

For release on delivery  
8:00 p.m. EDT  
March 24, 2010

Homework Assignments for Monetary Policymakers

Remarks by

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at the

Cornelson Distinguished Lecture at Davidson College

Davidson, North Carolina

March 24, 2010

The events of the past few years have raised many questions for central bankers. Although prompt and innovative actions by the Federal Reserve and other central banks helped prevent a severe economic downturn from turning into something even worse, our experience also highlighted a number of areas we need to study further to see whether we can improve the conduct of monetary policy. I've titled my presentation "Homework Assignments" because I don't think the answers are clear, though I will venture some tentative thoughts. I have four assignments on my list; I could easily have more. And others would have yet a different list. I recognize that the complexity of these questions could keep us profitably engaged for a whole semester, but let's see if I can outline some of the challenges and possible responses in an evening.

The first two assignments concern the policy actions the Federal Reserve and other central banks took during the financial crisis. A key part of the Federal Reserve's response was to fulfill its traditional role of providing backup liquidity to sound institutions during times of financial turmoil. In a break with tradition, we had to provide that liquidity to nonbank financial institutions as well as to banks. One assignment is to evaluate the implications of the changing character of financial markets for the design of the liquidity tools the Federal Reserve has at its disposal when panic-driven runs on banks and other key financial intermediaries and markets threaten financial stability and the economy. In addition to providing liquidity on an unprecedented scale, we reduced our policy interest rate (the target for the rate on overnight loans between banks) effectively to zero, and then we continued to ease financial conditions and cushion the effect of the financial shock on the economy by making large-scale purchases of several types of securities. My second assignment involves improving our understanding of the effects of those purchases and the associated massive increase in bank reserves.

The third and fourth assignments relate to whether changes to the conduct of monetary policy in normal times could make financial instability and its wrenching and costly economic consequences less likely. Number three involves considering whether central banks should use their conventional monetary policy tool--adjusting the level of a short-term interest rate--to try to rein in asset prices that seem to be moving well away from sustainable values, in addition to seeking to achieve the macroeconomic objectives of full employment and price stability. The fourth and final assignment concerns whether central banks should adjust their inflation targets to reduce the odds of getting into a situation again where the policy interest rate reaches zero.<sup>1</sup>

### **Changes in Financial Markets and the Federal Reserve's Liquidity Tools**

Financial markets have evolved substantially in recent decades. The task of intermediating between investors and borrowers has shifted over time from banks, which take deposits and make loans, to securities markets, where borrowers and savers meet more directly, albeit with the assistance of investment banks that help borrowers issue securities and then make markets in those securities. An aspect of the shift has been the growth of securitization, in which loans that might have been on the books of banks are converted into securities and sold in markets. Serious deficiencies with these securitizations, the associated derivative instruments, and the structures that evolved to hold securitized debt were at the heart of the financial crisis. Among other things, the structures exposed the banking system to risks that neither participants in financial markets nor regulators fully appreciated.

The implications of these changes are far reaching, but I want to concentrate on those that bear on the tools we use to supply liquidity to the financial system. Every central bank had to adapt its liquidity facilities to some degree, but the Federal Reserve had to adapt more than most.

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<sup>1</sup> The views expressed here are my own and not necessarily those of my colleagues on the Board of Governors or the Federal Open Market Committee. William Nelson of the Board's staff contributed to these remarks.

Before the crisis, the Federal Reserve adjusted the liquidity it provided to the financial system through daily operations with a relatively small set of broker-dealers against a very narrow set of collateral--Treasury debt, agency debt, and agency mortgage-backed securities. Those transactions had the effect of changing the quantity of reserve balances that banks hold at Federal Reserve Banks, and that liquidity was distributed by interbank funding markets through the banking system in the United States and around the world. In addition, the Federal Reserve stood ready to lend directly to commercial banks and other depository institutions at the “discount window.” At their discretion, banks could borrow overnight at an above-market rate against a broad range of collateral when they had a need for very short-term funding.

