

## A MORE EFFECTIVE STRATEGY FOR THE FED

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### **Current Conditions and the Policy Problem**

The Federal Open Market Committee's Policy Statement from its January 27-28 meeting provides a favorable outlook for the US economy with solid economic growth and strong job gains and renewed momentum heading into 2015.

Real gross domestic product, our broadest measure of inflation-adjusted income and spending, advanced at a 2.5 percent rate during the past year, weighed down considerably by the severe weather-related decline in 2014Q1; real GDP growth exceeded 4 percent in the final three quarters of 2014.. This healthy growth generated more than three million new jobs during 2014, and the Employment Report for January 2015 brought even more good news from the American labor market. 257,000 new jobs were created and upward revisions to already strong gains in prior months lifted the cumulative 3-month job gain above one million. At 5.7 percent, the unemployment rate is down almost a full percentage point from a year ago, and wage growth rebounded in January, suggesting that December's puzzling decline was an anomaly.

Propelled by these strong fundamentals, and undoubtedly helped along by falling energy prices, too, real disposable personal income growth has accelerated and measures of consumer confidence have moved sharply higher. Persistent increases in household and non-financial corporate debt, coupled with very low delinquency rates, suggest that the post-crisis deleveraging process has largely run its course. And recent forecasts of economic growth in 2015 have been revised sharply higher -- well above 3 percent -- by the IMF, other official forecasters, and the Blue Chip Economic forecasters. All of these signs indicate an economy that stands at an important inflection point, already showing considerable strength and on the verge of accelerating further. The expansion, now in its sixth year, may be old in calendar time, but potentially disruptive imbalances are absent, and in business cycle time, the economy is exhibiting features much more characteristic of prior early-to-middle stage cycles.

Against this backdrop of stronger sustainable economic growth and labor market improvement, policymakers at the Fed and outside analysts agree that the FOMC will have to begin moving interest rates back to more normal levels sometime during 2015. And everyone understands that interest rate hikes, when they do commence, will have to proceed gradually, allowing the Fed to closely monitor the effects that they are having on the economy and guard against the danger of tightening too much, too soon.

Important differences of opinion remain, however, both inside and outside the Fed, as to exactly when to begin hiking rates. Would it be prudent to delay any rate increases past mid-year, in order to insure that the economic expansion continues to gather strength? Or, would a more prolonged period of artificially low rates raise the risk that inflation might overshoot the FOMC's 2 percent long-run target, requiring more aggressive and potentially more costly adjustments later on? Once rate increases do commence, at exactly what speed should they

proceed? And what are the distortionary effects on financial markets and the economy of prolonging the period of artificially low bond yields? These questions will dominate debates and discussions of Federal Reserve policy in coming months, making it imperative to find the right analytic framework for addressing these critical issues.

### **Fundamental Flaws in the FOMC's Approach**

Throughout much of the post-crisis recovery and expansion, FOMC officials have relied heavily on a variety of labor market indicators to describe their policy actions and plans and to gauge the effects that those policy actions are having on the economy. In December 2012, the unemployment rate began playing a central role in FOMC policy statements, as the Committee adopted language effectively committing to keep its policy rate anchored to zero so long as the unemployment rate remained above 6.5 percent. This policy of forward guidance, which was meant to clarify the Fed's intentions for policy over an intermediate horizon, worked instead to generate confusion, as the unemployment rate declined much more rapidly than FOMC members had forecast, approaching the 6.5 percent target towards the end of 2014 and falling decisively below it in April 2014 – a date that, in retrospect, will precede by more than a year the actual lift-off day for the funds rate.

As the unemployment rate fell much faster than the Fed forecast, the FOMC dropped its reference to 6.5 percent unemployment from its statements. Consider, for example, that in December 2013, the FOMC's central tendencies of the unemployment rate were 6.3-6.6 percent for 2014 and 5.8-6.1 percent for 2015. Yet 2015 has only just begun and the actual unemployment rate stands at 5.6 percent. In fact, this is exactly in the middle of the range of the

FOMC's December 2012 central tendency forecasts of the long-run natural rate of unemployment – what many Fed officials referred to at the time as full employment!

