

JEL Classification: E52, E58, E61, G12, G18

Keywords: monetary policy, financial stability, asset markets, macroprudential policy

Monetary Policy in a Small Economy after Tsunami: A New Consensus on the Horizon?#

Jan FRAIT – Czech National Bank, Technical University of Ostrava (jan.frait@cnb.cz) and
University of Finance and Administration, Prague (*corresponding author*)

Zlatuše KOMÁRKOVÁ – Czech National Bank (zlatuse.komarkova@cnb.cz)

Luboš KOMÁREK – Czech National Bank, Technical University of Ostrava and University
of Finance and Administration, Prague (lubos.komarek@cnb.cz)

Abstract

The last financial crisis significantly changed views concerning the relationship between monetary policy, asset prices and financial stability. We survey the pre-crisis opinions on the appropriate monetary policy reactions to financial market developments and delineate the new consensus which is currently emerging from the lessons taken. The new consensus is an amended model of flexible inflation targeting in which the central bank “should sometimes lean and can clean”. We try to add the small open economy context to the debate and demonstrate that the optimal reactions of monetary policy-makers in small open economies may differ and that sometimes the optimal solution may not even be available due to the policies of the key world central banks acting as price makers. In such instances, second-best policies have to be considered.

“The modern central banker needs to be open to the reality of the ongoing structural changes around him, and to keep an open mind as to how monetary policy might best be used to enhance the welfare of the citizens for whom he or she is responsible.”

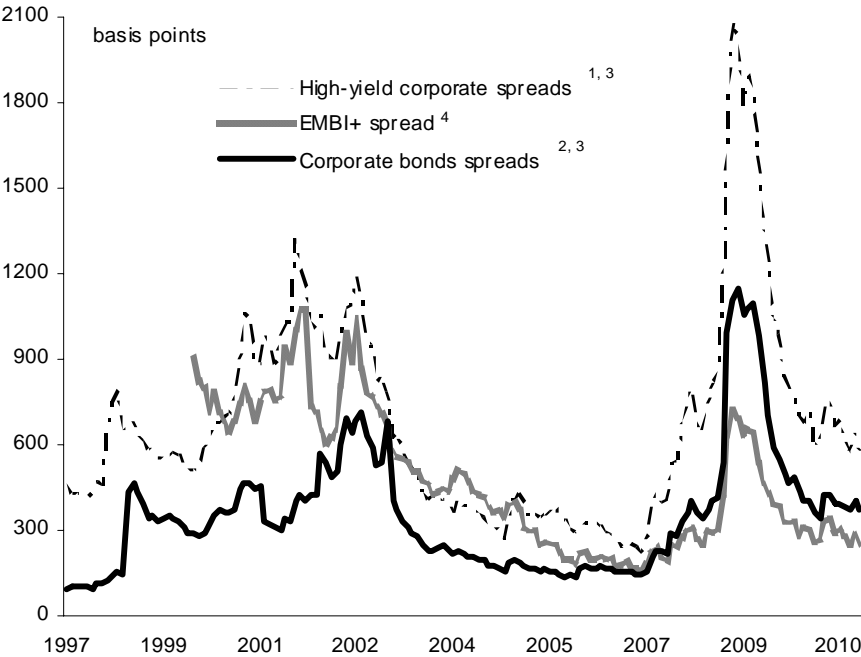
William R. White (2002)

1. Introduction

In the second half of the 1980s, in response to the high inflation of the previous two decades, central banks focused on achieving price stability, i.e. low and stable inflation, as their primary objective. In most countries, price stability was achieved relatively quickly – in advanced countries by the early 1990s and in emerging and developing ones in the second half of the 1990s. Inflation expectations in many countries started to be strongly and successfully affected by explicit or implicit inflation targets.

Authors note that everything contained in this paper represents their own views and not necessarily those of the Czech National Bank. All errors and omissions remain entirely the fault of the authors. The research behind this paper is supported by Grant Agency of the Czech Republic within a project no. 403/11/2073, which initiated with the project of Internal Grant Agency of the VSFS.

Figure 1 The Price of Risk – What Goes Down Must Come Up



Note: ¹ As from December 1997, simple average of US and euro area high-yield Merrill Lynch indices; ² Monthly average of BBB-rated Merrill Lynch bond index yields against 10-year government bond yields for US, EMU (10Y German), JP and UK, simple average; ³ option adjusted spreads; ⁴ JP Morgan Emerging Markets Bond Index Plus.

Source: Thomson Reuters, Bloomberg LP

The restoration of price stability, the fall in inflation expectations and the efforts of many countries to stop their currencies appreciating led to a considerable decline in nominal interest rates. At the start of the last decade, severe disinflationary and deflationary pressures pushed short-term and long-term nominal interest rates to historically low values, at least from the post-war perspective. As a result, various real interest rate measures also declined markedly, although perhaps less so than some economic agents thought. In this environment of low inflation and stable inflation expectations, moreover, central banks did not have to respond to the economic recovery by rapidly tightening monetary policy as they had in previous boom and bust cycles. This fostered a reduction in the short- to medium-term volatility of real economic activity. The view started to prevail that a “*Great Moderation*” had occurred in the world economy and that a long period of low and stable inflation and high and stable economic growth lay ahead. Although the financial markets experienced no such stabilisation (see section 2), financial institutions also gradually started believing that the Great Moderation, together with better risk management by financial institutions, would lead to a fall in credit and market risks. This resulted in a gradual decline in risk premia (credit spreads, interest rate margins) as measures of the price of risk of loans and other debt products. The biggest decline in the risky assets’ yield spreads over relevant “risk-free” benchmarks

occurred during the boom around the middle of the last decade (see Figure 1).¹ Even though this decline was explained at the time by the effects of the Great Moderation and financial institutions' improved ability to manage risks, in reality financial markets were losing part of their capacity to value risk. This was fully revealed following the onset of the crisis in 2007 and 2008, when spreads increased dramatically. In the last decade, therefore, financial markets experienced a *tsunami effect*, as risk first disappeared from the markets like water from the oceans only to return with a vengeance at the start of the crisis in the form of a destructive tidal wave.²

The onset of the Great Moderation coincided with the development of the theory and models of inflation targeting. In the years before the crisis, a consensus reflecting the theoretical and empirical studies published over the previous two decades completely prevailed among mainstream theoreticians and policy-makers. Bean et al. (2010) talk about this consensus as a synthesis of the rigour of dynamic general equilibrium modelling with the empirical realism of sticky-price Keynesian thinking. Mishkin (2010) refers to it as the "science of monetary policy" based on the new neoclassical synthesis (as defined by Clarida, Gali and Gertler, 1999) and transformed into a system of *flexible inflation targeting*. One of the major effects of the strength of this consensus was a strong belief in the potential of monetary policy and in central banks' ability to leverage this potential. However, the financial crisis that started in summer 2007 severely damaged the existing consensus regarding monetary policy strategy, and a search for a new consensus began.

This article focuses on the debate concerning the relationship between monetary policy, asset prices and financial stability in the last twenty years or so. Besides surveying the literature from both the academic and central banking communities, it attempts to extend the debate to the small open economy context. It explains how the lessons from the last financial crisis have affected the consensus about the proper way of conducting monetary policy and how a new consensus is emerging. Since the focus of the article is primarily on the general and long-term framework for monetary policy, some issues – such as the zero lower bound and quantitative easing – are left nearly untouched. The article is organised as follows. Section 2 describes the predominant view on the optimal reaction of central banks to the asset price movements existing in the pre-crisis years. Section 3 reviews features of the views of economists of the Bank for International Settlements (BIS), which were in many aspects different to the predominant view. Section 4 confronts the developments in the world economy in the pre-

¹ What was rather abnormal was that it happened on the background of central banks' policy tightening.

² The comparison of the financial crisis with a tsunami was first used by Alan Greenspan on 23 October 2008 in his Congressional testimony before the Committee of Government Oversight and Reform, which he started by saying: "We are in the midst of a once-in-a-century credit tsunami". What he had in mind, however, was only the shocking deterioration of credit markets that occurred after the Lehman Brothers failure. We nevertheless think that the more important tsunami-like aspect was the near disappearance of credit risk margins from international financial markets in the mid-2000s. In other words, the correct description of the credit tsunami has to take into account both periods of risk motion. By the way, the one-way description of events is a nice example of the asymmetric approach of Fed officials as well as US academics (see section 2). To be fair, Greenspan on number of occasions pointed to the risks building up in the economy while warning that history cautions that people experiencing long periods of relative stability are prone to excess. After all, it was he who brought the "irrational exuberance" concept into central bankers thinking as far back as in 1996.

crisis years with both the predominant and the BIS views described in the previous sections. Section 5 explains how the small open economy context modifies the depicted landscape and refers to the challenges faced by some economies during the pre-crisis period. In section 6 we sum up the lessons from the crisis and outline the monetary policy framework that is in our view emerging as the new consensus. Finally, section 7 returns to the small open economy context and discusses policy constraints in relation to the new consensus, and section 8 concludes.

2. The Great Moderation versus the Asset Markets' Wilderness

Although the restoration of price stability and the low economic volatility undoubtedly helped to reduce some significant risk sources in financial markets, the expected stabilisation of asset prices and the financial markets did not take place. On the contrary, fluctuations in asset markets increased and were accompanied by sharp changes in credit dynamics. Economists responded in the late 1990s by opening a major debate on whether monetary policy should actively seek to encourage asset price stability, or even whether it should attempt to prevent or at least reduce asset price bubbles.

Central banks automatically take asset price developments into account when setting monetary policy, even if formally they focus on price stability defined solely in terms of the consumer price index. This is primarily because large movements in asset prices have implications for CPI inflation. Rapid rises in the prices of real estate, for example, may put some pressure on the price of building materials. In addition to such direct impacts, asset price movements can feed into CPI inflation through the “wealth effect”. As asset prices rise, people tend to feel wealthier and consume more. Due to these effects the debate on the response of monetary policy to asset price movements has always been not whether it should respond at all, but whether it should respond over and above the response associated with the objective of stabilising inflation and output.

This particular debate arises from the fact that asset prices feed through to the economy in other ways than the ones discussed above. For example, asset price increases improve balance sheets, increasing the borrowing capacity of firms and individuals. Increases in net worth tend to increase the willingness of lenders to lend and borrowers to borrow, facilitating a general expansion in spending as well as an expansion in spending on investment in appreciating assets. Though most of the time, asset and consumer prices roughly move together, there are times when asset prices move well out of line with underlying economic fundamentals. Sometimes, asset prices can become disconnected from reasonable expectations of future earnings, resulting in speculative bubbles that cannot be justified by economic fundamentals. Sooner or later, speculative bubbles will burst. But the damage they can do to the economy can sometimes be huge. Thus there is the question of whether central banks should try to constrain asset price bubbles.