But this structure proved inadequate in the crisis. Interbank markets stopped functioning as effective means to distribute liquidity, increasing the importance of direct lending through the discount window. At the same time, however, banks became extremely reluctant to borrow from the Federal Reserve for fear that the borrowing would become known and thus cast doubt on their liquidity condition. Importantly, the crisis also involved major disruptions of important funding markets for other institutions. Commercial paper markets no longer served as sources of funds to lenders or to nonfinancial businesses; investment banks could not borrow for even a short term on a secured basis when lenders began to have doubts about some of the underlying collateral; banks overseas could not reliably exchange their currency in swap markets to fund their dollar assets beyond the very shortest terms; and investors pulled out from money market mutual funds. These disruptions posed the same threats to the availability of credit to households and businesses as did runs on banks in a more bank-centric financial system. Intermediaries unable to fund themselves were forced to sell assets, driving down prices and exacerbating the crisis; they were unwilling to make markets necessary to allow households and businesses to

borrow; and households and businesses unable to borrow were unable to spend, deepening the recession.

The Federal Reserve responded by providing funding when it became unavailable to banks and other intermediaries. We reduced the spread of the discount rate over the target interbank rate, lengthened the maximum maturity of loans to banks from overnight to 90 days, and also provided discount window credit through regular auctions to overcome the reluctance to borrow. In addition, we created emergency liquidity facilities to meet the funding needs of key market participants, including primary securities dealers, money market mutual funds, and other users of short-term funding markets.<sup>2</sup> We did so while generally adhering to time-honored central banking principles for countering a financial panic: Lend freely to solvent institutions at a penalty and against good collateral. We also lent dollars to other central banks so that they could help banks in their jurisdictions meet their dollar funding needs, thus easing pressures on U.S. money markets.

Now that the financial markets are functioning much better, we have closed the emergency facilities that we created to lend to nonbanks. The homework assignment is to think about the design of liquidity facilities going forward. I've tentatively concluded that the recent crisis has demonstrated that in a financial system so dependent on securities markets and not just banks, we need to retain the ability to lend against good collateral to certain groups of sound, regulated, nonbank financial firms. I'm not suggesting that we establish permanent contingency liquidity facilities, just that the Federal Reserve retain the authority to create the tools necessary to meet liquidity needs of groups of nonbank institutions should a panic impair the ability of securities markets, as well as banks, to function and the Board of Governors find that the absence

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<sup>2</sup> Primary dealers are broker-dealers that trade in U.S. government securities with the Federal Reserve Bank of New York.

of such functioning would threaten the economy.<sup>3</sup> The collateral would have to be of good quality and the institutions sound to minimize any credit risk to the Federal Reserve.

Holding open this possibility is not without cost. With credit potentially available from the Federal Reserve, institutions would have insufficient incentives to manage their liquidity to protect against unusual market events. Hence, the emergency credit would generally be provided only to groups of institutions that were regulated and supervised to limit such moral hazard. If the Federal Reserve did not directly supervise the institutions that would potentially receive emergency discount window credit, we would need an ongoing and collaborative relationship with the supervisor. The supervisor should ensure that any institution with implicit access to emergency discount window credit nevertheless maintained conservative liquidity policies. The supervisor would also provide critical insight into the financial condition of the borrower and the quality of the available collateral and more generally whether lending was necessary and appropriate.

### **Large-Scale Asset Purchases and the Buildup of the Reserve Base**

The Federal Reserve and other central banks reacted to the deepening crisis in the fall of 2008 not only by opening new liquidity facilities, but also by reducing policy interest rates to close to zero. Such rapid and aggressive responses were expected to cushion the effects of the shock on the economy by reducing the cost of borrowing for households and businesses, thereby encouraging them to keep spending. In addition, the Federal Reserve and a number of other central banks have provided more guidance than usual about the likely future path of interest rates to help financial markets form more accurate expectations about policy in a highly

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<sup>3</sup> I am not referring here to the loans we extended to individual troubled institutions like American International Group, whose disorderly failure would have had catastrophic consequences for the economy. That sort of lending is more appropriately done by the fiscal authorities and conducted only in association with the exercise of new authority to regulate and resolve systemically important institutions.

uncertain economic and financial environment. In particular, we were concerned that market participants would not fully appreciate for how long we anticipated keeping interest rates low. If they hadn't, intermediate- and longer-term rates would have declined by less, reducing the stimulative effect of the very low policy rates.

