BANK OF GREECE
EUROSYSTEM

Working Paper

How Friedman and Schwartz became monetarists

James R. Lothian
George S. Tavlas

207

MAY 2016

BANK OF GREECE
Economic Analysis and Research Department – Special Studies Division
21, E. Venizelos Avenue
GR-102 50 Athens
Tel: +30210-320 3610
Fax: +30210-320 2432

www.bankofgreece.gr

Printed in Athens, Greece
at the Bank of Greece Printing Works.

ISSN 1109-6691

HOW FRIEDMAN AND SCHWARTZ BECAME MONETARISTS

James R. Lothian
Fordham University

George S. Tavlas
Bank of Greece
and
University of Leicester

ABSTRACT

During the late-1940s and the early-1950s Milton 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. He believed that the economy is inherently unstable because of endogenous movements in money supply under a fractional-reserve banking system. In her work, Anna Schwartz downplayed the role of monetary factors in business cycles and the role of monetary policy as a stabilization tool. We show how the joint work of Friedman and Schwartz from 1948 to 1958 led Friedman to view money as the "primary mover" of the business cycle and underpinned his shift to a rule based on money growth so that discretionary monetary policy would not act as a source of destabilizing shocks. The decisive factor in the evolution of Friedman's thinking was the empirical confirmation that the Great Depression had been both initiated and deepened by the Fed. The largely neglected influence of Clark Warburton on the evolution of Friedman's thinking provides a missing -- but crucial -- link in explaining Friedman's recognition of the role of monetary factors in the Great Depression and of the Fed's ability to offset the destabilizing effects produced by shifts from deposits into currency under a fractional-reserve banking system.

Keywords: Milton Friedman, Anna Schwartz, Clark Warburton, monetary rules, quantity theory of money, fiscal policy, Great Depression

JEL Classification: B22, E52

Acknowledgements: George Tavlas would like to thank the following institutions for hosting him as a Visiting Scholar: the Becker Friedman Institute at the University of Chicago (November 2013 and April 2015), the Center for the History of Political Economy at Duke University (September-November 2015), and the Hoover Institution at Stanford University (May 2015).

Correspondence:
George S. Tavlas
Member, Monetary Policy Council
Bank of Greece
21, El. Venizelos Avenue
102 50 Athens, Greece
tel. + 30 210 3202370
e-mail. gtavlas@bankofgreece.gr

1. Introduction

It is widely recognized that the research by Milton Friedman and Anna 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 not widely recognized, however, is that the data constructed, assembled, and analyzed by Friedman and Schwartz for that book went a long way towards altering their own thinking about economic policy. During the early 1940s and into the 1950s, both Friedman and Schwartz held Keynesian-type views about economic policy. The quantity-theory model gradually entered into Friedman's analysis but he nevertheless favored the use of fiscal policy to generate changes in the money supply with the aim of stabilizing output at full employment, and Schwartz's work was even more oriented along Keynesian lines, largely downplaying the role of monetary factors in the business cycle and in stabilization policy. By the time that Friedman first published his (soon-to-be) famous money-growth rule in 1958, the thinking of Friedman and Schwartz about stabilization policies had undergone a distinct change.

This paper analyses the reasons that led Friedman and Schwartz to change their policy views between the late-1940s and the time of Friedman's first public presentation in 1958 of a rule under which the money supply would annually grow within the range of 3 to 5 per cent.[2] The emphasis in what follows will be on Friedman's views since, unlike Schwartz, he made his views public as they evolved and set them down in unpublished memoranda.[3] Nonetheless, in the correspondence between the two authors during the 1950s, Schwartz concurred with Friedman's evolving positions.

Briefly to anticipate, the main findings are the following.

---

[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". Randall S. 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).

[2] The 3 to 5 per cent money-supply rule would become the key feature of the monetarist policy agenda of the 1960s and the 1970s.

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

- First, the decisive factor underpinning Friedman's switch to a money-growth rule was his 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.[4] 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 had begun seriously to consider the hypothesis that the Fed had initiated the Depression. The evolution of his thinking on a money-growth rule proceeded analogously: during 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 1958, he believed that he had confirmed both hypotheses about the Fed's damaging role in the Great Depression; at that time he also made public for the first time his money-growth rule, which aimed to limit the harm that could have been inflicted by discretionary monetary policy.

