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How Friedman and Schwartz Became Monetarists

During the early-1940s, both Milton Friedman and Anna Schwartz downplayed the role of money in the economy. By the mid-1950s, they had not only become what later were called monetarists, but the findings from their joint work defined monetarism. The key factor underlying the change in their views was what they learned from their study of U.S. historical experience, especially their empirical confirmation of the Fed's role in the Great Depression. Here, the influence of Clark Warburton on Friedman's thinking loomed large. We document Friedman's advocacy of the constant-money-growth rule as an outgrowth of his and Schwartz's empirical research.

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IT IS WIDELY RECOGNIZED THAT THE research by Milton Friedman and Anna J. Schwartz during the late 1940s and the 1950s, culminating in their 1963 landmark, *A Monetary History of the United States, 1867–1960,* revolutionized the economics profession's thinking about the effects and effectiveness of monetary policy.[1] What is much less widely recognized, however, is that the data constructed,

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1. Bordo and Rockoff (2013, p. 2) described *A Monetary History* as "easily one of the most influential volumes in economics in the twentieth century." Kroszner (2010), a member of the Board of Governors of the Federal Reserve System from 2006 to early 2009, called it, "Perhaps the single most important piece of economic research that provided guidance to Federal Reserve Board members during the crisis ... especially the sections related to the 'Great Contraction.'" For similar characterizations, see Lucas (1994) and Bernanke (2002).

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assembled, and analyzed by Friedman and Schwartz for that book went a long way toward altering both individuals' basic beliefs about macroeconomics and the role of economic policy.

During the early-1940s, both Friedman and Schwartz held Keynesian-type views.[2] Moreover, their views began to change as the decade wore on. By the middle of the 1940s, Friedman was using a quantity-theory model in his analysis of inflation rather than the Keynesian income-expenditure theory that he had been using. And, by the end of the 1940s he and Schwartz were working closely together on their National Bureau project studying the cyclical behavior of the money supply in the United States. So, it is very likely that Schwartz was then also at least starting to think in terms of a quantity-theoretic model.[3] In short, the two economists were becoming monetarists, but not in the usual sense of the word "becoming," for at the time there was no intellectual position that could be called "monetarism." It was only as a result of their joint work and the work of a small group of other like-minded economists that the empirical relationships that are now regarded as the hallmarks of monetarism were uncovered and the term came into popular usage.

We should point out that Friedman did not find the term "monetarism" to be congenial. In a lecture titled the "Counter-Revolution in Monetary Theory," delivered in London in 1970, he stated: "The counterrevolution also needs a name and perhaps the one most widely used in referring to it is the Chicago school. More recently, however, it has been given a name which is less lovely which has become so attached to it that I find it hard to avoid using it. That name is "monetarism" because of the renewed emphasis on the role of the quantity of money" (Friedman 1970, pp. 7–8). Friedman then went on to list 11 central propositions of monetarism. The first, the quantity theory of money, already had a long history before Friedman and Schwartz used it. The other 10, however, were largely outgrowths of their research: six having to do with the details of the relationships linking changes in money-supply growth and changes in the growth of nominal income and its price and real components, two with the relationships linking changes in money-supply growth to interest rates and other asset returns and with the transmission of monetary shocks, one with the relationship between monetary and fiscal policies, and one simply a cautionary note with regard to the limitations of knowledge about all of these relationships.[4] In their 1982 book, *Monetary Trends in the United States and the United Kingdom,* Friedman and Schwartz used the term "monetarism" very sparsely and critically. On that basis, Schwartz could also be considered to have been critical of the term.

2. Friedman's advocacy of rules included a monetary dimension that set him apart from leading Keynesians.

3. Our hesitancy in saying anything more definitive here with regard to timing stems from the dearth of relevant available writings by Schwartz in these early years. The correspondence between her and Friedman that we have uncovered, and which we review below, suggests that she and Friedman were of a similar mind early-on in their collaboration.

4. Meltzer (1993, 1998) provided a taxonomy that was similar to Friedman's.

This paper traces the evolution both of Friedman and Schwartz's analytical approach and views on policy, and the reasons that led the two economists to change their analytical approach and policy thinking so drastically. Our emphasis is on Friedman since, unlike Schwartz, he made his views public as they evolved and also set them down in unpublished memoranda.[5] Nonetheless, in the correspondence between the two authors during the 1950s, Schwartz concurred with Friedman's evolving positions.

Now, let us briefly outline our main findings:

- First, the shift in Friedman's analytical approach to macroeconomics, as described above, began shortly after World War II. The initial factor here was the inflation of the time, the hangover, so to speak, from the war and the removal of price controls. The shift then continued when he and Schwartz began their work on the National Bureau project investigating the cyclical behavior of money.
- Second, the key factor underpinning Friedman's switch to a constant money-growth rule was his and Schwartz's findings from that investigation—in particular, their empirical confirmation of the hypotheses that the Federal Reserve had initiated the Great Depression with its policy tightening in 1928 and 1929 and deepened the Depression with its policies beginning in 1930.[6] That confirmation, which demonstrated the damage that could be inflicted by inappropriate discretionary monetary policy, took years to develop. In the early-1950s, Friedman had begun to consider only the hypothesis that the Fed had deepened the Depression. By the mid-1950s, he believed that his empirical work with Schwartz had confirmed that hypothesis, and he began seriously to consider the hypothesis that the Fed had also initiated the Depression. The evolution of his thinking on a constant-money-growth rule proceeded analogously: in the early-1950s he considered the possibility of such a rule as one among several rules to govern economic policy—nevertheless, he favored a rule under which fiscal policy would generate changes in the money supply; by the mid-1950s, he had come to prefer a money-growth rule in his unpublished writings. By 1957, he believed that he had confirmed both hypotheses about the Fed's damaging role in the Great Depression; at that time he also published for the first time his money-growth rule, which aimed to limit the harm that could have been inflicted by discretionary monetary policy.
- Third, Clark Warburton, an empirically oriented economist at the Federal Deposit Insurance Corporation, appears to have played a key role in the transformation of Friedman and Schwartz's views. Students of monetary economics have long regraded Warburton a pioneer monetarist, whose views, including those on the role of monetary forces in the Great Depression and on monetary rules, were similar to those of Friedman (see Humphrey 1971, 1973, Patinkin 1973, Bordo

5. As an employee of the National Bureau of Economic Research, Schwartz was enjoined at the time from making policy recommendations in Bureau publications.

6. The two subhypotheses that the Fed (i) initiated the Great Depression and (ii) deepened the Depression are together known as the Monetary Hypothesis of the Great Depression.

and Schwartz 1979, 1983, and Cargill 1979, 1981) Specifically, Warburton has been credited with developing views that anticipated those of Friedman. It has also been recognized that, beginning in the mid-1950s, Warburton commented on various drafts of *A Monetary History* (see Friedman and Schwartz 1963, p. xxii). Correspondence that we have uncovered suggests further, however, that Warburton had influenced Friedman's thinking on the effectiveness of open-market operations in offsetting the effects of banking crises, on the monetary origins of the Great Depression and, possibly, on monetary rules.

- Fourth, the empirical data constructed by Friedman and Schwartz on the determinants of inflation during three wartime periods—the Civil War, World War I, and World War II—presented by Friedman in a 1952 paper, contributed to his shift to the position that monetary policy is more important than fiscal policy.

To substantiate these findings, we rely partly on unpublished and previously uncited documents.

The remainder of this paper is comprised of four sections. Section 1 provides an overview of Friedman and Schwartz's respective policy views in the 1940s and early-1950s. Section 2 provides an account of the Friedman-Warburton correspondence that took place during the course of 1951. As will be shown, Warburton's ideas about the Great Depression, the connection between monetary stability and the stability of the banking system, and monetary rules presaged Friedman's subsequent views on these issues. Section 3 describes the transformation of Friedman's views during the period from the early-1950s until the mid-1950s, which set the stage for his advocacy of a money-growth rule. Section 4 offers conclusions.

1. EARLY POLICY VIEWS[7]

From mid-1941 through early 1943, Friedman was an economist with the Treasury Department in Washington. In May 1942, he testified before the House Ways and Means Committee on the question of how to contain inflation. To do so, Friedman argued, consumer spending would have to be restricted. The best way to do that, he argued, was via income taxation. The other ways of avoiding inflation that he mentioned were price controls and rationing, controls on consumer credit, reduction in government spending, and the selling war bonds to the public. He made nary a mention of money or of monetary policy (Friedman 1942a). Looking back on that episode over a half a century later Friedman wrote: "The most striking feature of this statement is how thoroughly Keynesian it is" (Friedman and Friedman 1998, p. 112).

At first glance, this catalog appears incredible in another way. Given Friedman's criticisms of controls in the 1970s and, indeed, in his and George Stigler's *Roofs and*

7. Edward Nelson, in his book *Milton Friedman and Economic Debate in the United States*, now in draft form, provides an excellent treatment of this issue that is very much in accord with our own (Nelson 2017). Chapters 2, 3, 4, and 8 of the book are particularly pertinent. Nelson's earlier article on Friedman and UK economic policy contains a more abbreviated discussion of some aspects of the issue (Nelson 2009).

