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FRIEDMAN'S PRESIDENTIAL ADDRESS IN THE EVOLUTION OF MACROECONOMIC
THOUGHT

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Working Paper 24043
<http://www.nber.org/papers/w24043>

NATIONAL BUREAU OF ECONOMIC RESEARCH
1050 Massachusetts Avenue
Cambridge, MA 02138
November 2017

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Friedman's Presidential Address in the Evolution of Macroeconomic Thought
N. Gregory Mankiw and Ricardo Reis
NBER Working Paper No. 24043
November 2017
JEL No. E5

ABSTRACT

This essay discusses the role of Milton Friedman's presidential address to the American Economic Association, which was given a half century ago and helped set the stage for modern macroeconomics. We discuss where macroeconomics was before the address, what insights Friedman offered, where researchers and central bankers stand today on these issues, and (most speculatively) where we may be heading in the future.

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Presidential addresses to the American Economic Association are always notable events. They are given by scholars of great repute who, by virtue of their office, are being honored by the broad economics profession. The talks are attended by large crowds at the annual AEA meeting. They are prominently published as the lead article in an issue of the *American Economic Review*, one of the discipline's most widely read journals. It is no surprise, therefore, that these addresses often play a significant part in the evolution of the field.

Milton Friedman's presidential address, "The Role of Monetary Policy," which was delivered 50 years ago in December 1967 and published in the March 1968 issue of the *American Economic Review*, is nonetheless unusual in the outsized role it has played. Citation counts offer one measure of its influence. As of this writing, the article has been cited more than 7,500 times according to Google Scholar, making it the third most-cited presidential address in AEA history, beaten only by the addresses of Simon Kuznets on "Economic Growth and Income Inequality" (delivered in 1954, published in 1955) and Theodore Schultz on "Investment in Human Capital" (delivered in 1960, published in 1961). Friedman's address is cited less than his 1962 book *Capitalism and Freedom* and less than a brief essay he wrote in *The New York Times Magazine* in 1970, "The Social Responsibility of Business Is to Increase Its Profits." But the citation count for Friedman's presidential address is roughly on par with the 1963 *A Monetary History of the United States* by Friedman and Anna Schwartz. Aside from these, it is cited more often than anything else Friedman wrote during his long, prolific, and influential career.

What explains the huge influence of this work, merely 17 pages in length? One factor is that Friedman addresses an important topic. Another is that it is written in simple, clear prose, making it an ideal addition to the reading lists of many courses. But these same points can be made for many other AEA presidential addresses. What distinguishes Friedman's address is that

it invites readers to fundamentally reorient their thinking. It was an invitation that, after hearing the arguments, many readers chose to accept. Indeed, it is no exaggeration to view Friedman's 1967 AEA presidential address as marking a turning point in the history of macroeconomic research.

Our goal here is to assess this contribution, with the benefit of a half century of hindsight. We discuss where macroeconomics was before the address, what insights Friedman offered, where researchers and central bankers stand today on these issues, and (most speculatively) where we may be heading in the future. We focus on the presidential address alone, putting aside Friedman's many other contributions (see Nelson 2017).

Macroeconomics before the Address

Let's start by setting the stage. When Friedman gave his address in 1967, one author of the present essay was in grade school and the other was not yet born, so neither of us can claim first-hand experience. But using the historical record, only a little imagination is needed to get a sense of what was occupying the thoughts of most macroeconomists as Friedman walked to the podium.

There seems little doubt that the focal event for macroeconomists of that era was still the Great Depression of the 1930s. By the late 1960s the Depression, rather than being a recent event, had started to fade into history. (To put it in perspective, the Depression was then about as current as the presidency of Ronald Reagan is today.) But many of the macroeconomists listening to Friedman, especially the more senior ones, had lived through this historic downturn, and it was often the motivating event of their professional lives.

That was surely true for Friedman. In his contribution to the wonderful collection *Lives of Laureates* (edited by Breit and Hirsch 2004), Friedman wrote (pp. 69-70),

“I graduated from college in 1932, when the United States was at the bottom of the deepest depression in its history before or since. The dominant problem of the time was economics. How to get out of the depression? How to reduce unemployment? What explained the paradox of great need on the one hand and unused resources on the other? Under the circumstances, becoming an economist seemed more relevant to the burning issues of the day than becoming an applied mathematician or an actuary.”

Today, we can say with confidence that the world is a better place for Milton Friedman having forgone the opportunity to become an actuary!

In the decades after Friedman graduated from college, economists slowly developed an understanding of how to view fluctuations. That understanding was founded on John Maynard Keynes’s landmark book *The General Theory of Employment, Interest and Money*. Keynes’s vision was clarified and simplified—some would say oversimplified—in the work of Hicks (1937) and Hansen (1953). Their IS-LM model provided the benchmark theory for explaining how insufficient aggregate demand led to economic downturns, as well as how monetary and fiscal policy could combat those downturns. It also provided the starting point for larger econometric models used for forecasting and policy analysis, such as the Federal Reserve’s MPS model, work on which began in 1966 under the leadership of Franco Modigliani, Albert Ando, and Frank de Leeuw. The name MPS is derived from MIT, University of Pennsylvania, and Social Science Research Council (Brayton, Levin, Tryon, and Williams 1997).

