

Managing the Recovery in Uncertain Times: A Summary of the 2003 Philadelphia Fed Policy Forum

BY LORETTA J. MESTER

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Managing the Recovery in Uncertain Times was the topic of our third annual Philadelphia Fed Policy Forum held on November 14, 2003. This event, sponsored by the Bank's Research Department, brought together a group of highly respected academics, policymakers, and market economists, for discussion and debate about the effect of uncertainty on economic decision-making. Our hope is that the 2003 Policy Forum serves as a catalyst for both greater understanding and more research on policymaking in the face of uncertainty.

In its March 2003 press release, the FOMC acknowledged the difficulties that increased uncertainty was creating for assessing the risk to the economic outlook: "In light of the unusually large uncertainties clouding the geopolitical situation in the short run and their apparent effects on economic decision-making, the Committee does not believe it can usefully characterize the current balance of risks with respect to the prospects for its long-run goals of price stability and sustainable economic growth."



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Although policymakers and forecasters always have to operate in an uncertain environment, the degree of uncertainty that surrounded the economy during this cycle stands out. In fact, a search of the *Wall Street Journal's* archives shows that the words "uncertainty" or "uncertainties" appeared in that newspaper 20 percent more times in the three years 2001-2003 than during a comparable period 10 years ago, 1991-1993. This might not be the best measure, but it is an indication that "uncertainty" was on people's minds.

Those uncertainties began with the tragic attacks of September 11. The initial economic uncertainties surrounding that event — for example, whether the banking system would continue to operate and whether and when the markets would reopen — were resolved quickly. But new uncertainties arose in 2002. These included uncertainties surrounding the

outcome of the war with Afghanistan, the possibility of continued terrorist threats, and the effects of the corporate accounting and governance scandals that broke in the summer of 2002, all of which created concerns about the staying power of the recovery. Another large uncertainty loomed at the beginning of 2003, namely, whether and when U.S. military action in Iraq would start. The military campaign was followed by uncertainty about the success of rebuilding and peacekeeping activities in Iraq.

On the economic front, questions about the efficacy of monetary policy in a low-inflation or stable-price environment added additional uncertainty. Layered on top of all this was the fact that the economy appeared to be undergoing some structural changes on its own. There was uncertainty about whether the usual economic dynamics continued to be at work or whether these dynamics had shifted. Thus, the Policy Forum began with a discussion of some of the sectors — the consumer, housing, investment, and labor markets — that appeared to have behaved somewhat differently during the recovery that began in November 2001. We then turned to implications of uncertainty for optimal monetary policy and the effect on the economy of the uncertainty raised by the corporate governance and accounting scandals.

An underlying theme that emerged during the presentations was that uncertainty assumes many guises and each can have a different effect on the economy and decision-making.

Anthony M. Santomero, president of the Philadelphia Fed, be-

gan the day discussing how the three factors usually cited as causing the very slow turnaround in the labor market during this recovery — weak aggregate demand growth, strong productivity growth, and an increasing use of foreign labor — were all part of the same phenomenon, namely, the unfolding impact of the technological revolution on the economy. The boom and subsequent bust of business spending on information and communications technology (ICT) had generated the most recent business cycle. The very strong tech spending in the late 1990s represented a mix of both good and bad judgments. An implication is that it took the business sector three years, from 2000 through 2002, to digest this major investment spending, reallocating it across firms and fully exploiting its capabilities to boost productivity and cut costs within firms. Only after this were firms ready to contemplate new investment.

The late 1990s' acceleration in ICT investment coincided with a marked pickup in productivity growth, which points to higher growth in potential GDP. To re-employ those who became unemployed or underemployed during the recession and early recovery, real GDP growth would need to be higher than this now higher growth of potential. Moreover, the ICT revolution has raised the potential for possible mismatches in the near term between workers' skills and businesses' requirements, which can slow the rate at which unemployed workers are re-employed, relative to previous recoveries. In the longer term, it also means that industries will need to restructure, similar to what we've experienced in previous technological revolutions. Santomero points out that while these transformations benefit society by leading to higher income growth overall, the transition can be very difficult for workers whose job requirements

and locations change. In his view, the flexibility of the U.S. economy implies that markets will induce the required adjustments, and these adjustments will occur in a global context.

Santomero notes that the ICT revolution is creating an increasingly integrated market for both goods and services, including labor services. Information can be disseminated, transactions effected, and far-flung activities coordinated at lower cost than ever before. This means that as a result of the technology revolution, the demand for labor in the U.S. will become more sensitive to the labor market and other economic conditions abroad. Still, while economic forces will play out in a broader global context, the forces are not fundamentally different from those we've experienced in the past. Thus, in Santomero's view, economic stabilization policies, both monetary and fiscal, can still be effective in mitigating the impact of business cycles in this globally integrated economy in which market forces have an increasingly international scope.

The Policy Forum turned next to issues of how this business cycle has played out in various sectors and the role of uncertainty in the economic dynamics.

CONSUMER BEHAVIOR¹

I had the pleasure of moderating the first session, which addressed the behavior of the consumer sector. Typically in recessions, consumer spending declines, but during the 2001 recession, consumer spending continued to grow. As interest rates fell to historically low levels, there were several waves of mortgage refinancings, which put money into homeowners' pockets. Increased home equity buoyed

¹Many of the presentations reviewed here are available on our web site at www.phil.frb.org/econ/conf/policyforum2003.html.

consumers' wealth, even as the stock market booms of the 1990s ended and the market significantly corrected. How important were these factors to consumer spending during the cycle? How do consumers respond to increases in their wealth? The session's papers underscored the importance of looking beyond the simple conventional wisdom in addressing these questions.

