

Concluding Remarks

by Maurice Obstfeld

The remarkably consistent unifying theme of this conference has been this one: can the methodology of modern analytical macroeconomics be used to address major questions about the goals and implementation of monetary policy? As Lawrence Christiano pointed out in his comments earlier this morning, it is amazing how similar are the tools, scientific methodology, and assumptions that each and every presenter has used. When the Bank of Japan (BOJ) created its two Honorary Adviser positions decades ago, the initial appointments were the warring prophets of Monetarism and Keynesianism, Milton Friedman and James Tobin. But I think it is fair to say that the three current and former Honorary Advisers present today—myself, Bennett T. McCallum, and John B. Taylor—share a fairly common framework for thinking about standard macro issues, even though Taylor and I happen to be in the line of descent from Tobin, whereas McCallum is a descendant of Friedman. That macro framework, as the papers we have discussed show, is increasingly eclectic and nondenominational. Its widespread acceptance testifies to the significant scientific progress that macroeconomists have made over the last three decades.

In these remarks I will review this basic common framework, the fruitful ways in which the conference papers employ it, and the papers' relevance to some current global policy problems. We should be uncomfortable, however, whenever we are tempted to succumb to the notion that the outstanding issues in a field as complex as monetary policy conform to any sort of received wisdom. I will therefore also highlight some obvious questions of first-order importance that the conference papers addressed, if at all, only obliquely. As I understand it, these further questions, connected with financial instability, will be the focus of the BOJ's 2009 International Conference.

The class of models central to most of the conference papers grows out of a large literature on dynamic macroeconomic models with microfoundations, incorporating price rigidities but also rational expectations in the manner pioneered by Phelps and Taylor (1977) and Fischer (1977) three decades ago (and subject to the critique of Barro [1977] that more recent models have been at pains to avoid). Marvin Goodfriend and Robert King called this approach the "New Neoclassical Synthesis," while Kenneth Rogoff and I have applied a closely related approach under the name of the "New Open-Economy Macroeconomics." The most authoritative development and summary of the general setup is in Michael Woodford's (2003) treatise. These models avoid the Lucas (1976) critique by incorporating rational expectations of policy rules, and the microeconomic

University of California, Berkeley (E-mail: obstfeld@econ.berkeley.edu)

These remarks were presented at the 2008 International Conference, "Frontiers in Monetary Theory and Policy," held by the Institute for Monetary and Economic Studies, Bank of Japan, in Tokyo on May 28–29, 2008.

foundations allow an explicit welfare analysis of alternative regimes. As Andrew Levin reminded us in his comments from the floor, however, the empirical basis for some of the more common assumptions about demography and preferences (not to mention expectations formation) is shaky, to say the least. Yet policy conclusions are likely to be quite sensitive to just these assumptions. Now that we have become adept with these models, the robustness of welfare conclusions is likely to be a major issue going forward. The paper we heard George Evans present, which I will return to below, highlights the convergence properties of different learning processes and thus emphasizes one aspect of the problem.

At some level, the current modeling approach starts with the work of Kydland and Prescott (1982) on real business cycles. This was a heroic attempt to capture the salient features of macro fluctuations with a variant of the perfectly competitive Ramsey-Cass-Koopmans growth model, abstracting from money or economic rigidities and allowing only for technology shocks. Earlier work on the business cycle had placed money at center stage, but the bold Kydland-Prescott approach eliminated at a stroke a major embarrassment in macroeconomics: we really do not fully understand money, where to draw the line separating money from near-money assets, or the nature of money demand. The most salient manifestation of intellectual convergence since the 1980s has been the willingness of researchers, almost without regard to academic pedigree, to entertain realistic distortions and institutional features relating to non-auction markets. Not coincidentally, the neo-Keynesian sticky-price approach shares an important selling point with the real business cycle approach. Based on the realistic view that the central bank's monetary instrument is a short-term nominal interest rate, the neo-Keynesian model of monetary policy eliminates the need to worry about explicit descriptions of money supply and demand. Money is an accounting unit, the interest rate set by the central bank is the intertemporal relative price of that unit, and the dependence of the interest rate on price inflation through a variant of the Taylor rule ties down the price level. Money supply and demand, whatever they may be, automatically adjust in the background.

