



FEDERAL RESERVE BANK *of* ST. LOUIS
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Allan Meltzer and the Search for a Nominal Anchor¹

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Meltzer's Contributions to Monetary Economics and Public Policy

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Introduction

Allan Meltzer was an outstanding monetary economist with a long and distinguished career.² He has been an absolute fixture on the central banking and monetary economics scene during my entire career, so much so that I have a hard time picturing that scene without him. He was also a great friend of the St. Louis Fed.

Meltzer published seven papers in the St. Louis Fed's *Review*. The first was published in 1969 and was titled "Controlling Money."³ The last was published in 2005 and was a precursor to Volume 2 of his monumental *A History of the Federal Reserve*.⁴ I will use this last *Review* publication as a starting point for my comments.

The paper, titled "Origins of the Great Inflation," discusses the run-up to the extraordinary inflation of the 1970s and early 1980s in the U.S. from a policymaker perspective. Meltzer presents in the style later carried on in the *History*. He quotes the views of individual Federal Open Market Committee (FOMC) members, along with those of the staff, that describe what they thought they were doing in adopting particular monetary policy actions at particular times. He presents this material almost deadpan, with little judgment, to try to discern what the protagonists were thinking as the Great Inflation developed.

And indeed, they were thinking and saying a wide variety of things. As the narrative

¹ Any opinions expressed here are my own and do not necessarily reflect those of the Federal Open Market Committee.

² Taylor (2017).

³ Meltzer (1969).

⁴ Meltzer (2003, 2005, 2009a, 2009b).

progresses, however, it becomes quite apparent that there was little in the way of a clear framework for monetary policy during these years. Meltzer states that the Committee had no common baseline even for fundamental questions, such as the causes of inflation. Ideas for the provision of a nominal anchor centered on keeping fiscal deficits low, closely regulating the growth of the money supply, or keeping interest rates sufficiently high. None of these were widely accepted, and all had detractors. Some FOMC members eschewed macroeconomic theory altogether. He notes that then-Board Governor Sherman Maisel often exhorted the Committee to spend more time on the development of a coherent model that could be used to better guide decision-making, but with little effect. As a result of the theoretical incoherence, actual decision-making was perhaps more open to influence by other factors, such as domestic politics, which Meltzer discusses in some detail.

From this situation some five decades ago as described by Meltzer, we come to the present. Is the situation today very different? The debates in the monetary theory literature and the fiscal theory of the price level literature roll onward. Certainly, much progress has been made, but complicated arguments abound and clear resolution seems distant. Yet today, despite the remaining theoretical incoherence, inflation control has been in place in the U.S. for about two decades—and this despite the global financial crisis. If there is a problem with inflation today, it is because inflation has been lower than promised, not higher. How is it that a nominal anchor for the U.S. has been found without clear resolution to the puzzles posed in the academic literature?

Inflation Targeting

The answer to this question is surely “inflation targeting.” Inflation targeting does not provide a comprehensive account of inflation dynamics or of the methods used to attain a given inflation goal over the medium term. As implemented in the U.S., it is really only a credible statement of a goal and a promise to try to achieve the goal in the medium term via all means at the disposal of the FOMC. That is not enough to satisfy any modern notion of what constitutes a macroeconomic theory. Nevertheless, it has succeeded in providing the U.S. with the nominal anchor that so eluded us during the 1970s and early 1980s.

Inflation targeting came upon the global central banking scene in the 1990s. Early adopters included the Reserve Bank of New Zealand and the Bank of England, but many other central banks around the world have followed since that time. The European Central Bank was conceived and established with a formal inflation target. The Bank of Japan and the Federal Reserve did not join the club formally until fairly recently, with the U.S. adopting an inflation

target in January 2012.

Nevertheless, in my opinion the U.S. has followed a *de facto* inflation targeting policy from 1995 onwards. As of that time, U.S. inflation had declined to about 2 percent and has not deviated substantially from that target over the last 22 years, at least not on the scale observed during the 1970s and early 1980s. U.S. policymakers were well aware of the trends in the international policy debate toward inflation targeting during this era, and many members of the Committee were sympathetic to the arguments supporting inflation targeting.

