







































































































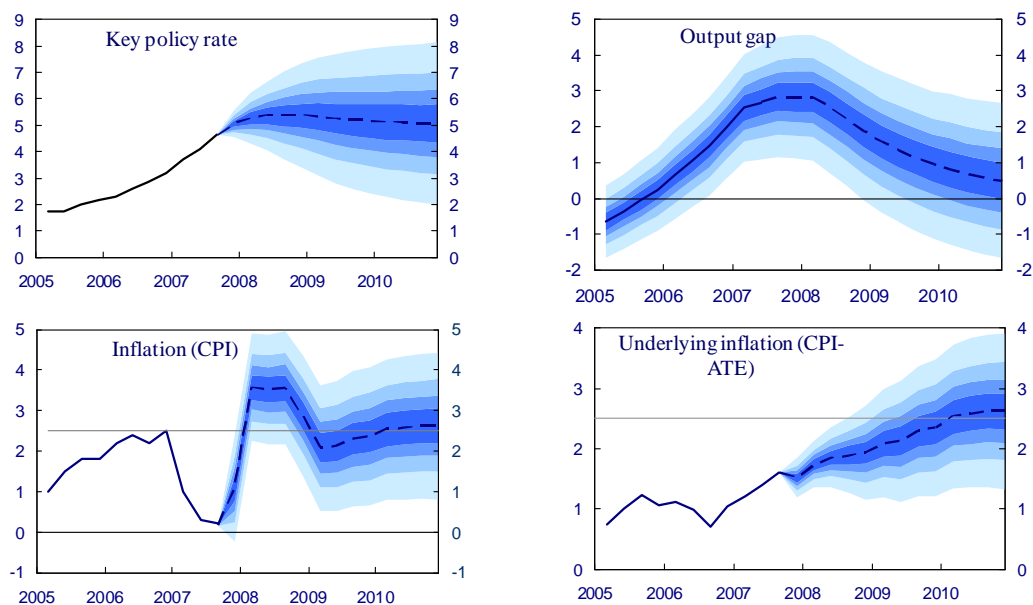








Figure 4.3: Main scenario and uncertainty intervals, Norges Bank, January 2008



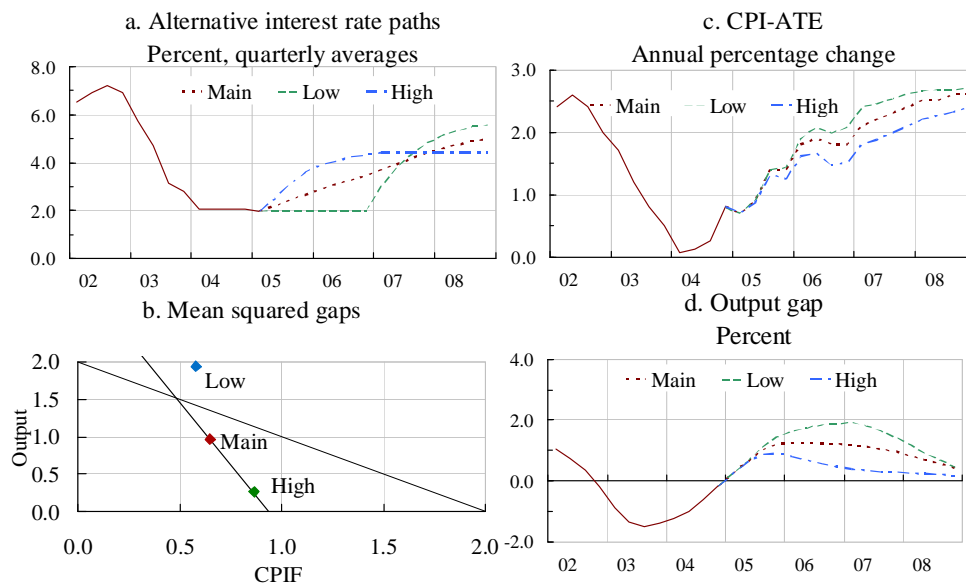
The decision process starts with the staff producing optimal policy projections under commitment.<sup>53</sup> Although optimal policy projections with the medium-sized DSGE-model NEMO (Brubakk and Sveen (2009)) is used as an input in the decision process, weight is also put on simple interest-rate rules, such as the Taylor rule. Judgements are then added to the model-based projections. The projections are then discussed by the board which might ask for additional adjustments based on their judgments.

