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Comment on Rudebusch and Williams, "A wedge in the dual mandate: Monetary policy and long-term unemployment"

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ABSTRACT

Rudebusch and Williams (2015) conclude "A wedge in the dual mandate: Monetary policy and long-term unemployment" with the policy prescription "Optimal policy should trade off a transitory period of excessive inflation in order to bring the broader measure of underemployment to normal levels more quickly." The question that I address is whether our knowledge of the dynamics linking monetary policy, inflation and real growth is sufficiently well-developed that policy recommendations of the sort that Rudebusch and Williams proffer can be effective. I present two bodies of empirical evidence pertinent to this issue. The first has to do with the Phillips Curve itself; the second with the class of models now used to analyze the economic effects of monetary policy.

1. Introduction

Rudebusch and Williams (2015) (RW) in their "A wedge in the dual mandate: Monetary policy and long-term unemployment" begin by showing the exceptional increase in long-term unemployment that took place during the course of this last recession. They then present econometric evidence showing that the association between short-term unemployment and inflation is stronger than the association between total unemployment and inflation. Their model simulations buttress these econometric findings. They conclude: "Based on the analysis in this paper the implications are clear: Optimal policy should trade off a transitory period of excessive inflation (beyond what is calculated using this paper's model) in order to bring the broader measure of underemployment to normal levels more quickly."

The question that I want to address is whether our knowledge of the economy's dynamics linking monetary policy, inflation and real growth is sufficiently well-developed that policy recommendations from RW's model are practical and, consequently, useful. I present two bodies of empirical evidence on the question of the link between policy and inflation. The first pertains directly to the Phillips Curve; the second to the class of models that now are used to analyze the effects of monetary policy on the economy.

2. Empirical problems

A decade and a half ago Atkinson and Ohanian (2001) created quite a stir with a paper published in the Federal Reserve Bank of Minneapolis *Review* questioning the ability of the Phillips curve relationship to predict inflation behavior. The evidence they presented showed that the Phillips curve was unstable and that did a poor job of predicting inflation.

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A number of follow-up papers have reached more or less the same conclusions (e.g., Dotsey, et al., 2015; Lansing, 2002; Stock and Watson, 2009). One in particular stands out; the paper by Stock and Watson (2009) published in a Federal Reserve Bank of Boston conference volume commemorating 50 years of the Phillips Curve. They examine the performance of 192 forecasting procedures – 157 different models and 35 combination forecasts – in forecasting five common measures of inflation. In accord with the findings reported elsewhere in the literature, they conclude that the procedures that they examine have great difficulty outperforming univariate models and do so only sporadically. They then go on to say:

A question that is both difficult and important is what this episodic performance implies for an inflation forecaster today. On average, over the past 15 years, it has been very hard to beat the best univariate model using any multivariate inflation forecasting model (Phillips curve or otherwise). But suppose you are told that next quarter the economy would plunge into recession, with the unemployment rate jumping by 2 percentage points. Would you change your inflation forecast? The literature is now full of formal statistical evidence suggesting that this information should be ignored, but we suspect that an applied forecaster would nevertheless revise downward his or her forecast of inflation over the one- to two-year horizon.

In Fig. 1, I have plotted inflation against unemployment. The figures are for annual percentage rates of change of the CPI and annual rates of unemployment over the period 1950 to 2014. I use these data to provide added background to the econometric results reported by Atkinson and Ohanian and Stock and Watson.

Shown in panels Fig. 1a–h are plots for various subperiods and in panel Fig. 1i a plot of the data for full sample period. Until 1983 the subperiods are the same as those used by Robert E. Lucas, Jr. in his Nobel Lecture (Lucas, 1996). Lucas, in turn, took these charts from a textbook by Stockman (1996). Stockman chose the subperiods to illustrate the shifts in the inflation-unemployment relation that took place prior to and during the period of the Great Inflation of the 1970s and early 1980s.

