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Global Central Bank Focus

P I M C O

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Reflexive Potential

The handbook of global central banking has been revised considerably in recent decades, in particular the chapter dealing with “communications.” A version of the handbook from the early 1970s would not have included, even once, the word “transparency.” In fact, “mystery,” “surprise,” and “secret” would perhaps be the most commonly found quotations then. However, today’s central banking handbooks are littered with the word “transparency,” and as a corollary, devoid of most “mystery,” “surprise,” and “secret.”

Why is increased “transparency” such an important issue for central banks today? Modern central banks are burdened with the task of getting monetary policy right. In the case of the Federal Reserve, this means achieving (1) low and stable inflation, (2) full employment, and (3) moderate long-term interest rates all at the same time. If central banks could achieve their goals without being transparent, the chapter on “communications” from the 1970s would never have been altered. But history taught us, and them, otherwise.

In a seminal paper¹ on modern monetary policy theory titled “Imperfect Knowledge, Inflation Expectations, and Monetary Policy,” the authors Athanasios Orphanides and John C. Williams outlined what is perhaps the most critical rationale for raising modern central bank “transparency.”

Rewind to October 17, 1979 and then Fed Chairman Paul Volcker’s famous statement before the Joint Economic Committee of Congress:

“An entire generation of young adults has grown up since the mid-1960s knowing only inflation, indeed an inflation that has seemed to accelerate inexorably. In the circumstances, it is hardly surprising that many citizens have begun to wonder whether it is realistic to anticipate a return to general price stability, and have begun to change their behavior accordingly. Inflation feeds in part on itself, so part of the job of returning to a most stable and productive economy must be to break the grip of inflationary expectations.”

Core CPI inflation, at the time of Chairman Volcker’s speech, was running around 10% and headed higher. The Federal Reserve, charged with the task of low and stable inflation, had got it all wrong in the preceding decade. A decade in which “transparency” had no place in the central banking handbook, and in which private agents were left guessing as to what they might expect from monetary policy in the midst of an accelerating price inflation experience.

In their paper, Orphanides and Williams argue that modern central banks operate in a world of adaptive expectations and imper-

fect knowledge, instead of rational expectations and perfect knowledge. Private agents do not understand the full structure and complexity of the economy, and to a lesser extent, do not understand the parameters of their central bank’s reaction function in real-time. Private agents, therefore, must infer the knowledge they need to make decisions, from observations and extrapolations of recent history – a process known as “finite memory learning.” Sound familiar?

Orphanides and Williams suggest that in a world of “finite memory learning,” private agents are prone to display an “imperfect” and undesirable stickiness in their expectations of growth and inflation, which over time lend a stochastic dimension to central bank reaction functions. This “imperfect” dimension to the Federal Reserve’s reaction function was not fully perceived in the 1970s, and led to a series of inflation-shock driven policy mistakes. In a defining critique of the pre-Volcker Federal Reserve of the 1970s the authors write:

“This historical episode is a clear example of inflation expectations becoming uncoupled from the intended policy objective and illustrates the point that the design of monetary policy must account for the influence of expectations. We find that policies designed to be efficient under rational expectations can be quite inefficient when knowledge is imperfect...”

It is important here, to pause for a moment, and digest the “transparency” inducing logic of Orphanides and Williams:

“A key finding in this literature [relating to rational expectations with learning and the adaptive formation of expectations] is that under certain conditions an economy with learning converges to the rational expectations equilibrium. However, until agents have accumulated sufficient knowledge about the economy, economic outcomes during the transition depend on the adaptive learning process... sequences of policy errors or inflationary shocks, such as experienced during the 1970s, could give rise to stagflationary episodes that do not arise under rational expectations with perfect knowledge.”

In a world of adaptive expectations and imperfect knowledge, it is imperative for a central bank such as the Federal Reserve to share its knowledge with private agents, to be transparent, such that random shocks from sticky expectations do not interfere with the central bank’s reaction function. A large dividend distributed from increased Federal Reserve “transparency” and less “imperfect” understanding post-1984 is illustrated in Chart 1.