Norges Bank has also published a set of criteria that it uses when judging between different instrument-rate paths. The first two criteria can be understood as verbal forms of optimality conditions. The other three provide for interest-rate smoothing, robustness and cross-checking. The criteria also work as an agenda for the internal discussions, see Holmsen, Qvigstad, Røisland, and Solberg-Johansen (2008).

Like many other central banks, Norges Bank indicates how it will react should certain disturbances occur by presenting alternative scenarios in the *Monetary Policy Report*. The exact specification of the shocks in the illustrations differs over time. The shifts are specified such that, if shocks of the same type and size occur, the alternative instrument-rate path is the Bank's best estimate of how it would react in such a situation. The shifts are consistent with the main scenario

<sup>53</sup> The staff normally use commitment in a timeless perspective as the main normative benchmark, but they have also considered alternatives such as the quasi-commitment in Schaumburg and Tambalotti (2007) (see section 3.8.2).

Figure 4.4: Policy options for Norges Bank, March 2005



in the sense that they are based on the same loss function guiding the response of the central bank.

The *Monetary Policy Report* includes an account of the disturbances that have led to a change in the instrument-rate forecast from the previous report. This “interest-rate account” is a model-based illustration of how the change in the policy-rate forecast from the previous report can be decomposed by different exogenous shocks to the model. The illustration shows how changes in the assessment of international and domestic economic variables as well as changes in the shock processes have affected the policy-rate path. The interest-rate account serves as a tool for communicating commitment. When the central bank commits to a reaction pattern under commitment, a change in the instrument-rate forecast should reflect economic news and not re-optimization of monetary policy. With an interest-rate account, the public is better able to check whether the central bank responds to news only or whether it re-optimizes.

#### 4.5. Preconditions for inflation targeting in emerging-market economies

An oft-heard objection to inflation targeting (at least before Batini and Laxton (2007)) is that it is costly in terms of institutional and technical requirements, making the framework unsuitable for some emerging-market economies. A detailed exposition of this point was made in Eichengreen, Masson, Savastano, and Sharma (1999), who argued that technical capabilities and central bank

autonomy were severely lacking in most emerging-market economies (including several that subsequently adopted inflation targeting).<sup>54</sup> Such countries, the argument goes, would be better off sticking with a “conventional” policy framework, such as an exchange-rate peg or money-growth targeting. The preconditions include (International Monetary Fund (2005, chapt. 4) and Batini and Laxton (2007)) institutional independence of the central bank; a well-developed technical infrastructure in terms of forecasting, modeling and data availability; an economy with fully deregulated prices, not overly sensitive to commodity prices and exchange rates, and with minimal dollarization; and a healthy financial system with sound banks and well-developed capital markets.

To assess the role of preconditions for the adoption of inflation targeting, Batini and Laxton (2007) administered a survey to 21 inflation-targeting central banks and 10 non-targeting central banks in emerging-market countries. The version of the survey given to inflation-targeting central banks focused on how policy was formulated, implemented, and communicated and how various aspects of central banking practice had changed before and during the adoption of targeting. Survey responses were cross-checked with independent primary and secondary sources and in many cases augmented with “hard” economic data. The evidence indicates that no inflation targeter had all the preconditions in place before adopting inflation targeting. Furthermore, their evidence suggests that it does not appear to be necessary for emerging-market countries to meet a stringent set of institutional, technical, and economic preconditions before successfully adopting inflation targeting. Instead, the feasibility and success of targeting appears to depend more on the authorities’ commitment and ability to plan and drive institutional change after introducing targeting. Consequently, policy advice to countries that are interested in adopting targeting could usefully focus on the institutional and technical goals central banks should strive for during and after adopting targeting in order to maximize its potential benefits.

In a study of the experiences of Brazil, Chile, the Czech Republic, Indonesia, South Africa, and Turkey, de Mello (2008) concludes that many of the preconditions associated with inflation targeting had not been fulfilled when these countries adopted inflation targeting. Nevertheless, he finds that “these deficiencies have not undermined the implementation of inflation targeting where policy efforts have been focused on addressing them” (p. 10).