The Fed's inability to forecast changes in unemployment rates accurately reflects, in part, fundamental uncertainty about the extent to which high unemployment reflects structural or cyclical influences. It was unclear a year ago whether many of those who were listed as unemployed would be able to find jobs as GDP grew. To the extent that they were part of a structural employment problem, it was conceivable that rising GDP growth might be associated with slow declines in unemployment, indicating a significant rise in the "natural unemployment rate." Further uncertainties about the adjustment of the unemployment rate reflect uncertainties about the extent to which those who have left the labor force (and therefore no longer contribute to the denominator of the unemployment rate) may reenter as the economy grows. Similarly, it is unclear how many part-time workers are seeking full-time employment, which further complicates the analysis of GDP growth and the unemployment rate. For all these reasons, it is especially difficult to draw inferences about how much slack remains in the labor market.

The fact that so many workers have turned out to be cyclically, rather than structurally, unemployed helps to explain the low growth in wages that has accompanied the rapid growth in employment. Slow wage growth has provided an important counterpoint to the more general improvement in labor market conditions. However, the fact that wages have grown slowly need not indicate that slow growth in wages will accompany employment gains going forward – especially if the remaining unemployed turn out to include a larger fraction of structurally unemployed than those that have recently found employment. Uncertainty about the future of the unemployment rate, and about wage growth, persists.

The main policy lesson of the recent history of employment and wage growth is that economic models and monetary policymakers are not very good at predicting the level of the natural rate of unemployment, particularly after a long-lived, deep recession. That lesson reinforces the need for the Fed to adhere to a disciplined inflation targeting rule rather than focus too much on labor market indicators whose meaning remains highly uncertain.

Yet another possible monetary policy pitfall is excessive confidence that past slow wage growth implies little risk of inflation in the future. Many FOMC members legitimately cite low wage growth as a sign that many American families have yet to see conclusive evidence that the effects of the crisis and recession are behind us. Others have gone further, arguing that the continued sluggishness wage growth provides a reason for the Committee to delay its plans for mid-year interest rate increases, on the grounds that inflation is unlikely to rise unless wage growth rebounds first.

Behind that interpretation is a popular narrative about the sources of inflation, which sees inflation as a process through which firms pass rising costs associated with higher wages on to their customers via price increases. While that narrative certainly has some intuitive appeal, it receives absolutely no support from actual data. Figure 1 compares the behavior of nominal wage growth and price inflation systematically, using time series that extend back to 1965. Wage growth is measured by year-over-year percentage changes in the average hourly earnings of production and nonsupervisory workers on private, nonfarm payrolls, from the Bureau of Labor Statistics' monthly employment reports. Core price inflation is measured, similarly, as year-over-year percentage changes in the price index for consumer expenditures, excluding food and energy, computed by the Bureau of Economic Analysis.

Strikingly, Figure 1 shows that while wage growth and price inflation did move closely together from the mid-1960s through the early 1990s, whatever relation existed in those earlier years has completely disappeared. Figure 1 confirms a host of results from more formal, statistical analysis by Knotek and Zaman (2014) that show quite consistently, across a wide range of econometric models, that wage growth lost its ability to forecast future movements in inflation starting in the mid-1980s.

Some of the general flavor of Kontek and Zaman's conclusions is captured by the much smaller set of statistics shown in Table 1. To generate these new results, we estimated a bivariate, autoregressive, time-series model that analyzes how the interplay between wage growth and price inflation has shifted since 1984. The model uses monthly changes in average hourly earnings to measure wage growth and monthly changes in the core PCE price index to measure inflation. Each of the model's two equations regresses one of these variables – wage growth or inflation – on 24 quarterly lags of each of the two variables – wage growth and inflation. Conventional F-tests for the joint significance of the estimated coefficients on lags of each variable show whether or not that variable has incremental forecasting power, taking into account the information that is already provided by the other, for either wage growth or price inflation.