- Second, Clark Warburton, an empirical economist who spent his career at the Federal Deposit Insurance Corporation, appears to have played an important role in the transformation of Friedman's views. Heretofore, Warburton has been recognized as a pioneer monetarist, whose views, including those on the role of monetary forces in the Great Depression and on monetary rules, *anticipated* those of Friedman.[5] It has also been recognized that, beginning in the mid-1950s, Warburton commented on various drafts of *A Monetary History*.[6] Correspondence that we have uncovered suggests that Warburton had a direct influence on Friedman's views about the monetary origins of the Great Depression and, possibly, on monetary rules.

[4] The two sub-hypotheses that the Fed (i) initiated the Great Depression and (ii) deepened the Depression are together known as the Monetary Hypothesis of the Great Depression.

[5] See Humphrey (1971; 1973), Patinkin (1973), Bordo and Schwartz (1979), and Cargill (1979; 1981).

[6] See Friedman and Schwartz (1963, p. xxii).

- Third, 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 2 provides an overview of Friedman and Schwartz's respective policy views in the 1940s and early-1950s. Section 3 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 4 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 5 offers conclusions.

2. Early policy views

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 in turn, he argued, was via income taxation. The other ways of avoiding in inflation that he singled out 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, 1942). 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).

By the mid-1940s, Friedman already had begun to alter his views. In 1946, he joined the faculty at the University of Chicago.[7] In a University of Chicago Round Table radio discussion, "What Can Be Done About Inflation?" Friedman singled out what he referred to as "two pillars to the [inflation] problem". 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". (Friedman, Hart and Jacoby, 1946). 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.

Five years later in another statement before Congress on "The Failure of the Present Monetary Policy" he sounded much more like a quantity theorist. He 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, 1951a).

He did, however, continue to give fiscal policy a 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, 1951b). 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 three 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 fifty years of monthly data pertaining to a number of economic time series, including the money supply and its determinants, credit, real output, velocity (several

[7] See David Mitch (forthcoming) for an interesting discussion of the machinations surrounding Friedman's hiring at Chicago in 1946.

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.[8]

The origins and development of *A Monetary History* have been dealt with by Hammond (1996) and Rockoff (2006). 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 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 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

[8] This particular definition of money was chosen because of its close empirical relationship to income and other economic magnitudes. Nelson (2007) showed that Friedman's choice of a monetary aggregate would change in the 1980s.

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).[9]

The second has to do with the empirical approach that Friedman brought to bear on his work with Schwartz. Friedman in certain important respects was a Bayesian in his empirical approach. 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".[10]

In Friedman's view, scientific investigation was necessarily a sequential process, proceeding in successive approximations. Theory provided the initial starting point for empirical investigation, with its results then feeding back on theory and leading to its refinement. Such a process is evident in Friedman's work on consumption, on the Phillips Curve and in monetary economics and macroeconomics more generally. As James Heckman (2012) put it, Friedman's approach was one that "*distilled* wisdom from the data and learned from the data" [emphasis his].

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)

He preferred to look at the data from a variety of perspectives and take the weight of the evidence as a whole to see how well the data supported the hypothesis under

[9] 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).

[10] For discussions of Friedman's Bayesianism and of his empirical approach more generally see Pelloni (1987, 1996), Lothian (2009, 2016), and Dwyer (2016).

investigation. His emphasis on support of a hypothesis as opposed to failure to reject it is, as Dwyer (2016) has pointed out, also consistent with a Bayesian approach.

The true test, in Friedman's view, was replication using a different body of data. We see this in his work with Schwartz. He and Schwartz initially applied correlation analysis to a wide array of data to develop a first round of quantitative and qualitative evidence. This evidence in turn led to the formulation of broad hypotheses and informal testing based on data other than those used to derive the hypotheses.

2.1. 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 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 (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" (1948b, p. 145).[11] Friedman also believed that open-market operations are ineffective and should be abolished.