The IS-LM model takes the price level as given, which is perhaps a reasonable assumption in the shortest of short runs, but the economists of that era were also concerned about the forces that led the price level to change over time. One important reference is the 1960 paper by Paul Samuelson and Robert Solow, “Analytical Aspects of Anti-Inflation Policy.” Samuelson and Solow discuss the many forces that influence inflation, emphasizing the difficulty of identifying whether any rise in inflation is driven by an increase in costs or an increase in demand. Yet their essay is best remembered for its emphasis on the Phillips curve as a useful addition to the macroeconomist’s toolbox. Friedman does not cite this paper in his presidential address, but it is nonetheless representative of the worldview which many mainstream macroeconomists had adopted and to which Friedman was responding.

Samuelson and Solow (1960, p. 192) presented the Phillips curve as “the menu of choice between different degrees of unemployment and price stability.” While the idea of such a menu was their main thrust, they recognized the possibility that it might not be stable over time. In particular, they discussed various ways in which a low-pressure economy—one with low inflation and high unemployment—might shift the Phillips curve over time. On the one hand, “it might be that the low-pressure demand would so act upon wage and other expectations as to shift the curve downward in the longer run.” (p. 193) On the other hand, a “low-pressure economy might build up within itself over the years larger and larger amounts of structural unemployment,” resulting in “an upward shift of our menu of choice.” (p. 193) Thus, Samuelson and Solow anticipated what would later be known as the expectation-augmented Phillips curve and hysteresis effects (the possibility of long-lasting increases in unemployment after a recession). But these effects were considered caveats to their main analysis, rather than central to

it. For most readers of their paper, the main take-away was the Phillips curve as a menu of outcomes available to policymakers, both in the short run and in the long run.

The Key Insights

Enter Milton Friedman's AEA presidential address in December 1967, only a few years after he and Anna Schwartz had published their *Monetary History*. Though written by someone who had immersed himself in monetary history, he did not use this opportunity to review the historical record. Instead, the address is largely a work of monetary theory, aimed at providing a big picture view of the potential and limits of monetary policy. It is worth noting that Friedman's perspective echoes certain ideas presented, roughly concurrently, by Edmund Phelps (1967, 1968). It is unclear to us whether Friedman was aware of Phelps's work in this area or, more likely in light of the fact that neither cited the other, whether these two great scholars were led in the same direction by the intellectual climate of the time.

One major theme of Friedman's (1968) address is its focus on the behavior of the economy in the long run. Samuelson and Solow (1960) seemed to view the long run as merely the consequence of a series of Keynesian short runs. In contrast, Friedman viewed the long run as the time frame under which we should apply the principles of classical economics, especially monetary neutrality. Regardless of what the central bank did, unemployment would over time approach its natural rate, which he defined (p. 8) as "the level that would be ground out by the Walrasian system of general equilibrium equations, provided there is imbedded in them the actual structural characteristics of labor and commodity markets, including market imperfections, stochastic variability in demands and supplies, the cost of gathering information about job

vacancies and labor availability, the costs of mobility, and so on.” This understanding of how the economy worked in the long run provided the basis for, and restrictions on, how we tried to understand the behavior of the economy in the short run.

A second and related major theme of Friedman’s (1968) address is its focus on expectations. As noted, Samuelson and Solow (1960) had previously mentioned the role of expectations, and they understood that it might distinguish the short run from the long run. But this was not their main concern, and they attached no particular significance to whether actual and expected inflation are the same. By contrast, for Friedman, expectations were the key to explaining how the economy might appear to face a Phillips curve tradeoff and how that tradeoff would disappear if we tried to exploit it. He wrote (p. 11) that “there is always a temporary tradeoff between inflation and unemployment; there is no permanent tradeoff. The temporary tradeoff comes not from inflation per se, but from unanticipated inflation, which generally means, from a rising rate of inflation.” The deviation of reality from expectations was what permitted the economy to depart from its classical benchmark. But because over time people catch on to what is happening, expectations and reality must eventually come into line, ensuring that these departures are only transitory.

Friedman’s focus on the long run and his emphasis on expectations are closely connected. In some macroeconomic models, the long run is the time horizon over which nominal wages and prices can overcome their short-run stickiness, allowing the economy to return to its classical equilibrium. Friedman, instead, viewed the long run as the time horizon over which people become better informed and so their expectations align with reality.

By bringing expectations to the center of the story, Friedman’s address helped to usher in the rational expectations revolution that followed. Influential articles in the 1970s by Lucas

(1972), Sargent and Wallace (1975), and Barro (1977) were built on the conceptual foundation that Friedman had put in place. Nonetheless, it is worth noting that Friedman gave no hint that he thought expectations were as rational as these later authors would assume. Indeed, his emphasis on unanticipated inflation, along with his judgment that it took “something like two to five years” (p. 11) for the real effects to dissipate, suggests that he thought expectations were slow to adapt to changes in the policy environment. While it is possible that he had some other propagation mechanism in mind to explain these persistent effects, the address is most naturally read through the lens of old-fashioned adaptive expectations. From a modern perspective, Friedman’s assumption that expectations are sluggish rather than rational seems prescient. As we will discuss shortly, recent research on how people form expectations has moved in this direction.

Implications for Monetary Policy

Using these themes of the classical long run and the centrality of expectations, Friedman takes on policy questions with a simple bifurcation: what monetary policy cannot do and what monetary policy can do. It is a division that remains useful today (even though, as we discuss later, modern macroeconomists might include different items on each list).

