

What Do We Know about Monetary Policy that Friedman Did Not Know?

Charles Wyplosz



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About the Series

The Commission on Growth and Development led by Nobel Laureate Mike Spence was established in April 2006 as a response to two insights. First, poverty cannot be reduced in isolation from economic growth—an observation that has been overlooked in the thinking and strategies of many practitioners. Second, there is growing awareness that knowledge about economic growth is much less definitive than commonly thought. Consequently, the Commission’s mandate is to “take stock of the state of theoretical and empirical knowledge on economic growth with a view to drawing implications for policy for the current and next generation of policy makers.”

To help explore the state of knowledge, the Commission invited leading academics and policy makers from developing and industrialized countries to explore and discuss economic issues it thought relevant for growth and development, including controversial ideas. Thematic papers assessed knowledge and highlighted ongoing debates in areas such as monetary and fiscal policies, climate change, and equity and growth. Additionally, 25 country case studies were commissioned to explore the dynamics of growth and change in the context of specific countries.

Working papers in this series were presented and reviewed at Commission workshops, which were held in 2007–08 in Washington, D.C., New York City, and New Haven, Connecticut. Each paper benefited from comments by workshop participants, including academics, policy makers, development practitioners, representatives of bilateral and multilateral institutions, and Commission members.

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Abstract

This paper offers a personal review of the current state of knowledge on monetary policy. In a nutshell, I argue that a number of old results—what Friedman knew—have survived, but that modern monetary policy departs in some important ways from older principles. The older wisdom that monetary policy determines inflation in the long run but can have systematic shorter-run effects has survived a major challenge. Most of the new ideas stem from the recognition of the crucial role of expectations. In today's world, this observation lies behind the spectacular trend toward ever greater central bank transparency. Then it is more than likely that ideas will change in the wake of the global financial crisis. Early debates challenge the old wisdom that central banks ought to be mainly concerned with price stability. In particular, financial stability has always been part of a central bank's mission, but it has occupied limited space in theoretical and empirical studies.

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What Do We Know about Monetary Policy that Friedman Did Not Know?

*Charles Wyplosz*¹

In many respects, modern monetary policy remains largely framed by Milton Friedman's writings. This concerns the fundamental view that price stability is the central bank's key responsibility and that the output or unemployment gaps are, at best, temporary objectives. Many details of the channels of monetary policy described by Friedman and Schwartz also remain central to central bank operations. On the other hand, today's central banks deal with issues that have surfaced over the last three decades, many of which are not yet fully resolved. The crisis of the 2000s has led to unprecedented actions by central banks around the world which previously would have seemed impossible or outright nonsensical.

Is Inflation a Monetary Phenomenon?

The long-run neutrality of money logically implies that long-run price stability is the exclusive responsibility of central banks. Friedman's celebrated conclusion was that central banks should target the money stock and choose growth rates that deliver low inflation. The early adoption by the Bundesbank of money growth targeting proved to be a success in the 1980s. Many other central banks followed suite, including the U.S. Federal Reserve in the early 1980s under the chairmanship of Paul Volcker. Volcker's statement that the Fed would only focus on money supply growth and let the markets set the interest rate was soon followed by declining inflation.

Money growth targeting was soon seen as consistent with most schools of thought. Friedmanite monetarists naturally elevated the strategy to the status of unassailable fundamental principle. Keynesians brought the long-run neutrality

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of money within their framework by extending their traditional emphasis on the short run. Strikingly, however, the Bundesbank found itself unable to maintain its strategy in the 1990s. The reason was important changes in banking technology as computers slashed the costs of undertaking and recording increasingly complex operations. As a result, the demand for money changed and became unstable (Baltensperger, 1999). The episode made it clear that money targeting is implied by the neutrality principle only if money demand is stable. Indeed, long-run neutrality implies that any change in the supply over and beyond demand eventually dissipates into a reduction of money's purchasing power that brings in line with the purchasing power that people want to hold. If demand is stable, the link between money growth and inflation is one to one. If demand is unstable, the link still exists, but it is variable and cannot therefore serve as a guide to policy.

The current crisis provides a spectacular example. Badly hurt commercial banks have increased their own demand for money, preferring to hold cash that brings no interest than assets that can lose value. Central banks have responded by increasing the money supply by unprecedented amounts. It is far too early to draw definitive conclusions but, at the time of writing, inflation has not risen—quite the opposite. It may still rise if central banks do not withdraw the cash when the situation eventually normalizes and commercial banks return to normal practice. What is clear, however, is that the massive increases in money supply have prevented a disastrous systemic banking collapse. This move would have been impossible had money supply been driven by the quantitative rules associated with money targeting.

Structural changes in banking technology and increasing international financial integration constantly modify the use and definition of monetary aggregates. They do not challenge the neutrality principle but they make monetary targeting impossible, in fact misleading. The response has been the widespread adoption of the interest rate as the policy instrument. In a way, this is a return to pre-Volcker and pre-Friedman views, which explains continuing hostility to the “new” approach. In fact, it is simply a consequence of money demand instability and the consequently poor performance of money growth as a predictor of future inflation.