Frank Stafford of the University of Michigan, and director of the Panel Study of Income Dynamics (PSID), began his presentation by discussing the role of housing equity in the economy and what he terms the "refi puzzle." Almost 40 percent of households' nonpension wealth is in housing equity. The cost of accessing home equity can be high. It's not unexpected that when mortgage rates fall, possibly as the result of a change in monetary policy, one of the responses is a boom in refinancing. What's less expected is that there are people who refinance even during periods when interest rates are high. Moreover, there are people who refinance and pay a higher rate. This suggests there may be different motivations for refinancing. Stafford's research, which is co-authored by Erik Hurst of the University of Chicago and which uses micro data from the PSID, suggests that there are two motivations for refinancing. The first is the standard theory of refinancing: Refinancing is a financial option that is exercised when it is "in the money" (i.e., when interest rates fall enough relative to the costs of refinancing to make it financially worthwhile). Stafford's research indicates that people who refinance for this reason are not, in general, spending the proceeds. Instead, the money shows up elsewhere in their portfolio.

But there is a second motive for refinancing: a consumption option. Income is variable but home equity is a source of funds that can be

unlocked via refinancing. People who face an unexpected need for funds may refinance to gain access to their equity for spending. Thus, they may refinance and remove equity from their home even if they end up paying a higher rate (and Stafford finds that those whose refinancing results in a loan-to-value ratio over 0.8 do pay a premium). Note that refinancing for this reason can occur even in a stable interest rate environment. His empirical results indicate that rational households use home equity to buffer shocks to income — refinancing allows households to optimally smooth their consumption in the face of income shocks — and liquidity-constrained households spend most of the proceeds from refinancing.

The implication is that refinancing provides monetary policy another channel through which to affect the economy. Stafford's empirical results suggest that the liquidity-constrained households that experienced unemployment (an income shock) converted 60 cents out of every dollar they removed from equity via refinancing into current consumption (and this is likely a lower bound); on average, they removed about \$16,000. He estimates that there was \$18 billion in new spending by these liquidity-constrained households generated by refinancings as the Fed cut interest rates in 1993-94.

But Stafford also points out the downside. His data show that people who paid premium rates to refinance in the late 1990s often subsequently got into financial distress and pulled back spending. Thus, policymakers cannot expect to use the mortgage refinancing channel recurrently over short time periods. Nonetheless, Stafford hypothesizes that the 2001 recession generated a substantial negative stock market wealth effect that was, to a substantial extent, counteracted by the housing refinancing channel.

Sydney Ludvigson of New York University continued the discussion of the marginal propensity to consume out of wealth. As the stock market surged in the late 1990s, household net worth grew 47 percent from 1995 to 2000. A growing concern was the potential negative effect a large stock market correction might have on consumer spending and the aggregate economy. Another concern was that in the absence of a correction, consumers would be reacting to the surge in the stock market with a lag, so that eventually there would be an acceleration in consumption and an increase in inflationary pressures. Ludvigson concludes that both risks were not significant, based on her research with Martin Lettau of New York University. This research addresses four common statements about consumption and wealth and shows that the conventional wisdom is misleading.

Misleading statement (1):

“An increase in the stock market raises consumption via the wealth effect.” This is misleading because it ignores the distinction between transitory and permanent increases in wealth and treats all wealth changes equally. But only permanent changes in wealth affect consumption. Consumers do not react to unsustained transitory changes. That's not to say that transitory changes can't be long-lived. Ludvigson estimates that a transitory wealth shock continues to affect asset values for a little over four years.

Moreover, Ludvigson's research indicates that nearly all wealth fluctuations are transitory. (The transitory and permanent changes in wealth, consumption, and income are identified using cointegration techniques, exploiting the fact that these three variables follow a common trend over the long term. Deviations from this common trend are transitory changes.) She estimates that over



the postwar period, only 12 percent of the variation in household net worth (wealth) is attributable to permanent changes; the other 88 percent is transitory and mainly driven by volatility of the stock market.

Misleading statement (2): “A good rule of thumb is that a \$100 dollar gain in wealth raises spending by about \$4.” This is true only if the change in wealth is permanent. Most changes in wealth are associated with no change in consumption, since most changes in wealth are transitory.

Conventional estimates put the marginal propensity to consume out of wealth at 4 percent, but Ludvigson’s research suggests that this overstates the effect of an increase in wealth on consumption, since it ignores the distinction between permanent and transitory increases in wealth. She estimates that a \$100 increase in wealth would typically imply only a 60 cent increase in consumption, since most of the change in wealth is transitory. Since most of the gain in the stock market in the late 1990s boom was a transitory change, it wasn’t going to have a large effect on consumption. Hence, worries at the time about the effect of a stock market crash precipitating a rapid retraction of consumer spending and perhaps causing a recession had little foundation.

Consider the bull market from 1995 to 2000. Households reacted to the increase in their wealth but took account of the possibility of a stock market correction. The increase in consumption was \$1.70 per \$100 increase in stock market wealth, not the \$4 it would have been if consumers thought the increased wealth were permanent. Similarly, the stock market retreat from 2000 to 2002 elicited a reduction in consumer spending, but only by about 10 cents per \$100 of wealth lost. According to Ludvigson, historically, the economy has not had

a hard landing stemming from the effects of a stock market correction on consumption.

Misleading statement (3): “Consumers ignore daily volatility but spend if the gains in wealth stay for a few quarters.” No, consumers ignore transitory changes, even if they last for several years.