Friedman begins with what monetary policy cannot do. He emphasizes that, except in the short run, the central bank cannot peg either interest rates or the unemployment rate. The argument regarding the unemployment rate is that the tradeoff described by the Phillips curve is transitory, unemployment must eventually return to its natural rate, and so any attempt by the central bank to achieve otherwise will put inflation into an unstable spiral. The argument

regarding interest rates is similar: Because we can never know with much precision what the natural rate of interest is, any attempt to peg interest rates will also likely lead to inflation getting out of control. From a modern perspective, it is noteworthy that Friedman does not consider the possibility of feedback rules for interest rates, which today we call “Taylor rules” (Taylor 1993).

When Friedman turns to what monetary policy can do, he says (p. 12) that the “first and most important lesson” is that “monetary policy can prevent money itself from being a major source of economic disturbance.” Here we see the profound influence of his work with Anna Schwartz, especially their *Monetary History of the United States*. From their perspective, history is replete with examples of erroneous central bank actions and their consequences. The severity of the Great Depression is a case in point.

It is significant that, while Friedman is often portrayed as an advocate for passive monetary policy, he is not dogmatic on this point. He notes that “monetary policy can contribute to offsetting major disturbances in the economic system arising from other sources” (p. 14). Fiscal policy, in particular, is mentioned as one of these other disturbances. Yet he cautions that this activist role should not be taken too far, in light of our limited ability to recognize shocks and gauge their magnitude in a timely fashion.

The final section of Friedman’s presidential address concerns the conduct of monetary policy. He argues that the primary focus should be on something the central bank can control in the long run, that is, a nominal variable. He considers the nominal exchange rate, the price level, and monetary aggregates. He says that the exchange rate is not sufficiently important, given the small role of trade in the US economy. While the price level is the most important of these variables, he argues that the link between central bank actions and the price level is too long and

unpredictable for the price level to serve as a useful policy target. He concludes that steady growth in some monetary aggregate is the best starting point for policy.

This last recommendation may be the part of Friedman's analysis with which macroeconomists today would most strongly disagree (see Hetzel, 2017, for an exception). The economy is subject to many types of shocks, such as oil price changes, financial crises, and shifting animal spirits of investors. In many cases, simply keeping a monetary aggregate on a steady path seems an insufficient response to macroeconomic distress. Moreover, in a world with an increasingly complex array of financial instruments, determining an appropriate measure of the quantity of money to target is difficult and perhaps insuperable. As a result, over the past few decades, the ratio of nominal income to many measures of money (what is called velocity) has been unstable, convincing most economists and policymakers that targeting money would lead to large fluctuations in prices and incomes.

The Current State of Play

The Great Recession that followed the financial crisis of 2007-08 may become the defining moment for a new generation of macroeconomists, just as the Great Depression was for Milton Friedman's generation. The initial contraction in production and the turmoil in financial markets were as serious as those in 1929. Like classical economics in the 1930s, which had been criticized for not explaining why so many people who wanted a job could not find one, modern economics was criticized for not forecasting the crash. In a visit to the London School of Economics, the Queen of England famously asked (as reported in Pierce 2008): "Why did nobody notice it?" Macroeconomics responded, and researchers have been fervently at work

modeling banks and financial markets, using microeconomic data to better calibrate and estimate models, and studying unconventional monetary policies. The current state of play is not the same as it was ten years ago.

It is a testament to the reach of Friedman's (1968) presidential address that its two main themes—the use of the long-run time frame and the centrality of expectations—remain integral to macroeconomics and have not been greatly affected by the crisis. Most classes in macroeconomics for more than two decades have started with the long run, as many graduate and undergraduate textbooks will testify. Students first learn about the Solow (or Ramsey) models for the evolution of real variables and then use the classical dichotomy and the Fisher equation for interest rates to discuss nominal variables. To be sure, there is greater heterogeneity across institutions and teachers about what models are introduced next. But the starting point, just as in Friedman's address, is almost always a long-run classical benchmark. Keynes (1923) famously wrote: "The long run is a misleading guide to current affairs. In the long run we are all dead." But Friedman won the discussion about the relevance of the long run to current decisions, and economists today work through death before trying to make sense of life.

When Friedman wrote his address, most students organized their thoughts about business cycles using the IS-LM model. This model gives at best a secondary role to expectations. While early Keynesians sometimes emphasized the animal spirits of investors, these were taken to reflect irrational exogenous sentiments rather than purposeful forward-looking behavior. This is far from the reality of modern macroeconomics. Almost all macroeconomic analyses now emphasize intertemporal tradeoffs, so the beliefs of economic agents about the future have become a crucial part of the story. Expectations remain at the forefront of macroeconomic analysis, just as Friedman advised.

In particular, modern theories of price dynamics give expected inflation a key role, and in doing so, they embed Friedman's hypothesis that unemployment eventually returns to its natural rate, regardless of the policies pursued by the central bank. To be sure, some researchers have questioned this hypothesis and proposed theories of hysteresis, under which monetary policy can have real effects in the long run. But these arguments are the exception rather than the rule. For most macroeconomists, the natural-rate hypothesis remains the touchstone.

At the same time, the current state of play is also quite different from either the adaptive expectations that Friedman seemed to use or the rational expectations that were at the center of research in the 1970s. With rational expectations, there is, as Sargent (2008) noted, a "communism of beliefs": All economic agents believe the same thing, because they perfectly observe all the same variables and use the exact same model to combine them. This model is the one given to them by the omniscient model-builder. Economic theorists initially embraced this assumption because it offered them an elegant, model-consistent way to treat expectations. However, for several decades now, as expectations have become central not only to policy but also to research in economics, the rationality of expectations, as conventionally defined, is often called into question. It is common today to sit through seminars in macroeconomics and see presenters assume that the economic agents only imperfectly or infrequently observe some variables, or have limited attention, or learn according to a least-squares formula, or apply other heuristics that are behaviorally founded. Few in the audience wince at seeing these alternatives. Much like the long run, rational expectations may still be the starting point in the classroom, but years of research have produced more nuanced models of how people look into the future.