In Fig. 1a–e for the six subperiods ending in 1983, a negative relationship between inflation and unemployment – a Phillips Curve – is clearly visible. Notice, however, that the values on the axes in these charts differ. The curves shift outward through time. These shifts are broadly consistent with the critiques of the Phillips Curve by Friedman (1968) and Phelps (1967) who stressed the influence of inflation expectations on the relationship between the actual rate of inflation and unemployment. But there are several key differences in these data from those that would be consistent with the simplest versions of the Friedman–Phelps critiques. For one thing, the shifts appear to be outwards and to the right rather than vertical as implied by Friedman's and Phelps' analyses. The natural rate of unemployment apparently increased with the average rate of inflation rather than remain constant. Friedman in his Nobel lecture (Friedman, 1977) attributed the apparent increase in the natural rate to the uncertainty accompanying the increasingly higher and more variable inflation that characterized this period.

A second thing to notice in the charts is the variation in the shape of the within-period inflation-unemployment relations across the various subperiods. The slopes of lines fitted visually to these relations appear to alter over time. Post 1983, the slopes flatten considerably and the points become more widely dispersed. In Fig. 1i for the pooled data, there is no discernable relation whatever.

As a check on all these visual impressions and to calibrate my own internal probability calculator, I estimated individual regressions for the eight subperiods separately and tested their stability over time. The coefficients were all negative, averaging −1.18, but were widely dispersed, varying from −20 to −3.26. The *F*-ratio for the test of temporal stability was 2.95, which with 7 and 56 degrees of freedom leads to rejection of the hypothesis at the 0.01 level. The instability in these estimates is confirmed further by a regression shown below:

$$\text{Inflation} = 2.178 + 0.248\,\text{Unemployment}, \quad R^2 = 0.021, \quad \text{SEE} = 2.797, 1.302, 0.214 \tag{1}$$

where figures beneath the coefficient estimates are standard errors.

Some analysts might object that such comparisons are entirely too simple: a more thorough econometric investigation doubtless would include a variables proxing the expected rate of inflation and variables to capture the influence of real shocks. The problem here is twofold. Real shocks are one-off and random and, therefore, non-forecastable. Hence, this knowledge could not be helpful for policymakers who have to make decisions in real time. Accurately accounting for and forecasting expected rates of inflation are extremely difficult. Moreover, given the variance in such forecasts, it is unclear how policymakers could effectively account for expected inflation in conducting policy.

It is interesting to note that as we go from charts 1a and b to charts 1c through 1e, we not only see an upward shift in the inflation-unemployment relations but a decrease in the number of yearly data points making up the individual relations. The latter could be a result of the monetary shocks becoming more frequent and of greater intensity. It is also consistent, however, with Friedman's (Friedman, 1968, 1975) conjectures that the time it takes for expectations to adjust to the current rate of inflation shortens if rates of inflation continually ratchet up. Agents, on his view, would shorten the time horizon on which they based their expectations, paying more attention to the recent past and less to the distant past and eventually basing their projections on higher order derivatives of the price level. They would also take account of outside information, information about the factors affecting money growth, government deficits and the like.

Lucas (1973) and Sargent (1982) later formalized this argument in separate papers that were among the studies that ushered in the rational-expectations revolution. The basic ideas, however, already were part of the oral traditions of the workshops in Money and Banking and in Latin American Economics in Chicago when I attended them from the late 1960s and into the early 1970s.[1] They seem to have largely gone missing, however, in the recent Phillips curve literature.[2]

[1] See the discussion in Lothian (2016) (Forthcoming).

[2] An exception is Gordon (2011).