Importantly, the uses of the interest rate as an instrument does not challenge the neutrality principle and it does not either absolve central banks from the task of delivering price stability in the long run. The only difference is that causality between money and prices is reversed. The central banks' use of the interest rate as an instrument means that they must be ready to provide the amount of money that is demanded at the chosen rate. Instead of setting the money supply and letting the interest rate be determined by the market to bring demand in line with supply, central banks now set the interest rate and let the money supply be demand-determined. In the long run, money adjusts to the price level achieved by the central bank and the neutrality principle is respected (Gerlach, 2003). In

brief, money is now endogenous, meaning that its stock is a consequence of monetary policy and other economic developments.

What, then, guides central banks in choosing the interest rate? Most central banks, explicitly or implicitly, follow the inflation-targeting strategy, which is further discussed below. They know that changing the interest rate will affect inflation with a lag of one to two or three years. They decide what inflation rate they would like to see at that horizon; this is the target. Then they form a forecast of where inflation will be and they move the interest rate up if inflation forecasts exceed the target, and down in the opposite case. This is trial and error more than a clean rule of the Friedman type and, as the surge of inflation in 2007-08 illustrates, it does not work all the time. Worse, the current crisis is sometimes blamed on a long period of too-low interest rates as central banks focused on inflation and overlooked an excessively fast increase in bank credit and the money supply. These observations are important but they stop short of a rehabilitation of the money growth rule, especially since the crisis provides additional evidence on money demand instability. They indicate, though, that a narrow focus on inflation, a key legacy of Friedman, is now challenged. Central banks have long defended this focus and resist being given a wider mandate, precisely because they fully endorse the view that they can determine inflation in the long run while their impact on growth or asset prices is nil in the long run—this is why money is said to be neutral—and highly uncertain in the short run. But crises happen in the short run and central banks will have to address these questions.

Channels of Monetary Policy

If money is not exogenous anymore, then how does monetary policy affect the economy? At least in developed countries, the long-held wealth effect is no longer a serious contender, if it ever was. This is a key element of Friedman's view. He considered that money matters in the short run because an increase in the money supply makes people feel richer and induces them to spend more. Over time, he argued, with too much money chasing too few goods, prices rise, which reduces the purchasing power of money and brings it back to its initial level. In other words, more money creates a temporary illusion of higher wealth, which boosts the level of activity, but this effect does not last and neutrality takes hold as a result of higher inflation.

The interest rate channel

Several other channels are believed to play a role, but there is surprisingly little evidence on their respective importance. A first channel is the interest rate, which makes borrowing cheaper and should therefore encourage spending on loan-financed goods like housing, durables, or productive equipment. However,

theoretically, the effect of the interest rate on consumption spending is ambiguous. True, lower interest rates make borrowing cheaper but it also means that one needs to save more to reach the same amount of wealth—this is a standard trade-off between income and price effects. In addition, central banks control very short-term interest rates—usually the overnight rate—while consumers and firms borrow over periods of months and years. Thus, for the interest rate channel to be effective, monetary policy must be able to affect long-term rates, which is far from trivial. Indeed, short-term interest rates affect longer-term rates through expectations of future short-term rates. How central banks can “orient” these expectations is a crucial issue dealt with further below, but the evidence so far is that the link is tenuous at best. Finally, rational borrowers are not meant to respond to nominal but to real interest rates. This means that the channel also rests on private expectations of future inflation rates at horizons commensurate with the relevant interest rate maturity. Once again, therefore, it matters a lot for central banks to correctly assess private expectations and, if possible, to orient them. Given all this, it is not surprising that empirical studies typically fail to detect a direct impact of the policy interest rate on the economy.

Indirectly, however, the interest rate matters. It affects asset prices such as stock prices or exchange rates. Asset prices, in turn, affect private wealth and therefore consumption as well as the cost of capital and therefore investment spending. Exchange rates, of course, contribute to determine external competitiveness. The causation chain running from the interest rate to asset prices and exchange rates, however, faces theoretical and empirical challenges. Both are related to two elements of the chain: the role of expectations and the presence of significant risk. Asset prices, for instance, reflect expected returns. More precisely, in principle an asset price is the present value of expected future returns, with some provision for risk. Higher interest rates at the relevant horizon mean that future returns are more heavily discounted, which should depress the price, everything else remaining the same. But everything else typically does not remain the same. Expected future returns and perceived risk are likely to react to monetary policy and to the disturbances that prompt central banks to act. Furthermore, the impact of the short-term interest rate on longer rates relevant for discounting is again of the essence. Similar considerations apply to the link from the policy interest rate to the exchange rate.

So, in the end, by moving the short-term interest rate, central banks impact the economy and eventually inflation, both directly and indirectly. Their actions triggers a chain of causations that are deeply intertwined with private expectations, which means that the effects are far from precisely known and likely to vary according to a host of circumstances. The current crisis provides a vivid illustration. Shifting expectations and huge perceived risks have introduced a thick wedge between the interest rate and asset prices, including exchange rates, undermining monetary policy effectiveness.