Expectations are now also central in empirical work. With Justin Wolfers, the two of us made the point long ago that progress in studying expectations required that economists look at

micro data from surveys (Mankiw, Reis, and Wolfers 2004). There is a rich amount of panel data reporting people's survey answers to what they expect about numerous variables. While researchers had long looked at the average of these expectations, we emphasized that one should also examine disagreement across people and how it evolves over time. Moreover, researchers can see how individual characteristics, like age or income, might affect the accuracy of these expectations and how often they are updated. In the study of inflation dynamics, many active researchers are using these data to study which of the alternatives to rational expectations should supplant it as the benchmark (for example, Coibion and Gorodnichenko 2012, Malmendier and Nagel 2015, Andrade, Crump, Eusepi, and Moench 2016). There is not yet a consensus about which theory of expectations is most useful, but there is no doubt that expectations data are more central than ever in macroeconomics today, just as Friedman suggested they should be.

Friedman's analysis of macroeconomic fluctuations from the perspective of a Phillips curve that is anchored by the long run is also alive and well. In fact, the last decade has provided a new application of Friedman's logic. Friedman predicted that the Phillips curve that had appeared in the data throughout the 1950s and 1960s would break down if policymakers followed Samuelson and Solow's (1960) advice and started exploiting it. The stagflation of the 1970s, when both inflation and unemployment rose, is one of the greatest successes of out-of-sample forecasting by a macroeconomist. Soon after, macroeconomists could be split into camps of "freshwater" and "saltwater" varieties, in Hall's (1976) famous characterization, depending on the extent to which their theories were anchored by the tenets of classical economics. Yet, by the start of this century, macroeconomists had again converged on a view of the tradeoff facing central banks that merged the short-run insights from New Keynesian economics summarized in Mankiw and Romer (1991) and the long-run properties of the dynamic general equilibrium

models of Kydland and Prescott (1982), as Blanchard (2009) described. In honor of the neoclassical synthesis of Samuelson and Solow, Goodfriend and King (1997) labeled this approach the New Neoclassical Synthesis. From this perspective, Friedman's address can be viewed as a starting point for dynamic stochastic general equilibrium (DSGE) models (though Friedman might well have looked askance at some aspects of DSGE methodology).

At the heart of this new synthesis was a Phillips curve built on the work of Taylor and Calvo (discussed in Taylor 2016). Firms were assumed to set prices equal to the average of their expected future marginal costs, but to alter prices in an infrequent and staggered way. From the start, however, researchers saw flaws in this Phillips curve. Ball (1994) provided a pointed critique of its use for policymaking: He showed that the model predicted that times of announced disinflation should be times of economic expansion, which was almost never true in reality. Because the firms that are adjusting their prices today respond strongly to future expected events, inflation in the model can jump without any of the inertia observed in the data.

Models in the early 2000s attempted to remedy these problems by assuming that firms partially indexed their prices to lagged inflation. This approach introduced inflation inertia by sheer assumption. Smets and Wouters (2007) found that this model could fit the US data for the previous four decades reasonably well. Yet the empirical success of their model could end up sharing the same fate as that of Samuelson and Solow (1960). Just as Milton Friedman had done before, some researchers suggested that given its shaky foundations, this new Phillips curve was bound to break down, as soon as there was a large shock or a change in policy regime. In Ball, Mankiw, and Reis (2005), we pointed to "the sorry state of monetary policy analysis" and echoed Friedman in writing that "it is imperative that expectations be allowed to adjust to the new regime." The most recent decade of data has provided yet another vindication for Milton

Friedman's arguments, as the slope and location of the Phillips curve again shifted, invalidating previous estimates (Coibion and Gorodnichenko 2015, Blanchard 2016).

The Role of Monetary Policy Today

Modern macroeconomics is further from Friedman's views regarding what monetary policy cannot, can, and should do. The belief that, in the long run, the central bank can do little about real variables is still canon for most macroeconomists, and few would suggest that monetary policy should have targets for labor force participation, inequality, or the long-term real interest rate. Yet, it is not uncommon today to hear central bankers pontificate in speeches about such issues. Friedman's example that a speech or article about monetary policy should spend almost as much space on what the central bank cannot do, as it does on what it can do, has eroded over time.

While Friedman favored targeting the growth rate of a monetary aggregate, macroeconomists have for the last two decades instead embraced targets for inflation given to independent central banks (Svensson 2010). The major central banks in the developed economies of the world today all share not just a target for inflation but even a specific number, namely 2 percent, differing only in how strictly and quickly they strive to achieve it. Friedman worried that it would be hard to hit any target for prices, yet the track record so far has been quite successful, with annual inflation almost never straying from the band between 0 and 4 percent. For the central bank with the strictest target, the European Central Bank, the price level at the end of 2016 was 38 percent higher than it had been at the end of 1998, when the ECB started operations. An exact target of 2 percent per year would have predicted a 42 percent increase. The

annualized deviation from target averages a mere 0.2 percent over this 18-year period for the ECB, a success that Friedman was skeptical could be achieved.