Generally speaking, the evidence from around the globe is that inflation targeting has been successful in those countries that have implemented it. Inflation rates are generally lower today than in the pre-inflation targeting era, and inflation rates are often maintained relatively close to the announced inflation target. The variance of inflation has generally been lower than in the pre-inflation targeting era. In addition, the variance of inflation expectations has also declined, generally speaking, because financial market participants have tended to view many central bank inflation targets as relatively credible commitments. These developments are all in line with what one might expect based on theories that compare a noisy and purely discretionary monetary policy like the one Meltzer described for the U.S. during the run-up to the Great Inflation, as opposed to a policy based more on a commitment by the central bank as to what it intends to achieve.

What would Allan Meltzer say if he were here? My reading of his views is that he would stress that the act of naming a credible inflation target recognizes some fundamental truths—truths that were not recognized in the run-up to the Great Inflation. In particular, it assigns the responsibility for the inflation rate to the central bank. It strongly suggests that inflation is a monetary phenomenon. But it stops short of requiring an implementer of the policy to commit to any particular macroeconomic theory beyond these precepts.

I would add my own view at this point, without trying to implicate Allan Meltzer, as I am not sure that he would stress it as much as I do. My point is this: The act of naming an explicit inflation target recognizes the importance of macroeconomic expectations and future policy expectations as being paramount in the monetary policy arena. It is the expectations of future policy that can be unruly and lead to changes in economic behavior that can, in turn, change the nature of the macroeconomic equilibrium. If expectations are the problem, then a natural way to help tie them down is to credibly commit to an inflation target. This approach has worked admirably during the last two decades.

One could tie private sector expectations down still further by credibly committing to a

monetary policy rule, such as a Taylor-type rule.⁵ The Taylor-type rule has the inflation target as a critical component, but also specifies how the central bank should respond to various shocks to the economy. Would there be additional gains, on top of those already achieved through the naming of a credible inflation target itself, by a central bank commitment to such a rule? Allan Meltzer thought so, and testified to that effect before Congress in 2015.⁶ Others have been opposed, including my long-time colleague and now outgoing Fed Chair Janet Yellen.⁷

Two Indications of Monetary Policy Quality

How can we decide if there are additional gains that would accrue to the U.S. economy via monetary policymakers more explicitly adopting a Taylor-type policy rule? Much has been written on this issue. Some of the issues addressed in the literature include the idea that the Taylor-type policy rule is a more model-dependent object and that its policy prescriptions will be valid only in certain model environments. A very real issue, therefore, is the substantial model uncertainty that characterizes today's policy landscape. But instead of rehashing these arguments, I wish to go in a different direction in the remainder of my remarks.⁸

I want to turn now to make an assessment of whether inflation targeting, as implemented implicitly in the U.S. since 1995 (and explicitly since 2012), has led U.S. policymakers to adopt something we can view as close to optimal monetary policy. If recent monetary policy can be viewed as close to optimal, then attempts to further pin down expectations of future policy actions may be less desirable. If recent monetary policy is viewed as less close to optimal, then further monetary policy commitment may confer important benefits to the economy.

I will proceed by considering two examples. In these examples, the evidence on whether recent monetary policy is close to optimal or not is somewhat mixed, so the results here are broadly inconclusive. Nevertheless, I think it is instructive to work through these examples.

To make an assessment of this type requires a model. Since there are many models to choose from, we could simply stop here and say we do not know. But in the spirit of trying to understand a little more about the effects of inflation targeting, I will use a very simple version of a New Keynesian model. Since most of you know the ideas behind this model very well, I

⁵ Taylor (1993).

⁶ Meltzer (2015).

⁷ Yellen (2015).

⁸ For more on my views concerning the Taylor rule, see Bullard (2017).

have relegated the details to an appendix.