The predominant “*benign neglect*” view in the literature prior to the current crisis was that a central bank should pay attention to asset market developments, but cannot and should not try to constrain asset price bubbles on their own. The classical and influential contributions

justifying this particular view were provided by Bernanke and Gertler (1999, 2001).³ They argue that central banks should focus primarily on underlying inflationary pressures and that asset prices can become relevant only to the extent that they may signal potential inflationary or deflationary forces. Policy rules responding directly to asset prices would provide few if any additional gains. They could even bring greater variability in the real economy, interest rates and exchange rates. They also argue that monetary policy is not a sufficient tool to contain the potentially damaging effects of booms and busts in asset prices and that strategy to insulate the economy from financial disturbances should be based on transparent legal and accounting systems, a sound regulatory structure that helps to limit the risk exposure of banks and corporations, and prudent fiscal policies that help instil public confidence in economic fundamentals. Bernanke (2002) then suggested a very simple rule for central bank policy regarding asset market instability defined in line with the Tinbergen separation principle (Tinbergen, 1952). He basically says that the Fed has two sets of responsibilities – maximum sustainable employment, stable prices and moderate long-term interest rates on the one hand, and the stability of the financial system on the other. To achieve that, the Fed has two sets of policy tools: policy interest rates and a range of powers with respect to financial institutions. In this setting, the Fed should use the right tool for the job, i.e. the Fed will do its best by focusing its monetary policy instruments on achieving macro goals, while using its regulatory, supervisory and lender-of-last resort powers to help ensure financial stability. This particular rule subsequently held sway in the deliberations of the central banking community.

There was, however, a second stream developing alongside the predominant view, which favoured a more active monetary policy approach to asset price swings. Economists from this camp argued for a *lean-against-the-bubble* strategy.⁴ A special subgroup consisted of the writings of BIS economists (see the next section). The proponents of leaning assert that a central bank should take account of, and respond to, the implications of asset-price changes for its macro-goal variables. A well-known example of the “leaners” approach is Cecchetti et al. (2000)⁵, which applies the classic Poole (1970) analysis and concludes that a central bank should “lean against the wind” of significant asset price movements if these disturbances originate in the asset markets themselves. In contrast, if a disturbance originates in the real sector, asset prices should be allowed to change in order to absorb part of the required adjustment. They conclude that an inflation-targeting central bank is likely to succeed by adjusting its policy rates not only in response to its forecast of the inflation and output gap, but also in response to asset prices. They believe that such an approach could also reduce

³ See also Gilchrist and Leahy (2002) or Blinder and Reis (2005). The critical summary of the view is presented by Posen (2006).

⁴ Bernanke (2002) strongly argues against a much more activist approach, which he brands “aggressive bubble-popping”. He regards such a strategy, i.e. the use of monetary policy tools for pricking asset bubbles, as risky and dangerous. He points to the Fed action in 1929, when the Fed tried to prick the stock market bubble but succeeded only in killing the economy. Ferguson (2005) finds a similar pattern in Japan during the 1990s, which resulted in the lost decade of the Japanese economy. However, we find that support for aggressive bubble popping is rather low in both the academic and central banking communities. Roubini (2006) explains that the deliberate use of monetary policy for bursting bubbles might appear optimal in models in which the bubble is endogenous. He nevertheless talks about careful, not aggressive, bubble pricking.

⁵ Other important contributions represent Blanchard (2000) or Bordo and Jeanne (2002).

output volatility. This conclusion is based on the view that reaction to asset prices in the normal course of policy making will reduce the likelihood of asset price misalignments arising in the first place. On the other hand, the authors were not recommending that central banks either seek to burst bubbles currently perceived to exist, or target specific levels of asset prices. Furthermore, they do not recommend responding to all changes in asset prices in the same way or including asset prices directly in measures of inflation. They just say that it is important for central bankers to develop a framework for policy making that accounts for the various sources of uncertainty that they face in meeting their objectives.

While confirming their previous stand, Cecchetti et al. (2002) admit that setting policy rates on the basis of conscious deviations of expected inflation from the target could hurt credibility. The outcome could be that policy becomes less predictable and less transparent. In practice, attempts to set interest rates at a level different from what is necessary to achieve the target level at the two-year horizon must be accompanied by a justification that is explained simply and that commands broad agreement. Otherwise, policymakers who consciously aim away from their target at the two-year horizon (in order to reduce inflation volatility at other horizons) would attract suspicion if their explanation for doing so was too complex and not well-understood.

The lean-against-the-bubble strategy has always been acknowledged as not entirely without merit even by supporters of the predominant view. They have always agreed that it might be worthwhile for a central bank to take out some “insurance” against the formation of an asset-price bubble and its potentially adverse effects. They have nevertheless believed that leaning against the bubble was unlikely to be productive in practice. A few traditional and seemingly strong arguments against the leaning strategy have been used in this debate.

First, a central bank cannot reliably identify bubbles in asset prices, since it does not have any information advantage relative to private market participants. In particular, it is rather difficult to know at any particular point in time whether the increase in an asset price reflects fundamental improvements or excessively optimistic expectations.⁶ The second problem is the timing of the central bank’s reaction. Generally, asset price changes have an impact on inflation at a different horizon than the one usually associated with monetary policy-making. Specifically, once a central bank becomes certain that a bubble has emerged, it will probably be too late to act with interest rate hikes.

Third, pursuing a separate asset price objective could mean having to compromise on the inflation objective. Seeking to stabilise rising house prices or an overheated stock market might mean having to force inflation lower than would otherwise be required. Such a policy can lead to accusations by politicians and the media that the central bank is going beyond its remit. Fourth, a central bank’s focus on assets could lead to public confusion about its policy objectives. Giavazzi and Mishkin (2006) in their assessment of the Riksbank’s inflation-

⁶ The leaners are nevertheless sure that on some occasions one can be quite sure that a bubble is on the way, because fundamentals behind the asset price drift simply cannot be identified. They also argue that doubts about this capacity are based on a strong form of efficient market hypothesis leading to the false belief that incorporating all available information eliminates any misalignments.

targeting performance suggested that statements on house prices as a decisive factor in policy rate setting confused the public and led to a general weakening of confidence in the central bank's policy framework.⁷

The fifth and probably strongest objection is that even if a central bank can identify bubbles, monetary policy does not possess appropriate tools for effective use against them. It might be rather difficult to calibrate the appropriate tightening. A small increase in the policy interest rate can only lead to a correspondingly modest decline in the likelihood or size of a bubble. It is unlikely that a small increase in short-term interest rates, unaccompanied by a significant slowdown of the economy, will induce speculators to modify their equity or real estate investment plans. Interest rates simply may have limited power to affect the perceptions that move asset prices in the first place. To materially affect some asset prices, such as housing, interest rates would probably need to move by much more than would be required just to keep CPI inflation comfortably within the target range. Since interest rate changes affect not just house prices, but also the prices of most other assets, goods and services, there would be secondary, unintended consequences, with potentially serious consequences for the economy as a whole.

The argument regarding the small impact of monetary policy interest rates on asset prices and asset price bubbles has been heavily used in the debate regarding the contribution of monetary policies to the build-up of vulnerabilities leading to the recent crisis. Posen (2009) warns that authorities that would like to lean simply do not have a tool that works. He provides international evidence that monetary policy instruments do not predictably or dependably influence asset prices. In particular, nominal or even real policy rate changes do not seem to have had any impact during a wide range of booms. Extremely severe monetary tightening could have worked, but only at the price of large output losses.

3. The BIS Approach, or the Austrian Business Cycle Revisited

An alternative approach to the predominant view was championed by economists around the BIS, whose opinions were based to some extent on those of certain representatives of the Austrian business cycle school. Although their studies provided significant inspiration for leaners in the academic community, the opinions of the academic mainstream were affected only to a small extent by the BIS economists' approach, probably because they were not presented in the formal manner prevailing in the theoretical literature.⁸ The BIS economists concluded following their empirical observations that achieving both price and output stability still does not automatically guarantee *financial stability* and asked why the economies after the emergence of the Great Moderation regularly exhibit symptoms of financial instability in

⁷ The Executive Board of the Riksbank raised the repo rate by 0.25 percentage point in February 2006, communicating that although the inflation forecast had been revised downward and the inflation forecast was below the 2% target at the policy horizon, the rapid rise in household indebtedness and house prices justified the hike. A similar debate emerged during the Bank of England Monetary Policy Committee meetings in 2004.

⁸ The studies of other economists drawing on the arguments of the Austrian school were also largely ignored in the theoretical literature. A typical example is Hyman Minsky, whose long-neglected opinions returned to the centre of theorists' attention only when the crisis erupted.

the form of currency, banking and debt crises. They agreed that a whole range of factors contribute to the onset of financial instability symptoms. However, they spied one of the primary causes of financial instability in a phenomenon that has simultaneously contributed to the stabilisation of inflation – the behaviour of globalised, liberalised financial markets. The ability to support or even cause radical changes in macroeconomic dynamics had become one of its features.

Borio, Furfine and Lowe (2001), Borio, English and Filardo (2003) and Borio and White (2004) provide detailed descriptions of the implications of liberalised markets for macroeconomic dynamics. In the context of the liberalisation and globalisation of financial markets, they talk about the elevated or even *excessive elasticity of the economic system*, by which they mean the system's internal potential to gradually generate financial imbalances⁹ that cannot be kept under control by existing mechanisms and are ultimately corrected through financial instability. Despite the fact that more efficient monetary policies helped to reduce short-term output volatility and prolong expansions at the expense of recessions, liberalised financial markets have created favourable environment for *endogenous "boom and bust" cycles*. They do this through their increased ability to amplify natural pro-cyclical elements in the behaviour of financial institutions and their interactions with the real economy. In particular, in periods characterized by low volatility of inflation and stable economic growth market participants may be led to underestimate the level of risk in the economy. And due to the intense competition, financial institutions and their clients have significant incentives to take on more risk than before. They can do so because when an economy starts to experience good times, access to external sources of financing improves significantly. In the new environment, such access is more dependent on current risk perceptions on the side of both banks and their clients, which, in turn, are strongly dependent on current economic activity. So, during good times when cyclical improvements are confused with long-term boosts in productivity, virtuous circles can evolve, initiated by the higher readiness of firms and households to take on debt and use it for buying risky assets. Processes develop which manifests themselves in dampened risk perceptions, asset price drifts, lower external financing constraints on firms, households and governments and high investment activity from firms which is reflected in growth in production and profitability. Against the background of this virtuous circle, excessive financial imbalances as sources of systemic risks may be building up unnoticed. However, they often show up after a long lag, when economic activity weakens as a result of some kind of stimulus. Then a contraction occurs and reactions set in. When economic agents realise that the economy has been growing in an unsustainable manner and the debt is excessive, they start trying to restructure their balance sheets. This results in a decline in income, investment and asset prices. To a large extent these processes are natural, as they are cyclical fluctuations. However, things can sometimes go too far and a vicious circle may follow. When the adjustment is combined with a decrease in the external financing of firms and households owing to a more cautious approach from banks, the downward movement can be precipitate and destabilising. The last

⁹ By financial imbalances we understand disequilibria on both macro (external balance, fiscal balance) and micro (maturity and currency mismatches, excessively leveraged agents) levels.

episode of financial instability, which started in 2007, was global in nature and has been accompanied by associated with huge macroeconomic costs.