Modern macroeconomics also focuses more on the nominal interest rate than on monetary aggregates, both as an instrument for policy and as a guide to the state of the economy. Friedman's presidential address discussed Knut Wicksell's concept of a natural rate of interest but dismissed it as a good guide for policy. Today and for many years now, Friedman has lost this argument to Woodford (2003), who convinced academics and central bankers to embrace the Wicksellian use of interest rates as the main policy tool and their deviation from natural rates as the key policy target. The central bank directly controls one interest rate, and the effect of its actions on other interest rates is measured more reliably than the effect on money. Moreover, there is a clear link from interest rates to the price of credit and to the willingness of people to save or borrow. In the FAQ section of its website (at https://www.federalreserve.gov/faqs/money_12845.htm), the Federal Reserve unequivocally states that "the importance of the money supply as a guide for the conduct of monetary policy in the United States has diminished over time."

Friedman recommended strict rules to guide monetary policy because he thought that deviating from such rules added noise into the system, leading to inefficient fluctuations in inflation and the real economy. Many modern macroeconomists seem to agree, given the paucity of academic or applied arguments in defense of purely discretionary choices by central bankers. Kehoe and Chari (2006), summarizing in this journal the modern study of commitment and the potential time inconsistency of discretionary policy, emphatically wrote: "The message of examples like these is that discretionary policy making has only costs and no benefits, so that if government policymakers can be made to commit to a policy rule, society should make them do

so.” At the same time, almost no central bank has adopted a strict rule for monetary policy, all continuing to use a great deal of discretion to infer the state of the economy from many imperfect measures, and to react to the wide variety of shocks. Instead, policymakers responded to academics by placing a large emphasis on the transparency of central bank actions. Central bank governors give frequent speeches, their institutions publish detailed reports justifying their actions, and academic research has taken this transparency as given, busying itself instead with how to shape and conduct central bank communication (Blinder et al. 2008). Such efforts at transparency can be seen as trying to reduce the noise arising from central bank actions.

At the same time, modern central banks interpret inflation targets in a flexible way, with a willingness to trade off deviations of inflation from target against movement in real activity (Woodford 2010). By following feedback rules that condition policy on the state of the business cycle, central banks aggressively respond to recessions and booms and thus explicitly commit to the countercyclical stabilization policies that Friedman thought were fruitless. Gali and Gertler (2007) in this journal characterized the two insights of modern macroeconomic models for monetary policy as being: “1) the significant role of expectations of future policy actions in the monetary transmission mechanism and 2) the importance for the central bank of tracking the flexible price equilibrium values of the natural levels of output and the real interest rate.” Friedman would have applauded the first, but the second goes against the main thrust of the policy recommendations in his presidential address.

Moreover, Friedman’s presidential address argued (p. 16) that “too late and too much has been the general practice” of monetary policy because of “the failure of monetary authorities to allow for the delay between their actions and the subsequent effects on the economy.” Modern central banks agree but have responded by adopting a policy of “inflation forecast targeting”

(Woodford 2007): that is, they discuss their policies in terms of what will bring forecasted inflation two or three years ahead back on target.

Finally, the Great Recession and the actions of the Federal Reserve provide a useful contrast between the central bank that Milton Friedman wished for and the one that exists today. Friedman (p. 14) thought that “monetary policy can contribute to offsetting major disturbances in the economic system arising from other sources,” but he says that “I have put this point last, and stated it in qualified terms—as referring to major disturbances—because I believe that the potentiality of monetary policy in offsetting other forces making for instability is far more limited than is commonly believed.” In his seminal work with Anna Schwartz, Friedman had laid the blame for the Great Depression on the inaction of the Federal Reserve. On Friedman’s 90th birthday, then-governor of the Federal Reserve Ben Bernanke (2002) stated, “You’re right, we did it. We’re very sorry. But thanks to you, we won’t do it again.”

After becoming the Federal Reserve’s chair in 2006, Bernanke was put to the test in 2008 as a financial crisis comparable to the one that triggered the Great Depression hit the US economy. At first, a new depression seemed imminent. But the Federal Reserve (and many other central banks) responded aggressively. By preventing bank failures, providing emergency credit to financial intermediaries, and increasing bank reserves, the central bank made sure that M2 did not fall as precipitously as it did during the Great Depression; Friedman would have approved. At the same time, the Federal Reserve kept its focus on interest rates, now expanded through explicit forward guidance, and persistently increased the size of its balance sheet through quantitative easing policies that aimed to facilitate the operation of the mortgage market. This array of monetary policy actions arguably prevented a financial collapse and helped the economy recover (Blinder 2013). By the end, the contraction lasted for 19 months and industrial output

fell by 17 percent from peak to trough; during the Great Depression, the comparable numbers were 43 months and 52 percent. At least this one time, the Federal Reserve seems to have successfully rebutted Friedman's skepticism about its ability to respond to major disturbances.

The Road Ahead

Fifty years after Friedman's (1968) presidential address, it is remarkable that its themes remain central in the study of business cycles and monetary policy. Expectations, the long run, the Phillips curve, and the potential and limits of monetary policy all continue to be actively researched. Fifty years from now, our knowledge about each of these topics will surely be different, and we hope better, but we are willing to bet they will remain central topics in macroeconomics.

In the near future, the meager economic growth since the 2008-09 recession may lead to a reexamination of Friedman's natural-rate hypothesis. At this point, the simplest explanation is that this stagnation is due to a slowdown in productivity unrelated to the business cycle. Alternatively, however, it might contradict Friedman's classical view of the long run, either because hysteresis effects set in after large recessions or because the economy can suffer from a chronic shortage of aggregate demand (as Blanchard discusses in this issue).

