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# Credit Growth and Financial Stability in the Czech Republic

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## Abstract

The Czech Republic had experienced a credit boom similar to those in other converging economies in the pre-crisis years. Nevertheless, the consequences of this credit boom were limited as was the impact of the global crisis on domestic financial institutions. This paper describes the developments in the Czech banking sector and explains how the tough macroeconomic

environment in the Czech Republic acted as a strong tool of macroprudential policy. It concludes that although it is difficult to tame credit booms in small converging economies, a concerted set of microprudential and macroprudential measures, including monetary and fiscal ones, may ensure some success.

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# **Credit Growth and Financial Stability in the Czech Republic**

by

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**Keywords:** financial regulation, macro-prudential policies

# Credit Growth and Financial Stability in the Czech Republic<sup>1</sup>

## 1. Introduction

During the first half of the 1990s, in the initial phase of the Czech Republic's economic transition, the country's banking sector operated with a relatively high credit-to-gross domestic product (GDP) ratio and with loan portfolios concentrated almost exclusively on the corporate sector. The deep banking crisis from 1997 to 1999 changed the banking sector dramatically, however. The sector went through noticeable downsizing and deleveraging as a significant amount of credit was written off the banks' books. By the end of 2001 the banking sector had been restructured, and credit growth followed. Even though the credit-to-GDP ratio has remained reasonably low since then, a case can be made that the Czech economy experienced a credit boom nearly similar to those in other converging economies. The features and quality of the boom, however, were quite different. Among the differences were the facts that the growing portfolio of loans was financed from local deposits and that lending to the household sector was done in domestic currency only. Czech authorities did not resort to any supervisory or administrative measures to tame the credit boom, but its consequences were rather contained, and the banking sector was able to provide credit throughout crisis period without major disturbances. The basic explanation of this apparent puzzle is that the different qualities of the credit boom in the Czech Republic relative to other converging economies have been associated with tough macroeconomic policies and the environment that resulted from them. This paper attempts to explain how this scenario worked and what lessons could be taken from it for the future.

The paper is organized as follows. Section two describes the development of the Czech banking sector from the beginning of transition to the current post-crisis period. Section three reviews how the Czech National Bank (CNB), which has both monetary and supervisory authority, responded to credit growth in the pre-crisis years. Section four clarifies how CNB's monetary policy and sustained nominal appreciation of the Czech koruna acted as key components of macroprudential policy in the Czech Republic. Section five focuses on the identification of the excessive credit in a converging economy. Section six addresses potential future challenges in taming a prospective credit boom and a number of other policy issues, and finally section seven offers conclusions.

## 2. The Czech Banking Sector and Its Credit Cycles

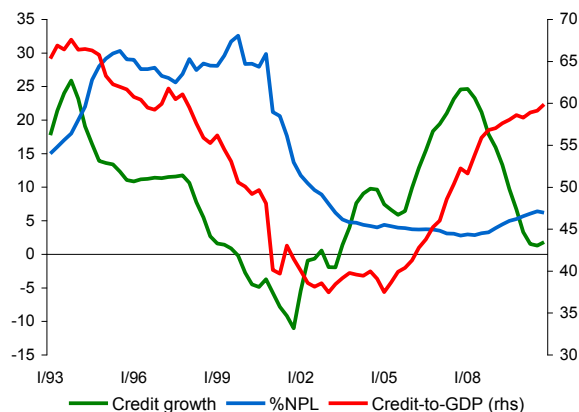
The financial system in the Czech Republic went through boom and bust in the 1990s, associated with swings both in financial system structures and macroeconomic developments. The start of the country's economic transition from socialism in 1991 and the subsequent privatization of the state-owned firms dramatically increased the demand for banking services, credit in particular. The group of four state-owned commercial banks that were built on the basis

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<sup>1</sup> This paper was supported by Czech National Bank Research Projects C1/09 and C5/11, and was prepared as background to a forthcoming World Bank report titled "Golden Growth: Restoring the Lustre of the European Economic Model." This paper represents the views of the authors and not necessarily those of the (i) Czech National Bank or its management, (ii) World Bank and its affiliated organizations, or (iii) the Executive Directors of the World Bank and the governments they represent. All errors and omissions remain entirely the responsibility of the authors. The authors can be reached by electronic email at [jan.frait@cnb.cz](mailto:jan.frait@cnb.cz), [adam.gersl@cnb.cz](mailto:adam.gersl@cnb.cz), [jakub.seidler@cnb.cz](mailto:jakub.seidler@cnb.cz).