The principal contributions of BIS economists to the debate on the relationship between monetary policy, asset prices and financial stability are Borio and Lowe (2002), Borio, English and Filardo (2003) and Borio and White (2004). The starting point in this literature is that financial imbalances can build up in a low-inflation environment and that in some circumstances it is appropriate for policy to respond to contain these imbalances. They point out that a highly credible monetary policy focused on price stability can paradoxically even contribute to the build-up of financial imbalances. If inflation expectations are strongly anchored, demand-pull inflationary pressures may accumulate for quite some time without being fully reflected in actual inflation.¹⁰ Excess demand pressures may show up first in credit aggregates and asset prices, rather than in the prices of goods and services, which can make it harder for monetary policy to be sufficiently pre-emptive. If explicit or implicit inflation targets are defined for too short a horizon in this environment, which, given central banks' efforts to achieve accountability, is natural, the response to potential inflation pressures may be postponed for quite some time. Monetary policy will then accommodate the build-up of financial imbalances and associated distortions in the real economy – notably excessive capital accumulation, until it is too late and the risk of financial instability arises.¹¹ In the light of these particular framework features, longer policy horizons and a greater emphasis on the balance of risks in economic projections, as opposed to central scenarios or most likely outcomes, were recommended.

Borio and White (2004) acknowledge that protecting against the aforementioned processes and the risks they generate is not easy. At the basic level they recommend combining monetary policy oriented towards price stability with *macroprudential policy*¹² oriented towards financial stability. Such policy focuses more on preventing episodes of systemic financial distress that have implications for the real economy rather than on the problems of individual institutions (unless they are systemically important). Such policy must also think further about the financial system's inclination towards excessive procyclicality and its implications for economic dynamics and macroeconomic stability. Monetary policy should have a central position in the new macroprudential framework, since it is ultimately the banking sector that creates liquidity and provides the bulk of external financing. Monetary policy oriented towards pursuing simultaneous price and financial stability in the long run, along with other elements of macroprudential policy, should provide mutually supportive anchors ensuring greater macroeconomic stability. Borio and White therefore suggest that the role of monetary policy would be to anchor the liquidity creation process and, hence, the availability of external finance, since lending plays a key role in determining macroeconomic

¹⁰ If central banks in their forecasting models estimate the output gap on the basis of current inflation, the risk of incorrect response increases further.

¹¹ For a central bank with inflation currently below the inflation target, it would be very difficult to explain that it is tightening monetary policy because it is afraid that in three or four years the accumulated imbalances could cause inflation pressures or problems in the financial sector and, conversely, deflationary pressures subsequently if the unsustainable trend were to end in recession, financial repression and a subsequent slump in demand.

¹² The BIS view of macroprudential policy is defined in Borio (2003, 2010).

dynamics. Such anchoring would help to reduce the “elasticity” of the economy, i.e. its ability to generate financial imbalances, thereby providing critical support to prudential policy. The authorities could implement it by being prepared to lean against the build-up of financial imbalances by tightening policy, when necessary, even if near-term inflation pressures were not apparent. The rationale for such a strategy is not just to cool down the economy in a particular phase of economic upswing. More importantly, it would seek to limit the downside risks for the macroeconomy in the medium to long term. It would also take out some insurance against the risk of monetary policy losing effectiveness due to the zero lower bound.

The BIS economists thus decisively challenge the traditional objections to the leaning-against-the-wind strategy (see section 2). As to the key problem relating to bubble identification, they say that it is simply a wrong focus. The proper one should be placed on financial imbalances and not so much on asset price bubbles. Even though identifying *financial imbalances* ex ante is not easy, it is certain that sustained rapid credit growth combined with large drifts in asset prices increases the probability of a future episode of financial instability. It is financial imbalances that contribute to imbalances in the real economy and put long-term economic growth at risk. On top of that, Cecchetti et al. (2000) comment that the difficulties associated with measuring asset price misalignments are not substantially different from those of estimating theoretical constructs such as potential output or the equilibrium real interest rate.

BIS economists also took the lead in challenging the other important aspect of the pre-crisis thinking about monetary policy, namely the “can’t lean, but can clean” *policy asymmetry* (see, for example, White, 2006). Many in the central banking community subscribed to the view that monetary policy would not be effective in “leaning” against the upswing of a credit cycle but that lower interest rates would be effective in “cleaning” up afterwards.¹³ White (2009) finds the “can’t lean, but can clean” propositions seriously deficient, since monetary policies designed solely to deal with short-term problems of insufficient demand could make medium-term problems worse by encouraging a build-up of debt to unsustainable levels. Loose monetary policy can temporarily succeed in postponing the necessary adjustment of intertemporal disequilibria, but only at the expense of a deeper downturn in the future.¹⁴ Instead, monetary policy should be focused more on “pre-emptive tightening” to moderate credit booms than on “pre-emptive easing” to deal with the after-effects. If recommendations derived from the two points described above are embodied in monetary policy strategy, better macroeconomic outcomes can be available. In particular, if the authorities are expected to react to financial imbalances, agents may be more responsive to the policy tightening. Moreover, communicating a reaction function of this type ex ante might even diminish the

¹³ The “can’t lean, but can clean” strategy is also called the Greenspan doctrine, since it was the former Fed chairman who argued that monetary policy should not try to lean against bubbles, but should clean up after they burst. For financial market participants this policy asymmetry created the “Greenspan Put”, i.e. the investor perception of put protection on asset prices by the central bank providing ample liquidity in the case of a sharp market downturn.

¹⁴ Even though not said by White explicitly, the “can’t lean, but can clean” approach creates a similar pattern as the one described by Friedman’s version of the Philips curve, only instead of the need for a further acceleration of inflation, a deepening of the intertemporal imbalance is called for.

likelihood of imbalances evolving, in a similar way that the credibility of inflation targets tends to anchor inflation expectations. By contrast, expectations of asymmetrical reactions by central banks, i.e. easing only when imbalances unwind, can contribute the build-up of such imbalances.

4. Global Liquidity, Asset Prices and Monetary Policy before the Crisis

Not only BIS economists, but also the economic community in general, were aware that the pre-crisis decade was a period of rapid global economic growth on the one hand and the build-up of significant risks due to financial market developments on the other. The fact is, however, that there was not much open debate in central banks about making fundamental changes to the existing monetary policy paradigm. One reason was that financial sector developments played a relatively small role in the prevailing models and the economy was almost always close to equilibrium in them. And if it did deviate from equilibrium, it was supposed to return quickly to it in a model economy. As a result, the possibility that the actual economy might in reality have been facing an “original sin” problem was not conceded.

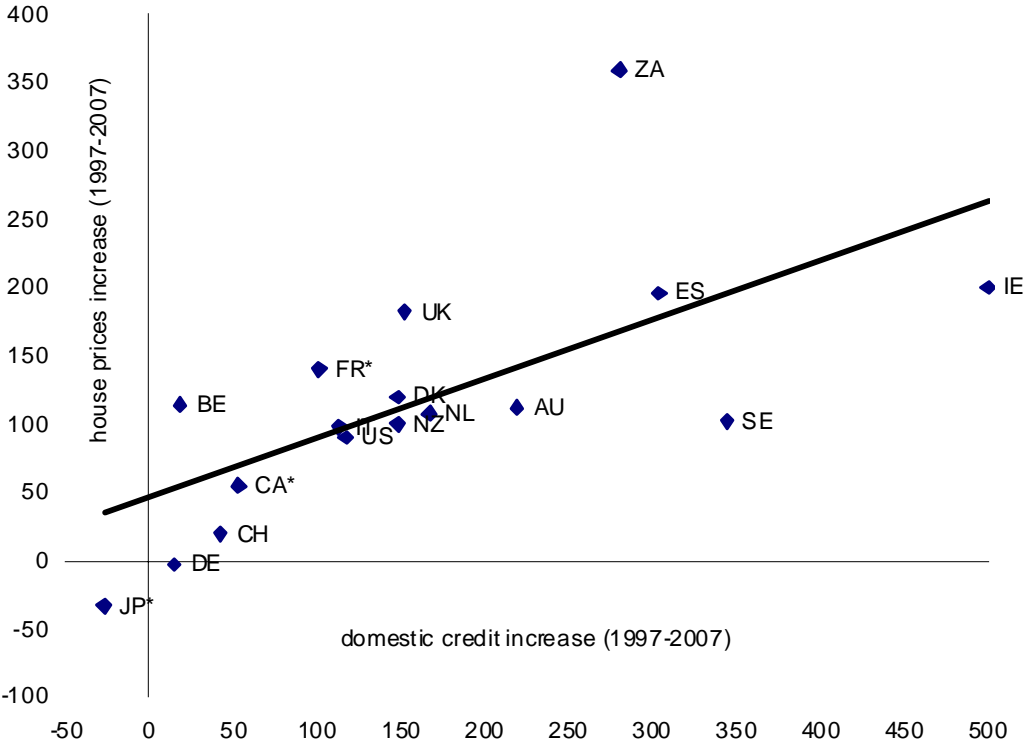
“Original sin” refers to the situation where an economy – owing to endogenous or exogenous events – undergoes a large deviation from equilibrium which can then be maintained in the medium run, for example through monetary policy. For instance, an unsustainable boom can be generated in the economy which manifests itself more in public finance and current account deficits than in inflationary pressures. The desired elimination of the intertemporal imbalance can be delayed for some time by continuing or accelerating supportive economic policies.¹⁵ In monetary policy models with short horizons and rapid adjustment of imbalances, however, fast output growth during a boom can be interpreted as growth in potential output, hence analyses can result in a recommendation to maintain low interest rates in an economy that is much overheated in reality.

From the current perspective it is quite clear that Western economies were much more overheated before the crisis than indicated by the output gap estimates, which were ultimately derived to some extent from the existing inflationary pressures. The underestimation of the overheating and its impacts on systemic risk was probably due to an extraordinary combination of temporary positive technological shocks, the involvement of a whole range of new countries in international trade, and market reforms in the former communist countries. These factors led to a seemingly permanent and pronounced increase in productivity. Another important factor in the pre-crisis years was the rapidly rising private sector and government debt levels in a large number of countries. This is why the overheating can also be branded a

¹⁵ A warning sign of the development of imbalances during the last decade was that virtually all countries wanted a weaker, or at least not stronger, currency, which obviously was not achievable. The root causes – of which there might have been a whole range – were not easy to identify. One possible cause was the efforts of central banks in large countries to “put off” the adjustment of the accumulated imbalances. The imbalances in the USA and some other Western economies might have arisen in connection with the “technological wave” in the late 1990s and the related over-optimistic assessment of future potential output growth. Similar trends could be observed in some EU countries.