Second, to deal with what Friedman regarded as the "inherent instability" of a fractional-reserve banking system, he called for 100 per cent reserve requirements against all deposits. Here, he followed the proposal made during the 1930s by Henry Simons, his Chicago teacher, who had attributed the severity of the Great Depression to the inherent tendency during times of panic for people to move their assets from

[11] 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.

bank accounts to cash.[12] 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" (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" (1948c, p. 3).[13]

Following Simons, Friedman believed that the way to deal with the inherent instability of the banking structure was to require 100 per cent reserve holdings against all deposits, thereby severing the link between the conversion of deposits into cash and changes in the money supply. Under the Friedman, and earlier Simons' proposal, 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 per cent 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.

[12] 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; 2015) and Rockoff (2015).

[13] 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".

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 countercyclically -- 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).

2.2. 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).[14] The book was started and largely completed in the early-1940s,[15] 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 business cycle: "monetary phenomena can be most usefully regarded … as a reflection of more deep-seated movements. This is not to deny any autonomous

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

[15] 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.

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).

3. Warburton and Friedman

3.1. 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.*[16] Friedman and Schwartz, in fact, referred fifteen 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 had the capacity to undertake

[16] 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".

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 cent 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 output, which Warburton estimated to have been two per cent a year, and a secular decline in the velocity of circulation of money, which Warburton estimated to be 1.5 per cent annually, he concluded that a four to five per cent 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).

3.2. The 1951 Warburton-Friedman correspondence

The available Warburton-Friedman correspondence in 1951 runs from June 22 until October 19.[17] That correspondence consists of eight letters, five from Warburton and three from Friedman. The available correspondence makes it clear that several letters are missing. Nevertheless, what we have uncovered is sufficient to reconstruct the influence that Warburton had on Friedman's thinking about monetary issues.

The trigger for the correspondence was an article, "Commodity-Reserve Currency," by Friedman, published in June 1951. In that article, Friedman (1951c) reiterated his views about the desirability of controlling the money supply through the fiscal budget and the 100 per cent reserve proposal.[18] 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

[17] The letters are available in the Friedman Collection at the archives of the Hoover Institution at Stanford University.

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

> 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, 1951d).

Based on a letter sent from Warburton to Friedman dated July 18, 1951, it is clear that the latter had responded to Warburton's comments about what Friedman considered to be the "inherent instability" of a fractional-reserve banking system. Friedman evidently argued that currency is "high powered" because a shift from bank deposits into currency leads to a reduction in the quantity of money while a shift from currency into deposits leads to an increase in the quantity of money.[19] Warburton disagreed that such a result is inevitable under a fractional-reserve system that has a central bank. The monetary authorities, he believed, could take action to offset an increase in the currency-to-deposit ratio or in the ratio of reserves-to-deposits held by the banks, leaving the money supply unchanged. Warburton believed that, prior to the establishment of the Federal Reserve System in 1913; Friedman's argument would have been valid but that the Federal Reserve had been created precisely to avoid such an outcome. Warburton wrote:

> If the disturbing results of the old 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).

[19] In his letter to Friedman of July 18, 1951, Warburton began with "Your two letters reached me last night". Both of the Friedman letters in question are missing. The words "high powered" were used by Warburton in his letter of July 18, 1951, which responded to Friedman. High powered money is defined as bank reserves and currency held by the public.

Between July 18, 1951 and August 6, 1951, at least two other letters, which apparently dealt with substantive issues, were exchanged -- one from Friedman to Warburton and another from Warburton to Friedman; both of them, however, are missing.[20] In a missing letter to Friedman, Warburton evidently had attributed the onslaught of the Great Depression to the incompetence of the Fed officials while Friedman, in his reply, apparently argued that the reduction in the quantity of money during the Great Depression was, at least in part, the result of increases in the currency-deposit and reserve-deposit ratios as people shifted their holdings of money from deposits to currency and banks increased their holdings of reserves. This reconstruction of the missing correspondence is evidenced in a letter from Warburton, dated August 6, 1951.

> 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"[21] 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.[22] 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 per cent in gold

[20] A letter from Warburton to Friedman dated July 23, 1951 is available, but it does not deal with substantive issues.

[21] The quote is from Warburton's letter of August 6, 1951.