of the previous “monobank” structure was not able to meet the demand. Besides natural capacity constraints, they were burdened with a legacy of loans that were to a large extent nonperforming. In addition, their balance sheets were poisoned by the so-called “loans for financing of inventory needs of firms,” which represented quasi-loans from the socialist period. To address the banking sector’s insufficient capacity, a couple of new, private banking institutions were allowed to operate. These institutions began extending credit to new private firms and tradesmen, and at the same time they played an important part in providing funding for the privatization of state-owned enterprises. With a loose monetary policy conducted under a regime combining money supply targeting and fixed exchange rate, the economy became overheated and the quality of the assets of the banking system weakened. Authorities initially resorted to partial solutions. Various forms of government assistance were used to cope with inherited as well as newly created deficiencies. (For details, see Bárta and Singer 2006.) The full extent of problem came to light only in the recession of 1997–1999. Decisive restructuring and (re)privatization of banks followed, paving the way to the current structure, in which the sector is controlled almost exclusively by foreign banking groups. In addition, deep changes in the regulation and supervision of banks, on the one hand, and in monetary policy making, on the other, had to be implemented. The approach was based not on more detailed regulation and tighter monetary control but on better and tougher supervision and smarter monetary policy.

**Chart 1. Credit and its quality in the Czech Republic (1993–2010, in %)**

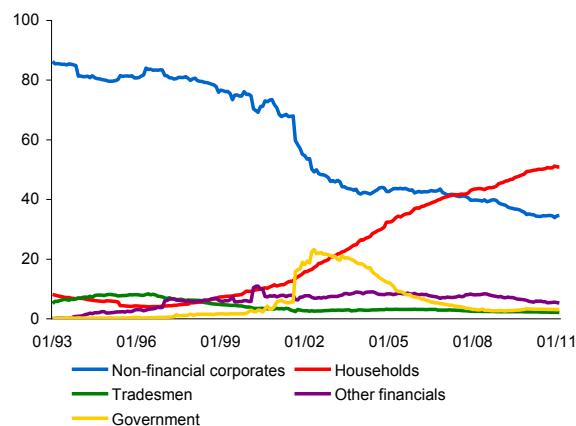


Source: CNB

Note: Credit growth is year-over-year increase in total bank credit, % NPL is the share of nonperforming loans on total bank credit.

Data from the beginning of 1990s are based on authors' estimates.

**Chart 2. Sectoral structure of credit in the Czech Republic (1993–2011, in %)**



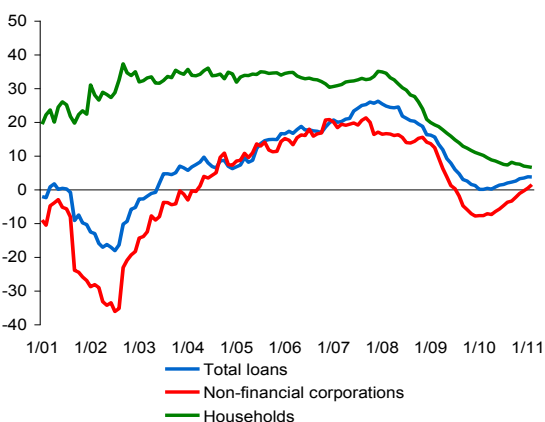
Source: CNB

Given the relatively high exposure of the banking sector to the corporate sector associated with legacy loans, loans for financing inventory needs, and new loans associated with privatization, the credit-to-GDP ratio of the Czech banking sector was rather high at the early stage of transition—roughly 65 percent in 1993 (see Chart 1). In addition, nearly 90 percent of loans in credit portfolios were to the nonfinancial corporate sector. The share of households in the overall credit system stayed below 10 percent throughout the 1990s (Chart 2).