Ceilings? (Friedman and Stigler 1946) not long after this testimony, was he really pro price controls in 1942? As Nelson (2017) points out, Friedman was an employee of the Federal Government at that time and, hence, hardly free to criticize government policy. And price controls were a part of government policy at the time.

The Keynesian perspective on spending and inflation in Friedman's Congressional testimony was mirrored in a comment he wrote on an article by Walter Salant on inflation (Friedman 1942b). When Friedman reprinted that article in his *Essays in Positive Economics* in 1953, he made several additions to correct for the omission of monetary effects from his original discussion.[8]

By the mid-1940s, however, Friedman began to alter his views substantially on the cause of inflation. In April 1946, he joined the faculty at the University of Chicago. In a University of Chicago Round Table radio discussion, "What Can Be Done about Inflation?" Friedman singled out what he termed the "two pillars to the [inflation] problem" (NBC 1946). The first was "the large volume of money and money substitutes in the hands of the public," and the second, "the great volume of unused lending power in the hands of the banks." In further contrast to his 1942 congressional testimony, Friedman argued against price controls, including rent controls, and also against the Federal Reserve's policy of pegging the interest rates on government securities.

In January 1948, Friedman along with University of Chicago colleagues Aaron Director, Abram Harris, Frank Knight, Gregg Lewis, Lloyd Mints, Russell Nichols, and W. Allen Wallis wrote a letter to the *New York Times* that the newspaper printed under the heading "Control of Prices" with the subheading "Regulation of Money Supply to Halt Inflation Advocated."[9] The letter was straightforward quantity theory in its analysis:

> The chief cause of the present high level of prices and incomes is the enormous inflation of the supply of money during World War II. In the course of financing the war, the government more than tripled the combined supply of paper money and demand deposits in the hands of the public .... A tripling in the supply of money would tend to result in roughly a threefold increase in the national income (expressed in dollars) and in the general price level. (Director et al. 1948)

The authors of the letter went on to call upon Congress to lay down rules governing the policies of both the Federal Reserve and the U.S. Treasury, and for the Federal Reserve to cease its attempts to peg government bond prices.

Three years later Friedman and six University of Chicago colleagues, Lloyd Metzler, Frederick Harbison, Lloyd Mints, D. Gale Johnson, Theodore Schultz, and H.G. Lewis (apart from Friedman, Mints and Lewis were holdovers from the *New York Times* letter) issued a joint statement, "The Failure of the Present Monetary Policy,"

8. See Friedman and Friedman (1998, p. 113) for a discussion of the Salant comment and its subsequent reincarnation. A propos of the price-control issue, Friedman wrote in the original: "The price system seems the least undesirable method of allocating the limited resources that will be available for the production of civilian goods." The statement, which Nelson (2017) quotes in part, is completely consistent with the view that Friedman's 1942 Congressional testimony was heavily influenced by his being a government employee at that time.

9. We are indebted to the referee for directing our attention to this letter.

that again had a decidedly quantity-theory ring to it and that received attention in Washington. They wrote:

> With a rise of over 8 percent in demand deposits, it is little wonder that personal income rose about 10 percent, wholesale prices about 11 percent, cost of living by nearly 6 percent. It is no accident that these figures are so nearly of the same magnitude. This is about as clear a case of purely monetary inflation as one can find. (Friedman et al. 1951)

They did, however, give fiscal policy a somewhat strong billing.

Friedman again pointed to the importance of monetary policy in combatting inflation in his contribution to a symposium on "The Controversy over Monetary Policy," published in *the Review of Economics and Statistics* the same year (Friedman 1951a). Most importantly, his views stood in contrast to those of the other participants in the symposium, Lester Chandler, Alvin Hansen, Seymour Harris, Abba Lerner, and James Tobin, all of whom looked to fiscal policy and, in some instances, direct controls to contain the inflation that was then underway.

Friedman began his collaboration with Schwartz on *A Monetary History* in 1948. At the time, he estimated that the research project would take 3 years to complete (Hammond 1996); it ultimately took 15 years as the scope of the data to be constructed, assembled, and evaluated increased over time. What was finally published in 1963 was an historical narrative evaluating 93 years of annual data and more than 50 years of monthly data pertaining to a number of economic time series, including the money supply and its determinants, credit, real output, velocity (several measures), prices, Federal Reserve credit outstanding, interest rates, reserves, share prices, personal income, industrial production, capital flows, gold flows, and estimates of the purchasing-power price of gold. Friedman and Schwartz defined money as currency held by the public plus demand deposits and time deposits in commercial banks.[10]

The origins and development of *A Monetary History* have been dealt with by Hammond (1996), Rockoff (2006), and Bordo and Rockoff (2013). Much of the work on the book took place in correspondence between Friedman in Chicago, and Schwartz, who was a researcher of the National Bureau of Economic Research, in New York.

Here, we want to highlight two points. The first point has to do with Friedman's role. From the beginning of the project, he was the lead investigator, inquiring about both the availability of data and the possibility of constructing data. Once certain data sets received Friedman's approval, he would sometimes write papers using inferences drawn from these data. Schwartz's role, especially during the early years of her collaboration with Friedman, was to investigate the availability of the data and, if data were not available, to construct the data. In her correspondence with Friedman, she would often question the reasons that Friedman had requested specific data; Friedman would typically write back, explaining his motivations, and Schwartz

10. This particular definition of money was chosen both because of its close empirical relationship to income and other economic magnitudes and because it was impossible to separate demand and time deposits pre-1914. Nelson (2007) showed that Friedman's choice of a monetary aggregate would change in the 1980s.

would then recognize the reasons underlying Friedman's inquiry. A typical exchange took place at the beginning of their collaboration, in March 1948, when, in a letter to Schwartz, Friedman wrote about the possibility of constructing a time series on government obligations held by individuals, business firms, and banks. In a letter dated April 5, 1948, Schwartz wrote to Friedman as follows: "With regard to your contemplated series of government obligations ... I have been troubled by a variety of considerations that I note below. They will indicate to you how far I am from comprehending what you have in mind" (Schwartz 1948a). Friedman wrote back on April 22, 1948 as follows: "I apparently did a very poor job of explaining myself" (Friedman 1948a). He then provided a detailed explanation of the reasons underlying his interest in a series on government obligations, to which, on May 12, 1948, Schwartz replied, "light has dawned ... I now see the point of the series you have in mind" (Schwartz 1948b).[11]

The second point has to do with the empirical approach that Friedman brought to bear on his work with Schwartz. Friedman in many important respects was a Bayesian. He did not use Bayesian statistical tools, but he viewed probability from a personal perspective and conventional hypothesis tests as devices that, as he was wont to put it, he could use "to calibrate [his] own internal probability calculator."[12] Moreover, as Dwyer (2016) pointed out, Friedman's emphasis was on the support for a hypothesis as opposed to failure to reject it.

In Friedman's view, scientific investigation was necessarily a sequential process, proceeding in successive approximations.[13] Theory provided the initial starting point for empirical investigation, with its results then feeding back on theory and leading to its refinement. As Heckman (2012) put it, Friedman's approach was one that "*distilled* wisdom from the data and learned from the data" (emphasis his). Heckman's observation is consistent with what we have uncovered in tracing the evolution of Friedman's views on macroeconomics.

1.1 Friedman's Early Policy Rule

The core of Friedman's policy position during the late-1940s and early-1950s was summarized in his 1948 paper, "A Monetary and Fiscal Framework for Economic

11. This pattern would persist at least until the late-1950s. Often, Schwartz's questions would deal with issues of economic substance, for example, the rationale for viewing money demand as the demand for the services that money provides or the effects of changes in the gold stock on the exchange-rate premium under the gold standard. In a 2004 interview, Schwartz stated: "I didn't think that my education in economics was really attended to until I started working with Friedman. And it was as if he were my real instructor in economics" (Schwartz, quoted in Nelson 2004, p. 595).

12. For discussions of Friedman's Bayesianism and of his empirical approach more generally, see Pelloni (1987), Lothian (2009, 2016), and Dwyer (2016).

13. The following quote from Friedman and Schwartz on the choice of a monetary definition is illustrative in this regard: "The problem is one that is common in scientific work. A preliminary decision ... must be made. Yet the decision can be made properly only on the basis of the research in which the preliminary decision is to be used. Strictly speaking, the 'best' way to define money depends on the conclusions that we reach about how various monetary assets are related to one another and to other economic variables; yet we need to define 'money' to proceed with our research. The solution, also common in scientific work, is successive approximations" (Friedman and Schwartz 1970, p. 91).

Stability." In it, he proposed a rule under which fiscal policy would be used to implement changes in the money supply. Two key elements underpinned his policy position.