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

and additional collateral of 60 per cent 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.[23]

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: (1) "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, (2) "throughout 1930, 1931, and 1932 … the amount of member bank borrowings was from about one-fourth 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

[23] For a discussion of the "free-gold problem", see Friedman and Schwartz (1963, pp. 400-06).

of basic principles".[24] 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, 1951d).

The Great Depression. Friedman (1951d) 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 wrote 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. 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".[25]

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 made that rule public in 1958. In his letter of September 3, 1951, however, Friedman raised the possibility of a money-growth rule. What is not clear is whether he raised that possibility (i) in response to something that Warburton had written in an earlier, missing letter, or (ii) in response to Warburton's published writings advocating such a rule, or (iii) as an idea that Friedman had independently contemplated in his own thinking. Given that Friedman would not again raise the possibility of a money-growth rule for another five

[24] 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 one month had passed since Warburton's letter of August 6, 1951, that circumstance appears likely.

[25] 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. 404-05) 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."

years, and also given his familiarity with Warburton's published work, one of the former two possibilities appears likely.

In his letter of September 3, 1951, Friedman considered three alternative rules: (a) 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 per cent reserve requirements; (b) a rule retaining the fractional-reserve banking structure combined with keeping "the total quantity of money (or bank reserves) constant"; (c) a rule retaining the fractional-reserve banking structure combined with allowing the "total quantity of money [to be] growing at X per cent a year". Friedman believed that in contrast to alternative (b) and (c), alternative (a) 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 (a), Friedman believed, involved less discretion that the other two alternatives. To put alternative (b) and (c) on an equal footing with alternative (a), 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, 1951d).

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

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).

3.3. Discussion

The following points merit comment. First, Warburton appears to have convinced Friedman of the Federal Reserve's capacity and responsibility to offset contractions of the money supply produced by shifts from deposits into currency. At a minimum, Warburton reinforced any beliefs that Friedman may have held about the Federal Reserve's ability to offset decreases in the money supply produced by shifts from deposits into currency. Second, Warburton appears to have drawn Friedman's attention to the role of the Fed in deepening the Great Depression during the early-1930s. Third, 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).[26] 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). Fourth, in contrast to Warburton, Friedman favored monetary rules, not only to prevent the possibility of mistakes by incompetent officials, but also to prevent the possibility that Fed officials might become subjected

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

to political pressures. Consequently, a rule that involves "managers" in its implementation, such as a monetary growth rule, should be embedded in legislation.

4. The transformation

4.1. 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 per cent 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, and published in *Nationalekonomiska Föreningens;* (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[27] 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, 1951e, 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, 1951e, p. 2). What he wrote about the Great Depression is central to understanding the evolution of his thinking because it reflects his growing belief that discretionary

[27] 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.

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, 1951e, pp. 2-3). Friedman did not refer to the hypothesis that the Fed had initiated the Great Depression.

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".[28] The determinants of the three inflations that he assessed were the following: (a) "federal expenditures in each year as a fraction of national income"; (b) "the fraction of government expenditures financed through taxes"; (c) the increase in output in each war; (d) wage and price controls; and (e) the quantity of money per until of output (Friedman, 1952d, 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 -- to our knowledge for the first time -- 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).

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

[28] 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.

banking system to be a potent force in the business cycle. Three changes had occurred, he believed, since the early-1930s that strengthened the resiliency 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 in banks' balance sheets, which Friedman estimated to be about 15 per cent of banks' deposit liabilities in 1929, had risen to more than 50 per cent, which "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).[29]

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". The 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).[30] 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 worsening of the Great Depression: "From 1929 to 1931 the Reserve System was largely passive. It

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

[30] The Fed's tightening occurred after Britain's departure from the gold standard in September 1931.

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 to 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 money-supply series and the methods used to compile those components.[31] 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[32] 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: (1) "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"[33] (Friedman and Schwartz, 1956, Chapter 2, p. 4); (2) both indices of economic activity ranked the 1929-33 contraction as the most severe of the five major contractions; (3) 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; (4) between June 1929 -- the month of the cyclical peak in the *level*

[31] Chapter 1 was ten 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.

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

[33] 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."

of the money-supply series -- and March 1933 (the trough in the series), the *level* of the (monthly) money supply fell by 35.9 per cent, 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 per cent registered between June 1920 and July 1921;[34] and (5) based on two methods[35] 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 months 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 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

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

[35] The methods were "the step approach" and the "specific cycle method".