Given the severity of the downturn, it became clear that lowering short-term policy rates alone would not be sufficient. We needed to go further to ease financial conditions and encourage spending. Thus, to reduce longer-term interest rates, like those on mortgages, we purchased large quantities of longer-term securities, specifically Treasury securities, agency mortgage-backed securities, and agency debt.

Central banks have lots of experience guiding the economy by adjusting short-term policy rates and influencing expectations about future policy rates, and the underlying theory and practice behind those actions are well understood. However, the economic effects of purchasing large volumes of longer-term assets, and the accompanying expansion of the reserve base in the banking system, are much less well understood. So my second homework assignment for monetary policymakers and other interested economists is to study the effects of such balance sheet expansion; better understanding will help our successors if, unfortunately, they should find themselves in a similar position, and it will help us as we unwind the unusual actions we took.

One question involves the direct effects of the large-scale asset purchases themselves. The theory behind the Federal Reserve's actions was fairly clear: Arbitrage between short- and long-term markets is not perfect even when markets are functioning smoothly; and arbitrage is especially impaired during panics when investors are putting an unusually large premium on the liquidity and safety of short-term instruments. In these circumstances, reducing the supply of long-term debt pushes up the prices of the securities, lowering their yields.

But by how much? Uncertainty about the likely effect complicated our calibration of the purchases, and the symmetrical uncertainty about the effects of unwinding the actions--of reducing our portfolio--will be a factor in our decisions about the timing and sequencing of steps to return the portfolio to a more normal level and composition. Good studies of these sorts of actions are sparse. Currently, we are relying in large part on studies that examine how much interest rates dropped when purchases were announced in the United States or abroad. But such event studies may not be an ideal means to predict the consequences of reducing our portfolio, in part because the economic and financial environment will be very different, and also because event studies do not measure effects that develop or reverse over time. We are also uncertain about how, exactly, the purchases put downward pressure on interest rates. My presumption has been that the effect comes mainly from the total amount we purchase relative to the total stock of debt outstanding. However, others have argued that the market effect derives importantly from the flow of our purchases relative to the amount of new issuance in the market. Some evidence for the primacy of the stock channel has accumulated recently, as the prices of mortgage-backed securities appear to have changed little as the flow of our purchases has trended down.

A second issue involves the effect of the large volume of reserves created as we buy assets. The Federal Reserve has funded its purchases by crediting the accounts that banks hold with us. Those deposits are called “reserve balances” and are part of bank reserves. In our explanations of our actions, we have concentrated, as I have just done, on the effects on the prices of the assets we have been purchasing and the spillover to the prices of related assets. The huge quantity of bank reserves that were created has been seen largely as a byproduct of the purchases that would be unlikely to have a significant independent effect on financial markets and the economy. This view is not consistent with the simple models in many textbooks or the

monetarist tradition in monetary policy, which emphasizes a line of causation from reserves to the money supply to economic activity and inflation. Other central banks and some of my colleagues on the Federal Open Market Committee (FOMC) have emphasized this channel in their discussions of the effect of policy at the zero lower bound. According to these types of theories, extra reserves should induce banks to diversify into additional lending and purchases of securities, reducing the cost of borrowing for households and businesses, and so should spark an increase in the money supply and spending. To date, that channel does not seem to have been effective; interest rates on bank loans relative to the usual benchmarks have continued to rise, the quantity of bank loans is still falling rapidly, and money supply growth has been subdued. Banks' behavior appears more consistent with the standard Keynesian model of the liquidity trap, in which demand for reserves becomes perfectly elastic when short-term interest rates approach zero. But portfolio behavior of banks will shift as the economy and confidence recover, and we will need to watch and study this channel carefully.

Another uncertainty deserving of additional examination involves the effect of large-scale purchases of longer-term assets on expectations about monetary policy. The more we buy, the more reserves we will ultimately need to absorb and the more assets we will ultimately need to dispose of before the conduct of monetary policy, the behavior of interbank markets, and the Federal Reserve's balance sheet can return completely to normal. As a consequence, these types of purchases can increase inflation expectations among some observers who may see a risk that we will not reduce reserves and raise interest rates in a timely fashion.