The neo-Keynesian modeling technology has led to a rigorous and deep analysis of the inflation-targeting function of central banks. But this elegant and effective hammer encourages us to think that every monetary policy problem is a nail. That is the downside. Thus, the conference papers addressed only tangentially the biggest macro policy problem before us today, a problem that is interacting adversely with the ability to hit inflation targets at reasonable output cost: financial instability. In my review of the papers presented over the last two days, I would like to expand on the financial instability theme and draw out some of the ways in which the subprime problem that originated in the U.S. housing market is complicating the task of monetary policy around the world.

More than most of the other contributions to this conference, Lawrence Christiano's paper (with Cosmin Ilut, Roberto Motto, and Massimo Rostagno)¹ has a direct bearing on the genesis of the current crisis. I want to start there, because there has been an ongoing debate about the response of monetary policy to asset bubbles that has been

1. Christiano *et al.* (2008).

renewed in the past year. Christiano's paper explicitly addresses that debate. According to what one may call the Greenspan-Bernanke-Gertler doctrine, central banks should not use monetary policy in attempts to pop positive asset-price bubbles; this is better accomplished through regulatory means, whereas monetary policy may be appropriate for cleaning up any post-bubble mess. An influential paper setting out this view is Bernanke and Gertler (1999).² Their view is that, to the extent that bubbles arise from financial market imperfections, prudential policies—akin to the macroprudential approaches being debated at the moment—are most likely to attack the underlying economic distortions at their sources. Yet, two major asset price crashes later, it remains unclear that monetary policy can generally be conducted independently of the need to worry about the financial system—a point also realized during Japan's recent deflationary experience.

Christiano's paper gives an example of what can happen when an inflation-targeting central bank underestimates the level of the natural real rate of interest, lowering the nominal rate to offset the deflation generated by the unobserved economic change. The result can look like a boom cycle, followed by a crash if the anticipated event motivating the rise in the natural real interest rate (such as a future technology improvement) does not actually occur. Of course, this boom-crash sequence entails monetary instability. Christiano then looks at the idea of a two-pillar strategy. The European Central Bank (at least officially) employs a two-pillar strategy based on inflation and the broad money stock. Christiano looks at one based on monitoring both the volume of credit and inflation. Another possibility that arises out of this work is to target wage inflation, which Christiano shows to have some advantages. Potentially, this work is complementary to some older literature on the predictive content of credit aggregates (for example, Friedman and Kuttner [1993]), but many policymakers remain skeptical about placing weight on volatile nominal aggregates. Thus, Lars Heikensten, the former governor of the Swedish Riksbank, has described Sweden's policy of taking asset price movements into account but explicitly rejects the suggestion of putting credit (or money) growth into the policy rule.³

A second and very relevant topic we have looked at is the problem of anchoring inflation expectations. The link between macro outcomes and longer-term expectations is especially critical right now given the growing inflationary pressures in the world economy. George Evans' paper with Seppo Honkapohja⁴ focused on this connection, as did, implicitly, Lawrence Christiano's. Evans considered an operational monetary policy rule with discounted least-squares learning. In that setting, he found, expectations do not converge. Particularly in a setup where the central bank might have to change its policy rule, for example, due to a change in the natural real rate of interest, policymakers are in a bind. How can policy anchor expectations in such an environment? How

2. Alan Greenspan recently reasserted his view; see Krishna Guha, "Greenspan Urges Policymakers to Focus on Banks' Capitalisation," *Financial Times*, May 27, 2008. Interestingly, in his comments from the floor on the original presentation by Bernanke and Gertler (1999), Greenspan allowed that if asset prices rose to form a bubble as abruptly as they crashed, monetary policy might be well advised to react in some instances. But this, he claimed, is not normally the case. His summary: "The markets are asymmetric; we [central bankers] are not."

3. Lars Heikensten, "More to It than 'Leaning against the Wind,'" *Financial Times*, May 28, 2008.

4. Evans and Honkapohja (2008).

can we anchor them even without learning if economic conditions mandate changes in the policy rule? Do we explain to the public that the natural real rate of interest has changed? How do we demonstrate that it has changed? It is a difficult problem. Christopher Sims' analysis⁵ also leads us to think about the anchoring of expectations. If fiscal policy is in the picture, so that the government's intertemporal budget constraint must be respected, certain central bank announcements may lack credibility if fiscal policy is given, and therefore fail to move market expectations. What options does the central bank have then?