The bank credit channel

Another channel of monetary policy relies on credit distribution by banks and it has figured very prominently during the current crisis. Because lending is inherently risky, the ability and willingness of banks to distribute credit depends on previously accumulated risk. Thus bank credit depends on the strength of bank balance sheets—the quality of their assets and the commitments represented by their liabilities. In this view, changing the interest rate matters if it affects the profitability of banks and their access to liquidity. But the money supply may play an independent role. A reduction of money, for instance, makes it harder for small banks to borrow on financial markets, which may force them to reduce the volume of credit if they are to maintain a prudential ratio between liquidity and loans.

The current crisis offers a perfect illustration of the bank credit channel. Bank credit became scarce and expensive when liquidity vanished in the interbank market, which were commercial banks routinely obtain liquidity. Scarcity continue even though central banks slashed interest rates to zero and attempted to “feed” the interbank markets with huge injections of liquidity that were absorbed by banks and not re-lent to their customers. In effect, monetary policy lost much of its effectiveness once the credit channel became impaired.

A closely related channel concerns the riskiness of potential borrowers. Quite obviously, at the individual level, banks closely examine the ability and willingness of borrowers to pay back their loans. Systematic changes at the aggregate level are of a different nature since they affect monetary policy. Aggregate borrower riskiness can be affected by general economic conditions, including economic volatility, and by the value of collateral that borrowers may post, for example house prices. Changes in the interest rates may affect these aspects in a wide range of ways.

Empirical evidence on the various bank channels has been controversial. The current crisis, on the other hand, should dispel any doubts that monetary policy operates through banks and that bank balance sheets matter, at least when they are severely impaired. Casual evidence is that banks that have maintained healthy balance sheets, or could restore them, have kept lending in the face of sharply declining demand. These observations, however, are not surprising and bear little implication for the role of the bank credit channel in normal times. Whether the bank credit channel has a sizeable effect in normal times remains an open empirical question.

The Inflation Target

As previously noted, nearly all central banks are now using the interest rate as their monetary policy instrument but they differ on what guides their decisions. The inflation-targeting strategy has become increasingly popular, but has not

been adopted by the major central banks (the Fed, the European Central Bank [ECB], and the Bank of Japan) and has come under criticism in the wake of the crisis. Whether it is formally adopted or not, however, central banks cannot fail to have a view of what is a desirable inflation rate since inflation is the ultimate and lasting outcome of monetary policy. Surprisingly perhaps, this question remains underdiscussed and understudied.

There is no discussion that high inflation is undesirable, although there is great deal of uncertainty about when inflation becomes high enough to be painful and even why high inflation is painful. It is also generally admitted that inflation can be too low but why exactly remains unclear. Akerlof et al. (1996) argue that some inflation makes relative price adjustments easier. Indeed, over time, changes on the demand and supply sides imply that some good prices must decline relatively to others. Since some prices, especially some wages, are difficult to cut, relative changes can be achieved through different inflation rates. Thus the inflation rate would be such that required relative price changes can be painlessly achieved. Estimates suggest that this rate is pretty low.

Most economists would probably disagree with Friedman's view that the optimal inflation rate is negative. His reasoning was that money is a highly convenient good that costs close to nothing to produce, so it should cost nothing to hold or, more precisely, that the marginal cost of holding money be equal to the (zero) marginal cost of producing money. The cost of holding money is the nominal interest rate, the opportunity cost of not holding safe assets which delivers returns. Thus the conclusion is that the nominal interest rate should be zero. Since the nominal rate is the real rate *plus* inflation and since the real rate of interest must be positive (say, because the marginal product of capital is positive), it follows that inflation should be negative, equal to *minus* the real interest rate. Friedman's suggestion has never been taken to heart although it has been much debated.

A different view of what inflation rate is desirable is rooted in tax considerations. Indeed, inflation can be seen as a tax on money holdings and it makes sense to ask what the appropriate tax rate is. Phelps (1973) and Auernheimer (1974) have argued that the inflation tax should be set as part of an optimal tax policy. Theory suggests that all tax rates should be set to equalize their marginal costs, which takes into account the importance of each taxable good to one's welfare. This is a high principle that is not easily implemented but various calculations suggest that the inflation rate that is optimal under this principle should be small.

In the end, while central banks around the world go on identifying explicit or implicit inflation targets, surprisingly little is known about what is the optimal rate of inflation. Theories exist but they refer to very different principles (the cost of money, optimal taxation, relative price adjustments) that are not integrated into a coherent framework. In addition, the empirical application of these principles is notoriously complex. This is why we are mostly in an experimental

stage, where common sense and perception of what the public wishes drive policy choices, but this is a sorry state of affairs.