The p-values displayed in panel A of Table 1 indicate that for the early period from 1964:01 through 1983:12, lagged values of both wage growth and core price inflation help to forecast movements in wage growth. But the null hypothesis that wage growth fails to help forecast movements in core price inflation, once lags of inflation itself are accounted for, cannot be rejected at any conventional significance level even for the early period. Thus, while Figure 1 does suggest the existence of a relation between wage growth and inflation for this earlier period,

the results in Table 1 characterize this relationship more sharply as one in which price inflation helps to forecast wage growth, but wage growth does not help forecast inflation. Panel B of Table 1, meanwhile, confirms the visual impression from Figure 1: in data from 1984:01 through 2014:11, no significant inter-linkages appear between the pair of variables.

The common problem revealed, both by these econometric results and by the FOMC's continuing difficulties in anticipating and interpreting movements in unemployment, is one that has always plagued those who attempt to use labor market variables to summarize the impact that monetary policy is having on the economy. Milton Friedman (1968) described this problem long ago. Monetary policy certainly can, and does, affect the unemployment rate and the rate of nominal wage growth. The difficulty is that those variables are influenced, too, by a wide range of other factors impacting on the labor markets, most of which are largely if not entirely beyond the central bank's control. Labor market variables seldom serve reliably, therefore, as indicators of the stance of monetary policy. That is all the more true now, when substantial uncertainty about structural unemployment complicates the forecasting relationship between employment changes and wage changes.

Figure 1 does suggest something more reassuring, however, which can then be confirmed with econometric hypothesis tests. It shows that since 1984, nominal wage gains have become highly procyclical, accelerating during good times and decelerating during periods of slow growth or recession. To highlight this relation further, panels C and D of Table 1 summarize what happens when the unemployment rate replaces the rate of core price inflation in our vector autoregression. The p-values show that whereas movements in unemployment did not help forecast changes in nominal wages during the period of high and volatile inflation before 1984, since then nominal wages have risen more rapidly than average following periods when

unemployment is below average. That last result strongly suggests that more rapid growth in wages, and the renewed prosperity those wage gains will bring to all Americans, ought to appear quite soon, given the recent strength we've already seen in employment and the coincident decline in unemployment. Despite uncertainties about structural unemployment, it is reasonable to expect that this relationship will continue to hold.

But while one certainly can find, in the recent data, good reasons to be optimistic that unemployment will continue to decline and wage growth will begin to accelerate, the more fundamental difficulties in finding stable relationships between these variables and monetary policy raise a final set of basic concerns regarding the FOMC's current strategy. In particular, some FOMC members have argued that it would be prudent to wait until inflation moves closer to the 2 percent target before taking any deliberate steps towards further tightening. Importantly, what this view ignores are the lags with which monetary policy affects the economy. Figure 2, which plots year-over-year growth rates of the Fed's M2 monetary aggregate, reveals that after a period of volatility during and immediate after the financial crisis, broad money growth has stabilized between 6 and 7 percent since 2012. This robust and sustained money growth is indicative of monetary stimulus that has already been applied, over the past several years, while interest rates have been held at zero and the Fed's balance sheet has expanded enormously, although that monetary stimulus has yet to be fully reflected in inflation itself. The Fed must remain forward-looking, confident that its past actions have been sufficient to drive inflation back to target and calibrating its next set of moves to avoid a potentially dangerous overshooting of inflation two to three years ahead.

A few FOMC members downplay this risk, arguing that that the economy might even benefit from a period during which inflation runs slightly above target, to make up for an

accumulation of past misses on the downside. History warns us, however, against any effort to use monetary policy for fine-tuning of this most delicate kind. Bringing about exactly the right trajectory, in which inflation first rises above and then glides gently back down to target, is far too much to ask for. More likely, if the FOMC does allow inflation to overshoot, it will require a much more aggressive and potentially much more costly round of monetary tightening to correct later on.

### **A Rule-Based Strategy for Policymaking**

If labor market indicators serve unreliably as guides for monetary policymaking, what more suitable options are available to the Fed? We would suggest, first and foremost, that FOMC officials resist the temptation to shift preference yet again from wages to some other variable that either may or may not exhibit some link to the effects of monetary policy. Such a shift would risk sowing additional confusion that would further erode public confidence. Our preferred approach begins by reiterating the Federal Reserve's objectives. Next, FOMC officials must embody those objectives in an inflation targeting rule. With the help of staff economists through the Federal Reserve System, Fed leaders should identify patterns of behavior that, when followed by policymakers in the past, have allowed monetary policy to achieve its policy goals. That past behavior should be used to construct a rule-based strategy to guide settings for policy in the present and future.