In fact, longer-term inflation expectations generally have been quite well anchored over the past few years of unusual Federal Reserve actions. And we are developing and testing the tools we need to remove accommodative monetary policy when appropriate. I am confident the

Federal Reserve can and will tighten policy well in advance of any threat to price stability, and successful execution of this exit will demonstrate that these emergency steps need not lead to higher inflation.

### **Monetary Policy and Financial Imbalances**

The past few years have illustrated two lessons about the relationship between macroeconomic stability and financial stability. First, macroeconomic stability doesn't guarantee financial stability; indeed, in some circumstances, macroeconomic stability may foster financial instability by lulling people into complacency about risks. And second, some shocks to the financial system are so substantial, especially when they weaken a large number of intermediaries, that decreases in aggregate demand can be large, long lasting, and not quickly or easily remedied by conventional monetary policy.

Given the heavy costs of the financial crisis, the question naturally arises as to how it could have been avoided. My third assignment is to reexamine whether conventional monetary policy should be used to lean against financial imbalances as well as aim for the traditional medium-term macroeconomic goals of maximum employment and price stability. One key question is whether we are likely to know enough about asset price misalignments and the effects of policy adjustments on those misalignments to give us the confidence to deliberately tack away for a time from exclusive pursuit of our macroeconomic objectives. Obviously, reducing the odds of financial crises would be very beneficial, but we need to balance that important objective against the potential costs and uncertainties associated with using monetary policy for that purpose.

One type of cost arises because monetary policy is a blunt instrument. Increases in interest rates damp activity across a wide variety of sectors, many of which may not be

experiencing speculative activity. Moreover, small policy adjustments may not be very effective in reining in speculative excesses. Our experience in 1999 and 2005 was that even substantial increases in interest rates did not seem to have an effect on dot-com stock speculation in the first episode or on house price increases in the second. And larger adjustments would incur greater incremental costs. As a consequence, using monetary policy to damp asset price movements could lead to more variability in output and inflation around their objectives, at least in the medium term. Among other things, greater variability in inflation could lead inflation expectations to become less well anchored, diminishing the ability of the central bank to counter economic fluctuations.

We simply do not have good theories or empirical evidence to guide policymakers in using short-term interest rates to limit financial speculation. Given our current state of knowledge, my preference at this time would be to use regulation and supervision to strengthen the financial system and lean against developing problems. Monetary policy would be used only if imbalances were building and regulatory policies either were unavailable or had proven ineffective. The homework assignment is to improve our ability to identify incipient financial imbalances and understand their interactions with changes in policy interest rates.

A related issue, which I'll assign for extra credit, is critical for the conduct of policy in the future. Some observers have attributed the bubbles observed in some asset prices in recent years to a decades-long downward trend in real interest rates. In this view, the decline in interest rates has caused investors to reach for yield by purchasing riskier assets with higher returns, driving the prices on riskier assets above fundamental values. Many critics of central banks ascribe the drop in real rates to monetary policy decisions that kept rates unusually low, on average, over the business cycle. From my perspective, the decisions the central banks were

making about their policy rates were shaped by the underlying determinants of the balance of saving and investment, including, in the past decade or so, the high saving propensities of the newly emerging Asian economies and the sluggish rebound in investment globally after the recession early last decade. Nonetheless, it is important that we understand the reasons for the decline in average real rates and whether low rates are likely to persist--and *that* very tough problem is the extra credit assignment. For one thing, as the economic expansion gains traction and central banks back off the current highly accommodative stance of policy, policymakers will need to understand how the longer-term trend in real rates has influenced the point at which the policy rate becomes restrictive. For another, if rates are going to continue to be low by historical standards, regulators will need to be especially alert to any signs that a reach for yield by investors is contributing to excessive risk-taking.

### **Inflation Objectives**

The final homework assignment concerns the inflation objectives of central banks. Central banks have widely chosen to target inflation rates near 2 percent. The Federal Reserve is required by law to conduct monetary policy to achieve maximum employment and stable prices. We haven't announced an explicit inflation rate target consistent with that dual mandate, but the Federal Reserve governors and Reserve Bank presidents publish our individual forecasts for inflation over the longer run, conditional on our individual views of appropriate monetary policy. Those forecasts indicate that most of the FOMC participants believe that inflation should converge to 1-3/4 to 2 percent over time.