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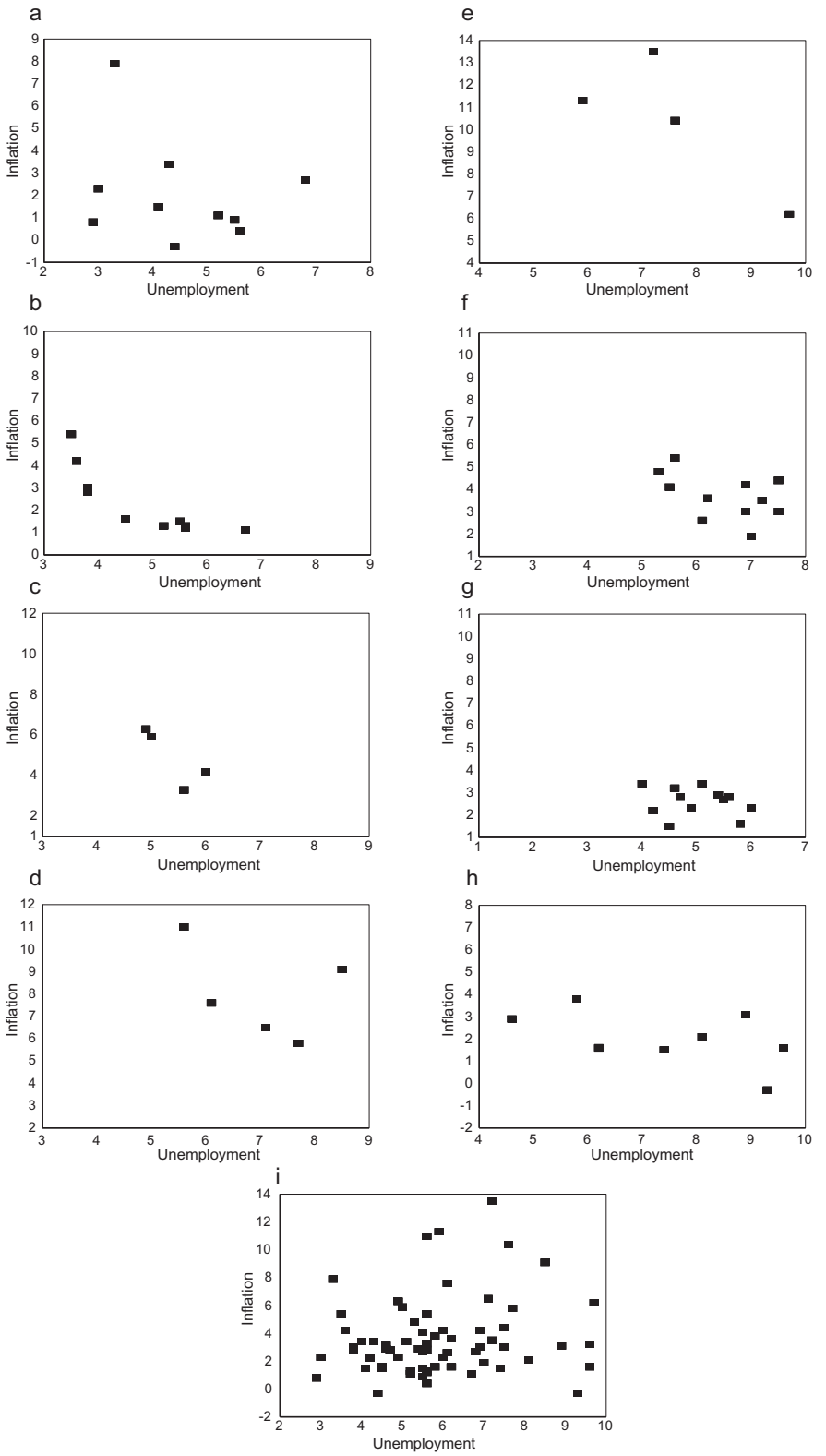

Fig. 1. (a) Inflation vs. unemployment, 1950–1959. (b) Inflation vs. unemployment 1960–1969. (c) Inflation vs. unemployment, 1970–1973. (d) Inflation vs. unemployment, 1974–1979. (e) Inflation vs. unemployment, 1980–1983. (f) Inflation vs. unemployment, 1984–1989. (g) Inflation vs. unemployment, 1995–1906. (h) Inflation vs. unemployment, 2007–2014. (i) Inflation vs. unemployment, 1950–2014.

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Table 1
Means of long-term real-growth and inflation volatility and the correlations between the two by subperiod.

	Means		Correlation
	SDy	SDp	SDy,SDp
1880–1913	1.73	1.57	0.68
1914–1993	1.61	1.44	0.92
1994–2014	0.37	0.36	0.90

These comparisons, I believe provide an insight into the dynamic forces driving the econometric results reported by Atkinson and Ohanian, Stock and Watson and others. They establish that there is a negative relation between inflation and unemployment; however, they also show that the relationship does not appear to be reliable enough for policy makers to use the Phillips Curve as a guide to policy.

Stock and Watson seem to me correct when they say that applied forecasters nevertheless would very likely revise their inflation forecasts downward if they thought that the economy was about to plunge into recession and unemployment increase. But that is cold comfort to someone in a policy position who needs detailed enough information to engage in fine-tuning of the sort that RW's model advocates.