Either way, the Phillips curve has come a long way since A. W. Phillips first plotted the unemployment rate against the change in nominal wages using British data. As a scatter plot, it has shifted so often that no one takes it to be anything other than a transitory, reduced-form empirical relation. Yet as a synonym for nominal rigidities, in the sense of a structural two-way causal relation between nominal and real variables in the short run, the Phillips curve is as alive

as ever. Much recent research has embraced Keynes's vision of focusing on how wages and prices are set at the micro level, both in theory and in the data. Future work might do well to re-embrace Friedman's vision and turn to modeling expectations instead to better understand the Phillips curve (Mankiw and Reis 2002).

Focusing on expectations is especially promising in light of the active work in the area (Coibion, Gorodnichenko, and Kumar 2017). On the side of theory, researchers are using insights from behavioral economics about the ways people go about crafting their expectations together with the formalism provided by measures of limited information flows borrowed from computer science (Mankiw and Reis 2010, Sims 2010). On the side of data, there are a growing number of surveys on people's expectations, field experiments that show how news spreads in networks of people, and laboratory data on the formation of perceptions. The road ahead lies in combining the two to provide a better benchmark model of expectations that can replace both adaptive and rational expectations (Woodford 2013).

In addition, the role of monetary policy is in flux today and has drifted quite far from the topics that Friedman emphasized in his presidential address. The overall design of central banks does not just merit discussion but is also the subject of revisions in practice (Reis 2013). The road ahead will likely lead to progress in four areas: the interaction between fiscal and monetary policy, the role of bank reserves, near-zero interest rates, and financial stability.

Friedman discussed fiscal policy in the presidential address only briefly by condemning the "cheap money policies after the war" for producing inflation in their futile attempt to keep interest payments on the debt low. Otherwise, fiscal authorities are largely ignored. Current research instead emphasizes that central banks cannot live in isolation from fiscal authorities. On the one hand, central banks are fiscal agents. Their choices have consequences for what the fiscal

authorities can achieve and for the fiscal burden they face (Reis 2017). On the other hand, fiscal authorities affect financial stability through implicit guarantees that encourage risky behavior, can smooth or enhance the business cycle by alternating between stimulus and austerity, and can put pressure on inflation through unsustainable fiscal policy (Sims 2013). Discussions of monetary policy today often include their fiscal dimensions, even if briefly, but this was not the case in most of Friedman's address.

As central banks focus on interest rates and the use of currency declines, the old monetarism that emphasized the medium of exchange seems outdated. But, in its place, a new monetarism is being built on the role of liquidity in financial markets and on the role that reserves play in these markets. This work builds on the fact that at the end of 2015, US banks held twice as much in reserves issued by the central bank as they did in government bonds issued by the Treasury (Reis 2016). Reserves are one of the largest homogeneous financial assets today, and the central bank can control both the interest it pays on them as well as their quantity independently. "Reservism" may become the new face of monetarism, not as a policy target but as an approach to inflation and as a guide for central banks for their "quantitative easing" policies and other uses of the central bank balance sheet (Benigno and Nistico 2015).

Friedman had studied the Great Depression extensively, and his views on monetary policy were deeply influenced by this experience. It is therefore surprising that the challenges of near-zero interest rates receive scant attention in his presidential address. Implicitly, Friedman seemed to dismiss the Keynesian views that the power of monetary policy is compromised when interest rates are near zero or that this requires the use of different monetary policy tools. Recent research on monetary policy takes a different perspective. It emphasizes that there is a lower bound on interest rates (slightly below zero) that puts a constraint on monetary policy, and

suggests using forward guidance policies to overcome it or raising the inflation target to reduce its occurrence (Eggertsson and Woodford 2003). Some go as far as suggest radical changes to the monetary system, such as abolishing currency or introducing dual currencies, to deal with the constraint posed by the zero lower bound (Agarwal and Kimball 2015, Rogoff 2017). This research suggests that if real interest rates remain as low as they currently are for long, monetary policy in the future may look very different from the one that Friedman considered (Eggertsson and Mehrotra 2014).

Finally, Friedman was an expert on financial crises, yet in an address on monetary policy, he chose to ignore the interaction between monetary policy and financial stability. Of course, it had long been recognized that as the lender of last resort, the central bank has some responsibility for financial stability. Yet any desire to tightly control the level of asset prices is foolish for all the reasons that Friedman explained in his address, especially when applied to stock prices or house prices (Brunnermeier and Schnabel 2016). Friedman would have been likewise skeptical about the current foray of central banks into macroprudential regulation (the use of financial regulatory tools to promote macroeconomic goals); the presidential address does not have a single word on regulation as a task for monetary policy. After almost a decade of research onto financial crises, the current consensus in the literature seems to be that central banks should pay close attention to credit and funding variables in an attempt to forecast and prevent financial crises, should take into account the effect of their actions on financial intermediaries, and at times should use financial regulation to intervene directly when doing so would promote financial and macroeconomic stability (Adrian and Shin 2008, Brunnermeier and Sannikov 2013). There remain many hard questions about the role that central banks should play and about how much we should expect from these important institutions. But in the spirit of

Milton Friedman's presidential address, we suspect that it would be best for central bankers to remain humble in what they aspire to achieve.

Acknowledgements

We are grateful for comments from Andrea Alati, Charlie Bean, Denis Fedin, Mark Gertler, Robert Hetzel, Tina Liu, Maria Lopez-Uribe, Enrico Moretti, Edward Nelson, Timothy Taylor, and Nina Vendhan.