“debt overheating”.¹⁶ The low inflationary pressures observed despite fast economic growth were largely due to huge inflows of labour into the world labour market as a result of globalisation (the opening up of China, India and the countries of the former Soviet bloc doubled the global labour supply), which dampened wage costs (see, for example, Borio and Filardo, 2007). Another problem faced by monetary policy-makers before the crisis was pronounced movements in relative prices associated with changes in the global economy (for example sharp fluctuations in prices of commodities and agricultural production). These movements caused short-term changes in inflation that were quantitatively significant in relation to the inflation targets. Eventually they complicated the monetary policy decision-making process and exposed it to increased uncertainty. This applied much more to the central banks that were relying mainly on the core measures of inflation. By doing this they were taking asymmetrically only the downward part of the price effect of globalization (declining manufacturing prices) while ignoring the upward part (rising commodity prices).

Figure 2 Correlation Between Credit Growth and Real Estate Prices



Source: authors’ calculations based on data from BIS, IMF and Economic Intelligence Unit.

The broad debate about the excess global liquidity¹⁷, that was going on around the middle of the last decade demonstrates that the risks associated with financial market developments were not ignored. The mix of low nominal and real interest rates, high credit growth and a real estate price boom was observed with remarkable apprehension. Number of economists

¹⁶ Borio and Lowe (2002) talk about periods of financial imbalances that are not associated with overt inflation pressures as “disguised overheating”.

¹⁷ Excess global liquidity or global liquidity glut were concepts which attracted considerable attention in pre-crisis years. They were de facto imprecise terms for excessively fast growth of credit and money. For discussion see for example Ruffer and Stracca (2006) or Bracke and Fidora (2008).

warned against rising propensity of the banking regulatory and accounting framework to procyclicality (Borio, Furfine and Lowe, 2001). There was a general awareness that the easy availability of credit might be adding to the real estate price expansion. And in a number of countries, the credit growth was apparently associated with the extension of housing loans. Number of countries recorded real estate price growth of between than 10 to 20 per cent annually in the pre-crisis decade. And in most of these countries, relative to income, real estate prices peaked historically in 2007. We plot growth in domestic credit and real estate prices between 1997 and 2007 in Figure 2. One can see a clear correlation between these variables, although causality surely cannot be automatically assigned to it. The opinion that the driver behind it was a credit boom fuelling bubbly increases in real estate prices was played down by emphasising the banks' ability to manage risks better than in the past (or transfer it away from their balance sheets).¹⁸

5. Does the Exchange Rate Make Monetary Policy Strategy Different?

The debate presented above unfolded primarily in the large and closed economy context. In the discussions of central bankers in small open economies, different and more structured views could be found. An important extension of the orthodox work on the *small open economy* case is Cecchetti et al. (2000, 2002). Its starting point is the finding that the primary exception to the view that asset prices do not belong in reaction function arose in an open-economy literature. They refer to Ball (1999), who finds that adding the exchange rate to the Taylor rule improves macroeconomic performance in a model where the exchange rate has a significant role in the transmission mechanism of structural shocks and monetary policy, and that it is optimal to target a measure of "long-run" inflation, i.e. inflation adjusted for the temporary effects of exchange rate fluctuations. Because Ball's model was questioned on the basis of the exchange rate specification in the model, Cecchetti et al. (2000) re-examined the issue in the context of a small-scale macroeconomic model in which these two aspects of exchange rate determination were present. The results showed that, on average, the degree of inflation and output volatility was really diminished by directly reacting to the exchange rate misalignment. Cecchetti et al. (2002), while generally confirming their previous view, admit that the result is model-specific and that monetary policy reactions to the exchange rate should also be conditioned by the underlying sources of these movements.

The exchange rate played a very important role indeed in the monetary conditions in small economies in the pre-crisis years. And perhaps surprisingly, rather positive outcomes in terms of price and financial stability were achieved in the countries in which central banks

¹⁸ A nice example of a belief in a much improved risk management in banks provides the ECB survey on credit risk transfer by EU banks (ECB, 2004). In this survey, banks were generally expressing conviction that credit risk management had improved greatly over recent years and their beliefs in increased sophistication of the latest credit risk models. Banks also reported that credit risk arbitrage and the deepening of credit derivatives markets had improved the pricing of risks involved in traditional loan portfolios, hence contributing to a better management of overall credit risks. On the contrary, Alan Greenspan, who is often criticized these days for ignoring risks, warned against the risks associated with credit risk transfer at that time (see Greenspan, 2005) stressing that a sudden widening of credit spreads could result in unanticipated losses to investors in some of the newer, more complex structured credit products.

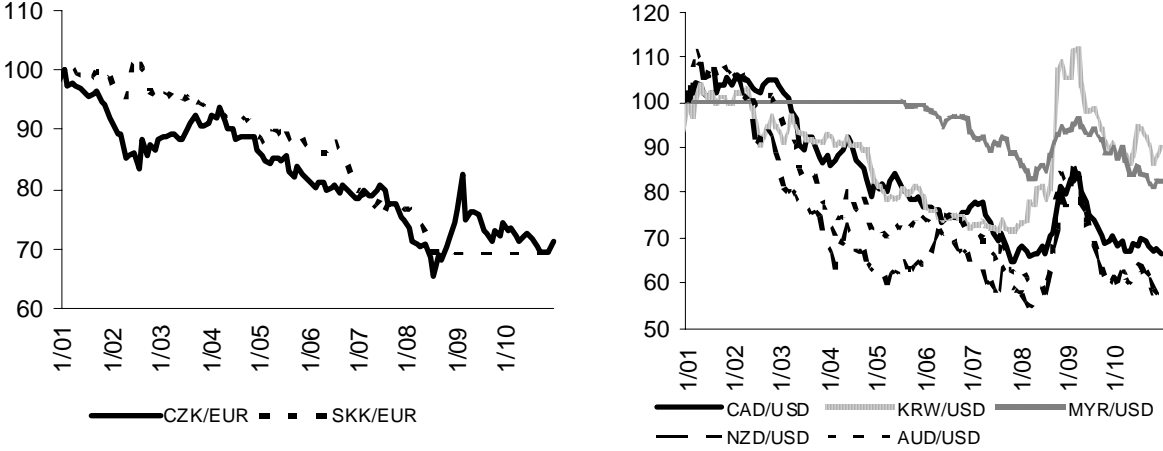
responded to exchange rate pressures broadly in a flexible inflation-targeting style. In particular, a strategy of reacting to the appreciation pressures pragmatically by cutting policy rates a bit and simultaneously allowing for some appreciation was working rather well. The explanation for this success is not a straightforward one. Basically, central bankers in small and open economies have been much more willing to accept that bubbles can emerge without signs of inflationary pressures and that inflation measured in terms of consumer prices has not always signalled when imbalances have been building up in the economy. In some countries, they felt – partly as a result of their own experience – that strong credit expansion and increasing asset prices preceded almost all banking crises and the majority of deep recessions. Some of them could also easily imagine a realistic scenario in which a bubble builds up without visible signs of inflationary pressures.¹⁹ Such a scenario can arise when higher economic growth creates excessively optimistic expectations about the future of the economy that lead to nominal appreciation of its currency. In such a situation, very low inflation can prevail even under rapid credit growth and asset price acceleration for rather a long time. When agents recognise that the real situation is not so rosy, and open inflation pressures subsequently appear, it may be too late for monetary policy to react. In addition, excessive demand, especially in small economies, may for a long time be reflected in rising current account deficits rather than in inflationary pressures (see Mandel and Kodera, 1995).

Some central banks therefore understood that the risks of a hard landing from the build-up and bursting of large asset price bubbles warranted taking some risks in an attempt to moderate the problem. There were cases where the asset price misalignment was sufficiently obvious that one could be confident enough to take the risk (see the debate on Riksbank policy below). In such cases, tightening monetary policy and accepting somewhat lower inflation relative to the target in the short term provided some chance to avoid a subsequent collapse in asset prices that could lead to large losses in terms of real output. Besides some tough inflation targeters, such as Sweden, Switzerland and Norway, such a chance was taken by the central banks that showed significant willingness to allow the foreign exchange value of their currencies adjust in the pre-crisis years by not resisting fully the appreciation pressures (Figure 3). By doing this, these countries avoided to some extent the adverse effects of a general asymmetry of pre-crisis monetary policy making which consisted of a much greater readiness to accept some depreciation of the domestic currency relative to appreciation. They applied, albeit sometimes unwittingly, the prescription of the BIS approach, in which a successful leaning-against-the-wind policy requires the central bank tightens monetary conditions above the level consistent with fulfilment of the inflation target and reduces inflation below the inflation target. After all, it is reasonable nominal appreciation of the currency that represents a direct and rapidly effective mechanism for achieving this in small open economies.²⁰

¹⁹ Frait and Komárek (2007) discussed the issue in the open economy context concluding that central bank policies should be conducted at least in a way that does not promote build-up of asset market bubbles.

²⁰ Small open economies do not generally have a menu choice between the levels of interest rate and exchange rate. We intentionally talk about the willingness of the authorities to permit the currencies to appreciate if pressures in this direction prevail. By this we emphasise that the strategy described above can be available in some specific periods only.

Figure 3 Currency Appreciation in Selected Inflation-Targeting Economies



Source: Thomson Datastream
 Note: January 2001 = 100, decline means appreciation.

An exemplary case of an inflation targeting economy with sustained appreciation pressures and an implicit history-based macroprudential mandate in central bankers’ minds (thanks to a previous crisis) was that of the Czech Republic. The local financial crisis that occurred at the end of the 1990s was resolved relatively quickly and the period since 2000 has been characterised by renewed economic growth, low inflation, stable and low interest rates and an appreciating currency. Due to the fact that from the outset of the economic transition until the present time the Czech currency has appreciated strongly in nominal terms against both the dollar and the euro, the koruna has gained the status of a safe haven currency. However, with this status it has also become quite sensitive to changes in global financial markets, especially to the search for yield by the international investors.²¹ This became the case primarily after the key central banks resorted to accommodative monetary policies following the events of September 2001. Since then the Czech koruna has exhibited a tendency to appreciate, sometimes quite sharply.²² Despite the fact that the Czech economy is export-oriented and has a large manufacturing sector, the Czech National Bank has openly adopted the position that it

²¹ Globalization and liberalization of the financial market made domestic monetary policy subject to arbitrage. Search for yield may be viewed as the attempt of domestic investors to avoid constraints imposed provided by their central banks’s policy. And demand for “cheaper” loans denominated in foreign currencies is de facto arbitrage on the side of borrowers.

²² The Czech currency has thus gained a very specific position – international investors have been buying it as a high-yielding asset from a successful emerging market economy and some have been borrowing and selling it because it has served, like the Swiss franc and the Japanese yen, as a funding currency for carry trades. Not surprisingly, after the onset of the financial turmoil in August 2007, the koruna appreciated sharply. After the collapse of Lehman Brothers, market sentiment towards the emerging markets in general, and the CEE region in particular, turned quite negative, which led to a sharp depreciation of all the regional currencies, the koruna being the exception only to a limited extent. Once the markets settled in 2009, the koruna set off on an appreciation trend again, and like some other emerging economies it has occasionally been exposed to search-for-yield induced pressures.

cannot and will not try to artificially soften the conditions for domestic producers.²³ The CNB has explained that these are global pressures that a small economy cannot avoid and that businesses have to learn how to weather them. This kind of approach has contributed to the flexibility of the economy – something that a small economy in the global competition crucially needs. Though initially it was quite difficult and for some painful, exporters have learned how to live with the tough exchange rate conditions and have factored in the future evolution of these conditions into their expectations. Labour unions have realised that currency appreciation improves the purchasing power of workers' wages, which has helped to discipline wage dynamics.