> 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 Freidman 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 output 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 statement to Congress's Joint Economic Committee.

1956: II. The unpublished 1956 document 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 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, 1956[b], p. 5). He considered his earlier proposal that the fiscal 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:[36]

> 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 per cent 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 per cent 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.

4.2. The 1958 public announcement and the Great Depression

It was left for Friedman to announce his money-growth rule publically. That announcement came in 1958 as part of his statement 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 will inevitably mean inflation;

[36] Tavlas (2015) claimed that Friedman first proposed his money growth rule in 1958.

> 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 (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" (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 statement 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. 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 (1958, p. 181, italics supplied).

Reflecting the NBER's protocol that enjoined researchers from expressing policy views in Bureau publications, Friedman and Schwartz do not advocate a money-growth rule in their *A Monetary History*. However, in one passage in that book, Friedman and Schwartz refer to the importance of such a rule indirectly. In this

connection, they point 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 conclude (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". [37]

4.3. 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 per cent reserve banking – the creation of the 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

[37] The credit for singling-out this passage belongs to Rockoff (2006).

against major mistakes differing in kind from those in the past … is well worth while" (Friedman, 1960, p. 94, italics supplied).

4.4. 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 of the NBER's policies about policy statements made by its staff. Many of her publications were co-authored with Friedman, but she also published papers in which she was the single author. In the latter papers, her policy views were entirely consistent with those of Friedman.[38] 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

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

behavior of interest rates" (Gayer, Rostow, and Schwartz, 1975, p. xiii).[39] 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).

5. 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.[40] Friedman asked, "What explains this contrast [in monetary-policy rules]?" (1967, p. 84). His answer was the following: "A few facts, which 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" (1967, p. 84). Friedman also contrasted his view on the 100 per cent reserves issue with that of Simons: While Simons considered 100 per cent 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.

[39] Schwartz 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.

[40] 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's proposal, under the Friedman rule the monetary authorities would not react to deviations of the observed inflation rate from the target inflation rate.

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 is 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.

The 100 per cent reserve proposal

- In the late-1940s Friedman favored 100 per cent 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 per cent 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 to 5 per cent in order to maintain a stable price level and to stabilize the economy. Open-market operations would be used to achieve and maintain that rate of growth of the money supply. Counter-cyclical 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 Chicago Workshop in Money and Banking during the 1950s[41], 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 drawing Friedman's attention to (a) the crucial part played by the Federal Reserve during the Great Depression, (b) the idea that a fractional-reserve banking system need not be "inherently unstable" since the monetary authorities can take countervailing measures to offset contractions in the money supply that result from flights into currency, and (c) the benefits of a rule based on the growth of the money supply.

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. Thomas Sowell (2012) addressing the question of how Friedman's views evolved during the course of his career got it right: "No one converted Milton Friedman, either in economics or in his views on social policy. His own research, analysis and experience converted him".

[41] See Friedman (1956c).

References

Bernanke, Ben. 2002. "Remarks at the Conference to Honor Milton Friedman". University of Chicago, November 8.

Bordo, Michael, and Hugh Rockoff. 2013. "Not Just the Great Contraction: Friedman and Schwartz's A Monetary History fo the United States 1867 to 1960". *American Economic Review* 103(5): 61-65.

Bordo, Michael, and Anna Schwartz. 1979. "Clark Warburton: Pioneer Monetarist". *Journal of Monetary Economics* 5(1): 43-65.

Cargill, Thomas. 1979. "Clark Warburton and the Development of Monetarism since the Great Depression". *History of Political Economy* 11(3): 425-49.

_____. 1981. "A Tribute to Clark Warburton, 1896-1979: Note". *Journal of Money, Credit and Banking* 13(1): 89-93.

Dwyer, Gerald P. 2016. "Milton Friedman: A Bayesian?" in Robert A. Cord and J. Daniel Hammond, eds. *Milton Friedman: Contributions to Economics and Public Policy*, Oxford: Oxford University Press, 2016, forthcoming.

Ebenstein, Lanny. 2007. Milton Friedman: A Biography. New York: Palgrave Macmillan.