References

- Adrian, Tobias and Hyun S. Shin.** 2008. "Financial Intermediaries, Financial Stability, and Monetary Policy." In *Maintaining Stability in a Changing Financial System*, Jackson Hole Economic Policy Symposium: Federal Reserve Bank of Kansas City, 287-334.
- Agarwal, Ruchil and Miles S. Kimball.** 2015. "Breaking Through the Zero Lower Bound" IMF Working Paper 15/224.
- Andrade, Philippe, Richard K. Crump, Stefano Eusepi, and Emanuel Moench.** 2016.. "Fundamental Disagreement." *Journal of Monetary Economics* 83: 106-28.
- Ball, Laurence.** 1994. "Credible Disinflation with Staggered Price-Setting." *American Economic Review* 84 (1): 282-89.
- Ball, Laurence, N. Gregory Mankiw, and Ricardo Reis.** 2005. "Monetary Policy for Inattentive Economies." *Journal of Monetary Economics* 52(4): 703-725.
- Barro, Robert J.** 1977. "Unanticipated Money Growth and Unemployment in the United States." *American Economic Review* 67(2): 101-15.
- Benigno, Pierpaolo and Salvatore Nistico.** 2015. "Non-neutrality of Open Market Operations." CEPR Discussion Paper 10594.
- Bernanke, Ben S.** 2002. "On Milton Friedman's Ninetieth Birthday: At the Conference to Honor Milton Friedman, University of Chicago, Chicago, Illinois." November 8, <https://www.federalreserve.gov/BOARDDOCS/SPEECHES/2002/20021108>.
- Blanchard, Olivier J.** 2009. "The State of Macro." *Annual Review of Economics* 1 (1): 209-28.
- Blanchard Olivier J.** 2016. "The Phillips Curve: Back to the '60s?" *American Economic Review* 106(5): 31-34.
- Blinder, Alan S.** 2013. *After the Music Stopped: The Financial Crisis, the Response, and the Work Ahead*. Penguin.
- Blinder, Alan S., Michael Ehrmann, Marcel Fratzscher, Jakob De Haan, and David-Jan Jansen.** 2008. "Central Bank Communication and Monetary Policy: A Survey of Theory and Evidence." *Journal of Economic Literature* 46(4): 910-45.
- Breit, William and Barry T. Hirsch.** 2004. *Lives of the Laureates, Fourth Edition: Eighteen Nobel Economists*, MIT Press.

Brayton, Flint, Andrew Levin, Ralph Lyon, and John C. Williams. 1997. "The Evolution of Macro Models at the Federal Reserve Board." *Carnegie-Rochester Conference on Public Policy* 47(1): 43-81.

Brunnermeier, Markus K. and Yuliy Sannikov. 2013. "Redistributive Monetary Policy." In *The Changing Policy Landscape*, Jackson Hole Economic Policy Symposium: Federal Reserve Bank of Kansas City, 331-384.

Brunnermeier, Markus K, and Isabel Schnabel. 2016. "Bubbles and Central Banks: Historical Perspectives." In *Central Banks at a Crossroads: What Can We Learn from History?* Cambridge University Press.

Chari, V. V. and Patrick J. Kehoe. 2006. "Modern Macroeconomics in Practice: How Theory Is Shaping Policy." *Journal of Economic Perspectives* 20(4): 3-28.

Coibion, Olivier and Yuriy Gorodnichenko. 2012. "What Can Survey Forecasts Tell Us about Information Rigidities?" *Journal of Political Economy* 120(1): 116-159.

Coibion, Olivier and Yuriy Gorodnichenko. 2015. "Is the Phillips Curve Alive and Well After All? Inflation Expectations and the Missing Disinflation." *American Economic Journal: Macroeconomics* 7: 197-232.

Coibion, Olivier, Yuriy Gorodnichenko, and Rupal Kamdar. 2017. "The Formation of Expectations, Inflation and the Phillips Curve." *Journal of Economic Literature*, forthcoming.

Eggertsson, Gauti B. and Michael Woodford. 2003. "The Zero Bound on Interest Rates and Monetary Policy." *Brookings Papers on Economic Activity* 34: 139-235.

Eggertsson, Gauti B. and Neil R. Mehrotra. 2014. "A Model of Secular Stagnation." NBER Working Paper 20574.

Friedman, Milton. 1962. *Capitalism and Freedom*. University of Chicago Press.

Friedman, Milton. 1968. "The Role of Monetary Policy" *American Economic Review* 58(1): 1-17.

Friedman, Milton. 1970. "The Social Responsibility of Business is to Increase its Profits," *New York Times Magazine*, September 13, 32+.

Friedman, Milton and Anna J. Schwartz. 1963. *A Monetary History of the United States, 1867-1960*. Princeton University Press.

Galí, Jordi and Mark Gertler. 2007. "Macroeconomic Modeling for Monetary Policy Evaluation." *Journal of Economic Perspectives* 21(4): 25-46.