The tendency of the koruna to appreciate over time has had a significant impact on the conduct of monetary policy. As a consequence of appreciation pressures, Czech inflation has often undershot the inflation target. In such a situation, the Czech National Bank naturally has had to keep its policy rate also at a similar or even lower level relative to the key central banks in order to avoid protracted and deep undershooting of its target. It has repeatedly communicated that its natural reaction in the inflation targeting framework is to cut the policy rates in case of strong disinflation pressures. On first impression it might appear that a policy of low interest rates in a converging economy must be rather suboptimal since it must lead to a credit boom. However, in reality this policy has served more as a shield against the risks coming from the external environment. Of course, the idea to use a policy of low interest rates in a small emerging economy to shield the country from risks stemming from developed countries' policies may sound strange. The monetary scene in the pre-crisis years was strange indeed. One way or another, the Czech financial sector came out of the crisis relatively untouched despite the economy inevitably slipping into a rather sharp recession.

The case of the Czech economy provides important lessons about how the expansionary effects of low short-term interest rates may be curtailed by the effects of nominal appreciation of the domestic currency. Currency appreciation can contribute to financial stability especially in a booming economy. It can help to reduce risks through a "favourable" nominal illusion. An appreciating currency will decrease the growth rate of nominal income, which may restrict over-optimism regarding its future trend. This can, in turn, slow the growth in loan demand down. Such an "illusion" means that the households will compare low interest rates with slow growth in nominal income, all expressed in the domestic currency. In reality, the purchasing power of nominal income will be increasing relatively fast thanks to the currency appreciation, but households will not reflect it in their decision-making. Evidence for the existence of this kind of "illusion" has been provided by the experience of a group of countries from Central and Eastern Europe (CEE). Seemingly, sustained currency appreciation should create an incentive to borrow in a currency that is becoming cheaper over time, i.e. in foreign currency. Nevertheless, the share of foreign currency loans provided to

²³ The CNB's attitude to exchange rate management has evolved over time. While there were three episodes of interventions against the exchange rate appreciation in the early years of inflation targeting, the CNB has not used direct foreign exchange interventions since late-2002. In the latter phase, the only measure indirectly affecting the exchange rate was an agreement with the government on purchases of privatisation revenues (and more recently of the inflow of EU structural and cohesion funds) into the CNB's foreign exchange reserves. Since Spring 2008, the IMF has classified the Czech de facto exchange rate regime as free floating.

households has been lowest in two countries with a history of profound and sustained nominal currency appreciation – the Czech Republic and Slovakia. It may thus be said that households from these countries have “suffered” from an illusion in a sense they have ignored the opportunity to take advantage of the appreciation by deciding that when borrowing they would do so in the domestic currency only.

There may be other factors specific to a small open economy at play too. First, if the economy is export-oriented, sustained exchange rate appreciation may work against the formation of overly optimistic expectations in the corporate sector,²⁴ which tames the potential for credit-enabled excessive investment and creation of unprofitable capacity. It may also shift part of the existing domestic demand from nontradables to tradables along a long-term trend towards higher consumption of nontradables, thus contributing to more balanced macroeconomic and structural dynamics. One should not forget that in an environment characterised by currency appreciation and low domestic interest rates households do not have any incentive to borrow in a foreign currency, which insulates their balance sheets from exchange rate risk.²⁵ In addition, with low interest rates the currency is not an attractive target, at least for some classes of speculators, which can partially reduce its volatility.

Still, one can hardly argue that pursuing domestic currency appreciation can be a general way to promote financial stability. It is more a specific case relevant for some particular periods only. Especially, it can serve a purpose during the exuberant times associated with significant gains in productivity and accompanied by expectation-led credit boom. In this case, achieving desired monetary tightening via stronger currency may be preferable to sharp interest rate increases (see also section 7). In other cases, pushing for nominal appreciation of domestic currency may represent a dance on the razor’s edge and thus bring about rather negative side effects (see Égert, 2007).

The Czech Republic was not the only country that permitted for strong appreciation of its currency, inflation target undershooting or both in the pre-crisis period. Similar patterns could be observed in other inflation targeters, for example Switzerland, Slovakia, Canada, Korea, Norway and Sweden. The case of Sweden is particularly interesting, since Giavazzi and Mishkin (2006) argue that the Riksbank made a serious mistake in its communication strategy

²⁴ In a country with a high share of tradables in production (an export-oriented economy with a strong manufacturing sector), the monetary conditions and financial constraints on the corporate sector may be significantly influenced by changes in the external value of the currency. In particular, trend nominal appreciation or a prolonged period of a “strong” currency will create monetary and financial constraints for the relevant sectors and thus reduce the risk of implementation of investment projects with relatively low profitability (i.e. projects profitable only under expectations of very low interest rates).

²⁵ There are those who believe that the rapid growth in real estate prices in the Czech Republic in 2005–2009 was due also to very low short-term rates and their contribution to the demand for housing credit. But it was probably due to the combination of expected significant increase in the VAT on housing construction and the emergence of optimistic expectations about future income. After all, a similar boom was observed in other CEE countries, where central banks maintained much higher rates. In these countries, however, the maintaining of higher domestic interest rates resulted in households and corporations switching to foreign currency loans, which further increased the risks to financial stability (see also Čihák and Mitra, 2009).

in the mid-2000s by discussing the role of asset prices in the conduct of monetary policy.²⁶ Not only do they suggest that the Riksbank should have clarified that asset prices (housing prices and exchange rates) are not independent targets for monetary policy, but also they suggested that, given the persistent undershooting of the inflation target, monetary policy should have leaned towards more expansionary policy. From the current perspective, Giavazzi and Mishkin give preference to purity in policy communication at the expense of pursuing long-term stability of the economy. Under the post-crisis consensus (see the following section), a lean-against-the-wind policy producing an undershooting of the inflation target would be viewed as natural in a period of credit boom and rising housing prices.

6. Monetary Policy and Financial Stability in the New Consensus

The crisis that started in 2007 made monetary economists aware of some deficiencies in the prevailing flexible inflation targeting framework. Following the lessons of the crisis, both academic economists and central bankers have started to discuss a possibility of reaching a new consensus. Before we describe this, let us restate the basic characteristics of the “old” view. In the terminology of Borio, English and Filardo (2003), the move to the new consensus can be labelled as a partial shift from the “continuity” view to the “new-environment” view. The authors describe the continuity view as one which saw the pre-crisis economic environment as a natural extension of that which had prevailed during much of the inflationary period of the 1970s and 1980s. Central banks, while acknowledging the changes that occurred during the Great Moderation, interpreted them essentially as unusual shocks in the context of a fairly stable macroeconomic environment or model of the economy. They thought that the dynamics of the economic system had not significantly changed. In particular, growth in aggregate demand outpacing that of supply, and so a wider output gap, was seen as generating upward pressure on prices. This type of view tended to rely heavily on models where there was a close correlation between output gaps and inflation and where the inflation rate itself was a key variable reflecting distortions in the economy. In such a view, the role of financial markets in the policy framework was fairly modest. It reflected primarily the marginal contributions that such variables make to forecasts of output and inflation over a policy horizon of one to three years. Similarly, possible financial imbalances, including rising household or business debt burdens, were seen as suggesting downside risks to the outlook, but they were not generally expected to play a central role. In a period of rapid non-inflationary growth, high investment and strong productivity gains, fast growth in leverage was seen as justified by more rapid anticipated growth in incomes and higher returns on investment.

The first and apparently most extensive subject of corrections of the “continuity view” framework is the way how the financial sector is covered in existing models. Mishkin (2010) admits that the changes in the financial sector have a far greater impact on economic activity

²⁶ “The discussion...does not justify the Riksbank focusing independently on housing prices in setting the repo rate as it seems to have done in its recent statements. Furthermore, housing prices have rarely led to financial instability because it is easier for financial institutions to assess the credit risk in residential mortgages, and households are very reluctant to default on these mortgages.” See Giavazzi and Mishkin (2006, p. 73).

than previously assumed and that the principle according to which financial frictions play an important role in business cycles was well understood, but was not explicitly part of the models used for policy analysis in central banks. One of the key reasons is that the models work with a representative-agent framework in which all agents are alike, whereas financial frictions require that agents differ. He concludes that the representative-agent framework together with the linear-quadratic framework are two key elements of the pre-crisis theory of optimal monetary policy that are undermined by the lessons from the crisis.²⁷ A more realistic description of financial sectors in macroeconomic models will also have to deal with the limited rationality of agents and imperfect efficiency of financial markets.

Economists now broadly agree that it is necessary to rework fundamentally the way that monetary policy transmission is described in macroeconomic models. Treatment of transmission was clearly oversimplified, especially as regards various channels related to financial institutions' activities and the tendency to behave pro-cyclically. Carney (2009) admits that central banks have effectively treated the transmission mechanism as uncertain but fixed when it is in fact highly variable and procyclical - it is a function of regulation, which changes over time; financial innovations, which often evolve to circumvent regulation; and confidence, which is influenced by monetary policy in ways not commonly acknowledged. Even the models that did encompass financial intermediation usually worked only with a simple "bank lending channel" or "broad credit channel" (Bernanke and Gertler, 1995) containing a financial accelerator mechanism in which interest rate changes affected the credit market through changes in asset and collateral values.

Some authors suggest concentrating more on the "*credit supply channel*" or "*risk taking channel*", which differs from the broad credit channel in focusing on credit amplifications due to financing frictions in the lending sector, not in the sector of non-financial borrowers. This channel considers the link between monetary policy, the perception and pricing of risk by economic agents, and credit provision. It provides an explanation of how monetary policy in a booming economy may promote excessive risk taking leading to higher leverage, maturity- and other asset-liability mismatches which make the financial system more fragile. There are basically three forces behind the channel. First, low returns on investments, such as government bonds, may increase incentives for banks, asset managers and insurance companies to take on more risk, for example to meet a target nominal return. This is the search-for-yield mechanism defined by Rajan (2006). The second stream focuses on the impact of changes in policy rates on either risk perceptions or risk tolerance and hence on the degree of risk in portfolios, on the pricing of assets, and on the availability of credit. Borio and Zhu (2008) and Adrian and Shin (2008) explain how low interest rates may affect asset prices, collateral valuations, incomes and cash flows, which in turn can modify how banks

²⁷ Our view is that these models suffered from the fallacy of composition in a way similar to microprudential regulation and supervision since they treated financial system as a simple sum of its individual components. In this respect Buiters (2009) concludes that in the crisis the knowledge of these models was rather useless, saying that "the Monetary Policy Committee of the Bank of England...contained...quite a strong representation of academic economists and other professional economists with serious technical training and backgrounds. This turned out to be a severe handicap when the central bank had to switch gears and change from being an inflation-targeting central bank...to a financial stability-oriented central bank...".

perceive and measure risk. The influence on risk perceptions is manifested through procyclical behaviour of estimates of probabilities of default, loss given default, volatilities and correlations. Third, as explained by Borio and Zhu (2008), risk-taking may be boosted by central bank communication, especially by the asymmetrical commitment of to clean in the risk-materialization phase of the financial cycle (the Greenspan put). The existence of the risk-taking channel has been supported by the empirical findings. Gambacorta (2009) finds evidence of a significant link between the extended period of low interest rates prior to the crisis and banks' risk-taking associated with the underestimation of the future default rates. In a similar manner, Maddaloni, Peydró and Scopel (2008) find robust evidence that lower overnight rates soften bank credit standards, both for the average and also for riskier loans, while Adrian and Shin (2008)²⁸ find out that monetary policy has a significant effect on the behaviour of highly leveraged intermediaries.