In an extensive survey, Freedman and Ötoker-Robe (2009) describe the experiences of a number

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<sup>54</sup> Others who stressed the conceptual relevance of “preconditions” include Agenor (2000); Schaechter, Stone, and Zelmer (2000); Carare, Schaechter, Stone, and Zelmer (2002); Khan (2003); and the May 2001 World Economic Outlook. See also Masson, Savastano, and Sharma (1997). More neutral or benign views on the conceptual relevance of “preconditions” can instead be found in Truman (2003); Jonas and Mishkin (2003); Debelle (2001); and Amato and Gerlach (2002).

of countries with the introduction and implementation of inflation targeting regimes, and discuss how they fared in meeting the various conditions that some have argued are needed in advance of introducing inflation targeting. They find that the country experiences are *not* supportive of the view that countries have to satisfy a long list of preconditions before adopting inflation targeting but that some elements were important in making the inflation-targeting framework more feasible and less challenging: (i) price stability as the overriding monetary policy goal; (ii) absence of fiscal dominance; (iii) central bank instrument independence; (iv) broad domestic consensus on the prominence of the inflation target; (v) some basic understanding of the transmission mechanism, and a reasonable capacity to affect short-term interest rates; and (vi) reasonably well-functioning financial system and markets. They suggest that these elements could perhaps be viewed as the conditions conducive to the introduction of a successful inflation-targeting framework. In particular, they conclude: “There is no single most effective path toward adoption of inflation targeting. It would certainly be a mistake to think that all the conditions for a successful implementation of inflation targeting need to be in place before the framework could be launched. As country experiences show, in many countries that now have successful inflation targeting, some of the conditions were not in place at the outset, but the authorities worked over time to establish them, and also learned by doing. It would similarly be a mistake, however, to think that all the conventional conditions would arrive spontaneously. The central banks have to initiate the process and make their best effort to establish the true conditions and work with the government toward that objective” (p. 19–20).

## **5. Future**

This section discusses two potential future issues for inflation targeting – whether it would be advantageous to move on to price-level targeting and whether inflation targeting needs to be modified in the light of the recent financial crisis and deep recession.

### **5.1. Price-level targeting**

A possible future issue is whether flexible inflation targeting should eventually be transformed into flexible price-level targeting. Inflation targeting as practised implies that past deviations of inflation from target are not undone. This introduces a unit root in the price level and makes the price level not trend-stationary, that is, nonstationary even after the removal of a deterministic trend. That is,

the conditional variance of the future price level increases without bound with the horizon. In spite of this, inflation targeting with a low inflation rate is referred to as “price stability”. An alternative monetary-policy regime would be “price-level targeting”, where the objective is to stabilize the price level around a price-level target.<sup>55</sup> That price-level target need not be constant but could follow a deterministic path corresponding to a steady inflation of two percent, for instance. Stability of the price level around such a price-level target would imply that the price level becomes trend-stationary, that is, the conditional variance of the price level becomes constant and independent of the horizon. One benefit of this compared with inflation targeting is that long-run uncertainty about the price level is smaller. Another benefit is that, if the price level falls below a credible price-level target, inflation expectations would rise and reduce the real interest rate even if the nominal interest rate is unchanged. The reduced real interest rate would stimulate the economy and bring the price level back to the target. Thus, price-level targeting may imply some automatic stabilization. This may be highly desirable, especially in situations when the zero lower bound on nominal interest rates is binding, the nominal interest rate cannot be further reduced, and the economy is in a liquidity trap, as has been the case for several years in Japan (and during the recent deep recession in several other countries). Whether price-level targeting would have any negative effects on the real economy remains a topic for current debate and research (Svensson (2002)). Recently several central banks, especially Bank of Canada, have shown new interest in price-level targeting and several reviews of new and old research have been published, for instance, Ambler (2009), Amano, Carter, and Coletti (2009), Deutsche Bundesbank (2010), and Kahn (2009).