First, changes in the stock of money would be linked to the federal budget. The stock of money would be increased when there was an increase in the budget deficit—by the amount of the deficit. It would be decreased when there was a surplus in the federal budget—by the amount of the surplus. The aim of the proposal was to stabilize aggregate demand and balance the budget at full employment (Friedman 1948b, p. 139). The advantage of the rule, Friedman believed, is that "it seems likely to do less harm under the circumstances envisaged than alternative proposals which provide for discretionary action in addition to automatic reactions" (Friedman 1948b, p. 145).[14] Under Friedman's proposal, open-market operations would be abolished.[15]

Second, to deal with what Friedman regarded as the "inherent instability" of a fractional-reserve banking system, he called for 100% reserve requirements against all deposits. Here, he followed the proposal made during the 1930s by Henry Simons, his Chicago mentor, who had attributed the severity of the Great Depression to the inherent tendency during times of panic for people to move their assets from bank accounts to cash.[16] The effect of that rush to liquidity led to reductions in banks' reserves and, thus, to contractions of the money supply.

In 1948, Friedman held a view similar to that of Simons. In an unpublished 1948 document, "Preliminary Plan for Completion of Data for Study of Monetary Factors in Business Cycles," prepared as an initial input for his collaboration with Schwartz, Friedman discussed the implications of fractional-reserve banking for the total quantity of money. During the "panic of 1933" and other "currency panics," attempts by the public, he argued, to move into more liquid forms of money led to reductions in the quantity of money: "For cyclical analysis, interest attaches not only and perhaps not mainly to the quantity of circulating medium but also to its form and the interchangeability of different forms. The most dramatic monetary episodes of business-cycle history all relate to attempt on the part of the general public to change the form in which they hold the circulating medium, in particular, attempts to convert bank deposits into hand-to-hand currency" (Friedman 1948c, p. 2). Once a movement from bank deposits to currency had started during a business contraction, there is "hardly any limit to the velocity of circulation" (Friedman 1948c, p. 3).[17]

14. Friedman (1948b) believed that rigidities in the price structure and lags in response to changes in policies made it difficult to achieve full employment under any proposal designed to mitigate the cycle.

15. Nevertheless, that fact does not imply that open-market operations would not be effective in altering the money stock in regimes that made use of open-market operations. Thus, the 1949 letter, cited above, by Friedman and his Chicago colleagues, was underpinned by the belief in the power of open-market operations. We thank the referee for bringing this point to our attention.

16. Simons attributed the origin of the Great Depression to a fall in confidence resulting from the stock market crash of October 1929. For discussions of Simons' views, see Friedman (1967), Patinkin (1979), Tavlas (1997, 1998, 2015, 2018a), and Rockoff (2015).

17. Simons (1942, p. 188) argued: "The bottom of an uncontrolled deflation, for all practical purposes, is non-existent – with adverse expectations causing price declines and with actual declines aggravating expectations, etc."

Following Simons, Friedman believed that the way to deal with the inherent instability of the banking structure was to require 100% reserve holdings against all deposits, thereby severing the link between the conversion of deposits into cash and changes in the money supply. Under both the Friedman and the earlier Simons proposals, banks would become warehouses of funds; the banks would provide check-clearing services for their depositors, charging fees for the services provided. In addition, Friedman thought that 100% reserves would reduce government intervention in lending and investing. The idea here was that the recognition that government has a responsibility for the provision of money leads to the view that institutions producing the money supply should be controlled and regulated, resulting in more intrusive regulations of banks' lending and investing activities than those of other financial institutions.

Over time, Friedman changed his views substantially with regard to policy as his empirical work progressed. In an interview conducted by John Taylor over a half century after he had published his 1948 policy proposal, Friedman had this to say:

> In [that] paper, I was at the point where I would say money is important but the quantity of money should vary counter cyclically – increase when there was a recession and, the opposite, decrease when there was an expansion. Rules for taxes and spending that would give budget balance on average but have deficits and surpluses over the cycle could automatically impart the right movement to the quantity of money.
> Then I got involved in the statistical analysis of the role of money, and the relation between money and money income. I came to the conclusion that this policy rule was more complicated than necessary and that you really didn't need to worry too much about what was happening on the fiscal end, that you should concentrate on just keeping the money supply rising at a constant rate. That conclusion was, I'm sure, the result of the empirical evidence. (Taylor 2001, p. 119)

1.2 Schwartz

To our knowledge, the only account of Schwartz's policy thinking during the 1940s or early-1950s—published or unpublished—is in her two-volume coauthored book with Arthur D. Gayer and W.W. Rostow, *The Growth of the British Economy 1790–1850: An Historical, Statistical, and Theoretical Study of Britain's Economic Development* (Gayer, Rostow, and Schwartz 1953).[18] The book was started and largely completed in the early-1940s,[19] but because of wartime and other delays did not get into print until 1953. In the book, the authors state that they had adopted a Keynesian perspective in interpreting movements in economic activity (Gayer, Rostow, and Schwartz 1953, p. xii). They attributed the main drivers of the business cycle to be changes in both investment spending and exports (Gayer, Rostow, and Schwartz 1953, p. 532). They asserted that money played—at best—a passive role in the

18. There are no accounts of her policy thinking during the 1940s or the 1950s in the "Anna Schwartz Collection" at the Duke University Archives.

19. The authors stated that its delayed publication was "mainly caused by the preoccupation of the authors with other tasks, during and after the war" (Gayer, Rostow, and Schwartz 1953, p. viii). Gayer passed away in 1951, before the book's publication. Similarly, Friedman and Schwartz's 1982 book, *Monetary Trends in the United States and the United Kingdom,* had a gestation period of some 20 years.

business cycle: "monetary phenomena can be most usefully regarded ... as a reflection of more deep-seated movements. This is not to deny any autonomous influences from the side of the money supply [since] easy money market conditions were required before general prosperity could develop" (Gayer, Rostow, and Schwartz 1953, p. 559).

2. WARBURTON AND FRIEDMAN[20]

2.1 Warburton's Views on the Great Depression and Monetary Policy

As we mentioned above, Warburton's views on monetary issues have been recognized as having anticipated many of the arguments that Friedman and Schwartz ultimately set forth in their *A Monetary History.*[21] Friedman and Schwartz, in fact, referred 18 times to Warburton in *A Monetary History,* and in their preface to the book wrote:

> We owe an especially heavy debt to Clark Warburton. His detailed and valuable comments on several drafts have importantly affected the final version. In addition, time and again, as we come to some conclusion that seemed to us novel and original we found that he had been there before. (Friedman and Schwartz 1963, p. xiii)

Warburton's major studies began appearing in the mid-1940s. Using the Fisherine equation of exchange as his analytical framework, he emphasized the importance of empirical verification for competing theories (Humphrey 1971, p. 15, Cargill 1981, p. 91). Two of his views are important to highlight for what follows.

First, he argued that Keynesians, who had downplayed the role of monetary forces in the Great Depression, had misunderstood the crucial role played by monetary policy in the late-1920s and early-1930s. Warburton presented evidence showing that declines in the growth rates of bank reserves and the money supply during those years below their long-term trends occurred following the Fed's adoption of a tight monetary policy in the late-1920s, which, he argued, preceded the 1929 decline in economic activity by several quarters (Warburton 1950, p. 190). Warburton believed that, throughout the Great Depression, the Fed had the capacity to undertake expansionary open-market operations and that these operations would have increased the money supply. He argued further that, had the Fed maintained a steady money-growth rate of 3% per annum—the rate experienced during the period 1923–28—beginning in 1929, the United States would have experienced "a moderate business depression ... in 1930," but not a Great Depression (quoted from Bordo and Schwartz 1979, p. 239).

Second, Warburton believed that what he called "erratic" money growth was largely responsible for economic instability. Based on the past growth rate of per capita real

20. For additional evidence of Warburton's influence on Friedman's thinking, see Tavlas (2018b).

21. For example, in an article published after Warburton's death in 1979, Cargill (1981, p. 89) wrote: "when we look back at his efforts today, it is clear that he anticipated much of the current discussion of money and monetary policy by a generation." In a similar vein, Bordo and Schwartz (1979, p. 235) characterized Warburton as "a forerunner of ideas that became current long after he first enunciated them."

output, which Warburton estimated to have been 2% a year, and a secular decline in the velocity of circulation of money, which Warburton estimated to be 1.5% annually, during the late-1940s and early-1950s he concluded that a 4 to 5% annual rate of increase of the money supply would provide stable prices at full-employment-output levels over the long run, mitigating extreme fluctuations in economic activity (Cargill 1979, p. 441).[22]

2.2. The 1951 Warburton–Friedman Correspondence

The Warburton–Friedman correspondence in 1951 runs from June 22 until November 21.[23] It consists of 13 letters, seven from Warburton and six from Friedman. The trigger for the correspondence was an article, "Commodity-Reserve Currency," by Friedman, published in June 1951. In that article, Friedman (1951b) reiterated his views about the desirability of controlling the money supply through the federal budget and the 100% reserve proposal.[24] In a letter, dated June 22, 1951, that initiated the correspondence, Warburton wrote to Friedman about the latter's policy views as follows:

> I disagree with you decidedly with respect to the desirability of attempting to control the money supply through government deficits and surpluses. Also, I think you vastly exaggerate government interference with lending and investing activities resulting from the fractional reserve system, when such a system is guided by a central bank which uses its power to promote stability of the monetary unit. (Warburton 1951a)

During the early-1950s, Friedman viewed the money supply as controllable in a fractional-reserve banking system, so that the monetary authorities could offset changes in the money stock arising from variations in the reserve-deposit and currency-deposit ratios (Nelson 2017, Chapter 2). Nevertheless, in his 1951 correspondence with Warburton, Friedman expressed the view that a fractional-reserve system *complicated* the task of controlling the money supply. Thus, in his reply, dated July 6, 1951, to Warburton's letter of June 22, Friedman wrote:

> Re fractional reserves . . . their existence greatly complicates the task of a central bank . . . . For they mean that the central bank must continuously intervene in order to offset changes in the form in which people desire to hold their money – what I have described as the inherent instability of a fractional reserve system like our present one. You will surely grant that the task of a central bank trying to provide stability is not so easy that strictly unnecessary difficulties should be added; surely, one should try to provide as stable a framework as possible to maximize the chance that such a central bank could be successful. (Friedman 1951c)

22. In the 1960s, Warburton advocated a 2% annual rate of growth in the money stock. The shift in emphasis to a lower proposed growth rate for money incorporated the assumption that the reversal in the trend of velocity in the 1950s—from negative to positive—would continue. See Bordo and Schwartz (1983).

23. The letters are available in the Clark E. Warburton papers in the Special Collections Research Center, Library Collections, at George Mason University. We are grateful to Ed Nelson for directing us to this source.

24. Friedman (1951b, p. 210) referred to an article by Warburton (1949) in which Warburton presented estimates of the secular trend in monetary velocity.

Warburton's response was contained in his letter of July 18. In that letter, he took a more sanguine view than Friedman about the effects of shifts from bank deposits to currency. Specifically, he argued that the Federal Reserve had been established to offset the effects of such shifts. He further argued that monetary policy had been "improperly managed" during the early-1930 because of the "incompetence of Federal Reserve officials." He went on to argue: "The faults which you (and other members of the Chicago group, particularly Simons) ascribe to defects in the banking structure should be ascribed to nothing more than incompetence on the part of a group of [Federal Reserve] officials" (Warburton 1951b). Warburton also wrote:

> If the disturbing results of the old [pre-Federal Reserve] system were not to be repeated under the new system it was necessary for Federal Reserve officials to recognize that when deposits are withdrawn by the public in currency the Reserve Banks should acquire a corresponding amount of assets from the commercial banks, in one way or another, without disturbing the reserves on which deposits are based. Now this is, and was from the beginning of the Federal Reserve system, a simple matter of decisions of Federal Reserve officials. Ever since establishment of the Federal Reserve banks there has been no reason in the banking structure for disturbances in the total quantity of money to result from the transformation of deposits into currency. The difficulties of the 1930s that did in fact result from such a transformation were in no sense due to faults in banking structure – they were directly due to the fact that the officials of the Federal Reserve, and presumably their economists also, had not learned how it was supposed to operate. (Warburton 1951b)

Friedman responded on July 31. He agreed with Warburton that, "in principle," the Fed "could prevent any changes in the form in which the public wishes to hold its money from changing the total amount to be held. But I disagree strongly with your view (a) that this is a trivially simple thing to do [and] (b) that the necessity of doing so by deliberate actions is not a defect of the system." He continued:

> First, under the present system, FRS [Federal Reserve System] actions to offset changes in the form in which people hold currency must occur with a lag and with error, if only because of the lag in the compilation of the statistical series required. The current system is one in which, at best, disturbances are permitted to start from this source and then countered. It would surely be better to eliminate the disturbances. Second, the changes in question are always mixed with others, and separation is often difficult. Third, the FRS has always had a gold-reserve requirement. If it had attempted single-mindedly to prevent changes in the form in which money was held from affecting the total it would have thereby produced changes in its gold ratio. The extreme example of all these is the 1929–33 period, especially the early part. (Friedman 1951d)

Friedman also took issue with Warburton's claim that the difficulties of the early-1930s were due to the incompetence of Fed officials:

> As I look over the roster of people who have played an important part in the determination of the policy of the FRS, they seem to me on the whole an extraordinary competent group, judged of course by criteria other than the performance of the FRS, a far more competent group than anyone had any reason to expect to be put in charge. If a group like this nonetheless made a complete mess of monetary management – as I and I take it you think – the blame should be placed on the institutional arrangements, not on the men. (Friedman 1951d)

In a letter dated August 6, Warburton replied:

> It is apparent that you do not realize the background of my charge that the difficulties of the 1930s were due to incompetence on the part of central bank officials rather than to a defect in the banking and monetary structure. That charge is based on the simple but obvious fact that in the early 1930s the Federal Reserve authorities acted as though they knew nothing about the principles of currency management developed in the long period of agitation for bank reform between the 1860s and the creation of the Federal Reserve System, and the fact that there is nothing in the publications of the Federal Reserve Board or the writings of its economic staff of that period to indicate that they did know anything about those principles. My own personal contacts with the Board's staff in 1932 and since that time also provide no evidence that they understood those principles. (Warburton 1951c)

To support his claim that the Fed officials had displayed "sheer incompetence, presumably based on ignorance"[25] during the Great Depression, Warburton referred Friedman to a 1951 book, *American Monetary Policy* by Emmanuel Goldenweiser, who had been Director of the Fed's Division of Research and Statistics during the early-1930s.[26] In that book, Goldenweiser argued that the Fed had faced legal constraints in undertaking open-market purchases during 1930 and 1931 because of the so-called free gold problem. Specifically, under the legal requirements of the early-1930s the Fed was mandated to hold as collateral a reserve of 40% in gold and additional collateral of 60% comprised of either gold or eligible paper against issuance of Federal Reserve notes. Consequently, the conversion of bank deposits into cash—which amounted to an increase in the circulation of Federal Reserve notes—during the early-1930s meant that the Fed needed to back these notes with additional collateral—gold or eligible paper. To engage in open-market purchases—effectively, increasing the quantity of Federal Reserve notes—the Fed would have to pledge part of its holdings of gold in excess of minimum-reserve requirements—that is, its "free gold"—or hold sufficient eligible paper on its balance sheet. Goldenweiser maintained that the Fed's holdings of both "free gold" and eligible paper during the early-1930s had been insufficient to allow it to engage in substantive open-market purchases.[27]

In his letter of August 6, Warburton took exception to Goldenweiser's argument that there had been an insufficient supply of eligible paper in the early-1930s. As evidence, he referred Friedman to a table published in the Federal Reserve Board's *Annual Report* for 1932, which, Warburton wrote, contained the following data: (i) "in 1928 and 1929 . . . member bank borrowings to Reserve banks (rediscounts and collateral loans) amounted to approximately to 1/5 or 1/4 of the amount of eligible paper other than government obligations held by member banks, or roughly 1/8 of such paper including such obligations;" and, (ii) "throughout 1930, 1931, and 1932 . . . the amount of member bank borrowings was from about one-fourth

25. The quote is from Warburton's letter of August 6, 1951.

26. Goldenweiser held that position from 1926 until 1948. For more on Goldenweiser, see Yohe (1982).

27. For a discussion of the "free-gold problem," see Friedman and Schwartz (1963, pp. 400–6).

to two-fifths the magnitude of 1928 and 1929 and remained at about 1/10 to 1/20 of the eligible paper held by member banks excluding Government obligations or about 1/30 to 1/50 including those obligations" (Warburton 1951c). From these data, Warburton concluded that the "virtual stoppage of the rediscounting process was not due to forces outside the Federal Reserve. It was due directly to the combination of policies deliberately adopted by the Federal Reserve Board" (Warburton 1951c).

Friedman responded to Warburton with a four page (single-spaced) letter on September 3, 1951. The main points were as follows.

The performance of the Fed. Friedman wrote that "I, too, have just read Goldenweiser's book and agree that it shows a lamentable deficiency of understanding of basic principles."[28] Friedman agreed with Warburton "that in practice the reserve system has been a complete and tragic failure, that it did not cure in practice the 'perverse' elasticity of hand-to-hand currency that was the main objective." (Friedman 1951e)

The Great Depression. Friedman (1951e) agreed with Warburton that "the 1931 experience constituted by all odds the most serious mistake in the history of the system. I found your discussion of this episode extremely illuminating." Friedman also noted that he had previously held the view that, in 1931, the Fed could have taken actions that would have increased the supply of eligible paper.[29] Those actions, he wrote, included the introduction of an earlier version of the 1932 Glass–Steagall bill (which, among other things, increased the variety and the quantity of assets that could be discounted) and the suspension of the gold requirement needed to issue Federal Reserve notes. Friedman wrote: "I had always accepted the eligible paper limitation as a real one, outside the control of the system ... But your analysis of the eligible paper problem and the figures you cite make the case very much stronger yet, since it makes it clear that this was an obstacle of their own contriving."[30]

Monetary rules. As mentioned above, during the late-1940s and the early-1950s Friedman advocated a rule under which fiscal policy would be used to implement changes in the money supply. As we show below, Friedman began favoring a money-growth rule in his unpublished work of the mid-1950s, and first advanced it in publication in 1957 (Friedman 1957). In his letter of September 3, 1951, however,

28. It is not perfectly clear from the above quotation that Friedman read the book in response to his receipt of Warburton's earlier letter. Given that almost 1 month had passed since Warburton's letter of August 6, 1951, that circumstance appears likely.