The Case of the Disappearing Phillips Curve

The first example is the case of the disappearing Phillips curve. Here we will begin with the empirical evidence, which is neatly summarized in Figure 1, adapted from the latest annual report of the Bank for International Settlements (BIS).⁹ The figure shows the coefficient on a measure of resource slack (unemployment) in a regression of price inflation on resource utilization, using the authors' preferred specification. The coefficient is estimated repeatedly in rolling 15-year samples, and the point estimates, along with 90 percent confidence bands, are plotted in the figure. The sample runs from the 1980s to the present. The data are for a panel of G-7 economies, and the point estimate is a weighted average across economies.

The main idea of the figure is that the slope of the Phillips curve was once negative in the 1980s but has been drifting toward zero in the inflation targeting era since 1995. The coefficient has not been different from zero in recent years—hence the disappearing Phillips curve that has been widely discussed in financial markets and in monetary policy circles.

The empirical phenomenon documented in Figure 1 can be related to the idea that monetary authorities have moved closer to implementing optimal monetary policy during the inflation targeting era.¹⁰ The details of this argument can be found in the appendix, but I will describe the approach here. I begin with a standard, two-equation, linearized New Keynesian model. I then assume that the monetary policymaker wishes to stabilize a quadratic function of inflation gaps and output gaps over an infinite horizon. I give the policymaker a Taylor-type linear feedback policy rule to work with. I allow the policymaker to choose just one parameter in this feedback rule in order to minimize the loss function. That single parameter is the coefficient on the inflation gap. We could think of this as representing the weight placed on inflation stabilization versus output stabilization in the Taylor-type rule.

In this simple exercise, the solution to the policymaker problem is to set the value of the coefficient on the inflation gap to a very large value—technically, infinity. In this situation, optimal monetary policy would call for very low tolerance of deviations of inflation from target. The central bank reacts very aggressively to keep inflation under control.

In this simple model, we can also write out explicitly the value of the regression coefficient in a

⁹ Bank for International Settlements (2017). Also see Blanchard (2016).

¹⁰ Gillitzer and Simon (2015) relate the flattening of the Phillips curve in Australia to inflation targeting. Blanchard (2017) points to inflation targeting as one of the possible explanations for the disappearing Phillips curve.

regression of the inflation gap on the output gap, which is the theoretical counterpart of the slope of the Phillips curve in the BIS regression of Figure 1. The Taylor-type rule coefficient on the inflation gap appears in this formula. As this value tends to infinity the policymaker is following something closer and closer to optimal policy—and at the same time the slope of the Phillips curve is tending toward zero.

This result is one way to state the idea that central banks have become better and better at inflation targeting, and that this success has driven the Phillips curve slope to zero. The empirical evidence in Figure 1 can therefore be interpreted as a signature of optimal monetary policy in observable data. Figure 1 is saying, in effect, that policymakers have already jumped on the Taylor rule bandwagon during the last two decades.

Price Level Targeting

The second example is price level targeting. I have so far argued that inflation targeting has conferred considerable benefits on the economy. And yet, within the standard New Keynesian model, optimal monetary policy is often characterized as price level targeting or its close cousin, nominal income targeting. In recent years, FOMC members (including me) have discussed both price level and nominal income targeting as a possible future of U.S. monetary policy. A move in this direction would require considerable debate and reflection, but might also confer substantial benefits to the U.S. economy if it could be implemented effectively.

If we simply take as given that price level targeting is optimal policy within the New Keynesian construct, a signature in the U.S. data of optimal monetary policy would be whether the price level in the U.S. follows a prescribed price level path. If it does, then the FOMC has been *de facto* price level targeting even if the Committee has not officially said that it has been doing so. The hallmark of price level targeting is that periods of below-target inflation are averaged out with other periods of above-target inflation in such a way that the economy remains on a price level path consistent with a given inflation rate.