Friedman, Milton 1942. "Statement by Milton Friedman before the Ways and Means Committee of the House of Representatives, May 7, 1942".

_____. 1948a. Letter to Anna Schwartz. April 22.

_____. 1948b. "A Monetary and Fiscal Framework for Economic Stability". *The American Economic Review* 38(3): 245-64. Reprinted in M. Friedman (ed.) *Essays in Positive Economics* (1953). Chicago: University of Chicago Press: 133-56.

_____. 1948c. "Preliminary Plan for Completion of Data for Study of Monetary Factors in Business Cycles". Unpublished manuscript.

_____. 1951a. “The Failure of the Present Monetary Policy” Congressional Record, 97, pt. 2: 1481-2 82nd Congress, 1st Session, 1951.

_____. 1951b. Review of Economics and Statistics. 33, (3): 186-91.

_____. 1951c. “Commodity Reserve Currency” *The Journal of Political Economy* 59(3): 203-232. Reprinted in *Essays in Positive Economics,* edited by Milton Friedman, 204-50. Chicago: University of Chicago Press.

_____. 1951d. Letter to Clark Warburton. September 3.

_____. 1951e. “The Role of the Monetary and Banking System in the Business Cycle”. Unpublished manuscript.

_____. 1952. “Price, Income and Monetary Changes in Three Wartime Periods”. *American Economic Review* 42(2): 612-25. Reprinted in *The Optimum Quantity of Money and Other Essays,* edited by Milton Friedman, 158-87. Chicago: University of Chicago Press, 1969.

_____. 1954. “Why the American Economy is Depression Proof”. *Nationalekonomiska Föreningens,* April 28.

_____. 1956a. Letter to Anna Schwartz. August 12.

_____. 1956b. “Monetary Policy, Domestic and International”. Unpublished lecture delivered at Wabash Universtiy on June 19.

_____. 1956c. *Studies in the Quantity Thoery of Money.* Chicago: University of Chicago Press.

_____. 1958. “The Supply of Money and Chcanges in Prices and Output”. In *The Relationship of Prices to Economic Stability and Growth,* 85th Congress, 2nd Session, Joint Economic Committee. Washington DC: U.S. Printing Office. Reprinted in *The Optimum Quantity of Money and Other Essays,* edited by Milton Friedman, 171-82. Chicago: University of Chicago Press, 1969.

_____. 1960. *A Program for Monetary Stability.* Chicago: University of Chicago Press.

_____. 1967. “The Monetary Theory and Policy of Henry Simons”. *Journal of Law and Economics* 10(1): 1-13. Reprinted in *The Optimum Quantity of Money and Other Essays*, edited by Milton Friedman, 111-39. Chicago: University of Chicago Press, 1969.

Friedman, Milton and Rose Friedman. 1998. *Two Lucky People*. Chicago: University of Chicago Press.

Friedman, Milton, Albert G. Hart and Neil Jacoby. 1946. “What Can Be Done About Inflation?”. Unpublished transcript of University of Chicago Round Table radio discussion,

Friedman, Milton, and Anna Schwartz. 1956. Draft Chapters, “The Estimates” and “Cyclical Behavior”, April.

_____. 1963. *A Monetary History of the United States, 1867-1960.* Princeton, NJ: Princeton University Press.

_____. 1970. *Monetary Statistics of the United States: Estimates,* Sources, Methods. New York: Columbia University Press for the NBER.

Gayer, Arthur, W. W. Rostow and Anna Schwartz. 1953. *The Growth and Fluctuations of the British Economy 1790-1850,* 1st edition (in two volumes). Oxford: The Clarendon Press.

_____. 1975. *The Growth and Fluctuations of the British Economy 1790-1850,* 2nd edition (in two volumes). New York: Barnes and Noble.

Goldenweiser, Emmanuel. 1951. *American Monetary Policy*. New York: McGrew Hill.

Hammond, Daniel. 1996. *Theory and Measurement: Causality Issues in Milton Friedman’s Monetary Economics*. Cambridge, U.K.: Cambridge University Press.

Heckman, James. 2012, “The Power of Ideas: Milton Friedman's Empirical Methodology”. Revised unpublished notes to a talk delvered at the conference “Milton Friedman and the Power of Ideas: Celebrating the Friedman Centennial”,

Becker Friedman Institute, November 12, 2012.

