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"Implications of Low Inflation Rates for Monetary Policy"

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It is a great pleasure to visit Washington and Lee University and have this opportunity to talk to students and faculty about the economy and monetary policy. The Federal Reserve places a high value on transparency and public understanding, so I am pleased to be able to share some insights into our work with you today.

I should note, of course, that the H. Parker Willis lecture in political economy is named for a distinguished representative of Washington and Lee and a leader in the founding of the Federal Reserve System, as colleagues like Ben Bernanke have noted

from this stage. Willis served on the National Monetary Commission, which recommended the creation of the Federal Reserve. And he served as research director at the Federal Reserve from 1918 to 1922.[1]

As I begin, I would note as I always do that the views I will express today are my own, not necessarily those of my colleagues at the Federal Reserve's Board of Governors or the Federal Open Market Committee (the FOMC).

One of the consequences that many central banks around the world have had to face since battling a severe recession in conjunction with the financial crisis of 2008 is an inflation rate that is *too low* rather than *too high*. Even though the U.S. economy has been improving and the FOMC ended its asset-purchase program last month, we have consistently and persistently undershot the Federal Reserve's 2 percent inflation target since the financial crisis.

To many of you, the idea that inflation could be "too low" may seem puzzling. Why would it be desirable to push the inflation rate up from its current rate of 1.4 percent[2] to something a bit higher? Today I want to talk about the costs of an inflation rate that is too low, and thus why it is important that our inflation target be viewed as "symmetric" – meaning the Federal Reserve must respond as vigorously to inflation that is too low as we have, historically, when inflation has been too high. I will then suggest that monetary policymakers should remain patient about removing accommodation until it is clear that we are on the path to achieving both our 2 percent inflation target and maximum sustainable employment.

It may seem counterintuitive to say that *too low* an inflation rate is problematic, so let me describe why this situation can be so costly. My first concern with very low

inflation rates is that when the starting point is very low inflation, an unexpected weakening of the economy could push inflation down even further, into a situation of outright deflation – that is, a fall in the overall level of prices in the economy. When households and firms expect that prices in the future will be lower than they are at present, they tend to postpone expenditures, awaiting the lower prices. Historically, under such circumstances, economic activity has tended to remain depressed.

In addition to spending effects, deflation is particularly problematic for debtors. The real value of their loan payments rises over time, making it more difficult to make repayment.

For a real-life example, the long period of mild deflation that Japan just faced was also a period of slow growth in the Japanese economy. Only recently, with strong policy actions taken by the Japanese central bank, has positive inflation been achieved in Japan. Similarly, there are growing concerns by some that Europe, too, could experience mild deflation.

Another concern is that very low inflation rates are typically accompanied by very low interest rates. Because nominal interest rates can't go below zero, when inflation and interest rates are already quite low, monetary policy has only limited room to further lower interest rates to offset negative shocks to the economy. Another way of thinking about this is that an economy with significant slack may need very low real interest rates to return with any speed to full employment. If the short-term inflation rate is close to zero, it's hard to push real interest rates much below zero. Estimates of the costs associated with the zero lower bound before 2007 now seem too low. Japan's experience seems to corroborate that view.

As a recent case in point, nominal short-term interest rates have been close to zero since the fall of 2008 (as **Figure 1** shows), leading the Federal Reserve to use less traditional monetary policy actions to counteract the significant slack in the economy.

Necessary labor market adjustments can be more difficult in a very low inflation environment as well. Consider some of the nuances of labor markets, as economists view them. Although not conclusive, there is significant evidence that workers and firms appear to resist outright declines in nominal wages – economists call this "downward nominal wage rigidity." During recessions, when demand for workers falls, real wages need to fall to help reduce (that is, employ) the excess supply of labor. But with wage inflation near zero and resistance to pay cuts, a reduction in real wages must primarily take place through rising prices. In a very weak economy with low inflation, the likelihood that rising prices will produce the necessary reduction in real wages is slim. Thus, the combination of low inflation and downward nominal wage rigidity likely make recovery from recessions, especially a recovery in the labor market, more protracted and painful.

Finally, failing to achieve a clearly stated inflation target can undermine the credibility of a central bank. Confidence that a central bank can achieve its goals helps to keep expectations well anchored. Failure to achieve these goals can cause expectations about inflation to become unstable. In particular, persistently undershooting the inflation goal could cause expectations about future prices to drift down, bringing along any realized inflation with them, and thus making it even more difficult to push inflation back to its 2 percent target.

The significant costs associated with low as well as high inflation explain why the FOMC has set a 2 percent inflation target. It is a symmetric target in that persistent deviations in either direction should generate a monetary policy response.