Misleading statement (4): “It takes many quarters for permanent changes in wealth to affect spending.” This is not true for most of consumer spending, which responds to permanent changes in wealth within about one quarter. Spending on durable goods takes about two quarters to respond, but durables make up only

additional results that show that in contrast to aggregate wealth, the non-stock-market component of wealth, which includes housing, has a very small transitory component; most of the changes are permanent. Thus, households would be more responsive to changes in wealth derived from housing than that derived from the stock market. Stafford’s results suggest that different households respond differently to changes in wealth; so it would be interesting to extend Ludvigson’s aggregate results using Stafford’s micro data allowing for heterogeneity across households. Perhaps different households respond differently to the permanent and transitory components of wealth.

Failure to distinguish between permanent and transitory increases in wealth could lead to overstating the sensitivity of consumption to changes in wealth and, therefore, policy mistakes.

10 percent to 15 percent of consumer spending. This means that in the late 1990s, it was unlikely that there was some pent-up consumption due to the stock market boom that was waiting in the wings to put upward pressure on inflation.

The implication of Ludvigson’s findings is that policymakers need to carefully evaluate the type of wealth increase in order to forecast its effect on consumption. Failure to distinguish between permanent and transitory increases in wealth could lead to overstating the sensitivity of consumption to changes in wealth and, therefore, policy mistakes.

It is interesting to consider the relationship between the Stafford and Ludvigson results. In the audience discussion following the formal presentations, Ludvigson mentioned

A further question is, How do households infer whether the changes in wealth are permanent or transitory? Note that the different marginal propensities to consume out of permanent and transitory changes in wealth may reflect this inference problem. It could be that it takes time for consumers to identify whether a change is permanent, so that the impact of changes in wealth on consumption is only gradual. And the more volatile the component of wealth, the more gradual its impact, since the inference problem is more difficult. This might explain the higher marginal propensity to consume out of changes in non-stock market wealth, which is less volatile, and changes in stock market wealth, which is more volatile.

Another question arises: If consumers are really able to identify

the transitory and permanent components, why aren't they selling when stock market prices are over trend and buying when stock market prices are below trend, thereby eliminating the transitory fluctuations? One unsatisfying answer is investor irrationality. But models of rational investor behavior that allow for time-varying risk aversion on the part of investors (in particular, where risk aversion varies over the business cycle and is higher in bad economic times and lower in good economic times) can also help explain persistent transitory variation in the prices of risky assets. Households might be willing to buy risky assets at temporarily higher prices in good times, since they've become less risk averse, even if they expect lower prices in the future. And they might be unwilling to buy assets with temporarily low prices in bad economic times, since they've become more risk averse.

THE EFFECT OF UNCERTAINTY

The Policy Forum's next session looked at the behavior of two other sectors — labor markets and business investment — in an uncertain environment and concluded with a discussion of how to forecast when there is an increased level of uncertainty.

The labor market has figured prominently in discussions of the recent recession and recovery. Indeed, employment growth had been the "missing link" of this recovery until recently. **Richard Rogerson** of Arizona State University discussed the possible effect increased uncertainty might be having on the labor market, emphasizing that different types of uncertainty may have different effects. He began by pointing out that from a policy perspective, it is important to determine what the underlying causes of observed changes in the labor market are, since they may require very different policy prescriptions. But determining these

causes is difficult because policymakers must analyze data in real time. Often, we economists first look at the data and then try to formulate a model that helps us understand the data. The model generally describes the steady state, a very stable situation, and then adds some shocks that induce fluctuations around that steady state. Then, when studying some particular economic event ex post, the economist will try to assess whether it is best thought of as a fluctuation around the steady state or a change in the steady state. This helps direct the search for the driving forces of the event. If

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one looks at historical episodes, one can tell whether, say, employment growth temporarily declined and then returned to its previous steady state or whether it has stayed down, which would be interpreted as a change in the steady state. But Rogerson points out that economists and policymakers have to look at the data in real time, so it won't be clear at any point in time whether growth will revert to its previous rate or whether it will stay down. In a situation like this, Rogerson says, additional information must be brought to bear. For example, one could look at other indicators of the economy. A rebound in other variables but a continued decline in employment

might indicate that there has been a permanent decline in employment, i.e., a change in the steady state.

The current recovery is an interesting case. The economy continued to lose a significant number of jobs after the recession trough in November 2001. Indeed, the current data suggest that nonfarm payrolls fell by 1.4 million jobs from November 2001 through August 2003, before companies began rehiring in September 2003. In Rogerson's view, that situation should lead one to consider whether some more fundamental, longer run changes are taking place in the economy. One possibility was that increased uncertainty was depressing the steady-state level of employment by discouraging job creation.

But as Rogerson points out, in thinking about the effect of uncertainty on job creation, it is important to be more precise about what is meant by uncertainty. Hiring is a costly and risky endeavor. Recruiting and training workers takes time and money. The payoff from hiring is uncertain, not only because the quality of the worker is uncertain but also because future demand for the firm's product is uncertain. Although this might seem to imply that increased uncertainty would make firms less willing to hire, Rogerson points out that this need not be the case — it depends on what's meant by increased uncertainty. If increased uncertainty means that the firm's average return is the same but the distribution of possible returns is more dispersed (i.e., there's a mean-preserving spread of returns), this would not be bad for job creation. That's because for a firm, returns are truncated on the downside — if the return goes below a certain point, the firm will close — but they are not truncated on the upside — the firm gets to keep all of the upside gains. This type of increased uncertainty

would actually be good for job creation.