In the price level targeting world, the starting date matters. I have already argued that 1995 is the point at which the Volcker-era inflation stabilization came to full fruition, and that from that point onward, the FOMC attempted to maintain a 2 percent inflation target. But did the Committee do even more, implicitly attempting to keep the U.S. economy on a 2 percent price level path?

In the fall of 2012, I argued that the FOMC had kept the U.S. on a 2 percent price level path since 1995, and that this was an outstanding achievement given the global financial crisis during

the intervening years.¹¹ Again, at least as of 2012, the actual implementation of U.S. monetary policy could be viewed as optimal. By itself, this would suggest that there would be little to be gained from additional monetary policy commitments by the central bank. However, as Figure 2 illustrates, in the last five years, the U.S. has fallen off the 2 percent price level path established in 1995. The deviation from the path is now fairly substantial, about 4.6 percent on the low side. Recent FOMC forecasts do not seem to anticipate enough inflation to return the economy to the 2 percent path. Therefore, we will have to conclude that monetary policy has not been optimal from this perspective.

Summary and Conclusion

I have ruminated on Allan Meltzer's excellent career by casting it in terms of a search for a nominal anchor for the U.S. I took as a starting point Meltzer's last article for the St. Louis Fed's *Review*, "Origins of the Great Inflation." That article, a precursor to the much larger work, *A History of the Federal Reserve, Volume 2*, suggests that during the period of the run-up to the Great Inflation, there was no coherent monetary policy framework. This lack of coherence may have left monetary policy susceptible to influences other than those from monetary science, such as politics.

Today, some five decades later, there remains a great deal of theoretical and empirical uncertainty about the effects of monetary policy on the economy. And yet, despite this uncertainty, the U.S. and many other countries have been able to achieve low and stable inflation and, if anything, have faced a problem of inflation being lower than promised, instead of higher than promised as in the 1970s and early 1980s. How was the nominal anchor found, and what was it?

My answer is that it has been inflation targeting, either practiced implicitly or explicitly. This may not have been the answer many economists were expecting during the earlier portions of the postwar era—ideas then revolved around constant money growth, low fiscal deficits or the level of short-term nominal interest rates. Inflation targeting has worked well because it deals more directly with the coordination of macroeconomic expectations than other approaches. By committing to an inflation target, inflation has generally been kept lower and less variable, and inflation expectations have also been less variable. This has been a major achievement of U.S. monetary policy, and one to which Allan Meltzer made an outsized contribution.

If the naming of a credible inflation target coordinates expectations and helps inform the

¹¹ Bullard (2012a, 2012b).

macroeconomic equilibrium, then perhaps further coordination can be achieved by being even more explicit about the future actions of monetary policymakers. One method of doing this would be for the central bank to commit to using a Taylor-type monetary policy rule. Whether this would confer added benefits or not would depend on whether one thinks there are in fact additional gains to be had for the economy by more tightly buttoning down future expectations of monetary policy.

Such questions cannot really be answered without the assistance of a macroeconomic model. But if we go ahead with a popular and simple version of the New Keynesian model, we can consider two examples of what optimal policy would look like and how it compares to actual monetary policy outcomes during the inflation targeting era. The “disappearing Phillips curve” example suggests that actual U.S. monetary policy has tended to be closer and closer to optimal in the last two decades, and that this has, in fact, killed off the Phillips curve correlation previously apparent in the data. The “price level targeting” example suggests U.S. monetary policy was close to optimal between 1995 and 2012, but has since fallen away somewhat.

Whether we can do better than these two examples suggest, or whether the available gains have largely accrued already via the commitment to inflation targeting implicitly made in the U.S. in the 1990s, remains an important question for future research. I am sure that research will continue to be influenced by the enormous contributions of Allan Meltzer.