The deep banking crisis that hit the Czech economy from 1997 to 1999 was caused by a mix of flaws in the financial system and suboptimal steps in macroeconomic policies. (See, for example, Frait and Tamarappoo 1998.) The share of nonperforming loans exceeded 30 percent,

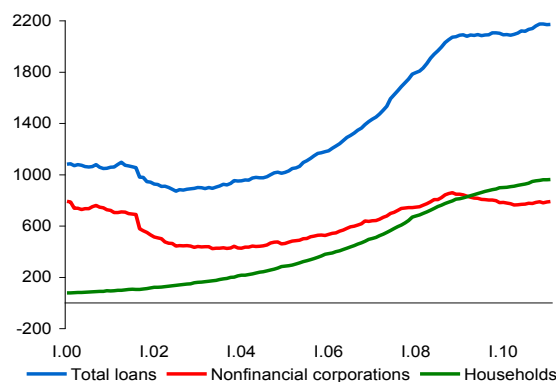
and sharp contraction of credit followed. (For a detailed description, see Hampl and Matoušek 2000.) Between 1997 and 2000 the credit-to-GDP ratio declined from more than 60 percent to less than 40 percent (Chart 1). Considering the unfavorable situation in the major financial institutions, the authorities decided to resume the privatization process with the goal of finding strong strategic investors. By the end of 2001 the banking sector was restructured and privatized. During the process, all major domestic banks were acquired by banking groups from the European Union. Soon these banks started to extend loans to the segment of households that had been largely ignored by pre-crisis, semi-state banks. With the acceleration of the economic recovery, the performance of the banking sector improved significantly, and the share of nonperforming loans decreased to less than 5 percent in 2003. The financial system simultaneously regained its dynamics, and a strong pickup of credit growth followed. At least part of this dynamic has to be linked to overly optimistic expectations associated with EU membership.

**Chart 3. Year-over-year growth rates of a bank loans in the Czech Republic (2001–2011, in %)**



Source: CNB

**Chart 4. Bank loans to the private sector in the Czech Republic (2000–2011, CZK billions)**



Source: CNB

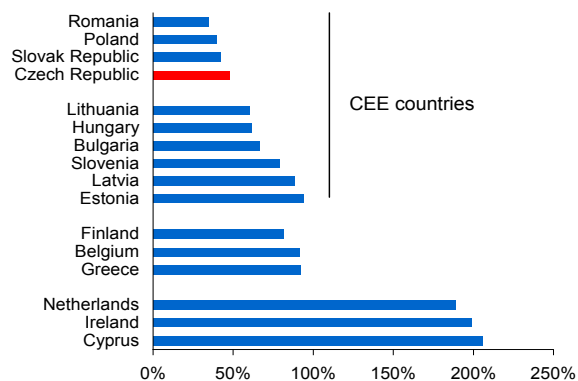
From the beginning of 2002 until the middle of 2008, credit to the household sector grew by 30 percent or slightly more on a year-over-year basis (Chart 3), albeit initially from a very low base (Chart 4). Credit to the nonfinancial corporate sector exhibited a much slower dynamic, but between the beginning of 2006 and the middle 2008 it also rose rather fast (15–20 percent). Unlike the household credit, the nonfinancial corporate credit started from a much higher base, even though its absolute level at the beginning of 2011 was roughly the same as at the beginning of 2000.

Despite comparatively strong credit growth observed in from 2003 to 2007, the stock of bank loans relative to income in the Czech Republic was still relatively low at the end of 2007.<sup>2</sup> This applies not only to a comparison with the advanced euro area economies but also with the most economies from the Central and Eastern European (CEE) region. Chart 5 reveals that in

<sup>2</sup> One limitation of this comparison is that it is based solely on data on domestic bank loans. This indicator may understate total private credit a bit, as it neglects loans provided by nonbank financial intermediaries and loans provided directly from abroad.