Increased Transparency and Understanding Have Contributed To a More Stable Economy

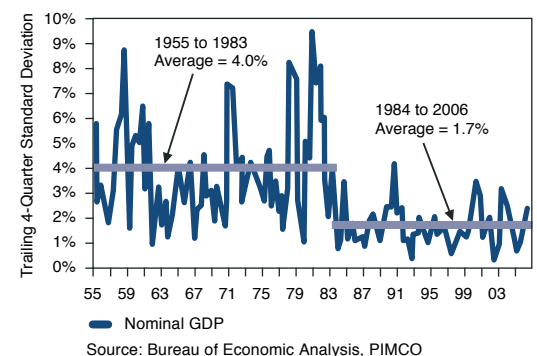


Chart 1

Ex Ante Potential GDP

Fast forward to October 11, 2006 and the release of the minutes of the FOMC meeting from three weeks prior:

“The staff, however, had again reduced its projection for potential GDP growth, and the projected slow pace of growth over the next several quarters was thus consistent with an opening of only a small gap in resource utilization.”

Today’s Federal Reserve is all about “transparency.” Stagflationary outcomes, by definition, are undesirable to a central bank that is charged with maintaining (1) low and stable inflation, (2) full employment, and (3) moderate long-term interest rates at the same time. The Federal Reserve never wants to make the painful choice between stabilizing real economic activity and stabilizing prices when the two options are at odds with one another. And therein lies the rub to this peculiar paragraph, which has appeared twice now within consecutive FOMC minutes.

There has been a shower of Fed-speak recently, referring to a Federal Reserve Board study² on the declining potential growth rate of U.S. GDP over and beyond PIMCO’s three- to five-year secular horizon. Fed Governor Bies, in a recent speech³, sums it up well:

“Recent work by economists at the Federal Reserve Board has explored how changes in the age distribution of the population affect the [labor] participation rate... As I noted earlier, the reduction in growth of the labor

force and, thus, of potential output has important implications for how we interpret incoming economic data... the increase [in monthly payrolls] consistent with stable unemployment rate would be about 140,000 per month. However, if the labor force participation rate instead declines 0.2 percentage points over the next year, as suggested by the Fed’s staff research, then the comparable equilibrium payroll employment growth would be closer to 110,000 per month... Ferreting out the changing trends in these elements is an important part of making monetary policy.”

The ex ante potential growth rate of U.S. GDP is a critical input into the Federal Reserve’s monetary policy reaction function. It is the ex ante “speed limit,” which when compared to the Federal Reserve staff’s expectation of future GDP growth, determines the likely direction of future employment and hence, future inflation. GDP growth faster than potential leads to a fall in unemployment, which in turn leads to a rise in inflation rates, and vice versa. Therefore, a central bank charged with juggling three balls with one hand must calculate the ex ante “speed limit” well before a single ball is tossed in the air.

Federal Reserve policies during the 1970s were deemed too soft on inflation and too focused on “below trend” growth in retrospect. But, we know this today only because we have a better understanding of potential GDP growth, which the Federal Reserve of the 1970s did not have. However, our better understanding today, does not imply a perfect understanding for the future.

Labor Force Participation

A brief description of potential GDP growth is necessary here to make the distinction between better understanding and perfect understanding. In its most basic form, the long-run potential GDP growth rate is equal to the sum of the long-run growth rate of total labor input and the long-run growth rate of total labor productivity. In turn, the long-run growth rate of total labor input is a function of the long-run growth rate of the total population, expected changes in the labor force participation rate, and expected changes in the number of hours worked per employee.

The potential growth rate (read “speed limit”) of U.S. GDP rises proportionately with increases in the growth rate of total labor input and/or increases in the growth rate of total labor productivity. The growth rate of total labor productivity is very difficult to predict, but relatively easy to observe from history. Over the last 35 years or so, total labor productivity has grown at an average rate of about 2% per year. When making a forecast for the potential GDP growth rate, it is best to assume that this historically observed rate will persist over PIMCO’s secular horizon and beyond, with typical cyclical volatility.