Although there are, in principle, many ways of proceeding more deliberately along the lines just suggested, one approach that is already available, right off the shelf, is based on the celebrated interest rate rule for monetary policy proposed by John Taylor (1993). In its original form, the Taylor Rule suggests that the Fed adjust its target for the federal funds rate  $r$  in

response to deviations of actual inflation  $p$  from its long-run target rate  $p^*$  and deviations of actual GDP  $y$  from potential output  $y^*$  according to the equation

$$r = p + (1/2)(p - p^*) + (1/2)(y - y^*) + 2.$$

The easiest way to understand this equation is with the help of an example. Suppose first that inflation is at its target and the gap between actual output and potential is zero, so that the economy is in its most “natural” state, neither in a demand-driven boom nor in a slowdown or recession. Under these circumstances,  $p = p^*$  and  $y = y^*$ , so that the Taylor Rule recommends a setting for the funds rate  $r$  equal to  $p^*+2$ , two percentage points above the inflation target. In the United States today, where the Fed has officially announced a 2 percent target for inflation, the Taylor Rule would therefore call for a long-run “normal” funds rate of 4 percent. Then, during periods when either inflation rises above target, so that  $p > p^*$ , or output rises above potential, so that  $y > y^*$ , the Taylor Rule instructs the Fed to raise its funds rate target, to prevent an accelerating economy from overheating. Conversely, when inflation falls below target or output falls below potential, the Taylor Rule instructs the Fed to lower the funds rate, to prevent the economy from falling any deeper into a deflationary recession.

Although first proposed in 1993 – more than twenty years ago! – the Taylor Rule appears, if anything, to be even better suited to guiding Fed policy today. Importantly, the FOMC has now stated, explicitly, that its principal long-run goal is to stabilize inflation around a 2 percent target. Thus, while  $p^*$  appeared as a free parameter in Taylor’s original article, the Fed has now told us its true value:  $p^* = 2$ . By tightening policy when it appears too accommodative in view of the behavior of inflation and output, and by easing policy when it appears too restrictive, the Taylor Rule is designed quite specifically to bring about precisely the type of price stability that the FOMC has promised. What’s more, the Taylor Rule treats deviations of inflation

symmetrically, exactly as noted above, calling for appropriate adjustments to the funds rate when inflation falls below target just as it does when inflation becomes too high. When Taylor wrote his original paper in 1993, few economists would have guessed that outright deflation would become the biggest perceived threat to central bankers around the world, yet the Taylor Rule not only anticipates this, its ingenious design tackles the problem head on. Finally, by prescribing adjustments to the funds rate when either positive or negative output gaps appear, the Taylor Rule recognizes that the Fed often can pursue and achieve modest countercyclical objectives, smoothing out short-run fluctuations in real variables even while stabilizing prices in the long run. Contrary to assertions made by some of its critics, the Taylor Rule is therefore fully consistent with the Federal Reserve's statutory dual mandate, which requires it to monitor and respond to developments in product and labor markets as well as movements in inflation.

We wish to emphasize again that, as individual economists and as Shadow Open Market Committee members, we are not tied specifically to the Taylor Rule as the one and only possible guide for monetary policymaking. Many other reasonable variants, designed to achieve the same objectives and tested with the same high degree of analytic rigor, have been proposed and studied through the extensive literature on monetary policy rules. A number of quite attractive alternatives, for example, are discussed in the collection of papers compiled in Taylor's (1999) own edited volume. Yet, we would also emphasize that many of the advantages offered up, even by the Taylor Rule in its original and simplest form, resonate almost perfectly with the core beliefs outlined by the SOMC (2014) at its meeting last November.