But in Rogerson's view, this is probably not the type of increased uncertainty that affected the economy during the beginning of the recovery. Instead, firms thought there was a greater chance that something bad would happen that would cause them to lose their investment. This is not a spreading out of possible returns, but a greater weight on bad outcomes. Rogerson investigated the implications of this type of uncertainty for job creation. He modeled increased uncertainty as corresponding to a shorter expected lifetime for the job once it is created and assumed that job creation entails certain costs, including equipment, recruiting, and training costs. His research implies that a permanent 10 percent increase in uncertainty, i.e., a 10 percent shortening of the expected life of the job, would lead to a 0.5 percent decrease in employment in the steady state — not a trivial effect, but not a large one either.

In Rogerson's view an increase in uncertainty is unlikely to be the main reason for labor market weakness during this recovery: It would take massive increases in uncertainty of the type modeled to result in the employment declines seen early in the recovery. However, he does acknowledge that if the increase in uncertainty were perceived to be temporary, it might have larger effects, as firms wouldn't act until uncertainty was resolved.

In thinking about alternative explanations for labor market weakness, Rogerson notes that although along some dimensions all business cycles are the same, along other dimensions, there is some heterogeneity across those cycles. Current conditions need not be suggesting there has been a fundamental change in the labor market or business cycle. Compar-

ing the current recovery to past recoveries, he shows there was considerable variation in how long it took the labor market to recover. The early part of the 1991-92 recovery looked similar to the current cycle, but the market eventually recovered strongly, i.e., it did not remain at a permanently lower steady state. Rogerson points out that in the 1970-71 recession/recovery, it took almost a year from the trough for labor markets to begin showing some recovery. Thus, other recoveries in the past have had somewhat of a "jobless recovery" aspect to them.

He concludes that it is too soon to say that the labor market weakness that occurred in 1991-92 and in the current recovery represents a change in the nature of business cycles. But if the business cycle has changed this time around, Rogerson suggests it could be changes in production methods, workforce options, or composition of economic activity, or it might be a reflection of the nature of the shocks that caused the cycle. He believes that to understand recoveries, one must also investigate the recessions that preceded them. That is, to come to any understanding about the changing nature of the business cycle, one must look at the whole cycle.

Andrew Abel of the Wharton School, University of Pennsylvania, turned our attention to business investment under uncertainty. He began discussing two theories of investment: the standard Tobin's q theory and the newer real options theory of investment. Although many economists believe that the theories reach different conclusions regarding investment under uncertainty, Abel shows that when these theories are correctly applied, they yield similar answers.

According to q theory, the rate of firm investment, i.e., the rate at which firms want to increase the capital stock, should be related to q ,

the market value of new additional capital relative to its replacement cost. Given that changing one's capital stock involves adjustment costs, a firm will undertake investment until the marginal cost of investment is equal to the marginal value of another unit of capital, q . This implies that the firm will invest up to the point where the net present value of the next unit of capital is equal to zero. Since marginal q is not observable, average q , measured as the value of the firm divided by the replacement cost of its capital stock, is used.

According to the real options theory of investment, the decision to invest now is an irreversible decision; the firm has given up the option of waiting for more pertinent information on which to base its investment decision, and the elimination of this option is a cost of investing today.

What are the implications of the theories for investment under uncertainty? Similar to the point made by Rogerson, it depends on the type of uncertainty and the type of investment. Consider the real options theory: If investment is irreversible (i.e., the capital has no value to others, so it cannot be sold), an increase in uncertainty should tend to discourage current investment, since it raises the value of this option, i.e., the cost of investing today. But if investment is reversible, this need not be the case, since the firm can undo the investment decision.

The effect of increased uncertainty on investment may depend on a number of other aspects of the economy, e.g., how competitive the economy is and whether firms use increasing or decreasing returns to scale technologies. For example, the literature suggests that under increasing returns to scale and perfect competition, an increase in uncertainty, holding all else equal, would raise a firm's q and

therefore induce higher investment (for reasons similar to those Rogerson discussed regarding a firm's hiring decision when the increased uncertainty is a mean-preserving-spread of future returns). But under decreasing returns to scale or when firms have monopoly power and investment is costly to reverse, increased demand uncertainty can mean lower investment. Fortunately, q will give the correct signal: If higher uncertainty results in lower q , investment will decline, and vice versa.

Abel concluded his talk with an application of the q theory to the current business cycle, which was driven by the investment cycle: q rose significantly during the boom of the 1990s and then tumbled, and investment followed it with a slight lag. Abel was optimistic about future investment given the recent turnaround in q .

According to **Laurence Meyer** of the Center for Strategic and International Studies, and of Macroeconomic Advisers, uncertainty and forecasting go hand in hand. These uncertainties include forecasting errors; which model is correct and the parameters of that model; unknowable shocks that can hit the economy; identification of structural change (discussed by Rogerson); and data revisions or lack of data on important fundamentals such as potential growth. What's a forecaster to do with so much uncertainty? Meyer suggests that the first rule is "be humble." Next, identify what you know more about and what you know less about. Finally, continually learn, since the economy is a dynamic place and economic research is advancing as well. One of the important things a forecaster can do is know when an old story is over and when a new one is beginning.

Meyer outlined three major questions facing forecasters in the late 1990s, when he served as a Federal Reserve Board Governor: Was there

a productivity acceleration and what were its implications? Was there a bubble in the stock market (irrational exuberance)? And would the U.S. experience a spillover effect from global financial turmoil?