29. It is important to point out that Friedman's mentor, Lloyd Mints, also blamed the Fed for deepening the Great Depression. In his 1950 book *Monetary Policy for a Competitive Society,* on which Friedman had provided extensive comments, Mints (1950, pp. 44–8, 128–9) argued that Federal Reserve officials had followed misguided theories (i.e., the real bills doctrine) in conducting monetary policy in the early-1930s. Thus, Friedman's exposure to Mints' views also likely influenced Friedman's thinking about the role of the Fed in the Great Depression.

30. In their assessment of the "free-gold problem," Friedman and Schwartz (1963, p. 406) concluded that "the problem of free gold was an ex-post justification for policies followed, not an ex ante reason for them." Regarding the availability of eligible collateral, Friedman and Schwartz (1963, pp. 404–5) concluded: "member banks could have been encouraged to increase their discounts. At all times there was ample eligible paper in the portfolios of member banks."

Friedman raised the possibility of a money-growth rule. What is not clear is whether he raised that possibility (i) in response to Warburton's published writings advocating such a rule, or (ii) as an idea that Friedman had independently contemplated in his own thinking. Given Friedman's familiarity with Warburton's published work, the first possibility appears likely.[31]

In his letter of September 3, 1951, Friedman considered three alternative rules: (i) his 1948 rule under which the fiscal position would be used to generate changes in the money supply, and deposits would be subjected to 100% reserve requirements; (ii) a rule retaining the fractional-reserve banking structure combined with keeping "the total quantity of money (or bank reserves) constant"; (iii) a rule retaining the fractional-reserve banking structure combined with allowing the "total quantity of money [to be] growing at X% a year." Friedman believed that in contrast to alternative (ii) and (iii), alternative (i) had the advantage of being "automatic"—there would be no need for "managers" to implement the rule since the rule would not require the use of open-market operations. In other words, alternative (i), Friedman believed, involved less discretion that the other two alternatives. To put alternatives (ii) and (iii) on an equal footing with alternative (i), Friedman believed that they would have to be accompanied by legislation "instructing the managers" to implement the rules, thereby reducing the scope for discretion in the implementation of the rules (Friedman 1951e).

The role of Fed officials. Friedman's argument that a money-growth rule would have to be accompanied by legislation underlined an important difference between the views of Warburton and Friedman about the role of Federal Reserve officials during major depressions. As documented above, Warburton attributed the Fed's policies of the early-1930s to the incompetence of its officials; had competent officials been in charge, the Depression would not have been so severe. Friedman agreed that the Fed officials had been incompetent during the early-1930s, but he also believed that even competent officials could have been subjected to political pressures, leading to "unwise" policies. In his letter of September 3, 1951, Friedman wrote:

> Our difference of opinion is on the conclusions we draw from this period. You interpret it as a product of ignorance and incompetence and, in effect, say "throw the rascals out" and put in competent and wise people. For the moment let me grant first, that the failure is attributable solely to ignorance and incompetence, and the competent and wise people in charge would run the system so that it would avoid past failures and no longer contribute to instability. What is the likelihood that competent and wise people will be chosen, or that if chosen, they will be allowed to continue in charge? Is it a pure accident that the system was in the hands of incompetent and ignorant people for 40 years? Wisdom and competence involves readiness to do the opposite of what

31. Mints (1946; 1950), also considered the possibility of a money-growth rule in his writings. In his book, *Monetary Policy for a Competitive Society,* Mints provided extensive assessments of alternative monetary-policy rules, including a money-growth rule (1950, pp. 123–4). However, Mints thought that a money-growth rule was not well-suited to take account of fluctuations in velocity. His preferred rule was direct price-level stabilization. Therefore, Friedman's exposure to the money-growth rule was not limited to the specific rule proposed by Warburton.

> everyone else is doing, which is hardly the way to win friends and influence people. (Friedman 1951e)

Thus, to guard against both the possibility that incompetent monetary authorities are at the leadership of the Fed and the possibility that competent but politically influenced authorities are at the helm, Friedman believed that a rule based on the quantity of money would have to be reinforced with legislation, further limiting the possibility of discretion (beyond the limitation imposed by the rule itself).

2.3 Discussion

The following points merit comment. First, although in the early-1950s Friedman believed that the Fed possessed the capacity to offset contractions in the money supply produced by shifts from deposits into currency, in contrast to Warburton he believed that fractional-reserve banking "greatly complicates" the task of controlling the money supply. In his correspondence with Friedman, Warburton provided evidence showing that, during the early-1930s, the Fed possessed the capacity to offset decreases in the money supply produced by shifts in the currency-deposit ratio.[32] Specifically, Warburton convinced Friedman that the Fed authorities' argument that the amount of eligible paper was limited in the early-1930s was in Friedman's words (in his response to Warburton), "an obstacle of their own contriving."

Second, in their 1951 correspondence neither Warburton nor Friedman expressed the view that the Fed had initiated the Great Depression with its policy tightening in 1928 and 1929. Warburton, however, *implied* that the Fed had caused the initial downturn in 1928 and 1929. In his letter dated August 6, 1951, he wrote: "It is true that in 1928 and 1929 the Federal Reserve Board became obsessed with the problem of speculation in corporate stocks and prevention of the use of bank loans for this purpose" (Warburton 1951c, p. 3).[33] In his published writings of the late-1940s and early-1950s, Warburton was more specific than in the above-cited letters to Friedman about the Fed's role in initiating the Great Depression (see Bordo and Schwartz 1979, p. 239, Cargill 1979, p. 432).

Third, Friedman favored monetary rules, not only to prevent mistakes by Federal Reserve officials, but also to prevent those officials from being subjected to political pressures. Politically motivated short-term actions by the monetary authorities could, he believed, have destabilizing long-term consequences. It, therefore, followed in Friedman's view that a rule that required "managers" for its implementation, such as a monetary growth rule, should be embedded in legislation.

Fourth, in contrast to Warburton, Friedman's advocacy of a constant monetary growth rule, beginning in the mid-1950s, reflected, in part, his stress on model

32. By the late-1950s, Friedman held the view that, aside from periods of financial panics, fluctuations in the excess-reserves-to-deposits ratio and currency-deposit ratio were not major sources of instability in the money multiplier (and, hence, potentially in the money stock). See Nelson (2013, 2017, Chapter 4).

33. In early 1928, the Fed began tightening its policy stance in order to stem speculation in the stock market. See Tavlas (2011).

uncertainty.[34] Friedman contended that there was no basis for believing that policymakers (and the economics profession) possessed the detailed knowledge of the economy's complex interactions and of the lag structure requisite for the pursuit of successful countercyclical policies or for fine-tuning. In contrast, Warburton's advocacy of a constant money-growth rule was mainly predicated (much more than in the case of Friedman) on the existence of a fairly-precise money-income relationship.

3. THE TRANSFORMATION

3.1 Early-1950s to Mid-1950s

During the period from the early-1950s until the mid-1950s, Friedman's views on the role of monetary forces in the Great Depression, the relative effectiveness of monetary policy and fiscal policy, monetary rules, and 100% reserves, evolved. To demonstrate, consider the following evidence from five documents: (i) an unpublished 1951 document, "The Role of the Monetary and Banking System in the Business Cycle," prepared as an update on his work with Schwartz (with the objective of obtaining financial support for the continuation of that work); (ii) an article, "Price, Income and Monetary Changes in Three Wartime Periods," published in the *American Economic Review* in 1952; (iii) a lecture, "Why the American Economy is Depression-Proof," delivered in Sweden in April 1954, published initially in *Nationalekonomiska Föreningens* and later made more widely available in Friedman's *Dollars and Deficits* (Friedman 1968); (iv) an unpublished 1956 document comprising the first two draft chapters of Friedman and Schwartz's *A Monetary History;* and, (v) an unpublished document, "Monetary Policy, Domestic and International," which formed the basis of a lecture that Friedman delivered at Wabash College on June 19, 1956.

1951. The unpublished 1951 document does not provide information indicating precisely when (i.e., month) during the year it was written[35] and so it is not possible to determine whether it was written before, during, or after the period of Friedman's 1951 correspondence with Warburton. Thus, it is not possible to determine if the views in the paper were influenced by that correspondence. In terms of policies, Friedman referred to the "suggestions" (Friedman 1951f, p. 3) made in his 1948 paper, "A Monetary and Fiscal Framework for Economic Stability." Friedman argued that the data showed "the monetary system" had played "an essentially passive" role in minor business cycles, but "an active and important role" in major cycles (Friedman 1951f, p. 2).[36] What he wrote about the Great Depression is central to understanding the evolution of his thinking because it reflects his growing belief that discretionary

34. This argument was made by Nelson (2008, p. 101).

35. The main purpose of the paper was to describe the data Friedman and Schwartz had collected and constructed, and the gaps in the data that needed to be filled.