## **5.2. Inflation targeting and financial stability: Lessons from the financial crisis<sup>56</sup>**

At the time of writing (April 2010), the world economy was beginning to recover from the financial crisis and the resulting deep recession of the global economy, and there is a lively debate about what caused the crisis and how the risks of future crises can be reduced. Some blame loose monetary policy for laying the foundation for the crisis, and there is also a lively debate about the future of monetary policy and its relation to financial stability. In this section I discuss the lessons for inflation targeting after the crisis. My view is that the crisis was not caused by monetary policy but mainly by regulatory and supervisory failures in combination with some special circumstances,

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<sup>55</sup> See Berg and Jonung (1999) for a discussion of the good experience of price-level targeting in Sweden during the Great Depression.

<sup>56</sup> This section builds on Svensson (2009a) and Svensson (2010b). I thank Hanna Armelius, Charles Bean, Claes Berg, Alan Blinder, Stephen Cecchetti, Hans Dellmo, Chuck Freedman, Charles Goodhart, Björn Lagerwall, Lars Nyberg, Irma Rosenberg, Hyun Shin, Frank Smets, and Staffan Viotti for discussions of these issues.

such as low world real interest rates and U.S. housing policy. Ultimately, my main conclusion for monetary policy from the crisis so far is that flexible inflation targeting, applied in the right way and using all the information about financial factors that is relevant for the forecast of inflation and resource utilization at any horizon, remains the monetary policy before, during, and after the financial crisis that has the best chance to stabilize both inflation and the real economy. But a better theoretical, empirical, and operational understanding of the role of financial factors in the transmission mechanism is urgently required and needs much work, work that is already underway in academia and in central banks.

As described in the previous sections, flexible inflation targeting means that monetary policy aims at stabilizing both inflation around the inflation target and resource utilization around a normal level, keeping in mind that monetary policy cannot affect the long-term level of resource utilization. Because of the time lags between monetary-policy actions and their effect on inflation and the real economy, flexible inflation targeting is more effective if it relies on forecasts of inflation and the real economy. Therefore, flexible inflation targeting can be described as “forecast targeting”: the central bank chooses a policy-rate path so that the forecast of inflation and resource utilization stabilizes both inflation around the inflation target and resource utilization around a normal level or achieves a reasonable compromise between the two. The forecasts of inflation and the real economy are then conditional on the central bank’s view of the transmission mechanism, an estimate of the current state of the economy and a forecast of important exogenous variables. The central bank uses all relevant information that has an impact on the forecast of inflation and the real economy. In this framework, the central bank takes financial conditions such as credit growth, asset prices, imbalances, potential asset price bubbles and so on into account only to the extent that they have an impact on the forecast of inflation and resource utilization. Inflation and resource utilization are target variables, that is, variables that the central bank tries to stabilize. Financial conditions are not target variables. Instead, they are only indicators, as they provide information to the central bank about the state of the economy, the transmission mechanism and exogenous shocks. Financial conditions then affect policy rates only to the extent that they have an impact on the forecast of inflation and resource utilization.

Now, is there any reason to modify this view of monetary policy given the experience of the financial crisis so far? Let me approach this question by first asking what the causes of the financial crisis were, whether monetary policy contributed to the crisis, and whether a different monetary policy was warranted and could have prevented or reduced the size of the crisis.

### **5.2.1. Did monetary policy contribute to the crisis, and could different monetary policy have prevented the crisis?**

Many have claimed that excessively easy monetary policy by the Federal Reserve after 2001 helped cause a bubble in house prices in the U.S., a bubble whose inevitable bursting proved to be a major source of the financial crisis.<sup>57</sup> However, as I see it, the crisis was mainly caused by factors that had very little to do with monetary policy and were mostly due to background macro conditions, distorted incentives in financial markets, regulatory and supervisory failures (also when central banks have been responsible for regulation and supervision), information problems, and some specific circumstances, including the U.S. housing policy to support home ownership for low-income households.<sup>58</sup>

The macro conditions preceding the crisis included low world real interest rates associated with global imbalances, as well as the Great Moderation, with a long period of very stable growth and stable low inflation, which led to a systematic underestimation of risk and very low risk premia in financial markets. There were distorted incentives for commercial and investment banks to increase leverage that were made possible by lax regulation and supervision and the lack of an appropriate bank resolution regime. There were also distorted incentives to exercise less due diligence in loan origination because of securitization and to conduct regulatory arbitrage by setting up off-balance-sheet entities, which for various specific reasons ended up still effectively remaining on the balance sheet. There were also distorted incentives for traders and fund managers to take excessive risks because of myopic and asymmetric remuneration contracts. There were eventually enormous information problems in assessing the risks of extremely complex asset-backed securities, and there was a huge underestimation of the potential for correlated systemic risks. None of these causes had anything to do with monetary policy, except that monetary policy may have contributed to the Great Moderation.