- Goodfriend, Marvin and Robert G. King.** 1997. "The New Neoclassical Synthesis and the Role of Monetary Policy." *NBER Macroeconomics Annual 1997*, 12: 231-296.
- Hall, Robert E.** 1976. "Notes on the Current State of Empirical Macroeconomics." Hoover Institution Stanford University.
- Hansen, Alvin H.** 1953. *A Guide to Keynes*. McGraw-Hill.
- Hetzl, Robert L.** 2017. "What Remains of Milton Friedman's Monetarism?" FRB Richmond manuscript.
- Hicks, John R.** 1937. "Mr. Keynes and the 'Classics'; A Suggested Interpretation." *Econometrica* 5(2): 147-59.
- Keynes, John M.** 1923. *A Tract on Monetary Reform*. Macmillan.
- Keynes, John M.** 1936. *The General Theory of Employment, Interest and Money*. Macmillan.
- Kuznets, Simon.** 1955. "Economic Growth and Income Inequality." *American Economic Review* 45(1): 1-28.
- Kydland, Finn and Edward C. Prescott.** 1982. "Time to Build and Aggregate Fluctuations." *Econometrica* 50(6): 1345-70.
- Lucas, Robert E.** 1972. "Expectations and the Neutrality of Money." *Journal of Economic Theory* 4: 103-24.
- Malmendier, Ulrike and Stefan Nagel.** 2016. "Learning from Inflation Experiences." *Quarterly Journal of Economics* 131(1): 53-87.
- Mankiw, N. Gregory and Ricardo Reis.** 2002. "Sticky Information Versus Sticky Prices: A Proposal to Replace the New Keynesian Phillips Curve." *Quarterly Journal of Economics* 117(4): 1295-1328.
- Mankiw, N. Gregory and Ricardo Reis.** 2010. "Imperfect Information and Aggregate Supply." In *Handbook of Monetary Economics, vol. 3A*, edited by Benjamin M. Friedman and Michael Woodford, Elsevier, chapter 5, 183-230.
- Mankiw, N. Gregory, Ricardo Reis, and Justin Wolfers.** 2004. "Disagreement about Inflation Expectations." *NBER Macroeconomics Annual 2003*, 18: 209-70.
- Mankiw, N. Gregory and David Romer.** 1991. *New Keynesian Economics*, volumes 1 and 2. MIT Press.
- Nelson, Edward.** 2017. *Milton Friedman and Economic Debate in the United States, 1932-72* University of Sydney book manuscript.

- Phelps, Edmund S.** 1967. "Phillips Curves, Expectations of Inflation and Optimal Unemployment over Time." *Economica* 34(135): 254-81.
- Phelps, Edmund S.** 1968. "Money-Wage Dynamics and Labor-Market Equilibrium." *Journal of Political Economy* 76(4): 678-711.
- Pierce, Andrew.** 2008. "The Queen asks why no one saw the credit crunch coming." *The Daily Telegraph*, November 5, <http://www.telegraph.co.uk/news/uknews/theroyalfamily/3386353/The-Queen-asks-why-no-one-saw-the-credit-crunch-coming.html>.
- Reis, Ricardo.** 2013. "Central Bank Design." *Journal of Economic Perspectives* 27(4): 17-44.
- Reis, Ricardo.** 2016. "Funding Quantitative Easing to Target Inflation." In *Designing Resilient Monetary Policy Frameworks for the Future*, Jackson Hole Economic Policy Symposium: Federal Reserve Bank of Kansas City.
- Reis, Ricardo.** 2017. "Can the Central Bank Alleviate Fiscal Burdens?" In *The Economics of Central Banking*, edited by David Mayes, Pierre Siklos, and Jan-Egbert Strum, Oxford University Press Handbooks in Economics, forthcoming.
- Rogoff, Kenneth S.** 2017. *The Curse of Cash*, Princeton University Press.
- Samuelson, Paul A. and Robert M. Solow.** 1960. "Analytical Aspects of Anti-Inflation Policy" *American Economic Review* 50(2): 177-94.
- Sargent, Thomas J.** 2008. "Evolution and Intelligent Design." *American Economic Review* 98, 5-37.
- Sargent, Thomas J. and Neil Wallace.** 1975. "Rational Expectations, the Optimal Monetary Instrument, and the Optimal Money Supply Rule." *Journal of Political Economy* 83(2): 241-254.
- Schultz, Theodore W.** 1961. "Investment in Human Capital." *American Economic Review* 51(1): 1-17.
- Sims, Christopher A.** 2010. "Rational Inattention and Monetary Economics." In *Handbook of Monetary Economics*, vol. 3A, edited by Benjamin M. Friedman and Michael Woodford, Elsevier, chapter 4, 155-181.
- Sims, Christopher A.** 2013. "Paper Money." *American Economic Review* 103(2), 563-84.
- Smets, Frank and Rafael Wouters.** 2007. "Shocks and Frictions in US Business Cycles: A Bayesian DSGE Approach." *American Economic Review* 97(3): 586-606.
- Svensson, Lars E. O.** 2010. "Inflation Targeting." In *Handbook of Monetary Economics*, vol. 3A, edited by Benjamin M. Friedman and Michael Woodford, Elsevier, 1237-1302.

Taylor, John B. 1993. "Discretion versus Policy Rules in Practice." *Carnegie-Rochester Conference Series on Public Policy* 39: 195-214.

Taylor, John B. 2016. "The Staying Power of Staggered Wage and Price Setting Models in Macroeconomics." In *Handbook of Macroeconomics*, edited by John B. Taylor and Harald Uhlig, Elsevier, 2009-42.

Woodford, Michael. 2003. *Interest and Prices: Foundation of a Theory of Monetary Policy*. Princeton University Press.

Woodford, Michael. 2007. "The Case for Forecast Targeting as a Monetary Policy Strategy." *Journal of Economic Perspectives* 21(4): 3-24.

Woodford, Michael. 2010. "Optimal Monetary Stabilization Policy." In *Handbook of Monetary Economics*, vol. 3, edited by Benjamin M. Friedman and Michael Woodford, Elsevier, 723-828.

Woodford, Michael. 2013. "Macroeconomic Analysis without the Rational Expectations Hypothesis." *Annual Review of Economics* 5: 303-46.