It may matter little in normal times what is the proper inflation rate. Over much of the 2000s, most countries around the world were achieving low rates, in the 1 to 4 percent range, and this was seen as adequate. Now that many countries face sharply increased public indebtedness, tax revenues will have to be boosted in the aftermath of the crisis. Fiscal principles would therefore suggest that the inflation tax should be raised. This is bound to be a controversial view, precisely because there is no agreed upon principle to hang on to.

The Link between Fiscal and Monetary Policy

The question of how to pay for the public debt—by “regular” taxation or the inflation tax—is a perennial one, with considerably important implications. Not only does it matter for one’s view of what is the right inflation rate, but it also concerns the delicate relationship between the government—the Treasury, in particular—and the central bank. This is a very old debate that goes at least as far back as Ricardo; see Frazer (1994). It has been recently recast as the issue of fiscal vs. monetary dominance (Canzoneri et al., 2001), following the seminal work of Sargent and Lucas (1981).

The story can be told as follows. On behalf of the people, the central bank has been granted by the authorities (government, parliament) the monopoly of producing money, from which it derives a sizeable income, called seigniorage. As a consequence, a central bank is part of the public sector and its income must be served back to the people. Indeed, nearly everywhere, a law regulates how seigniorage is paid into the Treasury. But how much? This is again the issue of the optimal inflation rate, but it now emerges as a deep institutional issue.

On the one hand, revenue from the inflation tax belongs to the government, which means that current and future seigniorage revenues appear in the intertemporal budget constraint of the public sector. Central bank independence is meant to remove seigniorage from government control, that is, to make seigniorage exogenous in the budget constraint. This is the monetary dominance case. Yet, even an independent central bank may not be able to fully extricate itself from the budget constraint. It can be that the alternative is economically unpalatable or that political pressure—including via public opinion—is irresistible. At any rate, if conditions exist such that the central bank must give in, seigniorage becomes endogenous: this is the case of fiscal dominance. As a residual contributor to the budget, monetary policy can become hostage to fiscal pressure.

In that case, even if the conditions under which the central bank can be coaxed to plug the budget constraint have a low probability, current and future price levels cannot be fully detached from this possibility. Put differently, if

emergency seigniorage is a possibility, current and expected future inflation is not uniquely determined by current and “normal” monetary policies. Note that the fundamental principle that inflation is a monetary phenomenon is not invalidated—quite the contrary.

The opposite case, monetary dominance, arises when the central bank is so strongly independent that there is no plausible circumstance under which it would have to alter its judgment because of government insolvency. The question is whether monetary dominance can be guaranteed. Skeptics argue that there can always be a situation such that independence can be twisted and monetary dominance can never be guaranteed, even by constitutional arrangements. A celebrated example is German unification. The Bundesbank is arguably one of the most independent central banks in the world.² On more than one occasion, it has successfully repelled government attempts to “do something.” When Germany was united in 1992, however, it could not legally and politically prevent the conversion of East Germany’s Ostmarks into the Deutschmarks at a highly subsidized conversion rate. As a result, money creation accelerated, as eventually did inflation. Forced to create money, the Bundesbank could have taken offsetting measures but this would have been far too contractionary to be acceptable to the public opinion, its usual protector of last resort.

The ongoing financial crisis is sometimes interpreted as providing another example of fiscal dominance in the United States, under extreme conditions. The Fed has been involved in bank bailouts or quasi-bailouts and, like the ECB, it has absorbed unsafe assets. The fact that these loans are collateralized assumes that the collateral’s value is 100 percent safe, but there is no such a thing as 100 percent safe assets. The Fed’s support system may end up a significant liability to the Federal government. It is not impossible that the Fed or other central banks seen as independent find themselves in a situation of insolvency and this forced to ask for a government bailout. Whether independence can be maintained in such a situation is an open question.

More generally, lender-of-last-resort interventions are carried out by central banks but they are not monetary policy operations. They are fiscal policy actions designed to support private agents. Yet they involve liquidity provisions by the central bank because only central banks can provide potentially huge amounts of liquidity at short notice. Does this qualify as fiscal dominance? One could argue that the central bank is forced to create money because the government does not have the needed resources and cannot raise them at the appropriate speed. The pressure on the central bank arises from its responsibility as guarantor of orderly financial market conditions in its jurisdiction. On the other hand, an independent central bank may withdraw the liquidity provided to one or more private agents on a bilateral basis through normal open market operations when and if it

² The Bundesbank has now ceased its monetary policy autonomy to the ECB.

determines that the money supply is excessive for macroeconomic reasons. Whether this is always possible in practice without disturbing an already dicey situation remains to be seen.