3. A second order tradeoff

Now let me address an additional issue; namely, the tradeoff between the volatilities of real income and inflation as opposed to the tradeoff between levels of real income (or unemployment) and inflation posited by the naïve Phillips Curve. This tradeoff originated with Taylor (1998) and is now a feature of most standard economic models. These models imply that as a long-run matter monetary policymakers can decrease inflation volatility but at the cost of increased volatility of real-income growth, and vice versa. If monetary policies are chosen optimally and the structure of the economy does not change, there will be a long-run negative relationship between the two volatilities, which policymakers could potentially exploit.

The questions are whether this tradeoff between volatilities has held empirically and if it has not the reason (or reasons) why it has not. To measure these volatilities, I computed log moving ten-year standard deviations of real income growth and inflation as measures of longer term volatility of the two underlying series.[3]

The four panels of Fig. 2 contain scatter plots of the standard deviation of the one against the other. In all instances, the data are plotted at end-period dates. Fig. 2a is for the full sample period 1880–2014. The figure shows a strong positive relationship between the two measures.

Fig. 2b is for 1880–1913, the period prior to the founding of the Federal Reserve System. This is the gold standard period, when inflation was determined by fluctuations in the supply of gold. This figure shows a weak albeit positive relationship.

Fig. 2c and d is for two subperiods since the Fed's founding, 1914–1993 and 1994–2014. The latter is broken out to highlight behavior during the Great Moderation but it also includes the years during and after the financial crisis and associated recession. Both figures show a relatively strong positive relationship. However, there is an obvious decline in the level of the variances during the Great Moderation period.

Table 1 lists the means of these measures of longer term volatility and the correlations between the two for the three subperiods. As the charts show quite clearly and the correlations confirm, the relation is positive in each instance. Moreover, the levels of their variability move together. We can see this quite clearly both for the century in which the Federal Reserve has been in existence as well as under earlier monetary arrangements during the period of the classical gold standard. Such positive correlations are not just a figment of these data. In Lothian (2014), I present evidence of the same sort for sample periods beginning early in the nineteenth century for the Netherlands and the United Kingdom as well as for the United States.

Did the existence of the Fed make a difference? In the broad schema of things, apparently not. We can see this by comparing Fig. 2a for the period 1880–1913 and Fig. 2b for the period 1914–1993. In both instances the correlations between the two volatility measures are positive. More important, something like two-thirds of the points in Fig. 2b show volatilities in the two series as great as or greater than those in Fig. 2a. As a check on these visual inferences, I ran regressions of the form

$$SD_{it} = b_1 + b_2 D2 + b_3 D3 + e_{it}, \tag{2}$$

where SD_{it} is the volatility of the ith variable – real growth or inflation – in year t, $D2$ is a dummy variable for the period 1914–1993, $D3$ is a dummy variable for the period 1994–2014 and e_{it} is an error term. Table 2 reports the results. If volatilities in the period since the founding of the Federal Reserve do not differ from earlier the earlier period, both coefficients should be insignificantly different from zero. In both instances, b_2 is in fact not statistically significant and also quite small in magnitude. Judged on the basis of these measures of volatility the Fed made no noticeable difference over the bulk of the time it was

[3] In measuring volatility in this way, I follow Friedman (2010) and my earlier paper, Lothian (2014).