36. As pointed out by the referee, the use of the words "passive role" need not imply that the course of the money stock did not matter for output. It could mean that money was allowed to move procyclically and thus reinforce other forces affecting output.

monetary policy can be a source of shocks to an economy: "I think that there is good reason to believe that the great depression might have ended in late 1931 or early 1932 if had not been for the monetary action taken by the Federal Reserve System in the fall of 1931. This hypothesis is as yet, of course exceedingly tentative and requires expansion and testing" (Friedman 1951f, pp. 2–3). Friedman did not refer to the hypothesis that the Fed had initiated the Great Depression.

The specific episode to which Friedman was referring was the monetary tightening that occurred following United Kingdom's departure from the gold standard in September 1931. In October 1931, the Federal Reserve Bank of New York raised its discount rate in two steps, from 1 ½% to 3%. In the early-1950s, Friedman viewed the October 1931 monetary tightening as a turning point, exacerbating the economic contraction. Nelson (2017, Chapter 4) documents that Friedman initially put forward the view that the October 1931 policy tightening intensified the Great Depression in the late-1940s. Additionally, Nelson points out that the eventual Friedman and Schwartz account in their *Monetary History* would view the Fed's decision in December 1930 to allow the Bank of the United States to fail as the key turning point in the Great Depression. We return to this issue below.

1952. In the 1952 published paper, Friedman presented evidence, based on data he had constructed with Schwartz, on the determinants of inflation during the Civil War, World War I, and World War II. Friedman (1952, p. 158) pointed out that "in all three cases the rises in prices was almost of precisely the same magnitude, so this critical variable is under control."[37] The determinants of the three inflations that he assessed were the following: (i) "federal expenditures in each year as a fraction of national income;" (ii) "the fraction of government expenditures financed through taxes;" (iii) the increase in output in each war; (iv) wage and price controls; and (v) the quantity of money per until of output (Friedman 1952, pp. 158–9). Friedman found that price behavior was proximately explained by the stock of money per unit of output; it could not be satisfactorily explained by an analysis that excluded the stock of money. He also found that none of the other variables helped to explain any of the three inflations.

These results influenced his thinking about the relative importance of monetary and fiscal policies. He set down a notion that would become a recurrent theme in his writings, namely, that there are "two competing theories of income determination: the quantity theory of money and the income-expenditure theory . . . the quantity theory asserts in essence that the velocity of circulation of money is an empirical variable that behaves in a stable or coherent fashion; the income-expenditure theory, that the propensity to consume, or the consumption function, is the empirical variable that behaves in a stable or consistent fashion" (Friedman 1952, p. 161).[38]

37. Friedman showed that prices approximately doubled from the outbreak to the end of each of three wartime episodes, although the durations of the episodes differed.

38. Friedman had earlier contrasted the income-expenditure and quantity theories in a chapter in the book, *Taxing to Prevent Inflation,* which was coauthored, along with Friedman, by Carl Shoup and Ruth Mack, in 1943.

1954. The lecture delivered in Sweden shows further changes in Friedman's thinking about the role of the banking structure in the business cycle and about the Fed's role in the Great Depression. Friedman no longer considered a fractional-reserve banking system to be a potent force in the business cycle. Three changes had occurred, he believed, since the early-1930s that strengthened the resilience of the banking system. First, the establishment of the Federal Deposit Insurance Corporation in 1934 effectively "converted all deposit liabilities of private banks into a Federal liability. It has thus eliminated the basic cause for runs on banks of the kind that occurred in 1931 and 1932" (Friedman 1954, p. 60). Second, the share of government obligations on banks' balance sheets, which Friedman estimated to be about fifteen per cent of banks' deposit liabilities in 1929, had risen to more than fifty per cent, a situation that "greatly reduces the potential effects of changes in the private demand and supply for credit on the quantity of money" (Friedman 1954, p. 60). As a result, deposits (like currency) had increasingly become a direct liability of the government. Friedman argued that a "consequence [of this development is] that it greatly reduces the potential effects of changes in private demand and supply for credit on the quantity of money. The private lending activities of banks are no longer the dog; they are threatening to become the tail" (Friedman 1954, p. 60). Third, the removal of gold from public circulation in 1934 loosened the link "between [gold and] the internal supply of money" (Friedman 1954, p. 61). The combined effect of the three changes was to "eliminate as a practical possibility anything approaching a collapse of the American banking structure" (Friedman 1954, p. 61).[39]

Friedman's position on the Great Depression had also evolved. First, the evidence had convinced him that by the summer of 1931 there had been signs of an economic revival. "But the decline," he argued, "did not come to an end." Fed officials took "strong deflationary measures, putting up the bank rate more sharply and suddenly than at any previous time in their history – and this after two year of economic contraction" (Friedman 1954, p. 64).[40] Second, Friedman had also begun to assess the Fed's policies beginning in 1929 (but not 1928 as he would do subsequently). While he did not argue that the Fed had initiated the Great Depression, he did argue that its policies, beginning in 1929, had contributed to a deepening of the Great Depression: "From 1929 to 1931 the Reserve System was largely passive. It allowed the stock of money to decline by about 10 per cent and banks to fail in a steady if not spectacular stream" (Friedman 1954, p. 64).

1956:I. By April 1956, Friedman and Schwartz had constructed annual money-supply data for the period 1879–1954 and monthly money-supply data for the period June 1917 to December 1954. At that time, they wrote two draft chapters for their *A Monetary History.* The chapters were titled "The Estimates" (Chapter 1) and "Cyclical Behavior" (Chapter 2) and were mainly descriptions of the components of their

39. As the experience during the euro-area crisis demonstrated, however, a large share of government obligations on banks' balance sheets can be a *source* of shocks if the sovereign is not creditworthy.

40. As mentioned, the Fed's tightening occurred after United Kingdom's departure from the gold standard in September 1931.

money-supply series and the methods used to compile those components.[41] However, in the chapter on "Cyclical Behavior" Friedman and Schwartz also compared cyclical peaks and troughs in both the level and the rate of change[42] in their money-supply series with peaks and troughs (as determined by the NBER's methodology) in economic activity; for economic activity, they used two measures—an index comprised of the average of three indices of "general business activity" compiled by Geoffrey Moore, who was a Director at the NBER during the 1950s—Friedman and Schwartz called this index "the Moore index"—and an index of bank clearings and debits outside of New York—which Friedman and Schwartz called "the clearings index."

The main findings were as follows: (i) "both indicators [of economic activity] agree that the five contractions since 1879 with the largest percentage decline in activity are 1893–94, 1907–08, 1920–21, 1929–33, and 1937–38"[43] (Friedman and Schwartz 1956, Chapter 2, p. 4); (ii) both indices of economic activity ranked the 1929–33 contraction as the most severe of the five major contractions; (iii) each of the five major contractions had been preceded by declines in both the level of the money-supply series and the rate of change in the money-supply series in the same direction—that is, the peaks in those series had occurred prior to the peaks in the two series for economic activity; (iv) between June 1929—the month of the cyclical peak in the *level* of the money-supply series—and March 1933 (the trough in the series), the *level* of the (monthly) money supply fell by 35.9%, by far the largest decline in that series registered for any of the five major contractions—the second largest decline in that series was 5.5% registered between June 1920 and July 1921;[44] and (v) based on two methods[45] for identifying peaks, the peak in the change in the money-supply series occurred well before the beginning of the Great Depression. With regard to the Great Depression, Friedman and Schwartz dated the cyclical peak in economic activity as having occurred in June 1929. They also identified the two peaks in the rate of change in the money supply as having occurred in April 1928 (for the so-called step peak) and in November 1927 (for the so-called specific cycle peak), that is, 14 and 19 months, respectively, before the peak in economic activity. With those data, Friedman and Schwartz were equipped with findings to attribute *both* the initiation and the deepening of the Great Depression to monetary forces.

Chapter 2 also referred to three alternative monetary rules: "a rule of maintaining the stock of money constant; or of increasing it at a constant rate of 6 per cent a

41. Chapter 1 was 10 pages in length and Chapter 2 was 68 pages in length. Many of the pages have faded and are difficult, if not impossible, to read.

42. To compute rates of change, Friedman and Schwartz used first differences of logarithms, effectively eliminating trends from the data.

43. These findings would not change. Thus, in their *A Monetary History,* Friedman and Schwartz (1963, p. 677) found that "In 93 years, there have been six periods of severe economic contractions . . . The most severe contraction was the one from 1929 to 1933. The others were 1873-79 [a period not evaluated in the 1956 draft chapters], 1893-94 . . . , 1907-08, 1920-21, and 1937-38. Each of those periods was accompanied by an appreciable decline in the stock of money, the most severe accompanying the 1929-33 contraction."