Specifically, the Taylor Rule acknowledges both the importance of preserving the Fed's independence from fiscal authorities and the Fed's accountability to the legislature by clearly specifying that monetary policy adjustments will only be made in response to changing

macroeconomic fundamentals, with substantial weights given to both countercyclical smoothing and long-run price stability, as required by the dual mandate. With its somewhat greater emphasis on inflation, however, the Taylor Rule also reflects the SOMC's core belief that maintaining price stability is the best contribution that monetary policy can make to overall macroeconomic performance; and, as noted above, the Taylor Rule operationalizes in a most clear and effective way the Fed's commitment to its long-run 2 percent inflation target.

### **What Should the Fed Do?**

What then, does the Taylor Rule tell the Fed to do next? In Figure 3, the red line provides the trajectory for the funds rate prescribed by the Taylor Rule going back to 2000 and extending through the end of 2014. The figure uses the GDP deflator, Taylor's (1993) original choice, to measure inflation, but replaces the linear trend he used for potential GDP with the Congressional Budget Office's more sophisticated estimate of potential that reflects shifts in demographics and changes in the long-run rate of technological progress, as well as the longer-lasting effects of the financial crisis itself on the level or growth rate of potential output.

The blue line in Figure 3, meanwhile, tracks the actual behavior of the federal funds rate over the same period. Surprisingly – but fully consistent with our view that the Taylor Rule continues to be relevant as a guide for monetary policy – the graph reveals that FOMC officials, whether by accident or design, followed the prescriptions of the Taylor Rule almost exactly as the U.S. economy started to weaken in 2007 and fell into a full-blown recession in 2008. The graph is also consistent with arguments, made by economists both inside and outside the Fed, that the zero lower bound on the federal funds rate prevented the FOMC from easing monetary policy through conventional channels as much as it should have, given the severity of the Great

Recession. Because, with respect to the fed funds rate, the Taylor Rule called for the impossible – a negative setting for the funds rate throughout 2009 and the first half of 2010, it provides support for the unconventional policy initiatives of the Fed that were designed to provide additional monetary stimulus during that period.

Since the third quarter of 2010, however, the Taylor Rule has specified a positive funds rate target, implying that, with the actual target remaining close to zero, FOMC interest rate policy has been more than appropriately accommodative. Even with the purely transitory slowdown in measured inflation generated by falling oil prices in the fourth quarter of 2014, the Taylor Rule now calls for a funds rate target of around 1.25 percent. With this as our benchmark, several very specific points of guidance for monetary policymakers today are apparent.

First, although some Fed officials argued that it was reasonable and arguably appropriate that the FOMC continued to hold interest rates at zero even after the Taylor prescribed lift-off, it is important to recognize that the Fed has maintained a zero-interest policy for over five years. Historical experience tells us that, whenever interest rates are held too low for too long, financial markets and economic behavior become distorted and resulting excess aggregate demand generates rising inflation. Along those lines, Figure 3 also serves to remind us that, when judged against the benchmark provided by the Taylor Rule, interest rates did remain too low for years after the 2001 recession. And while the role that these historically low interest rates played in driving the boom and subsequent crash of the US housing and mortgage markets is not yet fully clear (see Taylor 2009 and Hetzel 2012 for arguments on both sides), the mere possibility that another excessively prolonged, post-recession episode of low rates will generate a repeat of that historical experience provides a strong note of caution. In fact, both Figures 2 and 3 suggest that there is already enough monetary stimulus flowing through the U.S. economy to bring inflation

back to the 2 percent target. With that in mind, interest rate increases, starting as planned in mid-2015, would be appropriate, if the Fed wishes to avoid an even more costly overshooting of its long-run inflation target down the road.

Second, even in the most extreme case we could imagine (and certainly not an approach to policy that we would recommend!), where, guided by the Taylor Rule, FOMC officials immediately raised their target for the funds rate by 125 basis points, the short-term interest rate would still remain substantially below its long-run value of 4 percent computed above, and below the current rate of inflation. This consideration works to place any initial rate increases into proper perspective: even in such an extreme case, monetary policy would remain highly accommodative, fully reflective of concerns that inflation remains below target and that a lingering output gap still has to be closed.