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Appendix

Consider the linearized equations of the standard New Keynesian model:¹²

$$y_t = E_t y_{t+1} - \frac{1}{\sigma} \left[i_t - (\rho + \varepsilon_t) - E_t \pi_{t+1} \right],$$

$$\pi_t = \kappa y_t + \beta E_t \pi_{t+1} + u_t,$$

where y_t is the output gap, π_t is the inflation gap, and $(\rho + \varepsilon_t)$ is the natural real rate; ε_t and u_t are a natural rate and a cost-push shock, respectively. The two shocks are i.i.d. and have variance σ_ε^2 and σ_u^2 , respectively. Monetary policy is the choice of the nominal interest rate set according to a standard Taylor-type linear feedback policy rule:

$$i_t = \rho + \phi_\pi \pi_t + \phi_y y_t.$$

Assuming that the Taylor principle is satisfied, the rational expectations equilibrium indicates that the evolution of the output gap and inflation can be represented as linear functions of the shocks, and that this evolution also depends on the policy parameters in the Taylor-type policy rule:

$$y_t = \frac{\varepsilon_t - \phi_\pi u_t}{\sigma + \phi_y + \kappa \phi_\pi},$$

$$\pi_t = \frac{\kappa \varepsilon_t + (\sigma + \phi_y) u_t}{\sigma + \phi_y + \kappa \phi_\pi}.$$

Optimal policy can be viewed in a variety of ways, but let's suppose we view constrained optimal monetary policy as the choice of the Taylor rule coefficient on the inflation gap, keeping the Taylor rule coefficient on the output gap fixed. This might be interpreted as the policymaker's degree of attention to deviations of inflation from target, relative to the degree of attention to output gap developments in the Taylor-type rule. The policymaker then chooses this coefficient optimally to minimize a loss function of the form:

$$(1 - \beta) \sum_{t=0}^{\infty} \beta^t (\alpha \pi_t^2 + y_t^2),$$

where α is positive and represents the relative weight on the desirability of inflation stabilization compared to output stabilization in the eyes of the policymaker. The value of this

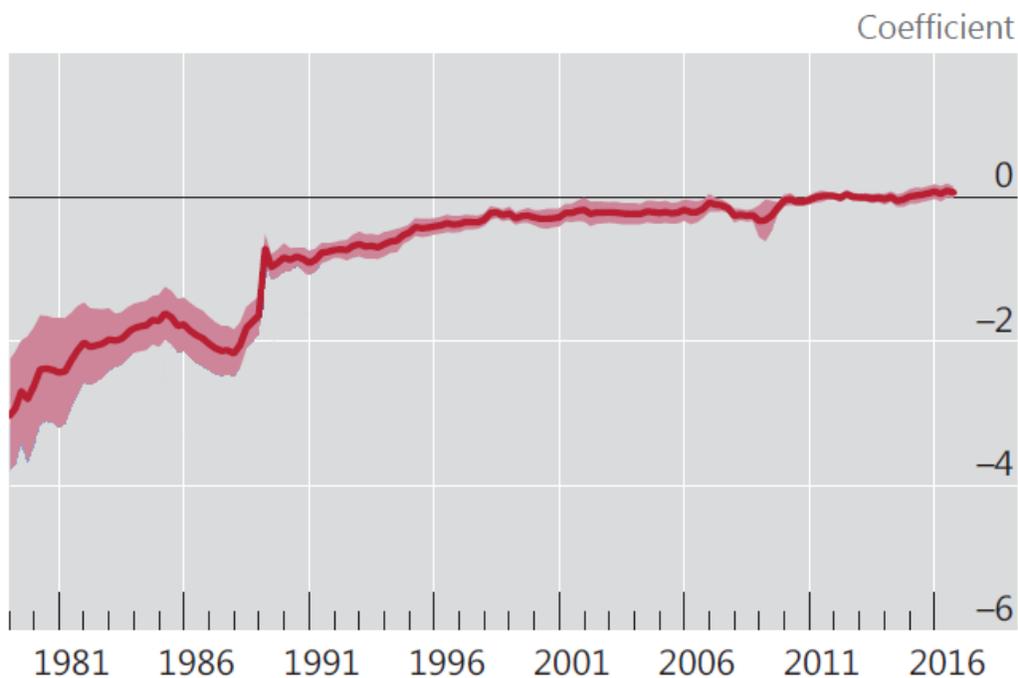
¹² For a textbook treatment of the standard New Keynesian model, see Woodford (2003).