Regarding the role of Federal Reserve monetary policy in the crisis, there are two relevant questions. First, was the low interest rate reasonable given the information available at the time? Second, could a different monetary policy with higher interest rates have prevented the crisis? The first question, whether the low interest rate was reasonable given the available information, is the

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<sup>57</sup> See, for instance, Taylor (2007).

<sup>58</sup> See Bean (2009) for an extensive and excellent discussion of the crisis, including the credit expansion and housing boom, the macroeconomic antecedents, the distorted incentives, the information problems, the amplification and propagation of the crisis into the real economy, the policy responses, and the lessons for monetary policy and economics generally. Bank for International Settlements (2009) provides a more detailed account of the possible macro- and microeconomic causes of the crisis.



relevant one when evaluating monetary policy. It is more relevant to evaluate policy taking into account the information available ex ante to the policymaker rather than information ex post that was unknown to the policymaker at the time (see Svensson (2010a) on evaluating monetary policy ex ante and ex post). During the period in question, given the information available, there was a genuine and well-motivated fear of the U.S. falling into a Japanese-style deflationary liquidity trap, and the optimal policy in such a situation is a very expansionary monetary policy.<sup>59</sup> It may be that, in retrospect, the risk of deflation was exaggerated, but there was no way to know this ex ante. Hence, I consider the expansionary policy very appropriate. Adding some ex post evaluation, one can note that it did not lead ex post to very high inflation or an overheated economy.<sup>60</sup>

The second question, whether a different monetary policy could have prevented the crisis, is relevant when assessing to what extent monetary policy can be blamed for causing the crisis, notwithstanding if it was reasonable from an ex ante perspective. The credit growth and the housing boom in the U.S. and elsewhere were very powerful. Real interest rates were low to a large extent because of global imbalances, and the global saving glut and investment shortage. I believe that somewhat higher interest rates would have made little or no difference. Empirical evidence indicates that only a small portion of house-price increases can be attributed to monetary policy.<sup>61</sup> Bernanke (2010) shows that the recent phenomenon of a higher share of adjustable-rate mortgages was unlikely to have significantly increased the sensitivity of house prices to monetary policy. The availability of new, more exotic mortgage types mattered much more for initial mortgage payments than the level of short-term interest rates. In my view, interest rates would probably have had to be raised very high so as to cause considerable damage to the real economy in order to stop the credit growth and housing boom. That could have thrown the U.S. right into Japanese-style deflation and eventually a liquidity trap.<sup>62</sup> Certainly, higher interest rates would have had no impact on the regulatory problems, distorted incentives and information problems mentioned above (although they could have ended the Great Moderation with a deep recession and deflation).<sup>63</sup>

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<sup>59</sup> See Svensson (2003a) for a discussion of policy options before and in a liquidity trap.

<sup>60</sup> Bernanke (2010) shows that Fed policy rates do not seem excessively low given real-time FOMC forecasts. See also Dokko, Doyle, Kiley, Kim et al. (2009).

<sup>61</sup> See Del Negro and Otrok (2007), Jarocinski and Smets (2008), Edge, Kiley, and Laforde (2008), and Iacoviello and Neri (2008).

<sup>62</sup> Assenmacher-Wesche and Gerlach (2009) study the responses of residential property and equity prices, inflation and economic activity to monetary policy shocks in 17 countries in the period 1986-2007, using single-country VARs and panel VARs in which they distinguish between groups of countries depending on their financial systems. The effect of monetary policy shocks on GDP is about a third of the effect on property prices. Thus, to increase policy rates so as to lower property prices by 15 percent would result in 5 percent lower GDP.