This analysis should not be confused with any claims on our part of certainty about how much rates will have to rise eventually to prevent an acceleration in inflation. Recently, there has been much discussion about whether the natural rate of interest now might be somewhat lower than the 4 percent policy rate of the past. That debate involves many complex issues, including the path of longer-run productivity and potential growth. But the eventual outcome of this debate – which presently it's too early to determine—has no bearing on the need to raise the target policy rate from its zero anchor.

Third, as argued above, in guiding inflation back to its 2 percent target, the Fed needs to be forward-looking, recognizing that its policies affect the economy only with long and variable lags. A related issue concerns the impact that falling energy prices have on measured inflation. While a number of FOMC officials, much to their credit, have already done so, policymakers must continue to emphasize that changes in oil prices – like shifts in the price of any individual

good or service – may indicate a lasting impact on the economy-wide relative price of those commodities or services but cannot determine the long-run inflation rate. Helping the public to see through the purely transitory effects of the recent decline in energy prices, and stressing that inflation is still expected to return to target once these transitory effects fade, will be critical for maintaining the Fed’s credibility. Indeed, given the positive consequences for the economy of a decline in the relative price of energy, the recent downtick in inflation should be cause for celebration, not misplaced concerns about deflationary consequences.

What our analysis points to, therefore, is the need to begin raising the funds rate gradually starting in mid-2015, provided the incoming data continue to prescribe those higher interest rates. Modest rate hikes (still keeping the real policy rate negative) amid sustained stronger economic growth does not involve monetary tightening and is likely to be needed to allow inflation to converge back to target.. Reference to the rate of money growth, the Taylor Rule, and the need for monetary policy to remain forward-looking all make clear that higher interest rates are nothing to be feared, but to the contrary are required by solid economic growth and a remarkably robust labor market that has been unfolding.

### **Communication Problems**

The Fed also must address its problems of communication about monetary policy. A disturbing disconnect has opened up between Fed officials and financial market participants. Fed leaders suggest that the Federal Open Market Committee (FOMC) will begin raising interest rates as early as mid-year 2015, and will continue raising them over 2016 and 2017. Market expectations, however – reflected in interest rate futures market prices – call for rate hikes beginning later in the year, and for a much more gradual process of raising rates, which lies below Fed forecasts.

This disconnect mainly reflects clumsiness in the way that the FOMC has communicated its outlook and intentions, which stem from the lack of a clearly formulated strategy for normalizing rates. While the Fed is formulating a long-term inflation targeting rule that it would announce to guide its strategy and prevent such misunderstandings in the future, what should the Fed do now to better align market expectations with their own? The stakes here are high: central bank surprises foment market upheaval, as we learned from the “taper tantrum” of 2013. Here are four concrete actions to avoid such problems.

First, Fed leaders need to stop giving mixed signals in their reactions to high-frequency data releases. While the January 2015 Employment Report itself went a long way in confirming the positive outlook for the “solid” economic growth and “strong” job gains described in the Fed’s January 27-28 policy statement, market sentiments have been clouded by conflicting remarks from Fed Chair Yellen and other Fed members. By wavering and expressing so much angst about whether a mid-2105 would be appropriate, some Fed speeches give the impression that the economy and labor markets are not healthy enough to withstand a rate hike. These speeches may be part of an effort to preserve maximum flexibility in policy, but this comes with a price. FOMC policy statements highlighting the virtues of being “patient” or “data-dependent” only add to market confusion. That is particularly true when some Fed members make public comment on monthly and even quarterly data that are known to be highly volatile. Recent data releases that fell below market expectations have been minor and explainable exceptions to a compelling set of indicators of sustained economic strength. The decline in real consumption in December—following an unsustainably robust gain in November—and the surprising decline in wages in December—subsequently reversed by a large rise in January—are good examples. Financial markets and the general public take advice from the Fed about what is important. The

Fed should highlight in its public statements the broader picture painted by all the various indicators, which provides a more reliable understanding of the underlying trend. For example, the three-month average for employment gains indicates clearly that the job market and economy as a whole are stronger now than they have been in years. The same helpful interpretation should be applied to monthly consumption and other data.