44. Friedman and Schwartz (1963, p. 274) dated the peak in the level of the money supply as August 1929.

45. The methods were "the step approach" and the "specific cycle method."

year . . . Or [a] rule of maintaining the stock of money at whatever level was required to keep a given price index stable" (Friedman and Schwartz 1956, Chapter 2, p. 20). Friedman and Schwartz, however, did not provide a comparative analysis of the three rules.

In a letter to Schwartz dated August 12, 1956, Friedman summarized what he believed to be the main implications of their work:

> I do not think we ought or can in this place and context outline a full-blown or comprehensive theory. What it seems to me we want to do is to make a number of major points suggested pretty directly by the empirical evidence; (1) there are long swings in the money series that correspond in time to the previously noted long swings in the output series; (2) these long swings are reflected most directly and clearly in prices and money national income; (3) we have reasonably straight-forward explanations of a historical or episodic character for most of the major swings in the money series; (4) if the swings in money are the primary mover – and the wider amplitude in them and in prices than in output makes this plausible – then an episodic explanation seems to be consistent with the evidence rather than a cyclical one; (5) whether this be right or not, no study of these supposed long cycles can afford to neglect the swings in money. (Friedman 1956a, p. 2)

Two issues merit comment regarding the above summary points made by Friedman. First, points (1) and (2) imply that long swings in the money supply do not seem to affect the long-run real growth rate of the economy. This conclusion follows from the observation that long swings in money are "most directly and clearly reflected in" long swings in nominal income, with the latter swings predominantly comprised of price-level changes. Consequently, changes in the quantity of money do not affect real economic growth in the long run. It also follows that monetary policy should be based on a rule that aims to achieve price-level stability since (1) discretionary policy can be harmful, as evidenced by the experience of the Great Depression, and (2) monetary policy influences nominal, but not real, values in the long term. Second, the five episodes of deep contractions identified by Friedman and Schwartz occurred under different monetary regimes—for example, the contractions of 1893–94 and 1907–08 took place under a gold standard and in the absence of a central bank, while the contractions of 1920–21 and 1929–33 took place under the gold exchange standard and in the presence of a central bank. The fact that the deep contractions of money took place under different institutional arrangements and were followed by large contractions in nominal income allowed Friedman and Schwartz to argue in their *A Monetary History* that the stock of money changed for reasons that were independent of contemporaneous changes in real income or prices. As discussed below, Friedman would stress this latter point in his 1958 submission to Congress's Joint Economic Committee.

1956:II. The lecture delivered by Friedman in 1956 at Wabash College contains the two elements of Friedman's thinking which we have argued are interconnected—the notion that the Fed both initiated and deepened the Great Depression—though the first part of that notion was introduced as a testable hypothesis in the 1956 document while the second part, Friedman now believed, had been confirmed by the data—and his advocacy of a money-growth rule. Regarding the Great Depression, Friedman

argued: “It may well be that earlier phases of this depression can be traced to unwise monetary policies. Be that as it may, there can be little question that the secondary decline from 1931 to 1933 was produced almost entirely by the Federal Reserve System’s reaction in the fall of 1931 to England’s (*sic*) going off the gold standard” (Friedman 1956b, p. 3).

Regarding the choice of monetary rules, Friedman stated: “I must confess that I am myself somewhat in a state of flux about the best answer” (Friedman 1956b, p. 5). He considered his earlier proposal that the federal budget be used to control the money supply to be “more sophisticated than is necessary” (Friedman 1956b, p. 5). In its place, he proposed—for the first time—a money-growth rule:

> Consider the very simple rule: the monetary authorities do nothing whatsoever except see to it that the stock of money increases by simply 4% per year . . . I think that any student of monetary experience and policy who compares month by month what the Federal Reserve actually did with what they would have done under the 4% rule will conclude that in perhaps as many as 90% of the months, they would have done better if they had followed this simple rule . . . it seems to me we might at least try this simple-minded rule for a time and see how well it works before we introduce further complications. (Friedman 1956b, p. 7)

In his 1956 lecture, Friedman also discussed his 100% reserves proposal. He believed that it had become less necessary because “unnoticed by anyone, we have in effect moved something like half or two-thirds of the way forward the essence of a hundred per cent reserve system since the 1930s, when the proposal first received much attention” (Friedman 1956b, p. 8). What accounted for this “unnoticed” change toward a 100% reserve system? Friedman singled-out the factors that he had cited in his 1954 lecture in Sweden—the establishment of the Federal Deposit Insurance Corporation, the increased share of government financial instruments on banks’ balance sheets, and the departure of the United States from the gold standard.

3.2. The 1957–58 Public Announcements and the Great Depression

It was left for Friedman to announce his money-growth rule publicly. The first published version came in 1957.[46] The second came in 1958 as part of his submission to the Congressional Joint Economic Committee (JEC):

> An essential requirement for the avoidance of either substantial inflation or substantial deflation over the coming decades is the avoidance of a substantially more rapid or a substantially less rapid increase in the stock of money than the 3 to 5 per cent a year required for price stability. A substantially more rapid rate of growth in the money supply

46. Friedman’s (1957) paper, “Consumer Credit Control as an Instrument of Stabilization Policy,” was prepared for a conference held at the Federal Reserve Board on October 12–13, 1956. Credit for the discovery of this article belongs to Nelson (2017, Chapter 8). In contrast to his 1956 Wabash lecture, in his 1957 article, Friedman did not propose a specific *numerical* growth rule. His advocacy of a constant money-growth rule was contained in a footnote, in which he stated “subsequent research on monetary experience . . . has led me to believe that even a much less sophisticated monetary policy - namely, simply providing for a steady increase in the stock of money year by year - would be consistent with a high degree of stability and might therefore be preferable on grounds of ease of public understanding and administrative operation” (Friedman 1957, p. 23, footnote 1).

> will inevitably mean inflation; conversely, continued inflation of substantial magnitude cannot occur without such a large rate of growth in the money supply. A substantial slower rate of growth in the money supply, let alone an absolute decline, will inevitably mean deflation; conversely, continued deflation of substantial magnitude cannot occur without a small negative rate of growth in the money supply. (Friedman 1958, p. 185)

In his JEC statement, Friedman argued that the historical evidence showed that there is a strong regularity between changes in the stock of money per unit of output and changes in prices in the same direction. Friedman (1958, p. 173) noted that, while this regularity "tells nothing about direction of influence," the variety of monetary arrangements—for example, the gold standard, flexible exchange rates, regimes with and without a central bank—over which this regularity has been observed "supports strongly . . . [the view] that substantial changes in the stock of money are both a necessary and sufficient condition for substantial changes in the general level of prices" (Friedman 1958, p. 173). Friedman did not refer to the need to embed his proposal in legislation, although he would subsequently do so (see Friedman 1960).

What about the Monetary Hypothesis of the Great Depression? In his submission to the JEC, Friedman made it clear that he had become convinced that monetary policy had both precipitated and deepened the Depression:

> A . . . dramatic example [of the effects of monetary policy] is the tight monetary policy from early 1928 and the associated lack of growth in the money supply which coexisted with economic expansion [in 1928 and early 1929] but contributed *both to the occurrence and the severity* of the 1929 downturn [emphasis ours]. The fact that these policies had a delayed effect in turn misled the monetary authorities . . . [who] were induced to believe that still stronger [tightening] measures were required and so tended to overdo a regressive policy . . . notably in 1932 as well as earlier in that catastrophe, the failure of tentative movements toward easy money to have an immediate effect led them to regard these actions as ineffective and to permit and contribute to the sharp decline in the stock of money which occurred and which played such so crucial a role in that episode. (Friedman 1958, p. 181, italics supplied)

Reflecting the NBER's protocol that enjoined researchers from expressing policy views in Bureau publications, Friedman and Schwartz did not advocate a money-growth rule in their *A Monetary History.* However, in one passage in the text of that book, Friedman and Schwartz referred to the importance of such a rule indirectly. In this connection, they pointed out that, following the collapse of the money supply from 1929 to 1933, the quantity of money grew at unusually rapid rates from 1934 to 1936 and from 1938 to 1941. Friedman and Schwartz concluded (Friedman and Schwartz 1963, p. 545) their analysis of the Great Depression with the following: "How different the history of that fateful dozen years [1929-1941] might have been if the money stock had grown steadily at its average rate of 2 1/2 per cent per year, let alone at the higher long-term historical rate, instead of first falling by one-third from 1929 to 1933 and then doubling from 1933 to 1941."[47]

47. Both Rockoff (2006) and Nelson (2017) cited this passage. Nelson also cited an earlier passage buried in a footnote in *A Monetary History* in which Friedman and Schwartz, commenting on a Federal Reserve annual report, wrote: "It is interesting that one "simple test" omitted from consideration is a steady

3.3 Discussion

A key factor underlying the money-growth rule was Friedman's aim of preventing a repetition of the major mistakes of past monetary policies as exemplified in the experience of the Great Depression. Yet the major defect of the banking structure of the early-1930s—namely, the perverse elasticity of the money supply under a fractional-reserve banking system—had subsequently been largely neutralized by what Friedman perceived to be movements toward 100% reserve banking—the creation of the Federal Deposit Insurance Corporation (FDIC), the high ratio of government obligations on banks' balance sheets, and the changed role of gold. Given that these changes in the banking structure lessened the possibility of a repetition of the Great Depression, what was the purpose of a rule that aimed to prevent the major mistakes of discretionary monetary policy? In a lecture delivered at Fordham University in 1959 (and published in 1960), Friedman provided his answer. In that lecture, he argued that a money-growth rule would help avoid the "excessive" mistakes of the past, including the collapse of the money supply from 1929 to 1933 (Friedman 1960, p. 93). He also acknowledged, however, that changes in the "monetary structure – notably federal insurance of bank deposits, the altered asset structure of banks, and the altered role of gold" had rendered "a repetition of major mistakes like those made during the inter-war period highly unlikely" (Friedman 1960, p. 44). Nevertheless, he argued that "a merit of the [money-growth] rule [is] that it provides *insurance* against . . . major mistakes . . . . I would be tempted to add that new mistakes are legion and insurance against major mistakes differing in kind from those in the past . . . is well worth while" (Friedman 1960, p. 94, italics supplied).