<sup>63</sup> Kohn (2008), after extensive discussion, concludes that there is insufficient evidence that low interest rates would have contributed much to the house-price boom and that higher interest rates would have had much dampening effect on it.

However, going beyond the Federal Reserve's actual monetary policy, perhaps it is possible that the emphasis on its readiness to relax monetary policy aggressively in the wake of a sharp fall in asset prices, as expressed by Greenspan (2002) for example, may have induced expectations of a floor under future asset prices and contributed to the asset-price boom, the so-called Greenspan put (Miller, Weller, and Zhang (2002)). Arguably, this is more of a communication issue than one of actual policy, and less emphasis on the readiness to clean up after a sharp fall in asset prices might have been a preferable alternative.

The IMF (International Monetary Fund (2009, chapt. 3)) has investigated the role of monetary policy in causing financial crises. A large number of countries and financial crises were included in the sample. The conclusion is that "the stance of monetary policy has not generally been a good leading indicator of future house price busts. . . There is some association between loose monetary policy and house price rises in the years leading up to the current crisis in some countries, but loose monetary policy was not the main, systematic cause of the boom and consequent bust." Furthermore, the overall relationship between the stance of monetary policy and house-price appreciation across countries in the years before the current crisis is statistically insignificant and economically weak, and monetary policy differences explain only about 5 percent of the variability in house price appreciation across countries.<sup>64</sup>

What conclusions can we draw so far from the financial crisis about the conduct of monetary policy and any need to modify the framework of flexible inflation targeting? One obvious conclusion is that price stability is not enough to achieve financial stability (Carney (2003), White (2006)). Good flexible inflation targeting by itself does not achieve financial stability, if anyone ever believed it would.

Another conclusion is that interest-rate policy is not enough to achieve financial stability. Specific policies and instruments are needed to ensure financial stability. Instruments like supervision and regulation, including appropriate bank resolution regimes, are more effective in promoting financial stability. In many countries, the responsibility for these instruments rests on authorities other than the central bank. Generally, to the extent financial instability depends on specific distortions, regulation is most effective if it aims to attack these distortions as close to the source as possible. To counter the observed procyclicality of existing regulation, macro-prudential regulation that is contingent on the business cycle and financial indicators may need to be introduced

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<sup>64</sup> The relationship for the euro area countries is less weak, but for reasons explained by Bernanke (2010) it is potentially overstated. See also Dokko, Doyle, Kiley, Kim et al. (2009).

to induce better financial stability. Possible macro-prudential regulation includes variable capital, margin, and equity/loan requirements. As expressed by Bean (2009), “the best approach is likely to involve a portfolio of instruments.”

### **5.2.2. Distinguish monetary policy and financial-stability policy**

More generally, what is the relation between financial stability and monetary policy? Financial stability is an important objective of economic policy. A possible definition of financial stability is a situation when the financial system can fulfil its main functions (of submitting payments, channeling saving into investment, and providing risk sharing) without disturbances that have significant social costs. I find it helpful to conceptually distinguish financial-stability policy from monetary policy. Different economic policies and policy areas, such as fiscal policy, labor market policy, structural policies to improve competition, etc., can be distinguished according to their objectives, the policy instruments that are suitable for achieving the objectives, and the authority or authorities controlling the instruments and responsible for achieving the objectives.

Monetary policy in the form of flexible inflation targeting has the objective of stabilizing both inflation around the inflation target and resource utilization around a normal level. The suitable instruments are under normal circumstances the policy rate and communication, including possibly a published policy-rate path and a forecast of inflation and the real economy. In times of crisis, as we have seen during the current crisis, other more unconventional instruments can be used, such as fixed-rate lending at longer maturities, asset purchases (quantitative easing), and foreign-exchange intervention to prevent currency appreciation. The authority responsible for monetary policy is typically the central bank.