Second, Fed leaders should clarify the implications of energy price declines for monetary policy. As we noted above, recent declines in energy prices do not portend sustained disinflation going forward, and they are very good news for American consumers, who are now paying much less for the gasoline and heating oil, which are a significant fraction of households' budgets. But misplaced worries about deflation persist, so the Fed should emphasize that as soon as the transitory effects of the decline in oil prices wears off, inflation should be expected to move back towards the Committee's two-percent target.

Third, the Fed should debunk fears that the necessary increase in interest rates will sidetrack economic expansion. Even with a rate hike beginning in mid-year, its policy rate would remain highly expansionary, and still well below the inflation rate, implying a negative real interest rate. The Fed should explain that prior rate hikes in similar circumstances did not sidetrack expansions; indeed, a rate rise at this stage of economic expansion would help to sustain healthy, balanced economic growth and financial market performance. Such a statement would boost rather than erode confidence.

Fourth and finally, the Fed should remind markets that monetary policy's effects on inflation become apparent only with the passage of time – what Milton Friedman famously referred to as “long and variable lags.” As we noted above, by holding interest rates close to zero since 2008, and expanding its balance sheet enormously, the Fed already has provided

unprecedented monetary stimulus to the economy. Its M2 measure of the money supply, for example, has been growing at rates in excess of 6 percent since 2011. As the effects of this sustained monetary growth continue to be felt, and as banks transform their idle excess reserves into new loans and deposits – a process that is well underway – inflation undoubtedly will rise. By referring to these lags more frequently in their public statements, FOMC officials could express more clearly their confidence that the cumulative effect of past policy actions will bring inflation back to the two percent target. They could also explain, with reference to the same long and variable lags, that the interest rate increases planned for mid-2015 are intended to prevent future inflation from overshooting that target, setting the stage for prolonged economic growth and prosperity.

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**Table 1. Forecasting Exercises for Wages, Inflation, and Unemployment**

<u>A. 1964:01 – 1983:12</u>		<u>Dependent Variable</u>	
Independent Variables	Lags of Wage Growth Lags of Price Inflation	Wage Growth	Price Inflation
		0.012	0.239
		0.055	0.000

<u>B. 1984:01 – 2014:12</u>		<u>Dependent Variable</u>	
Independent Variables	Lags of Wage Growth Lags of Price Inflation	Wage Growth	Price Inflation
		0.000	0.530
		0.881	0.000

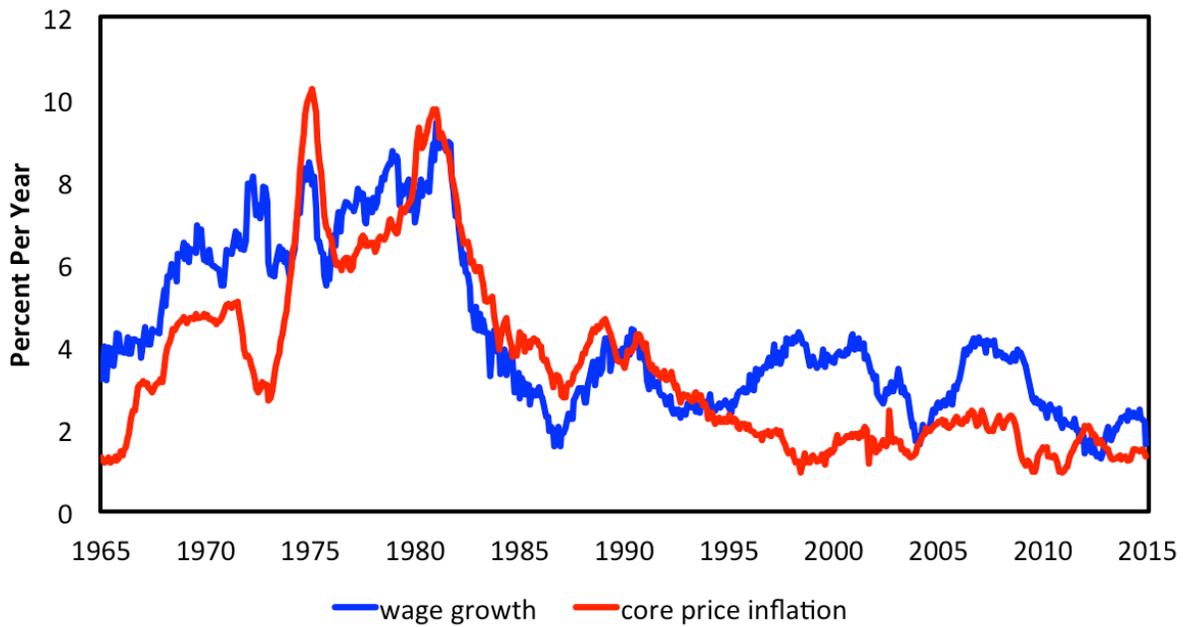
<u>C. 1964:01 – 1983:12</u>		<u>Dependent Variable</u>	
Independent Variables	Lags of Wage Growth Lags of Unemployment	Wage Growth	Unemployment
		0.003	0.460
		0.593	0.000