parameter could be high or low, encompassing policymakers who might prefer more or less output stabilization versus inflation stabilization. It turns out that regardless of the value of α the solution to this problem indicates that optimal policy requires a large coefficient on the inflation gap, that is, $\phi_\pi \rightarrow \infty$. What are the implications of this finding for the slope of the Phillips curve in such a model? The slope of the Phillips curve—that is, the coefficient on the output gap in a regression of the inflation gap on the output gap—is given by

$$\gamma = \frac{\text{Cov}(\pi_t, y_t)}{\text{Var}(y_t)} = \frac{\kappa\sigma_\varepsilon^2 - \phi_\pi(\sigma + \phi_y)\sigma_u^2}{\sigma_\varepsilon^2 + \phi_\pi^2\sigma_u^2}.$$

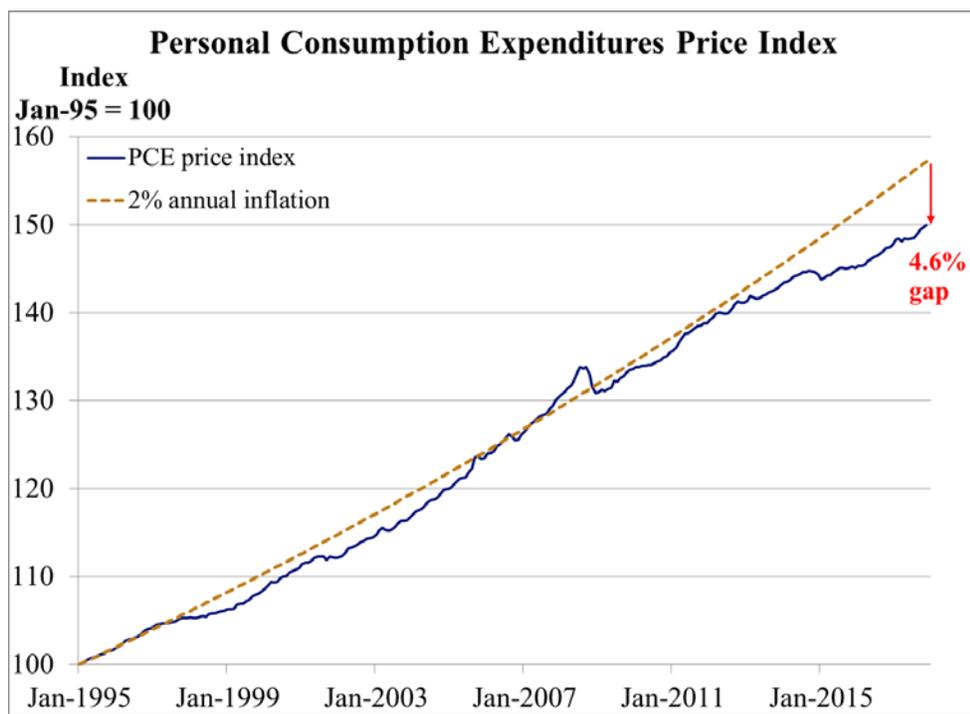
We can take the limit of the right-hand side of this expression to deduce that, under optimal monetary policy as described above, the Phillips curve becomes flat: $\lim_{\phi_\pi \rightarrow \infty} \gamma = 0$.

Figure 1. Slope of the Phillips Curve



Note: Rolling 15-year window estimates and confidence bands from a panel of G-7 economies. Source: Bank for International Settlements (2017).

Figure 2. The U.S. Price Level Path



Note: De facto price level targeting occurred from the mid-1990s to 2012, but the actual price level has since fallen off the price level path. Sources: Bureau of Economic Analysis and author's calculations. Last observation: November 2017.