Both core and total PCE inflation are currently running somewhat below our 2 percent target. Moreover, in the short-term, falling oil prices and other commodity prices – as well as the appreciation of the dollar and slow wage growth – are likely to prevent much progress in returning to our 2 percent inflation target.

These economic conditions should allow monetary policymakers to remain patient in removing accommodation. I would also note that such patience provides the opportunity to better determine how much labor market slack remains, above and beyond the widely reported unemployment rate.

Inflation Forecasts

Many forecasters expected that as labor market slack – meaning unemployed, underemployed, or discouraged workers, for example; not to mention those who have stopped participating in the formal labor market – declined and was eventually eliminated, the 2 percent inflation target would be achieved. **Figure 2** shows the Summary of Economic Projections (SEP) forecasts for PCE inflation and core PCE inflation in 2014, made from June 2012 through September 2014. At the time of the June 2012 FOMC meeting, the median forecast of FOMC participants predicted that both PCE and core PCE inflation rates would be at almost 2 percent by the end of 2014. However, as the chart shows, the forecast for 2014 inflation has been gradually declining. As of the

most recent SEP outlook, the forecasted 2014 inflation rate is not far from the 1.4 percent inflation rate that we have had over the past year.

The SEP has not been the only forecast that is too optimistic about how quickly the 2 percent inflation goal would be achieved. Private sector forecasts have also been too confident about returning to the target. As you can see in **Figure 3**, the median forecast from the Survey of Professional Forecasters in May 2012 actually anticipated that total PCE for 2014 would be *above* the 2 percent inflation target. However, as incoming inflation data have consistently fallen short of 2 percent, the Survey forecasters, too, have been lowering their forecast for 2014 inflation.

Given the normal forecasting errors for predicting PCE and core PCE inflation, a miss of half a percent is not that unusual. However, a little more surprising has been how persistently we have been undershooting both inflation expectations and our inflation target, particularly as the unemployment rate has fallen more than expected.

One possibility for why we have been missing on the Federal Reserve's 2 percent inflation target could be that there remains significant labor market slack. **Figure 4** shows that the typical, widely reported measure of unemployment, also known as the "U-3" measure, is currently at 5.8 percent. While this is still above my own forecast of full employment – 5.25 percent – there may be even more slack in the labor market than is captured in U-3. For example, a broader measure of unemployment called the "U-6," which includes workers who are part time for economic reasons and workers who are marginally attached to the labor force, still remains elevated. While U-6 has fallen significantly from its peak after the last recession, this measure is still greater today than it was at its peak following the *prior* recession.

Figure 5 plots the gap between the unemployment rate and the so-called natural rate of unemployment, and the change in the core CPI inflation rate from three years earlier – for each quarter since 1980.[3] The periods when the gap is positive are periods when the unemployment rate is higher than the unemployment rate at which the economy is considered at full employment. One of the largest gaps was experienced following the financial crisis, as the figure shows.

During periods when the gap is wide, the inflation rate tends to fall over time. This negative correlation is an imperfect indicator of inflation changes. However, it does highlight that slack in the economy tends to place downward pressure on the inflation rate over time, which is one reason to expect that as the U.S. economy returns to full employment we may gradually return to our 2 percent inflation target.

Figures 2 and 3 showed that expectations for 2014 inflation have declined, and with inflation having consistently undershot the Federal Reserve's 2 percent target, it is possible that longer-term inflation expectations are starting to decline as well. **Figure 6** provides one way to capture longer-run inflation expectations. By subtracting the 10-year inflation-indexed Treasury yield (TIPS) from the 10-year Treasury yield, you get a measure of so-called "break-even" inflation. That is, this difference represents the prevailing inflation rate that should make you indifferent between holding a fixed-rate bond and holding a Treasury bond of the same maturity that floats with the inflation rate. The latest readings have been at the low end of recent experience. However, one must be cautious to infer too much from Treasury interest rates, particularly given the recent volatility and the "flight to quality" by many global investors that may have temporarily reduced Treasury yields.

Figure 7 provides a measure of inflation expectations from survey data. The survey data have not shown the same decline and look little changed from previous periods.

However, it is also possible that temporary supply shocks rather than changes in the labor markets or inflation expectations can explain the low rates. I will say more about this in a moment.

Factors Influencing Recent Measures of U.S. Inflation

Figure 8 provides the recent movement of oil prices, as measured by West Texas Intermediate crude. As you can see, oil prices have recently fallen below $80 a barrel. This chart also shows that oil prices are quite volatile. That is one reason to focus on core PCE inflation – not because oil prices are not important, but because oil can be so volatile that its fluctuations may not aid in our understanding the overall movement of prices in the aggregate.

