trade. Yet they could not discourage speculation without further restricting credit. Their policy in 1929 was an attempt at compromise that did not satisfy either requirement." George Soule, *Prosperity Decade, From War to Depression: 1917-1929* (New York: Holt, Rinehart, and Winston, 1947), 280.
4. E.K. Burger and A.M. Leinbach, "Business," *The Magazine of Wall Street*, June 15, 1929, 289. Quoted in Harold Bierman, Jr., *The Great Myths of 1929 and the Lessons to be Learned* (New York: Greenwood Press, 1991), 97.
5. Milton Friedman and Anna Schwartz, *A Monetary History of the United States, 1867-1960* (Princeton: Princeton University Press, 1963), 269.
6. Elmus Wicker, *Federal Reserve Monetary Policy: 1917-1933* (New York: Random House, 1966).
7. Lester V. Chandler, *Benjamin Strong, Central Banker* (Washington: Brookings Institution, 1958).
8. David C. Wheelock, *The Strategy and Consistency of Federal Reserve Policy, 1924-1933* (Cambridge: Cambridge University Press, 1991).
9. Stephen V.O. Clarke, *Central Bank Cooperation: 1924-1931* (New York: The Federal Reserve Bank of New York, 1967), 151.
10. For an excellent description of this conflict, see Barry Eichengreen, "Designing a Central Bank for Europe: A Cautionary Tale from the Early Years of the Federal Reserve System," NBER Working Paper no. 3840, September 1991.
11. Chandler, *Benjamin Strong*, 199, suggests the source of conflict: "Moreover, the very multiplicity of considerations necessitated resort to judgment – to weighing the various considerations against each other when they conflicted and trying to find the least unsatisfactory compromise. Unfortunately for Federal Reserve officials, the guides too often pointed in different directions."
12. Friedman and Schwartz write: "Until 1928, the New York Bank was the prime mover in Federal Reserve policy both at home and abroad, and Benjamin Strong, its governor from its inception, was the dominant figure in the Federal Reserve System." "Strong became inactive in August 1928 and died in October of that year. Once he was removed from the scene, neither the Board nor the other Reserve Banks, as we have seen, were prepared to accept the leadership of the New York Bank." Friedman and Schwartz, *A Monetary History*, 411 and 413. Chandler also argues: "Strong's death left the System with no center of enterprising and acceptable leadership. Thus it was easy for the System to slide into indecision and deadlock." Chandler, *Benjamin Strong*, 465.
13. Some of these articles include: "Credit Status Gives Concern to Bankers," (January 10, 1929); "Credit Problems Are Still Unsolved," (February 10, 1929); "Impasse Recognized in Credit Situation," (February 17, 1929); and "Credit Situation Viewed as Obscure," (July 14, 1929).
14. "As a result of repeated warnings issued by the Federal Reserve Board against the absorption of credit in the securities markets, popular interest in the operations of the Federal Reserve System reached an unusual pitch in 1929. The weekly meetings of the directors of the Federal Reserve Bank of New York were watched closely in anticipation of a change in the rediscount rate, and individuals who had previously never given a thought to central banking practice took up the question of the discount rate and open market operations of the Reserve Bank as an absorbing topic of conversation and debate." From "Bank Rate was Topic of Popular Interest," *The New York Times*, December 31, 1929, 27.
15. For example, the risk premium is the difference between the yield on a ten-year Treasury bond and the average expected yield from rolling-over a series of ten one-year Treasury bills. Risk-averse investors usually demand a higher yield on longer-term bonds because their prices are more sensitive to changes in market interest rates.
16. Data are monthly averages of daily yields taken from *Banking and Monetary Statistics*, Washington: Board of Governors of the Federal Reserve System, 1943. Stephen G. Cecchetti points out the limitations of this data and corrects these yields for 1929-41. Stephen G. Cecchetti, "The Case of the Negative Nominal Interest

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Rates: New Estimates of the Term Structure of Interest Rates During the Great Depression,” *Journal of Political Economy* 96(1988): 1111-1141. Risk premia estimates using this data are highly correlated with those calculated from the Federal Reserve data, which provide a consistent series for the entire interwar period. Further details describing risk premia estimation can be found in David A. Zalewski, “An Empirical Analysis of Uncertainty and Investment During the Great Depression.” Unpublished Ph.D. thesis, Clark University, 1993.

17. Friedman and Schwartz, *A Monetary History*, (1963) pps. 413-14.

18. The vertical line in Figure 2 marks the business cycle peak as designated by the National Bureau of Economic Research.

19. Barrie A. Wigmore, *The Crash and its Aftermath: A History of Securities Markets in the United States, 1929-1933* (Westport, CT: Greenwood Press, 1985), 106-107. Because common stock was considered to be a speculative investment in the late 1920s, 81% of new securities issues were bonds in 1927 and 64% in 1928. However, the rise of the market lowered this ratio to 42% in 1929.

20. Alan Meltzer and Angelo Mascaro argue that increased interest rate uncertainty in the U.S. between 1979 and 1982 increased the demand for money and dampened real activity. Alan Meltzer and Angelo Mascaro “Long- and Short-Term Interest Rates in a Risky World,” *Journal of Monetary Economics* 12(1983): 485-518. This explanation complements that of Alexander Field who shows that increasing speculation in the late 1920s raised the demand for money, which was not accommodated by the Fed. Alexander Field, “A New Interpretation of the Great Depression,” *The Journal of Economic History* 44(1984): 489-98.

21. For a comprehensive description of this process, see Robert S. Pindyck, “Irreversibility Uncertainty, and Investment,” *Journal of Economic Literature* 29(1991): 1110-48.

22. Investment is the sum of quarterly expenditures on producer’s durables and nonresidential structures (in 1972 dollars), the quarterly monetary variables are nominal. All data are from Nathan S. Balke and Robert J. Gordon, “Appendix B – Historical Data,” in Robert J. Gordon ed., *The American Business Cycle: Continuity and Change* (Chicago: The University of Chicago Press, 1985).

23. Significance tests are conducted by calculating the confidence bands shown in Figure 3 by Monte-Carlo simulation. Moreover, to test the significance of the block of lags associated with each of the variables, F-statistics have been computed and only the lags of the risk premium are significant at the five-percent level.

24. Results for the other variables are mixed. Investment responses to monetary base shocks are not significantly different from zero over a ten-quarter horizon, and own-innovations in investment have a significant, positive effect for the first two quarters. Money multiplier disturbances also have a significant, positive impact for the first two quarters.

25. Data on variance and historical decompositions are not shown in the paper, but are available from the author upon request.

26. Kenneth Weiher, *America’s Search for Stability: Monetary and Fiscal Policy since 1913* (New York: Twayne Publishers, 1992), 52.