There is another important mechanism interconnected to the credit supply channel – the “*bank capital channel*” (Van den Heuvel, 2002 and 2009), in which monetary policy affects bank lending through its impact on bank equity capital. If monetary policy actions affect bank profits, then over time this will accumulate to changes in bank capital. Starting from a position of a binding capital requirement, any change in bank capital can in turn have a potentially large effect on lending. This particular channel becomes rather important in times of stress, when it restricts lending activity by threatening banks to breach minimum capital requirements.

Economists have already started trying to incorporate the newly defined channels into the monetary policy framework. Cúrdia and Woodford (2009) propose a simple adjustment of the Taylor rule by a factor proportional to the increase in the credit spread (the spread between the interest rates available to savers and borrowers). However, capturing the impact of financial frictions on macroeconomic dynamics only by implementing changes in credit spreads in the Taylor rule is clearly just a partial solution. Woodford (2010a) himself states that what is needed is a framework in which intermediation plays a crucial role and in which frictions that can impede the efficient supply of credit are allowed for. The construction of such a framework will constitute a major challenge for monetary economists in the years ahead.

The next significant move in monetary economists' and central bankers' thinking is the gradual acceptance of the opinion long held by BIS economists (see Borio and White, 2004;

²⁸ Adrian and Shin (2008, 2009) document the link between lower interest rates and risk-taking for investment banks in the United States. They stress that balance sheets of market-based financial intermediaries (broker-dealers) represent a source of monetary policy transmission, working through capital market conditions. Short-term interest rates are determinants of the cost of leverage and are important in influencing the funding conditions and the size of financial intermediary balance sheets. A difference of a quarter or half a per cent of the funding cost may make all the difference between a profitable venture and a loss-making one for leveraged financial intermediaries. In other words, cuts in the policy rate increase the net interest margin for financial intermediaries, making them more profitable and optimistic. Adrian and Shin conclude that financial intermediaries lie at the heart of both monetary policy transmission as well as policies towards financial stability and their balance sheet conditions are informative both on macroeconomic variables as well as the resilience of the financial system.. The two policies are therefore just two sides of the same coin.

White, 2009) that the asymmetric “can’t lean, but can clean” approach to monetary policy creates sources of long-term instability and that optimal monetary policy should be much more symmetric. There is considerable, though not full, agreement that monetary policy should clean to a certain extent after the effects of a financial crisis surface. There are also signs of agreement regarding the recommendation to respond in good times to the financial cycle and the build-up of risks to financial stability with monetary policy instruments even when no major risks to price stability are yet apparent. This applies primarily to episodes characterised by fast growth of real estate prices with a simultaneous credit boom.

Such a move may reflect recognition that macroeconomic dynamics are strongly *non-linear* due to the “excessive elasticity of the system” (see section 3). In such a system, fundamental sources of systemic risk arise at times when banks as well as their clients consider the risk to be at its lowest. If, during a boom, corporations, households and the government observe low interest rates relative to current income growth, they succumb to the illusion and start regarding it as a new long-term trend. This further increases their willingness to take on more and more debt, which is extended by banks with softened lending standards. Subsequently, a positive feedback loop between credit, asset prices and incomes starts to operate. If the financial cycle becomes too strong, the build-up of debt may reach an unsustainable level. Market participants will at some point realise the true nature of the situation and start to sell their overvalued assets, and a financial crisis will break out. In turn, banks will tighten their lending standards, and their clients’ demand for credit will fall sharply. In an environment of greatly increased uncertainty, a phase of sharp deleveraging begins, potentially leading to depressed output and inflation.

As a result of the aforementioned lessons, academic economists started to come up with proposals to increase room for manoeuvre in their models of flexible inflation targeting, which are essentially based on the mechanisms described in the BIS economists’ papers referred to in section 3 (see for example Woodford, 2010). We sum up these proposals below and describe the outcome as the *New Consensus*. By this we mean an amended model of flexible inflation or price-level targeting in which the central bank “should sometimes lean but can still clean”. In this framework, financial stability becomes a separate objective of the central bank, affecting its short-term behaviour without changing its long-term commitment to price stability. The primary instruments for safeguarding financial stability are still financial market regulation, capitalisation of financial institutions and macroprudential policy measures (these should also involve the modifications in the regulatory framework aimed at reducing its procyclical features). Since these instruments may not be sufficient to curb the enthusiasm in the financial system and reduce the risks to financial stability, monetary policy cannot ignore the risk of financial instability and acts pre-emptively when financial imbalances occur. Central banks start to lean against the wind and become ready to justify, via convincing public communication, the desirability of inflation slipping below the target for some time through the setting of interest rates at a level different from that consistent with achieving the inflation target (the pure inflation targeting rate in Figure 4). We have to stress again two critical assumptions. First, the pre-emptive reaction described above is relevant in cases of joint credit

and real estate booms.²⁹ Second, the bulk of the action has to be taken on the prudential policy level, while monetary policy can only provide co-insurance.

The cornerstone of this framework is the canon that the object of the reaction of the monetary authority should be the growing financial imbalances generated by a credit boom, which may potentially result in strong macroeconomic fluctuations, and not the asset market bubbles themselves. The *risk of financial instability*, or the risk of a future crisis, assessed and quantified in a certain way, rather than the target for credit growth or for the credit-to-GDP ratio, should determine the reaction. Since the monetary cycle is on average considerably shorter than the financial cycle, the reaction to the risk of financial instability will be occasional, irregular and strongly non-linear. At normal times, the monetary policy framework should therefore still behave almost identically to orthodox flexible inflation targeting. Financial stability considerations will become a factor of monetary policy reaction only if times are departing from the normal, i.e. when the authorities conclude that a certain threshold of financial vulnerability has been exceeded, leading to a high risk of financial instability. In such a situation policy makers will consider the need to restrain lending growth and excessive risk taking (the *excess leverage* in short). It will not be appropriate to follow the simple Taylor rule in the crisis materialisation phase, either. If it occurs, it will be necessary to supplement the rule with a reaction to an increase in risk margins in response to the reassessment of credit risk or other risks, i.e. to offset the sharply increased risk margins with a more pronounced fall in monetary policy rates (meaning that monetary policy should clean to a certain extent) in periods of the immense risks for financial stability.

In the following passages, we will provide our own interpretation of the properties of the new framework in terms of the understanding of the recent crisis, the reaction of monetary policy to it and current views of the macroprudential policy framework. For the sake of simplicity, we will present the variables linearly and depict the crisis as a point in time. This description is intentionally extremely stylised. The key concepts of the model are leverage and the risk of financial instability (marginal crisis risk³⁰), which determine the dynamics of monetary policy or its reaction to financial stability objective.

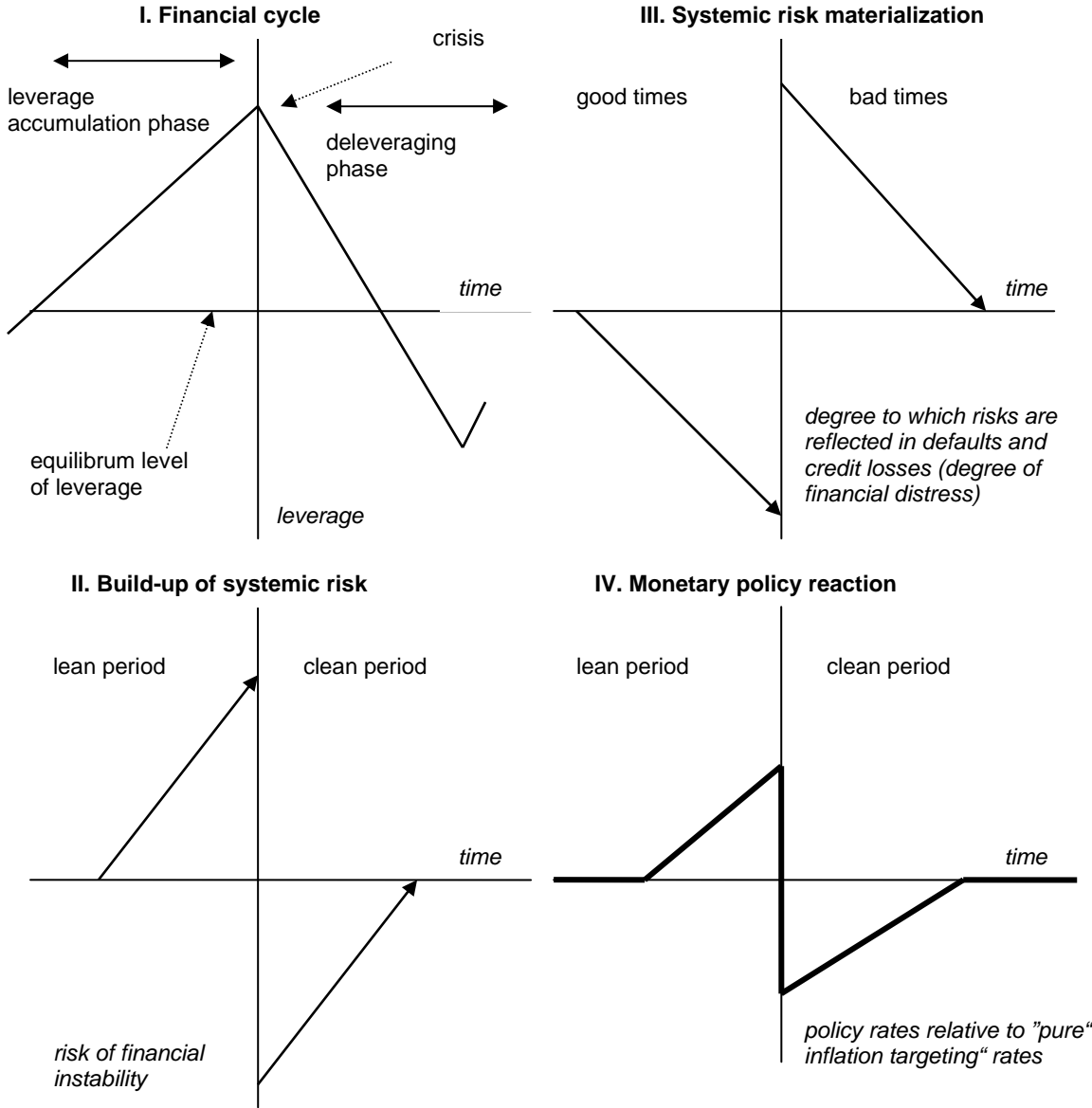
Leverage in panel I of Figure 4 approximates characteristics of the financial cycle (credit dynamics, the debt ratio of economic agents, the financial investors' lever length, the extent of maturity transformation by banks, etc.). The level of leverage increases until the point when the crisis breaks out, then gradually declines, although remaining high in the initial phase of the crisis. Although the level of leverage is high on both sides of the crisis point, the situations are very different – the level is increasing in the optimistic phase (when many agents do not realise that they are only in temporarily good times) and declining in the pessimistic phase

²⁹ The authorities have to look at a broad definition of credit comprised of any source of external finance employed in the economy: domestic as well as foreign, provided by banks as well as by non-banks.