In many respects, there is nothing new here. As already noted, it has long been understood that central bank independence is needed to protect central banks from government pressure. Debates about whether it is appropriate for central banks to act as lender of last resort too go far back in the past, with conclusions that typically back Bagehot's (1873) principle that central banks ought to intervene decisively but at a cost to the bank being bailed out. It may be surprising that, in spite of considerably improved understanding or related issues and with the hindsight of many experiments, so little has changed on the issue of "forced" central bank interventions and what it means for fiscal vs. monetary dominance. The current crisis has laid bare the usual provision that central banks may decide not to bail out commercial banks. This may have considerably worsened the case for monetary dominance.³

The Role of Expectations

The most radical innovation in our understanding is the realization that "monetary policy is actually the managing of expectations" (Svensson, 2005) and that "little else does matter" (Woodford, 2005). While such statements may indeed be seen as radical, they can be traced back to the works of Friedman and Phelps where the expectations-augmented Phillips curve was invented. The real innovation is not the realization that expectations matter a lot for monetary policy, but that they can be harnessed to make policy more effective and even more predictable. The radical element is the implication that central bank secrecy ought to be replaced by central bank transparency.

The link between Friedman and Phelps, on one hand, and the "new view" on monetary policy, on the other hand, is the rational expectations revolution. The rational expectations assumption is needed to stop seeing expectations as a black box. When expected inflation affects actual inflation and when monetary policy affects inflation through the channels presented above, then monetary policy also affects expectations, which become a new and all-important channel. Monetary policy is much like a gentle push gets a carriage moving downhill; awareness of where the central bank is heading gets actual inflation moving in the intended direction.

But if money is neutral, once the private sector figures out where inflation is heading and change prices accordingly, monetary policy effectiveness is undercut by rational expectations. This observation led to the highly influential conclusion, reached by Lucas (1972) and Sargent and Wallace (1976), that "only

³ This is a particular consequence of the more general moral hazard generated by bailouts. While Bagehot did not use the "moral hazard" expression, he was clearly aware of the phenomenon.

unanticipated money matters.” In that case, monetary policy stops being a useful countercyclical instrument and its only objective ought to be to deliver “optimal” inflation—that is, price stability. Thus Friedman’s rule, a stable and predictable money growth rate, came out strengthened by the rational expectation revolution: not only can it deliver long-run price stability but it does so at no short-run cost since monetary policy cannot be systematically used.

However, the view that only unanticipated policy matters never cut any ice with central bankers. Deep down, they were convinced by what they thought that they were seeing, namely that monetary policy can have real effects in the short run. All that was needed to justify their intuition was that inflation be sticky, that it adjusts slowly, as shown by Taylor (1979), or that it is forward looking, that it depends on *future* inflation, as developed by Woodford (2003) among others. The New Keynesian revival of Friedman’s Phillips curve, which incorporated the expectation of future inflation, not only reestablished a role for foreseeable systematic monetary policy, but also led to the view that central banks act mainly by shaping private sector expectations.

The New Keynesian view brought about a convergence of views between academic researchers and central bankers. The heart of this model is a reconstruction of the 1980 vintage Keynesian model that incorporated an IS curve, describing the goods market equilibrium condition, and LM curve that captures equilibrium in the money market and the expectations-augmented Phillips-Friedman-Phelps curve, with three modifications. First, the new model is entirely based on optimal individual behavior. Second, the IS curve, which really describes optimal intertemporal consumption (the Euler condition), implies that today’s real GDP is driven by expected future GDP. Third, the LM curve assumes that the central bank sets the money supply—for example, that it follows Friedman’s money growth rule, which has become inadequate. The New Keynesian models replaces the LM curve with the Taylor rule, which describes the central bank reaction function setting the nominal interest rate as a feedback rule designed to stabilize inflation at a target level and the output gap. The New Keynesian Phillips curve is virtually identical to its predecessor, except that it is based on optimal price setting by monopolistically competitive firms, which can only change their prices at random occasions. An implication of these models is that that current inflation and the output gap can be expressed as present discounted values of current and expected future interest rates, that is, of the whole path of current and expected future monetary policy decisions. This implies that monetary policy matters, but monetary policy is now described by current and expected future interest rates. This explains why expectations have become crucially important.

The New Keynesian model rests on a host of highly restrictive assumptions. Much effort is currently devoted to relaxing these assumptions, which leads to increasingly complex models. These DSGE (dynamic stochastic general equilibrium) models are developed in central banks around the world in an

effort reminiscent of the large-scale modeling effort that took place in the 1960s and 1970s when the old Keynesian model was enriched in increasingly complex ways, taking advantage of the power of the first computers.

Whose expectations?

Since central banks set policy to achieve a desirable path of inflation and output (or employment according the U.S. Federal Reserve Act), the expectations that matter are those of private agents who set prices and decide on production. This implies that the central bank acts on the basis of its expectations of private expectations of interest rates. But, among many other factors, the private sector's own expectations are driven by current and future interest rates. Once we realize that monetary policy and private actions are based on iterated expectations of each other's behavior, attention naturally shifts to information sets. Much of the ongoing research is devoted to the question of who knows what about which variables.⁴ One policy-relevant aspect of this research is the strategy of central bank communication, which is discussed below.

A related question that has not been much studied is what use is made by central banks of private sector information. The usual presumption is that private information is either homogeneous and observable on the market, or heterogeneous and aggregated into market prices. During the current financial turmoil, a number of markets have simply vanished. One lesson, therefore, is that markets may fail to adequately reveal private sector expectations in troubled times but also maybe in normal times. A potentially complicating factor is that prices are noisy and incorporate fast-changing risk premia, which has encouraged the use of poll data. But this assumes that banks truly reveal their expectations, which may not be the case. Individually, banks may have interest in misrepresenting their views in order to disorient competitors.