However, as **Figure 9** illustrates, *domestic* production of oil has increased. Some of the recent decline in oil prices may reflect the expansions of drilling practices that have increased the supply of oil. This may result in recent oil price declines persisting for some time. Nonetheless, the price movements of one commodity, oil, suggest a reason to focus more on core measures of inflation.

Figure 10 illustrates that many other commodity prices have also been falling. The slowing of economic growth among many of our trading partners has reduced the demand for a variety of commodities. This has depressed other material prices, and has

occurred at a time when relatively plentiful harvests have resulted in declines in many agricultural prices.

Figure 11 shows that the exchange rate for the dollar has appreciated, given that the U.S. economy has grown more rapidly than the economies of many of our trading partners. In general, this reduces the price of imported goods, placing a temporary downward pressure on inflation.[4]

Figure 12 provides the employment cost index by broad occupational categories. While there clearly are specialized skills that are experiencing significant increases in wages and salaries, it is striking to see no substantial increases in any particular broad category.

Figure 13 shows the employment cost index by the four main regions in the United States. While particular states with a concentration in oil production have experienced very low unemployment rates and rising wages and salaries, the broader regional patterns do not show much evidence of a pickup in wages and salaries.

Global Inflation Patterns

Figure 14 shows that Japan, the United States, and Europe have all been undershooting their inflation targets. Japan has been able to achieve positive inflation after a long period of mild deflation by taking aggressive monetary policy action, yet it still remains below its stated inflation target of 2 percent (when adjusted for the April 2014 increase in the consumption tax).[5] European inflation rates have continued to decline, and combined with very weak economic growth, have raised concerns among some observers that the Eurozone could experience mild deflation as well.

In sum, while the United States is only somewhat below the 2 percent inflation target, the challenges currently faced by other central banks indicate that we should not be complacent about persistently missing our inflation target.

Figure 15 shows short-term interest rates in Japan, Europe, and the United States. As weak economic growth and low inflation during the recovery from the recession prompted expansionary monetary policy responses, all three central banks kept short-term rates at the zero lower bound, leading to the use of less traditional monetary policies to stimulate growth and attempt a return to inflation targets.

Figure 16 highlights how low 10-year Treasury rates have fallen recently. Japan's experience and now Europe's current situation both indicate that indifference to very low inflation rates can generate a significant loss of confidence in the ability of a central bank to hit its inflation goal. It is hard to reconcile the market evidence – a 10-year German bond trading around 85 basis points and a 10-year Japanese bond trading below 50 basis points – with the publicly announced inflation targets. Bond market evidence suggests that investors have little expectation that 10-year average inflation rates will be anywhere close to their publicly announced targets.

By the way, these low long-term nominal rates also suggest the relatively limited impact that non-traditional expansionary monetary policies can have on lowering long-term borrowing rates in these countries – when long rates are already close to zero it is not possible to lower the rates much more, because they cannot be negative. This is another reason for worrying about and wanting to avoid protracted periods of low inflation and slow growth.

Concluding Observations

In summary and conclusion, I would observe that many central banks around the world have persistently missed their stated inflation targets. Experience in Japan and Europe increasingly indicate that it can be costly to be complacent when inflation gets too low. While recent inflation rates in the United States have been higher than in many developed economies, it is still important for the Federal Reserve to achieve the 2 percent target it has set for itself.

A variety of recent positive supply shocks (e.g. to oil) are likely to result in reported inflation rates remaining well below the target. Distinguishing short-term fluctuations in inflation from longer-run trends is not always straightforward. However, until there is stronger evidence that inflation *will* return to 2 percent – versus a repeated *forecast* that it will – I believe monetary policymakers should remain patient about removing accommodation.

Thank you.

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[1] http://www.federalreserve.gov/boardDocs/speeches/2004/200403022/default.htm

[2] Or 1.5 percent using the Core PCE or the Personal Consumption Expenditures Price Index excluding food and energy.

[3] Figure 5 uses the Congressional Budget Office's estimate of the natural rate of unemployment which is an estimate of the unemployment rate at which the economy is considered at full employment. The CBO's current estimate is an unemployment rate of 5.5 percent. My own estimate is a lower 5.25 percent, which is at the low end relative to many FOMC participants.

[4] Depending on the extent to which foreign producers pass through this exchange rate change into the prices they charge U.S. buyers

[5] Japan's CPI increased sharply due to a consumption tax increase in April 2014. The Bank of Japan estimates the tax increase has increased the CPI by two percentage points. Japan's adjusted CPI series is Japan's CPI, All Items less Fresh Food, adjusted for the consumption tax increase, as published by the Bank of Japan.