³⁰ The marginal crisis risk in Woodford (2010) or macroeconomic risk in Mishkin (2010) could be implemented in the form of a joint index of vulnerability and over-optimistic expectations not only into monetary policy models, but also into models for calculating macroprudential instruments such as countercyclical capital buffers. An index like this would be based not on the EWS indicator, but on financial cycle indicators such as the credit-to-GDP ratio, credit growth, the properly defined output gap or a measure of excess nominal income growth.

(when agents may be well aware that bad times are on the way). Since leverage in the stock sense adjusts to changed economic conditions with a significant lag, it cannot be a monetary policy response variable – such a variable must be a forward-looking one that describes the current level of risk for future financial stability. In panel II this variable is termed the risk of financial instability.

Figure 4 Financial Cycle, Financial Stability and Monetary Policy



The (marginal) risk of financial instability in panel II is a strongly discontinuous variable that increases in good times as leverage rises and sharply falls when crisis occurs. It describes marginal contribution of current financial environment to the risk of a crisis in the future. A fundamental requirement for growth in the risk of financial instability – in addition to the availability of cheap credit – is the emergence of overly optimistic expectations about future income and asset prices, which lead to the development of a bubble. When the bubble bursts and the financial crisis becomes openly visible, the level of this risk changes dramatically.

Banks revise their perception of the risks to their balance sheets by increasing risk margins, tightening lending standards and limiting the availability of credit. Economic agents become over-pessimistic and reduce their demand for credit. A phase of deleveraging sets in. It is the factors of expectations and risk perception which cause such a strong discontinuity. Monetary policy should respond to the risk of financial instability by raising interest rates sharply when it is rising. By doing so, it will partly offset the underestimation of risk by banks and their clients. After the crisis erupts, monetary policy should be eased rapidly in response to sharp upward risk revaluation by financial market participants (higher than the normal credit spreads occur) and can keep cleaning, if necessary, during the period when the risk of financial instability is rising from negative values to zero.

Panel III in comparison with panel II shows the difference between the build-up and materialisation of risks. In good times, when the risk of financial instability is rising, current default rates drop, the non-performing loan ratio declines, banks create fewer provisions and report low credit losses. In this period, the resilience of the financial sector seems very high. When the crisis breaks out, the situation is reversed and banks and their regulators start to assess – by means of stress tests – whether the financial sector will withstand the materialisation of risks. The panel in Figure 4 emphasises the rule that financial stability analyses must be focused in good times on assessing the risk of financial instability and in bad times on measuring the magnitude of the problem related to the materialisation of risks that were previously “allowed” to build up. Given the forward-looking nature of monetary policy, central banks’ staff in their analyses have to focus on the identification of the latent future risks brought about by current developments in the financial sector. This is rather difficult since the contemporaneous indicators (such as asset prices, incomes, trading volumes or provisioning costs) talk about the materialization of systemic risk, not about the probability of financial instability in the future. What is needed is a set of forward-looking indicators providing insight into the potential for financial imbalances. Those that based on the deviations of the current values of the indicators such as credit-to-GDP or ratio of real estate prices to income from their long-term trends appear most promising (for details see for example Borio and Drehmann, 2009).

Panel IV shows a monetary policy reaction in which the necessary non-linearity is deliberately ignored. In the risk build-up period, when the risk of financial instability is rising, monetary policy rates should at some point rise sharply above the neutral level consistent with “pure” inflation targeting (i.e. inflation targeting that does not take into account aspects of financial stability). When the crisis breaks out, the central bank should respond with sharp rate cuts. As the economy recovers, rates would then start to be increased back to the neutral level.

An interesting question is how inflation would evolve in the framework described above. The prevailing (Woodfordian) monetary policy models assume *price-level targeting*, which is still controversial from the public policy point of view. Since inflation would be below the target in good times owing to the central bank’s deliberate attempt to lean against the wind, and would also be below the target in bad times as a result of low demand, a period of “overshooting” would have to follow in which inflation would be higher than the target in

order to ensure that the targeted price level is achieved. This would have to be done solely by keeping interest rates low in the “cleaning” period (or maybe even in a “prolonged cleaning” period containing a phase of increasing leverage above the equilibrium level and an increasing positive risk of financial crisis). In literature such as Woodford (2003), a price-level target is a kind of rule that operates as an automatic stabiliser, helping to minimise the risk of deflation. In the event of a sharp decline in demand leading to an undershooting of the inflation target, agents expect a policy leading to a subsequent overshooting of the target to follow. In the real world of monetary policy-making, many issues regarding the conduct of price-level targeting would surely arise. These go far beyond the traditional worries about the ability to communicate and are currently untested.

7. The New Consensus And Post-Crisis Policy Making

Where are the advanced Western economies in the above stylised framework at the start of 2011? Probably in the immediate post-crisis period, in which monetary policy rates should remain low, as “underlying” monetary policy-relevant inflation remains below the target level and the negative marginal crisis risk “prescribes” keeping monetary policy rates even further below the level consistent with pure inflation targeting. And even if these economies were located much further to the right, they would still be at a point where the marginal crisis risk is zero or slightly positive. At this point, the central bank should act in virtually the same way as under standard flexible inflation targeting. This assumes a strongly non-linear monetary policy reaction to financial instability. In a real, non-model economy, however, monetary policy decision-making is always complicated by other factors. The rise in commonly used inflation measures, stemming from global growth in prices of food, commodities and energy, has been just such a factor since the end of 2010.

At this juncture, it may be very difficult to evaluate the current economic environment and the contribution of monetary policy to it – and not only in large advanced economies. The monetary policy rates of key central banks like the Fed or the ECB may currently appear abnormally low given the recovery in economic activity. However, the countries hit hardest by the crisis are still experiencing low credit growth and continuing deleveraging, which may have repressive effects, especially in overindebted economies where pessimistic expectations are prevalent. Monetary policy-makers are thus facing the dilemma of whether to tighten monetary policy and thereby limit the risks associated with the search for yield, or to maintain an easy policy and thereby dampen the adverse effects of deleveraging. If they simultaneously applied the logic of price-level targeting, they would have to keep interest rates low for a sustained period in order to rectify the previous undershooting with a period of overshooting by means of an “intentionally irresponsible policy”.

However, the monetary policies of large advanced economies have considerable implications for many countries, especially emerging ones. Their central banks are attempting to maintain very easy monetary conditions by keeping interest rates very low or by using quantitative easing or other ways of supporting banks’ balance-sheet liquidity. Owing to the low yields on assets denominated in key currencies, smaller countries may become exposed to the search for yield resulting from efforts to invest the “unliquidated” portion of liquidity from the boom

period in some higher-yield assets. If the central banks of smaller countries started to normalise monetary policy rates rapidly in line with flexible inflation targeting while the large central banks were de facto implementing price-level targeting policies, it would imply future nominal appreciation of the smaller countries' currencies against the key currencies. And as financial markets respond in a forward-looking and non-linear way, it could lead to a Dornbuschian overshooting appreciation of the smaller countries' currencies.

The impact of the low nominal yields in some large advanced countries on the developments in fundamentally sound emerging economies via capital flows driven by the search for yield became a hot topic in the economic policy debate in 2010 (see Economist, 2010). This topic has become relevant to quite a large group of countries, some of which are relatively large and therefore have a stronger voice. For some countries, at least for the Czech Republic the case study of which was presented in section 5, this is not a new issue. The Czech National Bank has had to discuss the effect of foreign investors' search for yield on the exchange rate, and therefore also on monetary policy decisions, regularly since 2001. The general lesson derived from its experience is that in small open economies, in certain periods under a given setting of external monetary policies and the financial markets' expectations about domestic anti-inflationary monetary policy strategy, the first best monetary policy solution (higher rates and slower nominal appreciation of domestic currency) may not be available and it therefore may be necessary to implement the second best policy (low rates and a relatively fast appreciation of the currency). In other words, the desired monetary conditions were achieved in the given period, but mostly thanks to the exchange rate component, whereas the interest rate component remained probably sub-optimally relaxed.

Posen (2009) uses the constraints faced by small open economies as an argument against the lean against the wind strategy, saying that open economies that raise interest rates to cut off booms can find that policy makes matters worse because the interest rate tightening attracts greater capital inflows and exacerbates their problems. We believe that this thinking reflects an unwarranted use of the closed economy approach. In these instances, open economies should accord with the logic of a monetary conditions index (see Mayes and Virén, 2000). Such logic is consistent with the approach recommended by Cecchetti et al. (2002), who conclude that when external financial disturbances hitting the economy are the sole source of shocks, it is desirable to lean against the wind of exchange rate changes, since doing so prevents these shocks from destabilising the real sector of the economy. In the cases discussed above, open economies therefore have to achieve the desired monetary tightening via a combination of currency appreciation and policy rate adjustment, and simultaneously to try to cut off part of the boom via various macroprudential measures, including fiscal ones (the various tools applied are discussed in IMF, 2010, and Moreno, 2011). Due to the current state of the world economy, or more precisely lingering global imbalances, a significant number of central banks from emerging market economies or small advanced economies will probably have more than enough opportunities to test alternative approaches to coping with financial pressures originating in the external environment. The availability of the new consensus optimal solution may become questionable indeed.

8. Conclusion

The financial crisis that started in 2007 significantly modified views concerning the relationship between monetary policy, asset prices and financial stability. One of the most powerful forces to have shaken the orthodox framework of flexible inflation targeting was the financial tsunami effect, i.e. a decline in risk premia during the tranquil years of the Great Moderation, replaced by a destructive tidal increase in credit spreads at the outset of the crisis.

With respect to the appropriate reaction of monetary policy to booms in asset prices and build-ups of financial imbalances, we have confronted the predominant pre-crisis view in both academia and the central banking community with the alternative view of BIS economists. The former was that a central bank should pay attention to asset market developments, but cannot and should not try to constrain asset price bubbles on their own. The latter posited that asset price bubbles had been the wrong focus and a proper emphasis should be placed on financial imbalances and the risks of financial instability. We conclude that following an assessment of what happened during the last decade the approach favoured by the economic profession has begun to shift from benign neglect to leaning against the wind. Such a shift may institute fundamental changes to the existing monetary policy paradigm, especially via the way the financial sector and its role in the transmission mechanism is covered in the existing models. The modified paradigm emerging right now we label the new consensus.