<u>B. 1984:01 – 2014:12</u>		<u>Dependent Variable</u>	
Independent Variables	Lags of Wage Growth Lags of Unemployment	Wage Growth	Unemployment
		0.000	0.049
		0.006	0.000

*Notes:* Each entry in each panel shows the p-value for testing the null hypothesis that coefficients on 24 lags of the independent variable do not help forecast the dependent variable within a bivariate autoregression. Thus, smaller numbers indicate cases where significant forecasting power is present. In particular, entries in red denote cases where the null is rejected at the 99 percent confidence level; entries in green denote cases where the null is rejected at the 95 percent confidence level; and entries in blue denote cases where the null is rejected at the 90 percent confidence level.

**Figure 1. US Wage Growth and Price Inflation**



**Figure 2. Growth of the M2 Money Supply**

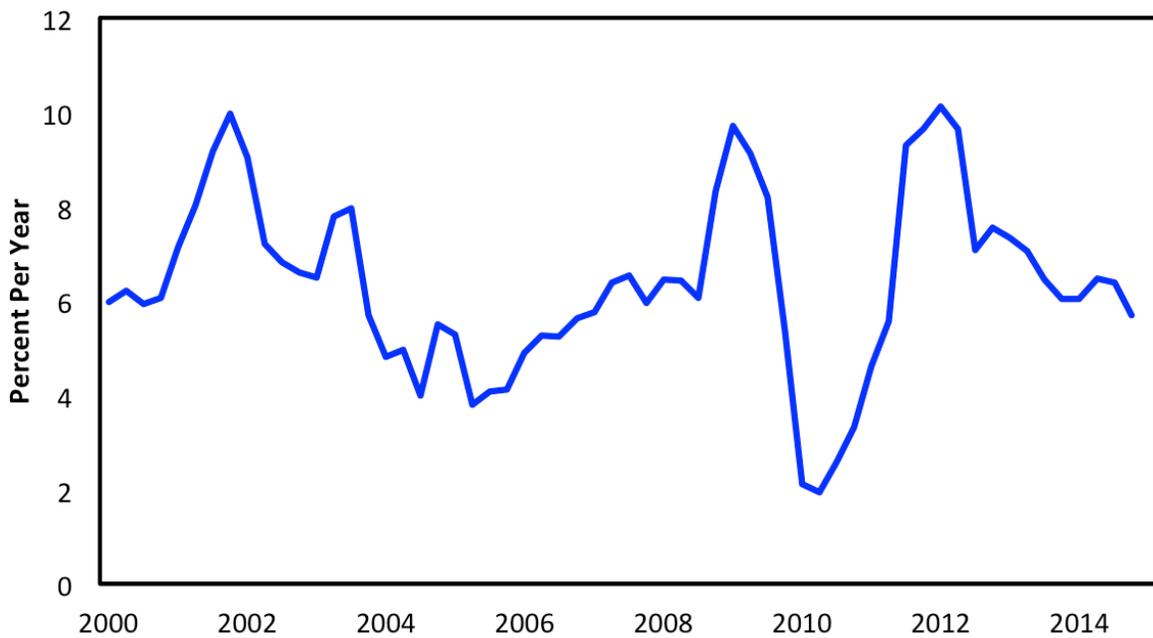


Figure 3. Federal Funds Rate: Actual vs Taylor Rule