What interest rates?

Most existing models do not make much of a difference between the very short-term nominal interest rate set by central banks and the longer-maturity real rates that drive most of the channels discussed above. The link from nominal to real interest rates involves inflation expectations, the much-researched issue discussed above. The link from short- to long-term interest rates is via expectations of future policy actions, also discussed above, and via expectations of disturbances, which involves an unbounded list of possibilities. In addition, both links are subject to much uncertainty, which leads to risk premia. All in all, the ability of central banks to affect the relevant long-term real interest rates is limited and our understanding of this issue is relatively poor.

The current crisis has amply illustrated this issue. Even though central banks have brought down their policy interest rates, longer-term rates have often

⁴ Of course, the private sector is not homogeneous. Some work explores how private agents also iterate each other's expectations.

increased because of rising uncertainty. In addition, inflation has sharply declined, which has raised the real interest rates. Finally, many central banks have faced the zero interest rate lower bound, which effectively suspends the use of their standard instruments. Experiments with nonstandard instruments—really a return to using the money supply—are under way and it is far too early to draw conclusions. A number of economists, who never accepted the view that central banks should give up money supply control to adopt the interest rate as the policy instrument, have started to argue that the crisis is partly a consequence of that change and that the zero lower bound requires a return to monetary targeting. While the view that interest rates have been kept too low for too long—a view also supported by many who support the change of policy instrument—is likely to be hotly debated at length, the zero lower bound problem is clearly a rare event that cannot be used as a guide to policy making in normal conditions.

Central Bank Transparency

While market prices reveal, possibly inappropriately, private sector expectations, a central bank can choose what information it releases. In fact, communication has long been very carefully orchestrated by all central banks. Over the last two decades, changes in the communication strategy have been spectacular. For decades, central bankers took secrecy as an axiom of their trade. The “creative ambiguity” principle developed by Cukierman and Meltzer (1986) provided a theoretical justification for some degree of bank secrecy. Working with a model where “only unanticipated money matters” view, Cukierman and Meltzer assume that the central bank’s own preferences are unknown. In order to pull surprises, the central bank must conceal its intentions. It is unclear, however, why central bank preferences should differ from those of society and whether social welfare is raised when these preferences are hidden.⁵ Naturally, the passing of the fashionable view that “only unanticipated money matters” further undermines the creative ambiguity result.

More recent work shifts the presumption toward central bank transparency, leading Blinder (1998), for instance, to consider that, unless proven to the contrary, central banks should be fully transparent. While some central banks have come close to backing this view, others strongly object. They advance a number of arguments. First, they express doubts that financial markets can correctly interpret central bank statements and express fear that too much information may raise confusion. Carefully managing what is said and what is

⁵ Rogoff (1985) provides one reason why central bankers ought to have difference preferences from society. He shows that a “conservative” central banker mitigates the time-inconsistency problem, that is, the inherent tendency to renege on previous promises once conditions have changed. A vast literature examines the implications of time inconsistency for monetary policy making.

not said, they argue, allows them to reduce misinterpretation. This explains why many central bankers have developed code words which, they assert, are precisely understood and interpreted. Second, they are concerned that markets could distinguish between conditional and unconditional expectations. Indeed, they observe that signals from central banks are necessarily conditioned by currently available information, which is almost by definition incomplete. They fear that their credibility would be impaired when they inevitably have to change their signals because information has changed. Third, returning to the theme emphasized by Cukierman and Meltzer, bankers do not wish their objectives be too precisely pinpointed because policy decisions are inherently controversial. They want to be judged *ex post* on their results and not *ex ante* on their intentions. This aspect of the debate raises the related question of independence and accountability.

The theoretical presumption that transparency is the default option relies on the very general principle that when markets operate efficiently, more information is generally better than less. The question, therefore, is whether there exist market imperfections that invalidate the presumption. The literature is under early development and it naturally focuses on information imperfections. An example is the existence of information asymmetries whereby the central bank information set includes the private sector information set, for example because policy makers' preferences are imperfectly known or because central banks can devote more resources to collect and process information relevant to monetary policy. It is unclear whether central banks indeed possess superior information but, if that is the only imperfection, the policy implication is that the first, best solution is for central banks to be transparent so that asymmetry is eliminated. The other and more interesting imperfection involves information heterogeneity whereby the central bank and the private sector have different, partially overlapping information sets. The literature suggests that there might exist cases when some degree of secrecy is desirable but only if the quality of central bank information is poor.