So let’s turn to the second determinant of potential GDP growth, the expected growth rate of total labor input. The first component of total labor input is the growth rate of the total population. The past 40 years have produced a 1.5% increase in the total population per year, with expectations of this growth rate slowing down to around 1% per

year for the next 10 years due to a myriad of reasons including lower fertility rates relative to mortality rates⁴. All else equal, this slower estimate of total population growth has shaved off 0.5% from our expected potential GDP growth rate. However, it gets worse, as the Federal Reserve study tells us.

The second component of forecasting total labor input is the labor force participation rate. The participation rate is defined as that portion of the total population which will actually be available to work (or participate in the economy). A rising participation rate boosts the growth rate of total labor input (and hence of potential GDP growth) all else equal, whereas a falling participation rate detracts from our “speed limit” all else equal. The Federal Reserve Board study shows that an ageing population demographic, over and beyond PIMCO’s secular horizon, will lead to a declining labor force participation rate for the first time in post-war economic history. The rationale, simply stated, is that as a growing proportion of baby boomers enter retirement age, the proportion of the population available to work will decline. Sounds simple enough, so what’s the big deal? Well, according to the Federal Reserve Board model, the expected decline in the labor force participation rate over the next 10 years is on the order of about 0.3 percentage points per year, which all else equal would lower our GDP “speed limit” by a further 0.5% per year.

If one combines the pessimistic population growth rate assumption, with the pessimistic labor force participation rate assumption, one lowers the U.S. economy’s speed limit

by a hefty 1% per year for the next 10 years. And this has extremely far reaching consequences for current and prospective Federal Reserve policy, among other things.

Before you go out and re-estimate all your long-term growth assumptions, remember we said that our understanding of potential GDP growth was better today, but still not perfect. Just because we can model demographic changes and age cohort participation rates based on historical observations, doesn't mean that our model estimates will prove accurate ex post. For example, take the case of baby boomers entering retirement age, a major factor driving the Federal

Reserve's expectation of lower labor force participation in coming years. The model assumes that future retirement age labor participation will be more or less the same as we have observed over the past 40 years, notwithstanding evolving factors such as improved life expectancy, and higher levels of longer shelf-life service-sector employment versus goods-producing sector employment. Further, the looming problem of a forward-defaulted public pension system, not to mention uncertain private pension system, is also ignored when making predictions of future baby boomer participation rates. All these factors could, and probably will, serve to enhance the future

Future Potential GDP Growth Rates Will Depend Significantly On Assumptions About Labor Force Participation and Population Growth

Period	History	Recent	Pessimistic*	Optimistic*
Starting Year	1966	2000	2005	2005
Ending Year	1999	2005	2015	2015
Real Non-Farm Output	3.8%	2.8%	1.9%	3.3%
<i>Equals</i>				
Productivity	1.9%	3.1%	1.8%	2.1%
<i>Plus</i>				
Total Labor Input	1.8%	-0.3%	0.1%	1.2%
<i>Which Equals</i>				
Actual Hours/Week	-0.3%	-0.3%	-0.3%	0.0%
<i>Combined With</i>				
Actual Job Growth	2.3%	0.5%	0.4%	1.2%
<i>Which Equals</i>				
Unemployment Rate Change	UNCH	+0.9 points	UNCH	UNCH
<i>Combined With</i>				
Actual Labor Force Growth	1.8%	1.2%	0.4%	1.2%
<i>Which Equals</i>				
Actual Population Growth	1.5%	1.4%	0.9%	1.4%
<i>Combined With</i>				
Participation Rate Change	+8.3 points	-1.1 points	-3 points	-1.5 points
Real Fed Funds Rate	1.90%	0.80%	?	?
Real Output to Real FF Rate Spread	+1.9 points	+2.0 points	?	?

Source: Bureau of Labor Statistics, PIMCO

Table 1

*PIMCO forecasts based on data obtained from government and private agency sources.

participation rate of labor relative to the pessimistic view. See Table 1 for a fuller range of outcomes that are possible.