Humphrey, Thomas. 1971. "Role of Non-Chicago Economists in the Evolution of the Quantity Theory in America". *Southern Economic Journal* 38(1): 12-18.

_____. 1973. "On the Monetary Economics of Chicagoans and Non-Chicagoans: Reply". *Southern Economic Journal* 39: 460-63.

Kroszner, Randall S. 2010. Implications of the Financial Crisis for the Grand Challenge Questions for the NSF/SBE. Washington, DC: National Science Foundation.
<http://www.nsf.gov/sbe/sbe_2020/2020_pdfs/Kroszner_Randall_304.pdf>.

Lothian, James R. 2009. "Milton Friedman's Monetary Economics and the Quantity-Theory Tradition", *Journal of International Money and Finance* 28 (7): 1086-1096.

_____. 2016. "Milton Friedman's Monetary Economics: Theory and Empirics". In Robert A. Cord and J. Daniel Hammond, eds. *Milton Friedman: Contributions to Economics and Public Policy*, Oxford: Oxford University Press, 2016, forthcoming.

Lucas, Robert E. Jr. 1994. "Review of Milton Friedman and Anna Schwartz's *A Monetary History of the United States, 1867-1960"*. *Journal of Monetary Economics* 34(1): 5-16.

Mitch, David. "A Year of Transition: Faculty Recruiting at Chicago in 1946". *Journal of Political Economy*, forthcoming.

Nelson, Ed. 2004. "An Interview with Anna J. Schwartz". *Macroeconomic Dynamics* 8(3): 395-419.

_____. 2007. "Milton Friedman and U.S. Monetary History: 1961–2006". *Federal Reserve Bank of St. Louis Review* 89: 153–82.

Patinkin, Don. 1973. "On the Monetary Economics of Chicagoans and Non-Chicagoans: Comment". *Southern Economic Journal* 39(3): 454-59.

_____. 1979. “Keynes and Chicago”. *Journal of Law and Economics* 22: 213–32. Reprinted in *Keynes, Chicago and Friedman*, edited by Robert Lesson, pp. 371–92, London: Pickering and Chatto, 2003.

Pelloni, Gianluigi. 1987. “A Note on Friedman and the Neo-Bayesian Approach”. *Manchester School*. 55 (4): 407-18.

Pelloni, Gianluigi. 1996. “De Finetti, Friedman, and the Methodology of Positive Economics”. *Journal of Econometrics* 75 (1): 33-50.

Rockoff, Hugh. 2006. “On the Origins of *A Monetary History*”. NBER Working Paper.

_____. 2015. “Henry Simons and the Quantity Theory of Money”. Paper presented at the conference on *The Legacy of Chicago Economics*, University of Chicago, October 5.

Schwartz, Anna 1948a. Letter to Milton Friedman. April 5.

_____. 1948b. Letter to Milton Friedman. May 12.

_____. 1969. “ Why Money Matters”. *Lloyds Bank Review.*

_____. 1981. “Undertanding 1929-33”. In *The Great Depression revisited,* edited by Karl Brunner, 5-48. Boston: Martinus Nijhoff Publishing.

Simons, Henry. 1942. “Hansen on Fiscal Policy”. *Journal of Political Economy* 50(2):161-96. Reprinted in *Economic Policy for a Free Society,* edited by Henry Simons, 184-219. Chicago: University of Chicago Press.

Sowell Thomas. 2012. “Milton Friedman's Centenary”. *RealClearPolitics* July 31, 2012. http://www.realclearpolitics.com/articles/2012/07/31/milton_friedmans_centenary_114960.html#ixzz441T46KT4

Tavlas, George. 1997. “Chicago, Harvard, and the Doctrinal Foundations of Monetary Economics”. *Journal of Political Economy* 105(1): 153-77.

_____. 2011. “Two Who Called the Great Depression: An Initial Formulation of the

Monetary-Origins View". *Journal of Money, Credit and Banking* 43(3): 565-574.

_____. 2015. "In Old Chicago: Simons, Friedman and the Development of Monetary-Policy Rules". *Journal of Money, Credit and Banking* 47(1): 99–121.