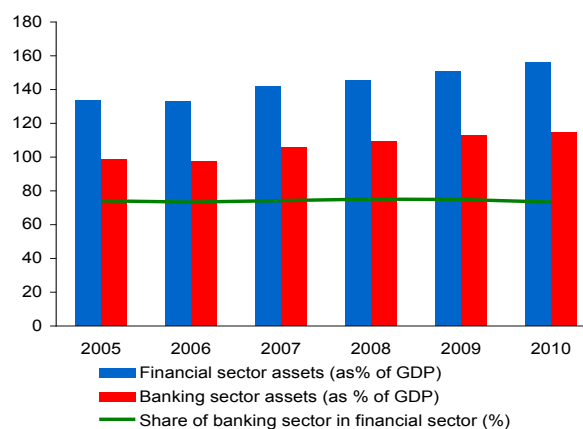
terms of the private-credit-to-GDP ratio, some countries from the CEE region had reached levels typical of some euro area countries.

**Chart 5. Private credit ratios in selected EU countries (as % of GDP; 2007 Q4)**



Source: IMF IFS, authors' calculations

**Chart 6. Financial and banking sector assets**



Source: CNB

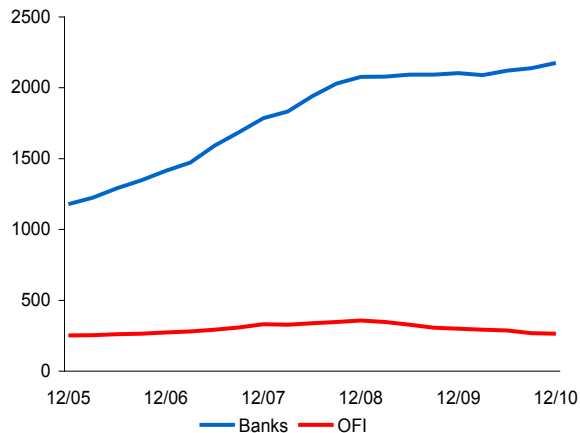
The Czech financial system is bank-based, similar to those in other European countries. While the depth of financial intermediation measured by the total assets of the financial sector in percent of GDP steadily increases, reaching 156 percent in 2010, the share of banks in the financial sector remains stable at around 75 percent (Chart 6). Compared to the euro area, where the financial sector assets account for some 570 percent of GDP, financial sector assets in the Czech Republic are still relatively low. The stock market is shallow in the Czech Republic, with capitalization of around 38 percent of GDP in 2010 (25 percent in 2003).

While the majority of loans to the private sector come from local banks, nonbank financial intermediaries (such as other companies engaged in lending or in leasing companies) also play some role (Chart 7). In 2004 their share in the loans to the nonfinancial private sector was almost 20 percent. However, increasing competition from banks and tax changes in past three years (which made leasing financing less favorable than earlier) have contributed to the decline of the relevance of these institutions. In 2010, their share in the loans to the nonfinancial private sector reached only 11 percent.

A remarkable increase in loans can be seen to the real estate industry, due mainly to the activities of real estate developers (Chart 8). Companies active in real estate markets now have an even higher share of loans than do manufacturing companies.

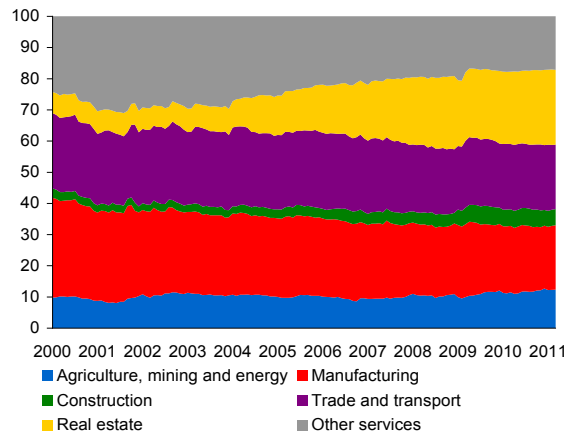
Direct cross-border credit to the private sector also plays a role in the Czech Republic, mainly in the case of nonfinancial corporations. Due to the large share of foreign ownership in the corporate sector resulting from past foreign direct investment, corporations often use intragroup financing directly from their parent companies abroad. An analysis of loans taken by nonfinancial corporations reveals that in 2010 slightly more than 50 percent of credit came from the domestic banks while the rest was from other nonbank financial intermediaries, from other (domestic) nonfinancial corporations, and from nonresidents, which include both parent nonfinancial companies abroad as well as direct cross-border loans from foreign banks (Chart 9).