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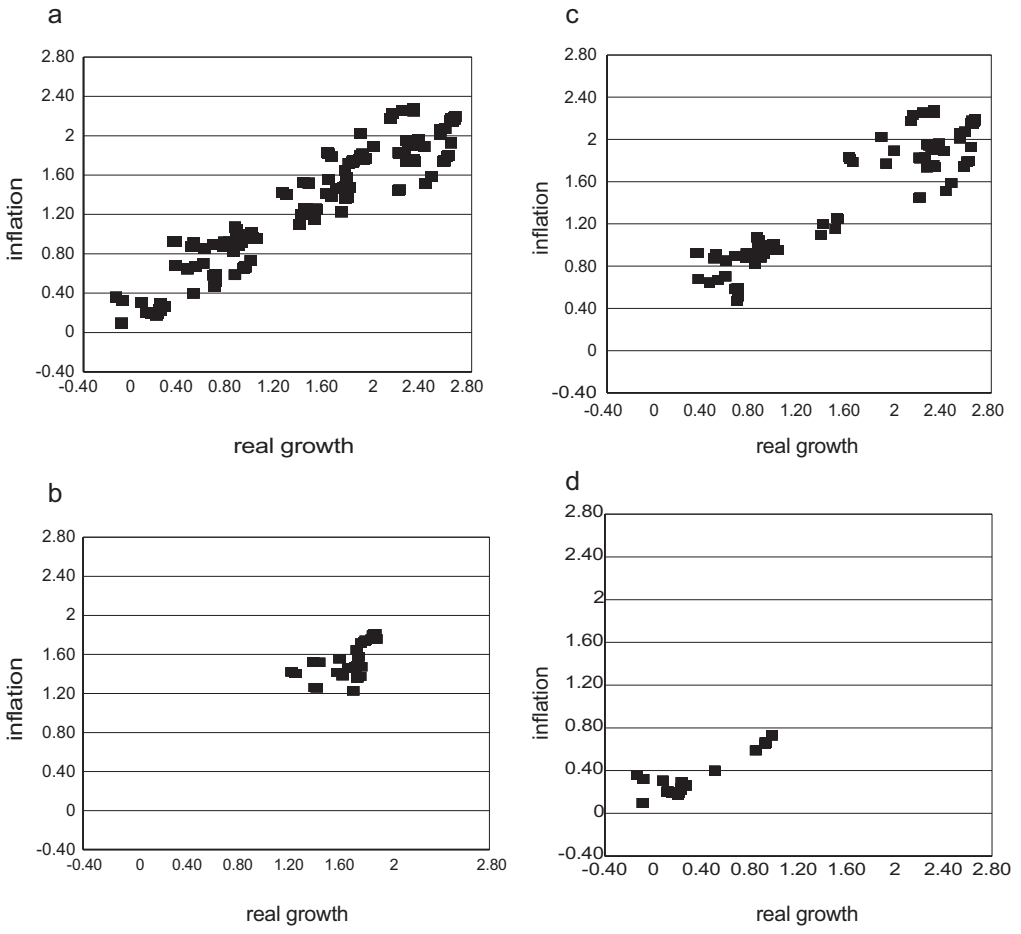

Fig. 2. (a) Volatility of inflation and real growth, 1880–2014. (b) Volatility of inflation and real growth, 1880–1913. (c) Volatility of inflation and real growth, 1914–1993. (d) Volatility of inflation and real growth. 1994–2014.

Table 2
Regressions of long-term real-growth and inflation volatility on dummy variables for subperiods.

	Constant	*D*2	*D*3	R^2	SEE
SDy	1.714	−0.079	−1.313	0.359	0.642
	0.109	0.129	0.169		
	(15.788)	(−0.611)	(−7.745)		
SDp	1.565	−0.102	−1.179	0.487	0.437
	0.074	0.088	0.115		
	(21.199)	(−1.163)	(−10.233)		

Note: *D*2 is a dummy variable for the subperiod 1914–1993; *D*3 is a dummy variable for the subperiod 1994–2014; figures in the first line below the coefficients are standard errors; and figures in parentheses are *t* values.

inexistence. The coefficient b_3 is, however, statistically significant and large in absolute value. The Fed, therefore, does appear to have made a difference is during the course of the past several decades – the period of the Great Moderation.[4]

The alternative view is that monetary policy was only a bit player; the decreased volatility was due either to good luck or a decreased incidence of real shocks. Bernanke (2004) provides a good summary of these competing views. The good-luck explanation seems to me to be sterile, neither testable nor capable of refutation. The real-shock explanation only makes sense if

[4] These moving standard deviations are plotted at end-of- period dates. The observation for 1993 thus includes data for 1984–1993, that for 1994 data for 1985–1994 and so on. The first observation with at least half its underlying data drawn from the period following the Great Moderation is 2011.

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such shocks were the major cause of the inflation and cyclical problems in the 1970s and 1980s. On my reading of the evidence this was not the case.[5]

More to the point, examination of data for the money supply shows strong positive relations between the volatility of monetary growth and the volatility of both real income growth and inflation. The correlation between the log moving ten-year standard deviation of M2 growth and the log moving ten-year standard deviations of real income growth and inflation were both 80. Friedman (2010) and Lothian (2014) for the United States, the Netherlands and the United Kingdom present corroborating evidence.[6]

The chain of influence in all of these instances, I believe, ran from money to the economy rather than the reverse. In the long spans of data analyzed here and in the other two studies, the monetary regimes and other the conditions of supply within the three countries varied too greatly for there to have been stable mechanisms leading to reverse causation.