We have illustrated our view of the new consensus as an amended model of flexible inflation targeting in which the central bank “should sometimes lean and can still clean”. In this model, financial stability becomes a separate objective of the central bank, affecting its short-term behaviour without changing its long-term commitment to price stability. However, at normal times, the monetary policy framework behaves almost identically to orthodox flexible inflation targeting. Only if a certain threshold of financial vulnerability is exceeded, leading to a high marginal risk of financial instability, does monetary policy start to lean against the wind pre-emptively.

We have added the small open economy context to the framework and explained that the optimal reactions of monetary policy-makers in small open economies may significantly differ and that in certain periods, under given external monetary policies and financial markets’ expectations about domestic monetary policy strategy, the first-best policy solution may simply not be available. In such instances, second-best policies have to be considered. These could in some specific periods operate in accord with the logic of a monetary conditions index in which a desired monetary policy stance is achieved as a mix of particular exchange rate and policy rate adjustments, with simultaneous support from relevant macroprudential measures.

We expect the features of the new consensus to become embodied in both the macroeconomic models and monetary policy frameworks of central banks. This process will certainly take some time, and in the meantime those responsible for monetary policy-making may occasionally need to work creatively with the features of the new consensus above and beyond the currently available analytical and modelling approaches.

REFERENCES

- Adrian T, and Shin HS (2008): Financial Intermediaries, Financial Stability and Monetary Policy. Maintaining Stability in a Changing Financial System, *Proceedings from Federal Reserve Bank of Kansas Economic Policy Symposium*, Jackson Hole, Wyoming, August 21-23:287-334.
- Adrian T, and Shin HS (2009): Money, Liquidity and Monetary Policy. *American Economic Review*, 99(2):600-605.
- Ball L (1999): Policy Rules for Open Economies. In: Taylor J (Ed.): *Monetary Policy Rules*. NBER Studies in Business Cycles, University of Chicago Press, Chicago.
- Bean C, Paustian M, Penalver A, Taylor T (2010): Monetary Policy after the Fall. *Federal Reserve Bank of Kansas Economic Policy Symposium*, Jackson Hole, Wyoming, August 26-28.
- Bernanke B, Gertler M (1995): Inside the Black Box: The Credit Channel of Monetary Policy Transmission. *Journal of Economic Perspectives*, 9(4):27-48.
- Bernanke B, Gertler M (1999): Monetary Policy and Asset Price Volatility. *Federal Reserve Bank of Kansas City Economic Review*, Q4: 17–51.
- Bernanke B, Gertler M (2001): Should Central Banks Respond to Movements in Asset Prices? *American Economic Review*, 91(2):253–257.
- Bernanke B (2002): Asset-Price “Bubbles” and Monetary Policy. *Remarks before the New York Chapter of the National Association for Business Economics*, New York, October 15.
- Blanchard O (2000): Bubbles, Liquidity Traps and Monetary Policy. In: Posen A, Mikitani R (Eds.): *Japan’s Financial Crisis*. International Institute of Economics, Washington DC.
- Blinder A, Reis R (2005): Understanding the Greenspan Standard. *CEPS Working Paper*, no. 114.
- Bordo M, Jeanne O (2002): Monetary Policy and Asset Prices: Does ‘Benign Neglect’ Make Sense? *International Finance*, 5(2):139-164.
- Borio C (2003): Towards a Macroprudential Framework for Financial Supervision and Regulation? *BIS Working Paper*, No. 128.
- Borio C (2010): Implementing a Macroprudential Framework: Blending Boldness and Realism. *HKIMR-BIS Conference Financial Stability: Towards a Macroprudential Approach*. 5-6 July.
- Borio C, English W, Filardo A (2003): A Tale of Two Perspectives: Old or New Challenges for Monetary Policy? *BIS Working Papers*, no. 127.
- Borio C, Filardo A (2007): Globalisation and Inflation: New Cross-Country Evidence on the Global Determinants of Domestic Inflation. *BIS Working Papers*, no. 227.
- Borio C, Furfine C, Lowe P (2001): Procyclicality of the Financial System and Financial Stability: Issues and Policy Options. In: Marrying the Macro- and Micro-Prudential Dimensions of Financial Stability, *BIS Papers*, no 1:1-57.
- Borio C, Drehmann M. (2009):, Assessing the risk of banking crises — revisited. *BIS Quarterly Review*, March:29-46.
- Borio C, Lowe P. (2002): Asset Prices, Financial and Monetary Stability: Exploring the Nexus. *BIS Working Paper*, no. 114.
- Borio C, White W (2004): Whither Monetary and Financial Stability? The Implications of Evolving Policy Regimes. *BIS Working Paper*, no. 147.

- Borio C, Zhu H (2008): Capital Regulation, Risk-Taking and Monetary Policy: A Missing Link in the Transmission Mechanism? *BIS Working Paper*, no. 268.
- Bracke T, Fidora M (2008): Global Liquidity Glut or Global Savings Glut? A Structural VAR Approach. *ECB Working Paper*, no. 911.
- Buiter W (2009): The Unfortunate Uselessness of Most 'State of the Art' Academic Monetary Economics. <http://www.voxeu.org/index.php?q=node/3210>
- Carney M (2009): Some Considerations on Using Monetary Policy to Stabilize Economic Activity. Remarks to *the Federal Reserve Bank of Kansas City Jackson Hole Symposium*, Wyoming, 22 August.
- Cecchetti S, Genberg H, Lipsky J, Wadhvani S (2000): Asset Prices and Central Bank Policy. *Geneva Reports on the World Economy*, no. 2, Centre for Economic Policy Research, London.
- Cecchetti S, Genberg H, Wadhvani S (2002): Asset Prices in a Flexible Inflation Targeting Framework. *NBER Working Paper*, no. 8970.
- Clarida R, Gali J, Gertler M (1999): The Science of Monetary Policy: A New Keynesian Perspective. *Journal of Economic Literature*, 37(4):661-1707.
- Cúrdia V, Woodford M (2009): Credit Frictions and Optimal Monetary Policy. *BIS Working Paper*, no. 278.
- Čihák M, Mitra S (2009): The Financial Crisis and European Emerging Economies. *Czech Journal of Economics and Finance*, 59(6):541-553
- Economist (2010): What You Going to Do About It? Emerging Economies Respond to the Federal Reserve's Quantitative Easing. *The Economist*, November 13th:84.
- ECB (2004): *Credit Risk Transfer by EU Banks: Activities, Risks and Risk Management*. European Central Bank, Frankfurt am Main.
- Égert B (2007): Real Convergence, Price Level, Convergence and Inflation Differentials in Europe. *Oesterreichische Nationalbank Working Paper*, no. 138.
- Ferguson R W (2005): Recessions and Recoveries Associated with Asset-Price Movements: What Do We Know? *The Real Estate Roundtable*, Washington, D.C. January 27.
- Frait J, Komárek L (2007): Monetary Policy and Asset Prices: What Role for Central Banks in New EU Member States? *Prague Economic Papers*, XVI(1):3-23
- Gambacorta L (2009): Monetary policy and the risk-taking channel. *BIS Quarterly Review*, December:43-53
- Giavazzi F, Mishkin F (2006): An Evaluation of Swedish Monetary Policy between 1995 and 2005. *Report for Riksdag Committee on Finance*, Stockholm.
- Gilchrist S, Leahy JV (2002): Monetary Policy and Asset Prices. *Journal of Monetary Economics*, 49(1):75-97.
- Greenspan A (2005): Risk Transfer and Financial Stability. Remarks to the *Federal Reserve Bank of Chicago's Annual Conference on Bank Structure*, Chicago, 5 May.
- IMF (2010): Managing Upside Risks to Emerging Markets. *Global Financial Stability Report*, Washington, International Monetary Fund.
- Kahn G (2010): Taylor Rule Deviations and Financial Imbalances. *Economic Review of the Federal Reserve Bank of Kansas City*, QII:63-99.
- Maddaloni A, Peydró JL, Scopel S (2008): Does Monetary Policy Affect Bank Credit Standards? Paper presented at CEPR/ESI 12th Annual Conference *The Evolving Financial System and the Transmission Mechanism of Monetary Policy*, 25 September.
- Mandel M, Kodera J (1995): Monetární přístup k automatickému vyrovnávacímu procesu

- obchodní bilance. *Politická ekonomie*, 43(1):71-80.
- Mayes D, Virén M (2000): The Exchange Rate and Monetary Conditions in the Euro Area. *Review of World Economics*, 136(2):199-231.
- Moreno R (2011): Policymaking from a "Macroprudential" Perspective in Emerging Market Economies. *BIS Working Papers*, no. 336.
- Mishkin F (2010): Monetary Policy Strategy: Lessons from the Crisis. Paper presented at ECB Central Banking Conference *Monetary Policy Revisited: Lessons from the Crisis*, Frankfurt, 18-19 November.
- Poole W. (1970): Optimal Choice of Monetary Policy Instruments in a Simple Stochastic Macro Model. *Quarterly Journal of Economics*, 84(2):197-216.
- Posen A (2006): Why Central Banks Should Not Burst Bubbles. *International Finance*, 9(1): 109–124.
- Posen A (2009): Finding the Right Tool for Dealing with Asset Price Booms, Speech to the *MPR Monetary Policy and the Economy Conference*, London, 1 December.
- Rajan R (2006): Has Finance Made the World Riskier? *European Financial Management* 12(4):499-533.
- Rüffer R, Stracca L (2006): What Is Global Excess Liquidity, and Does It Matter? *ECB Working Paper*, no. 696.
- Roubini N. (2006): Why Central Banks Should Burst Bubbles. *International Finance*, 9(1): 87–107.
- Tinbergen J (1952): *On the Theory of Economic Policy*, North-Holland, Amsterdam.
- Van den Heuvel SJ (2009): Does Bank Capital Matter for Monetary Transmission? *Federal Reserve Bank of New York Economic Policy Review*, 8(1):259-265.
- Van den Heuvel SJ (2009): The Bank Capital Channel of Monetary Policy. *Federal Reserve Bank of New York*, mimeo.
- White W (2002): Changing Views on How Best to Conduct Monetary Policy. *BIS Speeches*, 18 October.
- White W (2006): Is Price Stability Enough? *BIS Working Paper*, no. 205.
- White W (2009): Should Monetary Policy "Lean or Clean"? *Federal Reserve Bank of Dallas, Working Paper*, no. 34.
- Woodford M (2003): *Interest and Prices: Foundations of a Theory of Monetary Policy*. Princeton University Press, Princeton.
- Woodford M (2010): Inflation Targeting and Financial Stability". Presentation at the Conference *The Future of Monetary Policy*, EIEF, Rome, 30 September – 1 October.
- Woodford M (2010a): Financial Intermediation and Macroeconomic Analysis. *Journal of Economic Perspectives*, 24(4):21–44