As mentioned above, during the early-1950s Friedman considered the Federal Reserve's policy tightening in the fall of 1931 to have been the key turning point during the Great Depression. By the late-1950s, Friedman would consider the turning point to have occurred in late 1930, during which time the Federal Reserve allowed the Bank of the United States to fail.[48] In his 1959 Fordham lecture, Friedman (1960, p. 18) stated: "The serious fault of the Federal Reserve dates from the end of 1930, when a series of bank failures, including the notable failure of the Bank of the United States, changed the monetary character of the contraction." Friedman (1960, p. 19) went on to argue that the Federal Reserve's tightening in the fall of 1931 intensified what had already been a crisis situation.

3.4 Schwartz: Post-1963 Views

After the publication of *A Monetary History,* Schwartz became more actively engaged in publishing her views on monetary policy, perhaps reflecting a relaxation

rate of change in the stock of money. A policy along these lines was apparently urged by Carl Snyder of the New York Federal Reserve Bank."

48. Up to the time of its failure, the Bank of the United States was the largest commercial bank, as measured by volume of deposits, to have failed in the United States. See Friedman and Schwartz (1963, pp. 309–11). In his 1957 publication prepared for the 1956 Federal Reserve Board conference, Friedman continued to single-out the Fed's tightening in the fall of 1931 as the key turning point in the Great Depression.

of the NBER's policies about policy statements made by its staff. Many of her publications were coauthored with Friedman, but she also published papers in which she was the single author. In the latter papers, her monetary-policy views were entirely consistent with those of Friedman.[49] In what follows, we focus on the second edition of her book with Gayer and Rostow, *The Growth and Fluctuations of the British Economy 1790–1850,* published in 1975.

In the preface to this edition, Schwartz distanced herself from the theoretical framework in the book:

> With respect to the basic theoretical analysis presented in this book, further study and reflection have led to an amiable divergence of views between us that should be shared with our readers . . . one of us (A.J.S.) has concluded that three aspects of the analytical approach of the study require modification in light of recent theoretical and empirical research: (1) the role assigned to monetary policy; (2) the interpretation of the behavior of interest rates; and (3) the emphasis on *relative* price rather than price *level* changes. (Gayer, Rostow, and Schwartz 1975, p. ix, original italics)

Schwartz went on to point out that the analysis in both editions of the book was "a faithful reflection of the outlook of the economics profession . . . in the aftermath of the economic debacle of 1929–33." As a result of that episode, the profession had questioned "the efficacy of monetary policy" (Gayer, Rostow, and Schwartz 1975, pp. ix–x). Schwartz concluded that research since the publications of the first edition of the book required that "attention [be paid] to monetary relationships in the study of British business cycles . . . and to the . . . monetary effects of the cyclical and secular behavior of interest rates" (Gayer, Rostow, and Schwartz 1975, p. xiii).[50] Those modifications, she stated, "would entail revisions of some of the conclusions of these volumes . . . while monetary changes influence output change in the short run, in the long run the rate of monetary growth affects prices primarily" (Gayer, Rostow, and Schwartz 1975, p. xiii).

4. CONCLUSIONS

In his essay, "The Monetary Theory and Policy of Henry Simons," Friedman (1967) contrasted his view that monetary policy should be conducted on the basis of a constant money-growth rule with Simons' preference for a rule based on price-level stabilization.[51] Friedman asked, "What explains this contrast [in monetary-policy rules]?" (Friedman 1967, p. 84). His answer was the following: "A few facts, which

49. A representative example of her views on monetary policy is contained in the paper "Why Money Matters" (Schwartz 1969).

50. Schwartz (1981) drew a distinction between nominal and real interest rates. During the Great Depression, for example, nominal rates were very low, but real rates were high because of deflation.

51. Friedman (1967) argued that a rule focused on price-level stabilization involves more discretion than a rule that targets the money supply, since under the former rule the authorities would have to decide which price index to stabilize. An aim of Friedman's money-growth rule was to produce a stable price level, but in contrast to Simons' proposal, under the Friedman rule the monetary authorities would not react to deviations of the observed inflation rate from the target inflation rate.

we now know and he [Simons] did not know have made all the difference ... The facts have to do primarily with the Great Depression of 1929–1933" (Friedman 1967, p. 84). Friedman also contrasted his view on the 100% reserves issue with that of Simons: While Simons considered 100% reserves an essential element of monetary reform that would rectify the instability of a fractional-reserve banking system, in 1967 Friedman considered the idea less pressing than Simons (and less pressing than the Friedman of the 1950s): "[I] view it as a step toward reducing government interference with lending and borrowing in order to permit a greater degree of freedom and variety in the arrangement for borrowing or lending."

In this paper, we have documented the role played by the evidence constructed, assembled, and analyzed by Friedman and Schwartz in the evolution of Friedman's policy views from the late-1940s until the late-1950s. We have also documented the change in Schwartz's pre-*Monetary History* views that occurred after the publication of *A Monetary History*. With regard to Friedman, the following changes took place:

The Role of Money

- In the late-1940s, Friedman believed that the economy is "inherently unstable" because of the endogeneity of the money supply under a fractional-reserve banking system.
- In the late-1950s, Friedman thought that money was the "primary mover" of the business cycle and that changes in the money supply produced by monetary policy can be a source of destabilizing shocks.[52]

The 100% Reserve Proposal

- In the late-1940s, Friedman favored 100% reserves to deal with the destabilizing effects of flights into currency under a fractional-reserve banking structure.
- In the late-1950s, he believed that adherence to a money-growth rule would prevent incipient flights into money from turning into "currency panics." The 100% reserve proposal had effectively been rendered redundant by changes in the banking structure.

Policy Rules

- In the late-1940s, Friedman favored a rule under which fiscal policy would be used to generate changes in the money supply with the aim of stabilizing output at full employment, and open-market operations would be abolished.
- In the late-1950s, he advocated a rule under which the money supply would grow annually within a range of 3–5% in order to maintain a stable price level

52. Friedman, however, did not abandon his belief in the inherent instability of the monetary system. He remained convinced that the market for credit is unstable and that monetary policy should insulate the volume of commercial bank deposits from that market. What had changed was that he regarded the occasions during which bank deposits were destabilized by credit-market fluctuations as being limited to periods of financial panic. See Friedman and Schwartz (1986, p. 53). We thank the referee for drawing this point to our attention.

> and to stabilize the economy. Open-market operations would be used to achieve and maintain that rate of growth of the money supply. Countercyclical policy could not, he believed, influence long-term economic growth.

We have also documented the role played by Friedman and Schwartz's confirmation of the Monetary Hypothesis of the Great Depression in the evolution of Friedman's policy views. Certainly, factors other than confirmation of the Monetary Hypothesis of the Great Depression, including the evidence produced by Friedman's students in the University of Chicago Workshop in Money and Banking during the 1950s (see Friedman 1956c), and Friedman's empirical estimates on the destabilizing effects of lags in monetary policy and the stability of the long-run demand for money produced during the same decade, also played key roles in the evolution of Friedman's thinking, however. Nonetheless, as the above remarks by Friedman indicate, the accumulation and interpretation of data on the Great Depression—and, in particular, the destabilizing role played by monetary policy throughout that episode—arising from his work with Schwartz on *A Monetary History* were *decisive* in the evolution of his thinking toward a money-growth rule.

Finally, we have argued that Clark Warburton may well have played a greater role than has been recognized in influencing Friedman's thinking about (i) the effectiveness of open-market operation in offsetting the effects of banking crises, (ii) the monetary origins of the Great Depression and, possibly, (iii) monetary rules.

To verify these and other ideas empirically and make them implementable required years of careful and detailed study and research, including the development of meaningful data that could be subjected to analysis, which Friedman and Schwartz performed.

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