4. Final remarks

The focal point of these comments has been on policy, specifically on RW's conclusion that "Optimal policy should trade off a transitory period of excessive inflation (beyond what is calculated using this paper's model) in order to bring the broader measure of underemployment to normal levels more quickly."

> In his paper "The Great Inflation. Lessons for Central Banks," Lucas Papademos, former governor of the Bank of Greece and former vice president of the European Central Bank as well as former prime minister of Greece, expressed substantial misgivings about the ability of central banks to engage in fine-tuning the economy (Papademos, 2013). He wrote:

[T]he uncertainty characterizing the short- term relationship between inflation and the level and pace of economic activity, which stems from (a) developments in productivity growth and labor utilization that are difficult to predict and measure in real time, (b) unanticipated shifts in inflation expectations, and (c) the effects of shocks, implies that in general attempts to fine-tune economic activity by monetary policy are unlikely to succeed and might even be destabilizing.

Sixty years earlier, Friedman (1953) had trumpeted a similar warning, questioning the ability of policy makers to do more good than harm in their attempts to engage in active stabilization policies. Two decades later, when the Great Inflation was getting into full swing Friedman's message still was being largely ignored. As De Long (1997) has later argued policy remained focused on the supposed inflation-unemployment tradeoff and that was one of the reasons it continued to go off track. The same scenario, moreover, prevailed in Britain, with one exception – go-stop cycles started earlier and as a result ultimately produced higher average rates of inflation than in the United States.

My fear is that we could easily do it again. A propos of Friedman's (1953) article, De Long wrote:" [He] had made an extremely powerful argument that successful stabilization policy requires that you know the structure of the economy with substantial precision: using erratic instruments in response to noisy signals of the state of the system is likely to add variance and to make matters worse."

As with most modern macroeconomic models, RW's model – the model they imply that policymakers should use – is in some ways more sophisticated than the ones used in the onset and during the Great Inflation, but as I have argued, not good enough. The Fed does appear to have followed a Taylor Rule during the Great Moderation and to have done a much better job policy-wise, but more rule-based policy ended in the early 2000s when the Fed pegged the funds rate too low for too long and then raised its target abruptly.

During the course of and in the aftermath to the financial crisis, policy has been more erratic. The banking system has had a huge buildup of excess reserves as a result of Fed asset purchases and the form those asset purchases have taken has had more to do with industrial policy and credit control than monetary policy (Taylor 2013, Lothian, 2014; Meltzer, 2014). It is hardly a propitious starting point for more fine tuning.

Paul Volcker in remarks to the Economic Club of New York (Volcker, 2013) compared the situation today to the pre-accord years following World War II and cautioned that:

There is something else that is at stake beyond the necessary mechanics and timely action. The credibility of the Federal Reserve, its commitment to maintaining price stability, and its ability to stand up against partisan political pressures are critical. Independence can't just be a slogan.

He sounded a series of equally cautionary notes with regard to monetary policy:

> I know that it is fashionable to talk about a "dual mandate"—the claim that the Fed's policy should be directed toward the two objectives of price stability and full employment. Fashionable or not, I find that mandate both operationally confusing and ultimately illusory. It is operationally confusing in breeding incessant debate in the Fed and the markets about which way policy should lean month-to-month or quarter-to-quarter with minute inspection of every passing statistic. It is illusory in the sense that it implies a trade-off between economic growth and price stability, a concept that I thought had long ago been refuted not just by Nobel Prize winners but by experience.

[5] See here Darby, Lothian et al (1983), Lothian (1985), Meltzer (2005) and Barsky and Killian (2001).

[6] The Friedman (2010) data for the United States were for the period 1879–2005; the Lothian (2014) data for the Netherlands were for 1910–2011, for the United Kingdom for 1871–2012 and for the United States for 1877–2012. Both studies presented scatter charts for money- growth volatility versus real-growth volatility but not for inflation volatility.

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Volcker immediately went on to add:

> The Federal Reserve, after all, has only one basic instrument so far as economic management is concerned—managing the supply of money and liquidity. Asked to do too much—for example, to accommodate misguided fiscal policies, to deal with structural imbalances, or to square continuously the hypothetical circles of stability, growth, and full employment—it will inevitably fall short.

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