In practice, bank transparency has been on the rise over the last two decades, in some cases spectacularly so. The usual example is that of the Fed that used to keep its interest decisions secret until 1994. Nowadays the Fed publishes the minutes of its Board meetings (with a lag). In nearly all developed countries and in many emerging market countries, central banks also publish informative minutes on decision-making meetings and provide extensive information on the data and methods that they use in preparing their decisions. Most central banks also publish their forecasts of inflation and the output gap over a two or three year horizon. Recently, some central banks have gone even further as they reveal their forecasts of the path of the policy interest rate over a horizon of two or three years.⁶ In other words, these central banks share with the public their intentions

⁶ This is the case in New Zealand, Norway, and Sweden.

as far as they themselves see. The future evolution of the interest rate is arguably the most often asked question put to a central banker and the time-honored tradition has been to never answer.

Transparency, in turn, has raised a number of new questions. For example, when they produce their forecasts, what assumptions do central banks make regarding their own interest rates? For a while, the customary procedure was to assume unchanged interest rates. If however, the forecasts imply that some monetary policy action is warranted, now or in the foreseeable future, the unchanged interest assumption is inappropriate, and so are the inflation and output forecasts based on that assumption. This has led many central banks to change their practice and assume the policy rate implicit in the yield curve. This, in turn, brings about a new question: does the central bank agree with the market forecasts of their policy rates? If it does not, then again the inflation and output forecasts are based on an assumption with which the central bank disagrees. Pursuing this logic to the bitter end, central banks are led to revealing their own interest rate forecasts. Once they start traveling down the transparency road, central banks are led to constantly reveal more.

Should Central Banks React to Asset Prices?

Another controversy that has been lingering for a while is whether central banks should care about asset prices, including the exchange rate. The traditional view, in the spirit of Tinbergen, is that they should concentrate on the price stability objective and not attempt to hit more than one target. Central bankers also note that, anyway, they already care about asset prices to the extent that they affect inflation. But designating asset prices as an official concern could, in this view, put central banks in a situation where they have to choose between consumer price stability and dealing with asset prices, a choice laden with risks that they should not have to face.

Against this view is the fact that the strategy of choice of many central banks is flexible inflation targeting. Even if central banks pursue price stability as their primary objective, they have some room for secondary objectives. Indeed most of them, if not all, acknowledge that they care about stabilizing output. If, for example, inflation is above its target, the central bank must raise the interest rate and allow for output growth to slow down. The reasoning rests on the short-run Phillips curve trade-off between inflation and the output gap and on the presumption that monetary policy affects first output and then inflation. How quickly inflation is brought back to target, therefore, is a matter of choice. The central bank can decide how much of a growth slowdown it is willing to accept. Indeed, the Taylor rule, which captures this reasoning by linking the policy interest rate to inflation and the output gap, is reasonably well supported by the empirical evidence even though it does not recognize the hierarchy of inflation

being the primary objective and output the secondary objective. Thus, the one-instrument rule is already superseded by a more flexible and eclectic approach—that Governor Mervyn King described as opposed to the “inflation nutter” view—which recognizes inflation as the overriding objective of monetary policy in the long run and yet allows for a trade-off over the intermediate period.

This flexible approach to the long-run neutrality of money suggests that the central bank can also focus on out-of-equilibrium asset prices in the short run without necessarily jeopardizing the long-run inflation objective (see, for example, Cecchetti et al. 2000). Central banks have several reasons to consider this possibility. First, most central banks are given the task of ensuring the smooth functioning of financial markets. They need to be concerned about asset price bubbles, which are invariably followed by sharp corrections and market stress. Second, out-of-equilibrium asset prices inhibit or deform some of the channels of monetary policy transmission. Third, monetary policy itself, no matter how justified, may cause deviations of asset prices from their equilibrium values. When this is the case, subsequent corrections may be painful enough to justify a change in the current policy stance.

The current financial market turmoil has revived a fledgling debate that most central banks effectively sought to quell. There is a growing perception that the long era of low interest rates in the 2000s has contributed to the formation of housing price bubbles. With hindsight, it seems that raising interest rates early on could have shortened the unusually long expansion phase, which could well have avoided a recession of historical proportions.

Most central banks have resisted the responsibility of keeping asset prices in line with equilibrium. They argued that they cannot handle several objectives at the same time, which is precisely what flexible inflation targeting is all about, not to mention the dual mandate of the Federal Reserve. They noted that bubbles cannot be easily identified *ex ante*. This is true, but the other task of monetary policy, forecasting output growth and inflation over the two-year policy horizon, is not easy either.

Finally, central banks have pointed out that they may be unable to prick an asset bubble. Central bankers are usually of the view that they cannot and should not do so because it would require unacceptably high interest rates. They are reluctant to take drastic action in a situation where it is not possible to assert with any certainty the presence of a bubble because they worry that any action may be seen *ex post* as ill-conceived. Indeed, pricking a bubble amounts to suppressing an event and it is impossible *ex post* to “prove” that the event would have taken place absent the policy action. Having provoked a marked economic slowdown for no demonstrated reason could undermine their credibility and possibly make it more difficult, if not impossible, to achieve price stability, which is central banks’ foremost duty.