**Chart 7. Loans provided by banks and other financial intermediaries (OFIs) (CZK billions)**



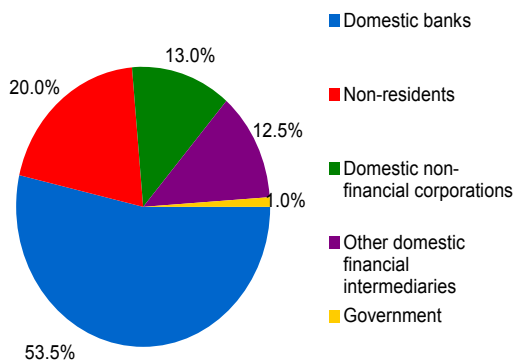
Source: CNB

**Chart 8. Corporate loans by industry (% of total corporate loans)**



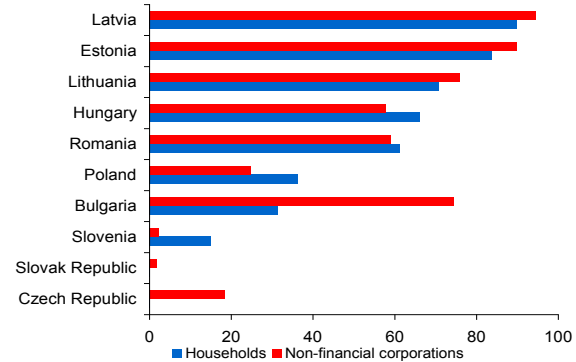
Source: CNB

**Chart 9. Credit to nonfinancial corporations by creditor, (%)**



Source: CNB, financial accounts

**Chart 10. Shares of foreign currency bank loans (as of end-2009; as % of total loans to given sector)**



Source: ECB

Note: Slovak Republic and Slovenia were already members of the euro area in 2009, so their foreign currency loans comprise currencies other than EUR.

The banking system is completely controlled by foreign banks, usually from other EU countries.<sup>3</sup> In 2010, the direct share of foreign banks in total assets was 80 percent, but as some banks (mainly specialized building savings societies) are owned by other banks domiciled in the Czech Republic, but with foreign owners, the share of banking sector under (direct and indirect)

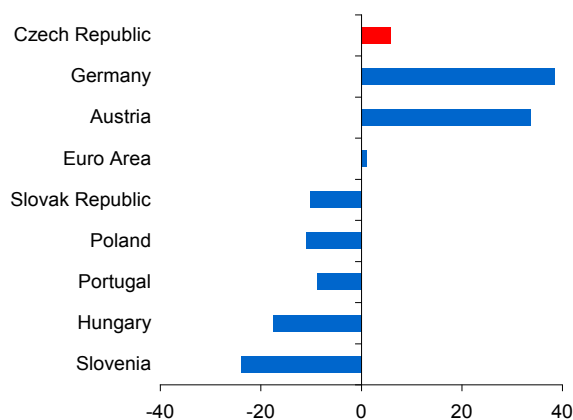
<sup>3</sup> For a detailed description of the Czech financial and banking system, see CNB (2010).



foreign control is almost 97 percent (93 percent under the control of banking groups from other EU countries, mainly Austria, Belgium, France, and Italy).<sup>4</sup>

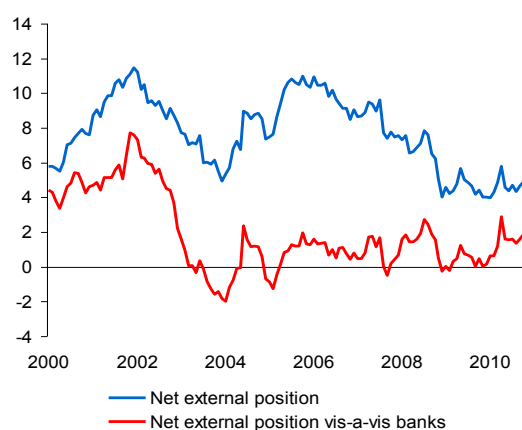
In some CEE countries, private loans were provided in foreign currency (Chart 10), especially because foreign interest rates were lower. This further increased the risks for the banking sector, because if the domestic currency depreciated, the volume of credit expressed in the domestic currency would rise, debt servicing costs would go up, and foreign exchange risk would turn into credit risk. In some CEE countries, therefore, the aforementioned measures to contain credit growth were targeted primarily at reducing growth in foreign currency loans (Steiner 2011). Furthermore, if a domestic credit boom is financed from foreign sources, as was the case in several CEE countries (except for the Czech Republic, Slovakia, and Poland), the risk of the domestic banking sector having insufficient balance-sheet liquidity (rollover risk) increases. In bad times, domestic banks face a high risk of outflows of short-term foreign funds that cannot be financed by the sale of liquid assets (Hilbers et al. 2005).