It wasn't obvious using the real-time data that we were in the midst of a productivity acceleration, but even after that determination, knowing its implications wasn't trivial. In Meyer's view one lesson we learned from the second half of the 1990s was that the productivity acceleration

metric effects on wages and prices, with prices responding more immediately to changes in productivity growth than do wages. In this case, prices fall in response to an unexpected rise in productivity, and NAIRU falls in the short run. Meyer believes that this is a big part of the reason the decline in unemployment didn't lead to higher inflation in the second half of the 1990s. (Later in the day, Al Broaddus, the recently retired president of the Richmond Fed, also spoke about this acceleration in productivity growth.)

In Meyer's view one lesson we learned from the second half of the 1990s was that the productivity acceleration wasn't just a major supply shock; it was a powerful demand shock as well.

wasn't just a major supply shock; it was a powerful demand shock as well, driving an investment and consumption boom. It led to above-trend output growth and rapid employment growth. We also learned that the productivity acceleration was a powerful disinflationary event and that it could significantly increase the equilibrium real interest rate, which has implications for monetary policy.

These developments were not consistent with the simplest models in which productivity growth affects wages and prices symmetrically. In these models, there should be no relationship between NAIRU (the non-accelerating-inflation-rate of unemployment) and productivity growth. In Meyer's view the late 1990s showed that when there's an unanticipated acceleration in productivity, there is a significant effect on short-run NAIRU and on inflation dynamics. Thus, it was time to change the model — in particular, productivity growth may have asym-

Another big question faced Meyer and his fellow policymakers and forecasters: Was the run-up in the stock market based on "irrational exuberance" and therefore unsustainable? If so, a stock market correction could be expected in the near future. In Meyer's view economic performance over the past few years can be explained as a post-bubble hangover, dominated by imbalances inherited from the bubble period, including the capital overhang and over-leveraged corporate balance sheets. These imbalances made it difficult to forecast during this period. To the extent that these imbalances are corrected, it would be a mistake to weight them too heavily in forecasting the future. However, he points out that the future always has some roots in the past — there are legacies that affect the economy going forward.

Today's economy is also affected by several uncertainties. One of the largest in Meyer's view is whether

there's been another acceleration in structural productivity growth. Understanding the source of the acceleration would be important in assessing its impact on the economy, a theme echoed earlier in Rogerson's presentation. Higher productivity growth has been associated with weaker labor markets this time, in contrast to the positive effect it had in the late 1990s. It could be that increased productivity growth derived from different sources may have a different impact on the economy. The acceleration in productivity growth in the late 1990s was driven by capital deepening, which went hand in hand with the investment boom and was beneficial for the labor market. The post-recession acceleration in productivity growth has been driven by competitive pressures and cost cutting, which has been a negative factor for labor markets.

Meyer concluded by addressing how monetary policymakers should respond in times of heightened uncertainty. One school of thought is that when there's uncertainty surrounding important fundamentals, the policymaker should attenuate his response. But another view is that the policymaker should be continually updating his model and reacting as aggressively as he normally would, based on the updated model. In the late 1990s, these two schools would have produced observationally equivalent outcomes: (1) if you are uncertain about the natural rate of unemploy-

ment, as the unemployment rate falls, you might not want to react to it, versus (2) as the unemployment rate falls without any acceleration in inflation, you revise down your estimate of the natural rate and therefore don't need to respond. Meyer says it is difficult to tell which of these was the dominant way of looking at policymaking in the second half of the 1990s.

underpinnings that are being used to study optimal monetary policy. These models are now sometimes referred to as the New Neoclassical Synthesis (NNS). The new macro models incorporate rational expectations; neoclassical foundations so that one can study consumption and investment dynamics; and various mechanisms so that money can affect the real economy in the short run; they also can be used to

evaluate alternative monetary policy rules. These models are fully articulated, in the sense used by Tom Sargent (our next speaker), in that the objectives of firms and households, the structure of the markets in which they interact, the nature of the shocks that hit the economy, and the policy instruments and information available to monetary policymakers are fully specified. Thus, the models have strong micro foundations.

The models have yielded a strong and consistent prescription for monetary policy: The central bank should target a low and stable rate of inflation. Current research in optimal monetary policy design is looking at a variety of motivations for departing from this strict inflation target, including price shocks, aggregate demand shocks, and financial market disruptions.

But the general conclusion is that optimally there would be little variation in the price level.

King reviewed the important ingredients in these models. Rational expectations modeling, developed by Tom Sargent and others, inevitably led to general equilibrium analysis and the development of important



Former Federal Reserve Governor Larry Meyer

OPTIMAL MONETARY POLICY

Important advances in macroeconomic theory and macroeconomic modeling in recent years have given economists the necessary tools to address questions about optimal monetary policy. **Robert King** of Boston University gave a progress report on the development of macroeconomic models with strong theoretical

computational and econometric tools. Economic agents often need to make forecasts about future events in order to make rational decisions, e.g., firms must forecast revenues and costs in order to decide whether an investment is worth undertaking. Under rational expectations, firms and other economic agents adjust their expectations over time to minimize forecast errors — i.e., they are not consistently fooled. Thus, outcomes won't differ consistently from expectations over time. To form its expectations, a firm must think about the product and labor markets in which it interacts, and this leads naturally to the general equilibrium models known as real business cycle (RBC) models. RBC models emphasize the importance of shocks to the real side of the economy and, in particular, the role of technical progress as a source of fluctuations. These models provide a powerful methodology for studying the interactions between the various agents in a macro economy.