The objective of financial-stability policy is maintaining or promoting financial stability. Under normal circumstances the available instruments are supervision, regulation, and financial-stability reports with analyses and leading indicators that may provide early warnings of stability threats. In times of crisis, there are instruments such as lending of last resort, variable-rate lending at longer maturities (credit policy, credit easing), special resolution regimes for financial firms in trouble, government lending guarantees, government capital injections, and so forth.<sup>65</sup> The responsible authority or authorities vary across countries. In some countries it is the central bank, in other

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<sup>65</sup> Gertler and Kiyotaki (2010) develop a canonical framework to help organize thinking about credit market frictions and aggregate economic activity in the context of the current crisis. They use the framework to discuss how disruptions in financial intermediation can induce a crisis that affects real activity and to illustrate how various credit market interventions by the central bank and/or the Treasury of the type seen during the crisis might work to mitigate the crisis.

countries there is a separate financial supervisory authority, sometimes the responsibility is shared between different institutions. In Sweden, the Financial Supervisory Authority is responsible for supervision and regulation, the Riksbank is responsible for lending of last resort to solvent banks and for promoting a safe and efficient payment system, while the National Debt Office is responsible for bank guarantees and the resolution of failed banks. During times of crisis, these authorities cooperate closely with the Ministry of Finance.

My point here is that financial-stability policy and monetary policy are quite different, with different objectives, instruments, and responsible authorities, the latter with considerable differences across countries. This does not mean that there is no interaction between them. Financial stability directly affects the financial markets, and financial conditions affect the transmission mechanism of monetary policy. Problems in financial markets may have a drastic effect on the real economy, as the current financial crisis has shown. Monetary policy affects asset prices and balance sheets and can thereby affect financial stability. But the fact that financial-stability policy and monetary policy are conceptually distinct, with distinct objectives and distinct suitable instruments, has to be taken into account when considering the lessons of the financial crisis for monetary policy. Thus, because the policy rate is a blunt and unsuitable instrument for achieving financial stability, it makes little sense to assign the objective of financial stability to *monetary policy*, although it may make sense assign that objective to the *central bank*, if the central bank gets control of the appropriate supervisory and regulatory instruments.<sup>66</sup>

### 5.2.3. Conclusions for flexible inflation targeting

What are the specific conclusions for flexible inflation targeting? One important lesson from the financial crisis is that financial factors may have a very strong and deteriorating effect on the transmission mechanism, making standard interest-rate policy much less effective. This motivates more research on how to incorporate financial factors into the standard models of the transmission mechanism used by central banks. A rapidly-increasing volume of such research is now being produced by academic and central-bank researchers and presented at an increasing number of conferences on financial factors and monetary policy. Important and challenging questions include how potential output and neutral real interest rates are affected by financial factors and financial distortions (Curdia and Woodford (2009), Walsh (2009b)), and what impact financial factors have on the general

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<sup>66</sup> Blinder (2010) discusses how much of the responsibility for financial-stability policy should rest with the central bank.

equilibrium effects of alternative policy-rate paths on inflation and resource utilization forecasts.<sup>67</sup> Even with much better analytical foundations concerning the role of financial factors in the transmission mechanism, there will of course, as always, be considerable scope for the application of good judgment in monetary policy.

Another conclusion, which is not new, is that consideration of the impact of financial factors on the forecast of inflation and resource utilization may require longer forecast horizons. Several inflation-targeting central banks (including the Bank of England, Norges Bank, and the Riksbank) have for other reasons already extended their forecast horizon from the previously common two years to three years. There is nothing that in principle prevents an inflation targeter from considering forecasts beyond a three-year horizon, but in practice there is usually little information about anything at longer horizons except the tendency to revert to the long-term average.

What about “leaning against the wind” (as advocated by, for instance, Borio and White (2003) and Cecchetti, Genberg, and Wadhvani (2002)), the idea that central banks should raise the interest rate more than what appears to be warranted by inflation and resource utilization to counter rapid credit growth and rising asset prices? It has sometimes not been quite clear whether advocates of leaning against the wind mean that credit growth and asset prices should be considered targets and enter the explicit or implicit loss functions alongside inflation and resource utilization, or whether they mean that credit growth and asset prices should still be considered just indicators and are emphasized only because credit growth and asset prices may have potential negative effects on inflation and resource utilization at a longer horizon. In the latter case, leaning against the wind is a way to improve the stability of inflation and resource utilization in the longer run. Then it is completely consistent with flexible inflation targeting.<sup>68</sup>

However, in line with the previous discussion, instruments other than interest rates are likely to be much more effective in avoiding excessive credit growth and asset-price booms, and are therefore more appropriate to use as a first-best alternative. Interest rates that are high enough to have a noticeable effect on credit growth and asset prices may have strong negative effects on inflation and