**Chart 11. Net external position of banking systems (as % of GDP; end-2010)**



Source: IMF IFS, central banks  
Austria as of end-2009

**Chart 12. Development of net external position of the Czech banking sector (as % of total assets)**



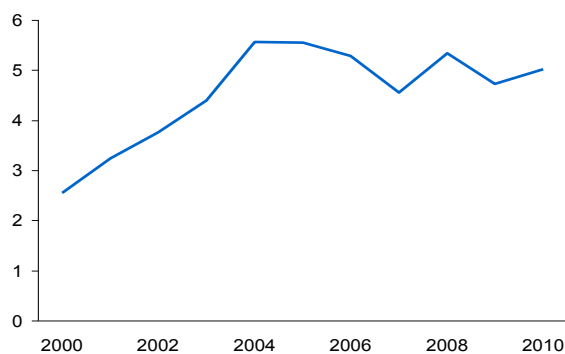
Source: CNB

Fortunately, the Czech Republic is one of a very few countries of the CEE region that neither experienced a boom in foreign currency lending nor relied on external (foreign) funding during the period of high credit growth of 2003–2008. Households do not take loans in foreign currency, while some parts of nonfinancial corporations do so in order to hedge the inflow of foreign currency, which come mainly from export revenues. Despite high foreign ownership, the Czech banking sector as a whole has a positive net external position vis-à-vis nonresidents of about 7 percent of GDP (Chart 11). The net external position vis-à-vis non-resident banks is

<sup>4</sup> Foreign banks play a key role in the Czech financial system, and fortunately the ownership is not concentrated into one or two key EU countries. The three biggest state-owned Czech banks were privatized in the early 2000s to three large EU banking groups with origins in different EU countries. This to some extent limits the contagion risk. See Geršl (2007).

smaller, but still positive (Chart 12). This suggests that the Czech subsidiaries of foreign banks lend to the parent groups they belong to (Chart 13).<sup>5</sup>

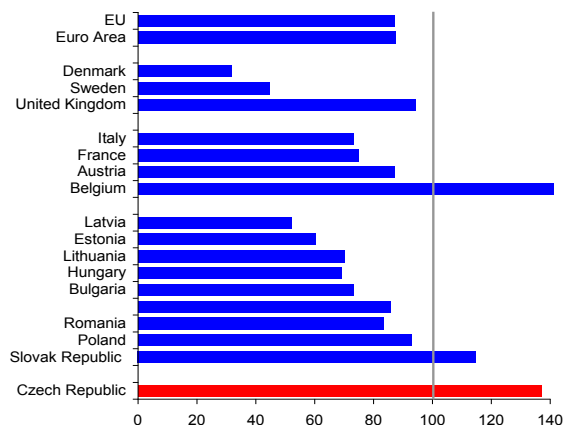
**Chart 13. Lending of banks in the Czech Republic to parent groups (gross exposure of six biggest banks to parent groups, as % of assets)**



Source: CNB.

Note: Lending to parent groups includes gross exposures to all institutions in the group, both non-resident and resident in the Czech Republic.

**Chart 14. Ratio of deposits to loans granted in selected EU countries (2010; %)**



Source: ECB

Note: EU = average for all EU countries.