Reflexive Growth, and Expected Real Interest Rates

The implications of a lower potential GDP growth rate are sizeable. In the immediate, cyclical time frame, a lower potential GDP growth rate would suggest that the current output gap (ex post GDP growth versus potential GDP growth) and the expected output gap (ex ante GDP growth versus potential GDP growth) are both larger than previously believed, raising the possibility of further gains in employment and inflation, leading to further firming in monetary policy and/or reducing the likelihood of any easing. But, hold on a second before you go reducing duration risk in your bond portfolios. Doesn't a lower potential GDP growth rate also mean that the current stance of monetary policy, relative to "neutral" is commensurately firmer than previously believed?

Over the long-run, the "neutral" stance of monetary policy (also known as the equilibrium real federal funds rate) should be closely related to the potential growth rate of GDP. Chart 2 shows that the historical "spread" between the real federal funds rate and real GDP growth has been systematically mean reverting. After all, the overnight real interest rate anchors the starting point of all capital asset pricing model-based (CAPM) calculations on expected asset returns, and GDP growth defines the growth in operating returns on all U.S. assets collectively. By the same definition,

CAPM Theory Governs the Mean Reversion of Equilibrium Real Fed Funds Rate to Real GDP Growth

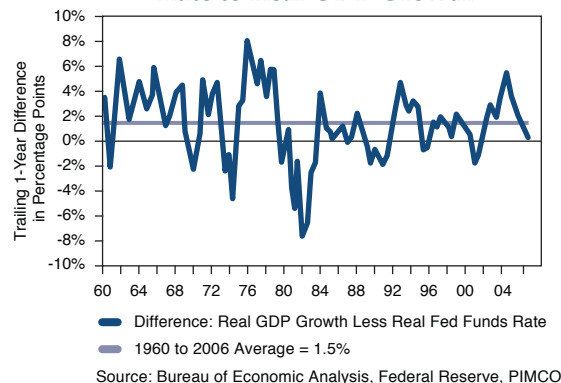


Chart 2

then, a lower long-run potential GDP growth rate expectation suggests a lower long-run equilibrium real federal funds rate in keeping with the general logic of capital asset pricing models.

So why are certain members of the FOMC fixated on a lower potential GDP growth rate, and does it mean that this "new information" raises the risk of more policy firming and/or less easing in the immediate future? We think not.

Monetary policy at the Federal Reserve works by raising and lowering the price of (overnight) capital in order to balance aggregate demand with aggregate supply over some future time period to attain the three goals of (1) low and stable price inflation, (2) full employment, and (3) moderate long-term interest rates. As former Vice-Chairman of the Federal Reserve Roger Ferguson eloquently put it⁵:

"An understanding of a likely long-run level of the equilibrium real rate is useful,

Housing, As Reflexive As It Gets: Price Appreciation Versus Interest Carry Cost Drives Turnover Volume