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<sup>67</sup> Walsh (2009b) points out that when financial factors cause distortions, these distortions will in general introduce corresponding terms in a loss function for monetary policy that is a second-order approximation to household welfare. Curdia and Woodford (2009) present a model where the second-order welfare approximation is a standard quadratic loss function of inflation and the output gap between output and potential output, but where potential output is affected by financial factors. Then inflation and the output gap remain the target variables, with and without financial factors. The neutral rate in the model, that is, the real rate consistent with output equal to potential output, is then also affected by financial factors.

<sup>68</sup> Adrian and Shin (2010a) and Adrian and Shin (2010b) argue, in a model with a risk-taking channel as in Borio and Zhu (2008), that short interest-rate movements may have considerable effects on the leverage of securities broker-dealers in the market-based financial sector outside the commercial-banking sector. However, new regulation may affect the magnitude of these effects, and the size of the market-based financial sector may end up being smaller after the crisis. In Europe, the commercial banks dominate the financial sector.

resource utilization, and a central bank will probably rarely have sufficient information about the likely beneficial longer-horizon effects on inflation and resource utilization for the trade-off to be worthwhile and motivated.<sup>69</sup>

In particular, if there is evidence of rapidly rising house prices and mortgage loans, and these developments are deemed to be unsustainable and a possible bubble, there are much more effective instruments than policy rates. Restrictions on loan-to-value ratios and requirements of realistic cash-flow calculations for house buyers with realistic interest rates are much more effective in putting a break on possible unsustainable developments than a rise in the policy rates. In particular, more transparency about future policy rates, in the form a policy-rate path published by the central bank, may help in providing realistic information about future interest rates.

Suppose, however, that, for some reason, the appropriate and effective instruments to ensure financial stability are not available, for instance, because of serious problems with the regulatory and supervisory framework that cannot be remedied in the short run. In such a second-best situation, if there is a threat to financial stability, one may argue that, to the extent that policy rates do have an impact on financial stability, that impact should be taken into consideration when choosing the policy-rate path to best stabilize inflation and resource utilization. Such considerations could result in a lower or higher policy-rate path than otherwise, in order to trade off less effective stabilization of inflation and resource utilization for more financial stability. However, so far all of the evidence indicates that in normal times that tradeoff is very unfavorable, in the sense that the impact of policy rates on financial stability is quite small and the impact on inflation and resource utilization is significantly larger, so an optimal tradeoff would still have little impact on financial stability. A good financial-stability policy framework is necessary to ensure financial stability. Monetary policy cannot serve as a substitute.

Ultimately, my main conclusion from the crisis so far is that flexible inflation targeting, applied in the right way and using all the information about financial factors that is relevant for the forecast of inflation and resource utilization at any horizon, remains the monetary policy before, during, and after the financial crisis that has the best chance to stabilize both inflation and the real economy. But a better theoretical, empirical and operational understanding of the role of financial factors in the transmission mechanism is urgently required and needs much work, work that is already

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<sup>69</sup> Kohn (2006) specifies three conditions that should be fulfilled for central banks to take “extra action” to deal with a possible asset-price bubble: “First, policymakers must be able to identify bubbles in a timely fashion with reasonable confidence. Second, a somewhat tighter monetary policy must have a high probability that it will help to check at least some of the speculative activity. And third, the expected improvement in future economic performance that would result from the curtailment of the bubble must be sufficiently great.” He concludes, also in Kohn (2008) and after thorough considerations, that those conditions would rarely be met. See also Kohn (2009).

underway in academia and in central banks.

The outcome might very well be that financial factors are considered to have a larger role in affecting the transmission mechanism and as indicators of future inflation and resource utilization. If so, central banks would end up responding more to financial indicators, in the sense of adjusting the policy rate and policy-rate path more to a given change in a financial indicator. However, this would not mean that financial factors and indicators have become independent targets besides inflation and resource utilization in the explicit or implicit central-bank loss function. Instead, it would be a matter of responding appropriately to financial indicators in order to achieve over time the best possible stabilization of inflation around the inflation target and resource utilization around a normal level.

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