Overall, the Czech economy experienced a credit boom similar to those in other CEE countries in the pre-crisis years. The features and quality of the boom, however, were quite different. First, fast credit growth was concentrated to the household sector, while the developments in the corporate sector lending were rather smooth. Second, the increase in lending was accompanied by an increase in the base of local deposits and was thus financed from domestic savings, not foreign sources (Chart 14). Moreover, the local deposit base is predominantly in domestic currency, so there was no incentive for banks to offer foreign currency loans to minimize possible currency mismatches on their balance sheets. Third, lending to the household sector was done in domestic currency only, and there was no additional risk except for the credit one associated with growing housing loan portfolio of the Czech banking sector. Finally, the boom in housing loans may have not been as fast as it seems. The increased demand for these loans in 2006–2007 was also due to an expected increase in value-added tax (VAT) on construction work from 5 percent to 19 percent as of 1 January 2008, as announced already in 2005.<sup>6</sup> All this suggests that there are particular factors behind the credit boom in the Czech Republic that explain its different quality. In the next section we describe how differences in macroeconomic policies were key among them.

### 3. The CNB's Approach to the Credit Growth Issue

<sup>5</sup> There is a regulatory limit on lending to parent groups that amount to 25 percent of regulatory capital. This limit is however applied on the so-called adjusted exposure (for example, if the parent bank is a bank from another EU country, 80 percent of the gross exposure can be deducted when calculating adjusted exposure). Most banks in the Czech Republic are around the half of the regulatory limit.

<sup>6</sup> Due to this factor, a number of creditworthy households shifted their plans regarding the purchase or building of housing and frontloaded the loans much earlier to take the opportunity of the still lower taxation.

Thanks to lessons learned from crisis of the 1990s, the CNB entered the new century with an explicit, history-based, macroprudential mandate in the minds of central bankers. The CNB adopted a definition of financial stability consistent with current thinking about the financial stability objective back in 2004: a situation in which the financial system operates with no serious failures or undesirable impacts on the present and future development of the economy as a whole, while showing a high degree of resilience to shocks. Another core element of the CNB's financial stability framework is its definition of financial stability analysis as the study of potential sources of systemic risk arising from the links between vulnerabilities in the financial system and potential shocks coming from various sectors of the economy, the financial markets, and macroeconomic developments.

These definitions explicitly emphasize the macroprudential orientation of the CNB's financial stability policies. The objective of these policies is to ensure that the financial system does not become so vulnerable that shocks causing financial instability ultimately result in a crisis. The CNB's financial stability analyses contained in its Financial Stability Reports have therefore been focused on determining whether weak spots are forming in the financial system that might reduce its resilience to shocks and whether conditions are being created in which the interaction of macroeconomic factors and policies; excessive household, corporate, government, or financial institution debt; and financial market volatility could cause a financial crisis. An empirical analysis of the history of financial crises reveals that the financial cycle—whose primary features are changes in credit growth and in the level of debt of economic agents—usually lies at the heart of systemic financial crises, with strong negative impacts on output.<sup>7</sup> The prime focus of the CNB's financial stability analyses was therefore the potential for a credit-led bubble, since a bursting of such a bubble and negative macroeconomic developments, leading to external financing constraints and growth in nonperforming loans, can cause the banking sector serious difficulties. This fear is consistent with existing studies in the field of early warning signals, according to which excessive credit growth can be considered one of the most reliable indicators of future problems in the banking sector (Borio and Lowe 2002; Borio and Drehmann 2009; Jimenez and Saurina 2006; Saurina et al. 2008).

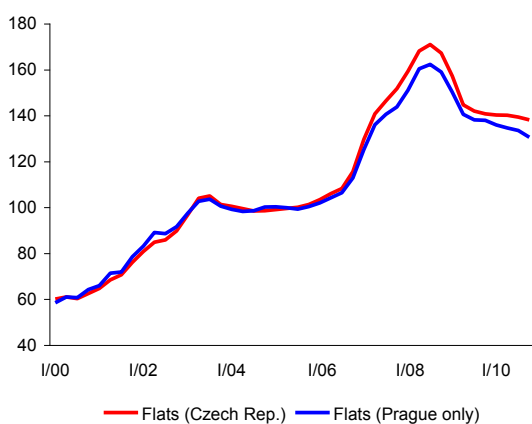
The CNB has been rather open and vocal as far as the risks associated with credit and debt levels in the economy are concerned. Despite the low level of private credit relative to income (Chart 5), the CNB launched at the beginning of 2006 series of analyses focusing preemptively on whether a prolonged period of sustained credit growth could bring systemic risks for financial stability and how to assess the “excessiveness” of credit in the private sector. Since real estate is usually a prime suspect in excess credit and often warrants a presumption of guilt, soon after real estate prices started to rise in 2006 (Chart 15), the CNB issued warning in its 2006 Financial Stability Report (page 9) that “a comparison of flat prices and income indicates a possibility of an emerging bubble on the property market.” This message was taken seriously by both the media and the financial industry. Mindful of the experience of the 1990s, the CNB experts were aware of the fact that potential impact of a lending boom on quality of banks' balance sheets is hard to assess, since the new loans tend to dilute the old ones, including the bad ones, and the vulnerability indicators are therefore strongly lagging. The 2007 Financial Stability Report (page 63) warns that “asset quality, measured by the share of default loans, does not deteriorate despite the credit expansion, as the rise in default loans is diluted by the growth in new loans.”