Recently, some prominent economists have called for central banks to raise their inflation targets to about 4 percent. Shifting inflation targets up would tend to raise the average level of

nominal interest rates and thus give central banks more room to lower interest rates in response to a bad shock to the economy before running against the zero bound.

Although I agree that hitting the zero bound presents challenges to monetary policy, I do not believe central banks should raise their inflation targets. Central banks around the world have been working for 30 years to get inflation down to levels where it can largely be ignored by businesses and households when making decisions about the future. Moreover, inflation expectations are well anchored at those low levels.

Increasing our inflation targets could result in more-variable inflation and worse economic outcomes over time. First of all, inflation expectations would necessarily have to become unanchored as inflation moved up. I doubt households and businesses would immediately adjust their expectations up to the new targets and that expectations would then be well anchored at the new higher levels. Instead, I fear there could be a long learning process, just as there was as inflation trended down over recent decades. Second, 4 percent inflation may be higher than can be ignored, and businesses and households may take inflation more into account when writing contracts and making investments, increasing the odds that otherwise transitory inflation would become more persistent.

For both these reasons, raising the longer-term objective for inflation could make expectations more sensitive to recent realized inflation, to central bank actions, and to other economic conditions. That greater sensitivity would reduce the ability of central banks to buffer the economy from bad shocks. It could also lead to more-volatile inflation over the longer run and therefore higher inflation risk premiums in nominal interest rates. It is notable that while the economic arguments for raising inflation targets are well understood, no major central bank has raised its target in response to the recent financial crisis.

Another approach to this problem is for central banks to target a gradually rising price level rather than a constant inflation rate. Imagine a plot of the consumer price index (CPI) from today onward increasing 2 percent each year. Central banks would commit to adjusting policy to keep the CPI near that line.

The advantage of this approach, in theory at least, is that when a negative shock drives prices below the target level, people will automatically expect the central bank to increase inflation for a while to get back to trend. In principle, that expectation would lower real interest rates without the central bank changing its inflation commitment, even if nominal interest rates were pinned at zero. It could also make it easier for people to make long-term economic decisions because they could anticipate that inflation misses would be reversed over time, reducing uncertainty about the future price level.

While I appreciate the elegance of this price-level-targeting idea, I have serious doubts that it would work in practice. Central to the idea is that the Federal Reserve would be committing to hit a price level that was growing at a constant rate from a fixed point in the past. The specific inflation rate that could be expected in the future would change over time, depending on the inflation that had been realized up to that point. You could know what inflation rate to expect only if you knew both the current consumer price index and the Fed's target for the index in the future. In addition, the inflation rate that you could expect would be different for different horizons. Moreover, central banks are able to control inflation only with a considerable lag and even then only imprecisely, so the process of hitting a target would likely involve frequent overshooting and correction and consequently frequently shifting inflation objectives.

Contrast this approach with the communications required of central banks when targeting a specific inflation rate. For example, central banks targeting a 2 percent inflation rate typically put that target prominently on their webpage. If those banks were instead targeting a price level growing at 2 percent, their webpages would have to provide a table of inflation rate targets for a variety of horizons, and the targets would change each month. I fear that rather than anchoring people's expectations about prices, it could leave them perplexed.

As you can tell, I see compelling reasons why central banks should stick to their current inflation objectives. Those reasons relate most importantly to the effect of a central bank's communications and behavior on its credibility and on the public's expectations. More study leading to a better understanding of the linkage between central bank actions and expectation formation should improve the ability of central banks to achieve society's inflation and output objectives more effectively under a variety of circumstances, including in a severe negative shock of the type we recently experienced.

## **Conclusion**

Many central bankers and economists, myself included, were a little complacent coming into the crisis. We thought we knew enough about the basic structure of the markets and the economy to achieve economic and price stability with relatively minor perturbations. And we thought we had the tools necessary to deal with liquidity shortages and maldistributions. The reality is that we didn't understand the economy as well as we thought we did. Central bankers, along with other policymakers, professional economists and the private sector failed to foresee or prevent a financial crisis that resulted in very serious unemployment and loss of wealth around the world. We must learn from our experience. The questions I've posed are tough, but

addressing these issues successfully should enable central banks to reduce the odds of future crises and respond more effectively to any bouts of instability that still might arise.