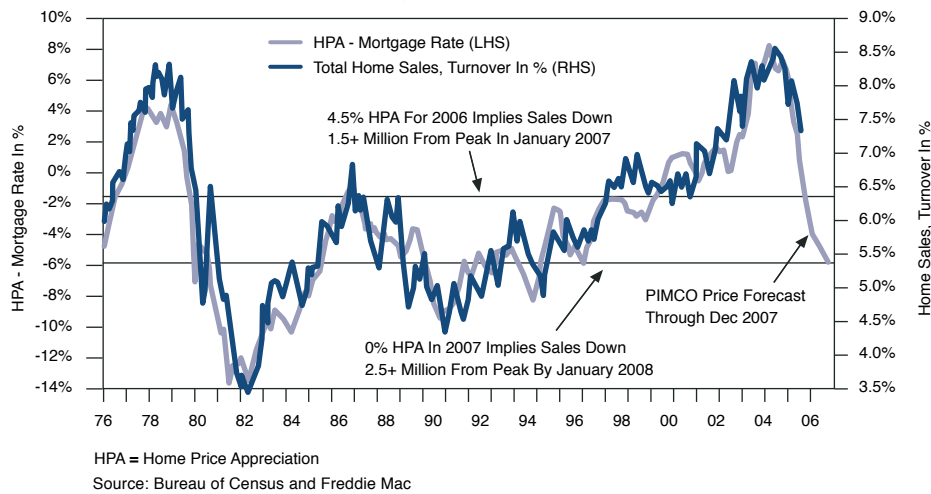


Chart 3

even though it is not directly observable, because it provides a general sense of the level that would, over that longer period, allow aggregate supply and demand to move into balance, given the evaluation of secular forces such as productivity and population growth. Such an understanding of the longer-term prospects for the real interest rate aids in identifying variations in the concept over the intermediate run... a period of several years, when cyclical forces dominate."

Correct us if we are wrong, but it sure sounds like to us that with lower potential GDP growth comes the bonus of a lower equilibrium real federal funds rate. So by definition, again, the current level of the real federal funds rate must be more restrictive to economic growth versus what we might have thought prior to the "new information," just as the current level of GDP growth must be higher than the potential level of GDP growth prior to the "new information."

Take yourself back to Chart 1 of the October Global Central Bank Focus, reproduced here as Chart 3 above. One of our favorite charts in recent memory, it displays the ultra-reflexive nature of a cyclically important asset class, residential real estate. A time-tested observation in residential real estate over the past 30 years (as also in tech stocks a la 1999-2000) is that growth tends to accelerate tremendously when the ex post returns on leverage are superior to the ex ante cost of leverage, and *ceteris paribus*, growth tends to decelerate tremendously when the ex post returns on leverage are inferior to the ex ante cost of leverage.

Reflexivity defined, as it were.

To marry the concepts of an already restrictive real federal funds rate, given "new information" on potential GDP, to the observed reflexive nature of the ongoing recession in residential real estate (which, is leading overall GDP growth lower over PIMCO's cyclical horizon), almost instan-

taneously yields a call for easier monetary policy in the not-so-distant future. This is what cyclical forecasting is all about – we must focus on understanding the source of cyclical output gaps and separate it from the by-products of the same cyclical output gaps, to arrive at a clear picture of future real interest rate expectations around “neutral”.

Bottom Line

The FOMC stopped raising the federal funds rate in June 2006, at a level that most members of the FOMC believed was consistent with attaining a balance between aggregate supply and aggregate demand in the future. At a time of rising employment and rising inflation rates, this level of interest rate, combined with the cumulus of tightening that preceded it, must have, by definition, been judged as restrictive versus “neutral” in order to achieve future balance between growth and inflation.

The Federal Reserve is transparent today to the extent that “transparency” keeps its three-ball juggling act from flopping tomorrow. In the immediate time frame, this entails a highly verbal vigilance on inflation to keep a lid on private sector inflation expectations, but an even higher analytical vigilance on the real economy to avert the dark side of observably reflexive economic growth.

While the potential growth rate of GDP may have decreased over PIMCO’s secular horizon, the potential for a reflexive correction in GDP growth to outright recession has

increased over PIMCO’s cyclical horizon. We sense volatility is creeping back into the business cycle, and the Federal Reserve’s “transparency” will be put to the test in the not-so-distant future.

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¹ Orphanides, Athanasios, and John C. Williams (2002). “*Imperfect Knowledge, Inflation Expectations, and Monetary Policy*,” FEDS Series 2002-27, The Federal Reserve Board, Washington D.C.

² Aaronson, Stephanie, Bruce Fallick, Andrew Figura, Jonathan Pingle, and William Wascher (2006). “*The Recent Decline in Labor Force Participation and its Implications for Potential Labor Supply*,” Brookings Papers on Economic Activity, Volume 1, 2006.

³ Bies, Susan S. (2006). “*The Economic Outlook*,” Speech at the Drake-FEI Lecture, Des Moines, Iowa.

⁴ The Census Bureau (2004), “*Interim Projections consistent with Census 2000*”, Population Projections.

⁵ Ferguson, Roger W. (2004), “*Equilibrium Real Interest Rate: Theory and Application*,” Speech at the University of Connecticut, Hartford, Connecticut.