Warburton, Clark. 1949. "The Secular Trend in Monetary Velocity". *Quarterly Journal of Economics* 63(1): 68-91.

_____. 1950. "Monetary Thoery and the Price Level in the Future". *Five Monographs on Business Income.* Study Group on Business Income. New York: American Institute of Accountants: 161-93.

_____. 1951a. Letter to Milton Friedman. June 22.

_____. 1951b. Letter to Milton Friedman. July 18.

_____. 1951c. Letter to Milton Friedman. August 6.

Yohe, William. 1982. "The Mysterious Career of Walter W. Stewart, Especially 1922–1930". *History of Political Economy* 14(4): 583-607.

BANK OF GREECE WORKING PAPERS

185. Adam, A., and T., Moutos, "Industry-Level Labour Demand Elasticities Across the Eurozone: Will There Be Any Gain After the Pain of Internal Devaluation?" July, 2014.

186. Tagkalakis, O.A., "Fiscal Policy, Net Exports, and the Sectoral Composition of Output in Greece", September 2014.

187. Hondroyiannis, G. and D., Papaoikonomou, "When Does it Pay To Tax? Evidence from State-Dependent Fiscal Multipliers in the Euro Area", October 2014.

188. Charalambakis, C. E., "On Corporate Financial Distress Prediction: What Can we Learn From Private Firms in a Small Open Economy?, November 2014.

189. Pagratis, S., E., Karakatsani and E. Louri, "Bank Leverage and Return on Equity Targeting: Intrinsic Procyclicality of Short-Term Choices", November 2014.

190. Evgenidis, A. and C., Siriopoulos, "What are the International Channels Through Which a US Policy Shock is Transmitted to the World Economies? Evidence from a Time Varying Favar", January 2015.

191. Louzis, D. P., and A.T., Vouldis, "Profitability in the Greek Banking System: a Dual Investigation of Net Interest and Non-Interest Income", February 2015.

192. Papaspyrou, S.T, "EMU 2.0 - Drawing Lessons From the Crisis - a New Framework For Stability and Growth", March 2014.

193. Litina, A and T, Palivos, "Corruption and Tax Evasion: Reflections on Greek Tragedy", June 2015.

194. Balfoussia, H. and H.D. Gibson, "Financial Conditions and Economic Activity: The Potential Impact of the Targeted Longer-Term Refinancing Operations (TLTROS)", July 2015.

195. Louzis, P. D., "Steady-State Priors and Bayesian Variable Selection in VAR Forecasting", July 2015.

196. Zografakis, S. and A., Sarris, "The Distributional Consequences of the Stabilization and Adjustment Policies in Greece During the Crisis, with the Use of A Multisectoral Computable General Equilibrium Model", August 2015.

197. Papageorgiou, D. and E. Vourvachaki, "The Macroeconomic Impact of Structural Reforms in Product and Labour Markets: Trade-Offs and Complementarities", October 2015.

198. Louri, H., and P. M. Migiakis, "Determinants of Euro-Area Bank Lending Margins: Financial Fragmentation and ECB Policies", October 2015.

199. Gibson, D. H, S.G. Hall, and G. S. Tavlas, "The effectiveness of the ECB's asset purchase programs of 2009 to 2012", November 2015.

200. Balfoussia, H and D. Malliaropulos, "Credit-less recoveries: the role of investment-savings imbalances", November 2015.

201. Kalyvitis, S., "Who Exports High-Quality Products? Some Empirical Regularities From Greek Exporting Firms", December 2015.

202. Papadopoulos, S., P. Stavroulias and T. Sager, "Systemic Early Warning Systems for EU15 Based on the 2008 Crisis", January 2016.

203. Papadopoulos, G., S. Papadopoulos and T. Sager, "Credit Risk Stress Testing for EU15 Banks: a Model Combination Approach", January 2016.

204. Louzis, P. D., "Macroeconomic Forecasting and Structural Changes in Steady States", March 2016.

205. Christodoulakis, N. and C. Axioglou, "Underinvestment and Unemployment: the Double Hazard in the Euro Area", April 2016.

206. Bardaka, C. I., "Structural and Cyclical Factors of Greece's Current Account Balances: A Note", May 2016.