King discussed the next major development, the so-called New Keynesian macro model. This model focuses on firms' price-setting behavior and produces a role for monetary policy in economic stabilization. A key ingredient is the notion of price stickiness, i.e., firms have some market power and set prices, but they hold those nominal prices fixed for some period because adjusting prices is costly. This, in turn, gives the central bank an avenue for affecting real activity by affecting real markups and relative prices. Note that a firm's pricing decisions in the New Keynesian model depend on expected future inflation, and these pricing decisions determine current inflation. Thus, current inflation depends on expected inflation.

The New Neoclassical Synthesis (NNS) builds on the New Keynesian model by embedding the New Keynesian price stickiness and

imperfect competition in a fully articulated stochastic dynamic general equilibrium model with strong micro foundations. A major benefit of these models is that they can be used to systematically study the effects of alternative monetary policy rules on real economic activity. The NNS models indicate that monetary policy shocks can have large and persistent effects on real economic activity and that the choice of rule matters. The models also underscore the importance of credibility in the monetary policymaker, since current inflation depends on expected future inflation. In King's view the NNS underscores that the management of expectations may be a key part of the central bank's job and that imperfect credibility in the monetary policymaker may be very important in understanding particular historical economic episodes.

King concluded his presentation by discussing the implications of the NNS models for optimal monetary policy. Within the context of the NNS model, a policy of strict inflation targeting at a zero inflation rate (i.e., a price level target) is optimal because it eliminates the relative price distortions caused by the interaction of inflation and sticky prices, since there is no inflation; it stabilizes the average markup and thereby holds fixed the market power distortion, which the central banks cannot eliminate; and it generates the same level of real output that would occur if prices were fully flexible and not sticky. Note that this "natural rate of output" fluctuates with the real shocks that hit the economy. King indicates that estimates of the cost of inflation in these models are dependent on the details about price stickiness, which is assumed to be exogenous; he suggests this is one place where further research is necessary.

More recent work with NNS models suggests that optimal monetary

policy may deviate from strict adherence to a price level target but that the models constructed to date indicate that optimal policy would allow only a little change in the price level. King conjectures that simple targeting rules may be close to optimal for a wide class of models and that this remains an important subject of ongoing and future research.

Thomas Sargent of New York University continued the discussion of optimal policy under uncertainty. The Federal Open Market Committee (FOMC) comprises 19 members. As Sargent points out, it could be that they have different goals and objectives. They might have different information on the economy — after all, the committee was designed to have regional representation. Or they might have different models of the economy — i.e., they may put different probability distributions on the various possible sequences of future economic outcomes. Sargent focused his discussion on this latter case.

As Sargent explained, rational expectations, which was discussed earlier by King, has been a powerful force in macroeconomics, and its power derives from the fact that it eliminates the possibility of different agents' having different views of the world. Rational expectations doesn't allow expectations to be free parameters; it makes them outcomes, and it delivers cross-equation restrictions that are important for deriving optimal policy. But as Sargent points out, rational expectations also eliminates any discussion of model mis-specification or multiple models. Under standard rational expectations, all agents have the same model. They can have different information, but they have the same economic model. In Sargent's view, learning may be technically difficult to analyze, but in a world with a single model, it is philosophically

trivial — it's just the application of Bayes' Law to update beliefs.

But experimental evidence suggests that agents do not act according to Bayes' Law applied to a single model. Rational people behave as if they have multiple models, i.e., multiple probability distributions over various outcomes, in their heads. This is a very profound kind of model uncertainty, and it is not at all clear how learning should take place in such a world. (For example, should you apply Bayes' Law model by model?) In Sargent's view this type of model uncertainty is an important factor in monetary policymaking.

With Tim Cogley, Sargent is currently researching models of learning with an application of why it took the Fed so long to stabilize the great inflation of the 1970s. One story for Fed decision-making in this time period is that economic research in 1960 indicated there was an exploitable Phillips curve (i.e., a systematic trade-off between inflation and unemployment), and in the mid-1960s, the Fed started trying to exploit it. Inflation started rising. Economic research then suggested there is no exploitable Phillips curve and that an optimal policy would target low inflation. The data in the early 1970s provided confirmation, and subsequently, the Fed returned to targeting low inflation.

This story is a learning story, with the Fed acting as a Bayesian decision-maker. But Sargent's research suggests that it is difficult to get this story to fit the facts. If the Fed was using the incoming data to update its beliefs about which was the correct economic model, by the early to mid-1970s, it would have put almost all the weight on the non-exploitable Phillips curve model as being the correct model. A Bayesian decision-maker, then, would have begun targeting inflation in the early to mid-1970s. But the Fed de-

layed. Sargent's research suggests that the Fed may have been "model averaging" instead. It's true that in the early to mid-1970s, the evidence suggested that the non-exploitable Phillips curve model was almost certainly correct, but there was still a very small chance that the exploitable Phillips curve model was right. If it was, targeting inflation would have yielded extremely bad economic outcomes. Given that, inflation targeting was too risky. The Fed behaved as a min-maxer — it chose the policy that yielded the best outcome

economic conditions and assessing what it indicates about the current state of the economy and the near-term outlook, then determining how promptly and strongly to respond to this information, based on instinct and common sense. Broaddus thinks this characterization is somewhat misleading, since it suggests a lesser role for economic analysis, including relatively recent developments in the academic literature. In his view, economic analysis has frequently played a central role in determining policy, especially over the

Broaddus advises policymakers that in addition to carefully monitoring incoming data, they must also use modern economic analytical tools to be successful.

under the worst-case scenario of assuming the wrong model was correct. It was only when the exploitable Phillips curve model was proven incorrect that the Fed began to target inflation.