Michael Woodford's paper with Vasco Cúrdia⁶ touches directly on financial market imperfections, elegantly incorporating into the basic monetary model an interest rate borrowing spread. Much of our discussion focused on the relevance of this extension to current credit market woes, and whether, as Cúrdia and Woodford essentially assumed, one can typically separate monetary policy from financial policy. Part of the unease is that there are asymmetries (as Greenspan notes in the quotation I reproduced earlier) between periods in which asset price misalignments are generated and those in which prices crash. These movements, and their effects, are not well captured by a log-linearizable model. The discrepancy arises in part because of the rate of price movement in the down phase, in part because certain markets may seize up entirely, furnishing a first-order transmission mechanism from asset-price declines to the broader economy.

In his still pertinent comment on the paper on asset prices by Bernanke and Gertler (1999), Dornbusch (1999, p. 133) summarized his skepticism by noting that the Bernanke-Gertler model "is just price based and lacks rationing and liquidity," whereas in the aftermath of a major asset price collapse, "markets plain stop in terms of flows and rollovers," possibly leading to "pervasive default."⁷ In that context, Governor Shirakawa made a very apt comment in his opening remarks.⁸ He said "although the monetary policy in a conventional sense and financial system policy are usually considered as different policy prescriptions, they become related in a complicated and delicate manner in critical phases." We are certainly now, as everyone would agree, in a critical phase.

In Christiano's model, the key question is to ascertain the prevailing natural real rate of interest. That challenge is sidestepped by the commonly used simple formulations of the Taylor rule. Another problem in applying Taylor rules, one that Mark Gertler mentioned earlier today, is the distinction between core and headline inflation. The model in Gertler's paper with Luca Sala and Antonella Trigari⁹ might lend itself to an analysis of the question, as it focuses on the details of labor market equilibrium and considers wage indexation. (Of course, a focus on nominal wage targeting, as suggested by Christiano, would make the issue moot.) When will the persistent exchange depreciation and oil price increases faced by the United States begin to feed into wages? Other countries face similar pressures. I am not convinced that in a supply-shocked environment like the present one, the prescription to simply strip volatile components out

.....
5. Sims (2008).

6. Cúrdia and Woodford (2008).

7. In the subsequent discussion, Dornbusch (1999) remarks more pointedly: "When I talked about liquidity, I did not talk about spreads. I talked about markets ceasing to exist. That is not your model."

8. Shirakawa (2008).

9. Gertler, Sala, and Trigari (2008).

of consumer price index (CPI) inflation makes for effective expectations anchoring or inflation control.

For many countries, the pressing issue right now is the response to imported inflation. The Mayekawa Lecture by John B. Taylor¹⁰ emphasized this problem within a global perspective. The inflationary pressures in the world economy today are greatly accentuated by the relative success of the emerging markets—markets such as China, India, and Brazil. The paper by Ipppei Fujiwara, Keisuke Otsu, and Masashi Saito¹¹ was firmly focused on Chinese growth, although the authors did not emphasize the monetary implications of China’s growth or of the growth of emerging markets more generally. In large part, the recent upsurge in inflation is the result of a reluctance to let currencies appreciate. China’s current predicament is only one of many instances. In many cases there has been some depreciation against the U.S. dollar, but generally less depreciation than the euro has experienced. The problem, indeed, is similar to the one embedded in Christiano’s paper. These economies have a “natural” real exchange rate that the monetary authorities resist in the interest of export promotion and growth. They keep the nominal interest rate relatively low to discourage appreciation, so the equilibrium real exchange rate must approach its natural level gradually through domestic inflation. Appreciation has been restrained in some emerging economies, not only through monetary policy but also through the imposition of capital inflow taxes of various kinds. Colombia, Thailand, and other countries have taken this route in recent years.

How bad is the emerging inflation problem? Taylor presented some data in his lecture, but let me reinforce his presentation with some additional numbers taken from the most recent issue of the *Economist*. These numbers cover the most recent known monthly inflation rates. Among other examples, we find Chile, 8.3 percent; Venezuela, 29.3 percent; Egypt, 16.4 percent; Turkey, 9.7 percent; Russia, 13.3 percent; Saudi Arabia, 9.6 percent; the Czech Republic, 6.8 percent; South Africa, 10.6 percent; India, 7.9 percent; and China, 8.5 percent. There is a gathering inflationary threat in every region of the world. Not all countries have such high inflation rates; I have tried to pick particularly striking examples. Clearly, however, something is going on. Clearly, these countries should allow their currencies to rise further against the dollar. The obstacles to doing so impede the reduction of another problematic phenomenon mentioned in Taylor’s remarks, global imbalances.