Little is known of what it takes to prick a bubble. The presumption is that interest rates must be raised very significantly but it might not be so. Bubbles are

not business-as-usual situations. Market participants are sensitive to the possibility that bubbles exist and are likely to react strongly if central banks specify target assets as potential bubbles. At this stage, we lack evaluation of what such a policy could do and for a good reason: it has never been tested.

These arguments were finely balanced until the current crisis. Of course, the meltdown of much of the world banking system and the dramatic decline in asset prices is not just the outcome of monetary policy mistakes. Without severe market failures and regulatory and supervision failures, the end of the U.S. housing price bubble would not have led to the current situation. One could even argue that, absent the U.S. housing price bubble, other shocks would have occurred one day or another and precipitated the crisis-in-waiting. This does not exonerate the surprising tolerance of an unsustainable credit expansion driven by unsustainably rising housing prices. Although less cataclysmic, the 2000-01 end of the high-tech bubble is another example of a situation where raising the interest rates early enough could have created a milder recession than the one that eventually happened.

This issue is reasonably new and the debate is likely to develop for quite some time. A complicating factor is that, assuming that central banks agree to intervene, the mode of intervention remains to be thought through. Obviously, prevention is more desirable than dealing with already formed bubbles but identifying budding bubbles is obviously more difficult than identifying already-formed bubbles. This means that much new research is needed in this area.

Conclusion: What Will We Learn from the Crisis?

Since the crisis started in August 2007, the major central banks have conducted increasingly unorthodox policies. The amount of liquidity injected into banking systems is staggering. The range of assets accepted as collateral has been extended to the point where central banks have assumed significant risks. In some countries, like the United States and Japan, central banks are even involved in loan-making to the private sector. Deposits have been guaranteed, in some instances without limit, and central banks have provided insurance for new loans. These emergency actions are unheard of and it will take years to observe and evaluate the consequences.

A particular and novel aspect of the crisis is that lending in last resort is no longer a conditional option left to central bank discretion. Central banks—or treasuries—have been forced to rescue banks because the systemic risks of not doing so were too large to contemplate, as was quickly realized after the failure of Lehman Brothers. We now have to rethink banking systems that benefit from automatic emergency support. Moral hazard mitigation will require new regulation that goes beyond current practice. Designing such regulation is an urgent research agenda, with much recent progress.

It will also take time to determine whether the liquidity injections will be withdrawn in time to avoid a burst of inflation. As noted above, before the crisis monetary policy was conducted through interest rate setting, with money supply fully endogenous. The crisis has made money markets inoperative and the link between quantity and price—the interest rate—has been broken. This new situation raises questions that challenge our understanding of monetary policy. First, can it work when the policy interest rate is at—or close to—zero? Many of the developments achieved since Friedman’s work suggest that this is highly unlikely.

Second, when the crisis ends, can central banks prevent inflation? Does this hinge on their ability to withdraw the liquidity that they created? The optimistic view is that once the money markets function normally again, central banks will simply have to raise the interest rates to deal with potential inflationary pressure. In that case, central banks will revert to their pre-crisis strategies of setting the interest rate that they see as leading to price stability. In that case, the money supply will become endogenous again and appropriate interest rates will be enough to return to normalcy. Put differently, this view rests on the assumption that the volume of liquidity does not matter per se because the wealth effect is negligible and the other channels are mostly driven by the interest rate. Facing a given interest rate, the banks will reduce the massive amounts of reserves that they have accumulated during the crisis as they saw liquidity as an insurance against further turmoil.

There is a more pessimistic view, however. It holds that money markets, and more generally banking systems, will have to recover first, long before the economic situation has improved. Several complications could arise. One possibility is that central banks may need to keep interest rates very low for an extended period of time to support convalescing commercial banks. If the money supply remains very large for an extended period of time and if banks use the liquidity to rapidly develop credit, a new lending boom could generate fast-rising inflation before central banks consider that it is possible to withdraw liquidity. Another possibility is that even if the interest rate is significantly increased, banks will not reduce the liquidity that they hold because they still feel fragile. As long as they do not engage in large-scale lending, this should not be a source of inflation. But once they feel confident again, they could use the accumulated liquidity to quickly jack up their lending activities. With the historical link between liquidity and the interest rate thus broken, central banks may find it difficult to judge what is the policy rate required to rein in credit growth. They could overreact and break the resumption of economic growth, or underreact and inadvertently allow for a rapid rise in inflation.

All these questions reflect uncertainty about banks’ behavior in unsettled times but also continuing doubts about the channels of monetary policy. It may be surprising that, in spite of all that we learned since Friedman’s seminal work, many of the same old questions remain open. Before the crisis, it seemed that

money growth targeting was a topic for economic historians and the emphasis on shaping private expectations made Friedmanian monetary economics look pretty naïve. Could it be that the pendulum will swing back because, as some argues, the inflation-targeting strategy and the use of the interest rate as the instrument of choice is a key cause of the financial crisis? Will a new paradigm emerge pretty much as the Great Depression led to the birth of macroeconomics? Or will we simply refine current practice? Of course, it is far too early to tell.

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