Sargent's research on policymakers' learning under model uncertainty is relevant for today's FOMC, and it is likely to remain relevant for the foreseeable future because, despite the advances outlined by King, model uncertainty will not be going away anytime soon.

Our next speaker, **Al Broaddus**, president of the Federal Reserve Bank of Richmond (since retired), related firsthand knowledge of how an FOMC member learns and uses economic research in formulating policy decisions. Broaddus indicates that the economists in the Research Department at the Richmond Fed, as well as academic visitors in the department, keep him abreast of ongoing research in monetary economics. Some people believe that the FOMC sets its target rate for the federal funds rate mainly by looking at data on current eco-

longer run. Indeed, Broaddus thinks that one of the Fed's greatest achievements over the last three decades was its role in breaking the high inflation of the late 1970s and early 1980s and subsequently helping to bring the rate down to its current low level. Broaddus indicates that economic research showing there was no exploitable systemic tradeoff between inflation and unemployment, discussed earlier by Sargent, paved the way for this accomplishment.

Broaddus next discussed three examples of how economic analysis guided his own thinking as a policymaker and how he has used economic principles in arguing his positions at FOMC meetings. The first involved the inflation targeting debate at the January 31-February 1, 1995, FOMC meeting.² Broaddus spoke in favor of inflation targeting, a position he continues to hold today. The underlying economic principle that in-

²Transcripts of the meetings Broaddus discussed are available on the Board of Governors' web site at www.federalreserve.gov/fomc/transcripts.



Fed Presidents Al Broaddus and Tony Santomero

formed his view was rooted in the idea of rational expectations, namely, that by announcing an explicit long-run inflation objective, the FOMC would enhance the credibility of its commitment to low inflation. In a rational expectations world, this increased credibility would make it less likely that inflation would reaccelerate but, if it did, would make it less costly to bring inflation back down.

Broaddus points out another benefit of inflation targeting: it would allow the FOMC to act more aggressively to help stabilize the economy in the short run, since its actions to do so would be less likely to reduce its credibility, thereby setting off an inflation scare. Broaddus continues to believe that an inflation target would be beneficial. Indeed, the recent experience with disinflation and proximity to the zero bound on the fed funds rate underscores the need to avoid not only inflation that is too high but also inflation that is too low. Broaddus stated that to him a 1 percent to 2 percent

inflation target range for the core PCE would be acceptable.

Broaddus's second example involves the Fed's intervention in foreign exchange markets on behalf of the Treasury with the aim of affecting the value of the U.S. dollar. An extended discussion occurred during the November 15, 1994, FOMC meeting. Broaddus is opposed to such intervention based on the underlying economic principle that intervention cannot have a sustained effect on the value of the dollar unless it is supported by basic monetary policy. He points out the problem that would arise if the policy needed to support the dollar conflicted with the appropriate policy based on domestic economic conditions. At the very least, it might raise doubts about whether Fed policy will support domestic or external objectives. In Broaddus's view, the Fed's intervening on behalf of the Treasury might put the Fed's credibility as an independent

monetary policymaker at risk unless the Fed "sterilized" this intervention, i.e., neutralized its effect on the fed funds rate by carrying out offsetting open market operations. But if the Fed did so, the interventions would be unlikely to have a sustained impact on the value of the dollar.

Broaddus's third example involves the recognition that an increase in trend productivity growth has important implications for monetary policy. In 1996 and 1997, the FOMC began to recognize that the U.S. might be experiencing a sustained increase in trend productivity growth. Faster trend productivity growth would imply slower growth in the cost of labor per unit of output for a while, since it would take time for real wages to catch up. As firms passed the lower cost through to lower prices of their final goods and services, this would put downward pressure on inflation. Most reasoned that as long as rising productivity growth kept inflation low, the FOMC could refrain from raising its funds rate target.

At the May 20, 1997, FOMC meeting, Broaddus discussed another possible implication of higher trend productivity growth for monetary policy, namely, that the equilibrium real interest rate might be higher as a result of higher trend productivity growth. Broaddus explained his economic reasoning. Higher trend productivity growth should cause firms to expect higher future earnings and workers to expect higher future wages in a world where the Fed has credibility for keeping inflation stable and, therefore, expected inflation stable. If so, at the prevailing level of real interest rates, firms and workers would want to bring some of this expected future income forward and would do so by borrowing against it. To prevent excessive current demand, current real interest rates would need to rise. Broaddus reports

that his argument did not elicit a response during the FOMC meeting. But in his view, somewhat more preemptive tightening might have prevented some of the excess investment during the late 1990s boom, which was followed by an investment decline and recession.

Broadus advises policy-makers that in addition to carefully monitoring incoming data, they must also use modern economic analytical tools to be successful. He believes his colleagues on the FOMC understand this and that economic analysis has improved policymaking over the past 20 years.

CORPORATE GOVERNANCE

Our last session focused on corporate governance, the system by which a corporation is managed and controlled. The recent corporate accounting and governance scandals have brought governance issues to the forefront. Although the effect these scandals have had on real economic activity is difficult to measure, the scandals are often listed as one of the factors that put a damper on the early stages of the recovery. Indeed, the FOMC's August 13, 2002, press release read: "The softening in the growth of aggregate demand that emerged this spring has been prolonged in large measure by weakness in financial markets and heightened uncertainty related to problems in corporate reporting and governance."

Andrew Metrick of the Wharton School, University of Pennsylvania, discussed some of his research on the design of corporate governance structures. How much power should shareholders, the owners of firms, yield to managers? Yielding too much power creates the potential for agency problems, since the managers' and shareholders' objectives may differ. Yielding too little means giving up the

benefits of the managers' expertise and resultant superior decision-making. In setting up the governance structure, shareholders want to be able to get rid of managers who aren't doing their jobs, but they also want to give managers the power to make the decisions necessary to run the firm.