It is no accident that the exchange rate changes that would allow many countries to avoid inflation are also those that would help reduce global imbalances most rapidly. Sims’ paper put me in mind of the fact that not only do governments have intertemporal constraints, so do entire countries. If we consider the matter within a framework like that of Sims, we might ask how the adjustments that force countries to live within their intertemporal constraints occur in practice. In Sims-type models of the fiscal theory of the price level, debt deflation or inflation may be the mechanism enforcing public solvency over time. In an international context, similar adjustments based on exchange rate and other asset price movements often are at work.

10. Taylor (2008).

11. Fujiwara, Otsu, and Saito (2008).

The United States has been running very large current account deficits throughout most of the 2000s. These are historically high deficits, yet if you look at the net foreign asset position of the United States in the last few years, it has barely budged. Why? The answer comes from considering the composition of the country's gross foreign assets and liabilities. The United States holds gross foreign assets exceeding its GDP. It holds an even higher value of gross foreign liabilities. Most U.S. liabilities are dollar-denominated, although the percentage is understandably coming down. A good portion of U.S. foreign assets, however, is denominated in foreign currencies. As a result, when the dollar depreciates unexpectedly, there is a large wealth transfer to the United States—foreigners lose on their dollar claims, whereas U.S. residents gain on their foreign-currency foreign claims. For dollar depreciations of the sizes we have seen recently, these transfers can amount to several percentage points of GDP. These are very big numbers.

Sims presented some preliminary vector autoregressions showing the predictive power of primary government surpluses for inflation. Some very interesting work published last year by Gourinchas and Rey (2007) shows, analogously, that net export deficits by the United States tend to predict higher rates of return on U.S. foreign assets, and lower rates of return on U.S. foreign liabilities. The result is a reduction in the U.S. net debt to foreigners, which helps to maintain intertemporal solvency. Much of the international wealth redistribution is effected through exchange rate movements that are not offset in advance by nominal interest differentials.

How long can this type of adjustment process continue? We need to know in order to understand where the United States and the world economy are headed. Clearly, the link between deficits and depreciation that Gourinchas and Rey detect in the data is not a menu for U.S. policy choice. Eventually, foreign investors will refuse to accept these low relative returns on U.S. assets. There is clearly a payoff to eliminating global imbalances by managing monetary policies in a more cooperative manner. It remains to be seen how the inevitable external adjustments in the international economy will come about.

Another reason some emerging markets are reluctant to adjust their exchange rates downward—that is, to allow their currencies to appreciate—is that they are holding large stocks of foreign exchange reserves. Those reserves will lose value if the domestic currencies rise, with negative implications for central bank capital positions and/or the public finances. There is much talk of official diversification out of dollars, and indeed some has occurred, but the implied coordination problem among dollar reserve holders is a factor hanging over foreign exchange markets. A similar instability characterized markets starting in the 1960s as a result of large acquisitions of dollars by foreign central banks.

In 1968, when industrial countries agreed to sever the market link between the dollar and the price of gold, the world economy found itself on a pure fiat currency standard. It took several decades for economists and central bankers to grasp at an intellectual level the technology of inflation control in a setting of sophisticated financial markets and fiat currencies. Just as we thought we had arrived at reliable answers, however, we realized that understanding the inflation process is not enough—

the deregulated financial markets themselves are central to monetary transmission, and can be a potent independent source of disturbance. This would not have surprised Henry Thornton, who in 1802 wrote what is probably the first modern treatment of central bank policy under a fiat standard. His classic treatise was called *An Enquiry into the Nature and Effects of the Paper Credit of Great Britain* (see Thornton [1939]). For Thornton, who wrote shortly after the start of Britain's 1797–1821 suspension of the gold standard, private credit and public credit—the value of government debt including money—were inextricably linked. Thus, Thornton focused his policy discussion as much on financial stability (and on the Bank of England as a last-resort lender) as on the determination of the price level; and in his account, the two sets of questions are inherently bound together. Recent events remind us how much we need to return to this historical perspective.

I am out of time. This conference has demonstrated the great progress that has been made in understanding monetary policy. But our discussions have also brought out how much we still can learn. We all thank the BOJ for providing a venue in which abstract monetary theory and practical policy questions can comfortably be discussed in full depth and side by side.

References

- Barro, Robert J., "Long-Term Contracting, Sticky Prices, and Monetary Policy," *Journal of Monetary Economics*, 3 (3), 1977, pp. 305–316.
- Bernanke, Ben, and Mark Gertler, "Monetary Policy and Asset Price Volatility," in *New Challenges for Monetary Policy*, Kansas City: Federal Reserve Bank of Kansas City, 1999, pp. 77–128.
- Christiano, Lawrence, Cosmin Ilut, Roberto Motto, and Massimo Rostagno, "Monetary Policy and Stock Market Boom-Bust Cycles," paper presented at the 2008 International Conference on "Frontiers in Monetary Theory and Policy" held at the Institute for Monetary and Economic Studies, Bank of Japan, 2008.
- Cúrdia, Vasco, and Michael Woodford, "Credit Frictions and Optimal Monetary Policy," paper presented at the 2008 International Conference on "Frontiers in Monetary Theory and Policy" held at the Institute for Monetary and Economic Studies, Bank of Japan, 2008.
- Dornbusch, Rudiger, "Commentary: Monetary Policy and Asset Price Volatility," in *New Challenges for Monetary Policy*, Kansas City: Federal Reserve Bank of Kansas City, 1999, pp. 129–135.
- Evans, George, and Seppo Honkapohja, "Robust Learning Stability with Operational Monetary Policy Rules," Centre for Dynamic Macroeconomic Analysis Working Paper No. 07/19, Centre for Dynamic Macroeconomic Analysis, 2007.
- Fischer, Stanley, "Long-Term Contracts, Rational Expectations, and the Optimal Money Supply Rule," *Journal of Political Economy*, 85 (1), 1977, pp. 191–205.
- Friedman, Benjamin M., and Kenneth N. Kuttner, "Economic Activity and the Short-Term Credit Markets: An Analysis of Prices and Quantities," *Brookings Papers on Economic Activity*, 2, 1993, pp. 193–283.
- Fujiwara, Ipppei, Keisuke Otsu, and Masashi Saito, "The Global Impact of Chinese Growth," IMES Discussion Paper No. 2008-E-22, Institute for Monetary and Economic Studies, Bank of Japan, 2008.
- Gertler, Mark, Luca Sala, and Antonella Trigari, "An Estimated Monetary DSGE Model with Unemployment and Staggered Nominal Wage Bargaining," paper presented at the 2008 International Conference on "Frontiers in Monetary Theory and Policy" held at the Institute for Monetary and Economic Studies, Bank of Japan, 2008.
- Gourinchas, Pierre-Olivier, and Hélène Rey, "International Financial Adjustment," *Journal of Political Economy*, 115 (4), 2007, pp. 665–703.
- Kydland, Finn E., and Edward C. Prescott, "Time to Build and Aggregate Fluctuations," *Econometrica*, 50 (6), 1982, pp. 1345–1370.
- Lucas, Robert E., Jr., "Econometric Policy Evaluation: A Critique," in Karl Brunner and Allan Meltzer, eds. *The Phillips Curve and Labor Markets*, Amsterdam: North-Holland, 1976, pp. 19–46.
- Phelps, Edmund S., and John B. Taylor, "Stabilizing Powers of Monetary Policy under Rational Expectations," *Journal of Political Economy*, 85 (1), 1977, pp. 163–190.
- Shirakawa, Masaaki, "Opening Speech," *Monetary and Economic Studies*, 26, Institute for Monetary and Economic Studies, Bank of Japan, 2008, pp. 25–30 (this issue).
- Sims, Christopher, "Stepping on a Rake: The Role of Fiscal Policy in the Inflation of the 1970s," paper presented at the 2008 International Conference on "Frontiers in Monetary Theory and Policy" held at the Institute for Monetary and Economic Studies, Bank of Japan, 2008.

- Taylor, John B., “The Mayekawa Lecture: The Way Back to Stability and Growth in the Global Economy,” *Monetary and Economic Studies*, 26, Institute for Monetary and Economic Studies, Bank of Japan, 2008, pp. 37–47 (this issue).
- Thornton, Henry, *An Enquiry into the Nature and Effects of the Paper Credit of Great Britain (1802)*, edited and with an introduction by F. A. von Hayek, London: George Allen & Unwin, 1939.
- Woodford, Michael, *Interest and Prices*, Princeton: Princeton University Press, 2003.