Before the wave of hostile takeovers in the 1980s, large firms were effectively immune from takeover. But as a result of the merger wave, in the mid-1980s, firms started adopting takeover defenses, such as poison pills and greenmail, and other provisions, to prevent takeover and reduce shareholder rights. Around the same time, many states passed laws to prevent outside firms from taking over firms in their states. The takeover wave subsided, but most of these provisions remained with little change in the 1990s.

Using the variation in those provisions across firms, Metrick and his coauthors, Paul Gompers and Joy Ishii, developed a "governance index" to proxy for the level of shareholder rights at a large sample of firms. The governance index is constructed using 24 different provisions a firm might have in place that either decrease or increase shareholders' rights (e.g., poison pills, golden parachutes, severance contracts not contingent on a change in control of the firm, whether a supermajority of shareholders is needed to approve a merger, etc.) A higher level of the governance index means a higher level of managerial power relative to shareholder power. The researchers studied how well firms with different levels of shareholder rights performed in the 1990s and found that firms with stronger shareholder rights according to their index earned significantly higher returns than firms with weak shareholder rights. Stronger shareholder rights are also associated with higher profits, higher sales growth, lower capital expenditures, and fewer

acquisitions made. Other researchers have found that firms with stronger shareholder rights generally have lower CEO pay and stronger pay-for-performance and that firms with weaker shareholder rights tend to overinvest in booms and then have to cut more as the economy weakens.

Metrick points out that the governance index is a simple construct and not a perfect measure of corporate governance and that the research cannot address causality (i.e., does good corporate governance lead to good performance? Or does good performance beget good corporate governance?). Nonetheless, in his view the results suggest that governance does matter for firm performance and decision-making and may have large macroeconomic implications. Metrick recommends empowering shareholders by dismantling takeover defenses, making it easier for shareholders to elect directors, and clearing the path for shareholder proposals that would be binding on a firm's management.

Peter Hooper of Deutsche Bank Securities, Inc., continued the discussion by pointing out that up to this point, legislation and regulation have driven improvements in corporate governance, but in his view, investor preference will increasingly drive future improvements. As research by Metrick, Deutsche Bank, and others show, investors have good reason to take corporate governance seriously. However, governance, which has both structural elements (such as the composition and independence of the board of directors) and behavioral elements (such as the effectiveness and capability of the directors), has been slow to gain the attention of analysts and investors. One reason is that U.S. firms are generally perceived to be well run and well regulated and that the scandals involve a few bad apples. Another reason is that it has been hard to

get good data on governance. This is beginning to change. Information on governance is becoming more widely available, and a number of research firms have begun to rate firms on their corporate governance. In Hooper's view this should result in institutional investors' taking corporate governance issues more into account.

Deutsche Bank Securities has produced its own rating system for firms' corporate governance, combining quantitative and qualitative factors in four areas: board structure, independence, and performance; shareholder treatment (e.g., the presence of anti-takeover devices); information disclosure; and corporate compensation. The resulting corporate governance scores vary widely across the firms in the S&P500. In Hooper's judgment, the dispersion means that investors cannot take for granted that being a U.S. firm or being in the S&P500 means that corporate governance standards are completely sound; the average firm has room to improve its corporate governance performance on this metric. In fact, on average, governance scores have been improving: From June 2001 to June 2003, 71 percent of the companies in the S&P500 showed improved scores. That's not surprising given the increased regulatory and media interest in governance over this period. More surprising to Hooper is that scores at 27 firms fell significantly over this period. The key factors leading to the deterioration were the adoption of poison pills and/or equity incentive plans that would lead to dilution in shareholder voting power.

There appears to be a weak positive correlation between corporate governance score and firm size as measured by market capitalization, but as Hooper points out, the causation could go either way. Larger firms

could be instituting better governance structures, perhaps because of greater investor scrutiny or because more resources can be devoted to governance or better governance structures could lead to larger size over time. The governance score does not seem to be systematically related to which U.S. state a firm is incorporated in, but firms incorporated offshore in Panama, the Cayman Islands, or Bermuda have noticeably lower scores. The Deutsche Bank research indicates that good corporate governance is associated with a higher return on equity in 10 out of the 16 major industry sectors of the S&P500, consistent with Metrick's results. While corporate governance does not explain much of the overall volatility in stock prices across S&P500 firms, better governance does appear to be associated with a somewhat lower variance in a firm's stock price.

Hooper's conclusion is that investors and analysts have lagged in appreciating the importance of corporate governance to firm valuation, partly because of the lack of information and data on governance.

The scandals of the last two years have raised awareness of the issue, and data are becoming increasingly available with which to rate firms on their corporate governance performance. Hooper believes, as a result, investors will increasingly be taking corporate governance into account when making their investment decisions.

SUMMARY

The 2003 Policy Forum generated lively discussion among the program speakers and audience participants on a number of issues that policymakers must confront in setting policy in uncertain times, which may be an apt description of our economy in the recent business cycle. Our hope is that the ideas raised will spur further research and foster a greater understanding of today's economy.

We will hold our fourth annual Philadelphia Fed Policy Forum, "Challenges and Opportunities in the Global Economy: Perspectives on Outsourcing, Exchange Rates, and Free Trade," on Friday, December 3, 2004. You will find the agenda on page 43.



Tony Santomero, Mike Dotsey, and Charles Plosser of the University of Rochester