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<sup>7</sup> IMF (2004) estimates that more than 75 percent of credit booms were followed by banking or currency crises.

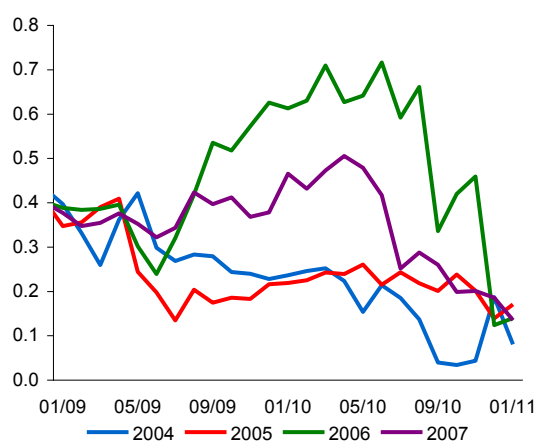
Excessive credit growth can threaten macroeconomic stability in many ways. Given that lending supports consumption, growth in private sector loans can overstimulate aggregate demand beyond the potential output and cause the economy to overheat, with subsequent effects on inflation, the current account deficit, interest rates, and the real exchange rate. At the same time, lending institutions can, in an economic growth phase, have overoptimistic expectations about borrowers' future ability to repay their debts and therefore very often lend to high-risk borrowers. The upshot is that the bulk of "potentially" bad loans arise during upward phases of the credit cycle. An analysis of corporate loans' monthly default rates shows that loans provided in the major boom years 2006 and 2007 defaulted at a higher rate than loans provided earlier (Chart 16).

**Chart 15. Prices of flats in the Czech Republic (2005 = 100)**



Source: CZSO, CNB

**Chart 16. Monthly default rate by vintage of loans, (corporate loans only; in %)**



Source: CNB, CNB calculation

The explanations provided above reveal that the Czech Republic and its central bank, unlike some other countries in the CEE region, did not resort to any supervisory or administrative measures to tame the credit boom. The only measures of a macroprudential kind consisted of open communication and public warnings. Still, the consequences of the crisis were relatively contained, and the banking sector was able to provide credit throughout without major disturbances. Particular qualities of the credit boom in the Czech Republic relative to those in other converging economies have been to a large extent associated with the specific macroeconomic environment in which the Czech economy has been operating. Prudent macroeconomic policies and tough monetary conditions were the key ingredients of the macroprudential policy toolkit. At the same time, as well as during the 2008–2009 crisis, the fact that both monetary policy and banking supervision have always been the responsibilities of the central bank proved to be rather important. With the benefit of hindsight, one can say that the specific macroeconomic environment has had a strong impact on the risks associated with the operation of the banking sector, its lending activity, and its policy reaction to the credit boom phenomenon. We attempt to explain the actual working of this environment in the next section.

#### 4. Inflation Targeting, Currency Appreciation, and Credit Dynamics

The CNB and the Czech economy in general have been operating in a rather specific environment since 2001. The period since 2001 has been characterized by appreciating currency, low inflation, and stable and low interest rates. The Czech Republic has become an exemplary case of an inflation-targeting economy with sustained appreciation pressures. 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.<sup>8</sup> 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.<sup>9</sup> Sustained currency appreciation has had far reaching and to a large extent surprising consequences. The Czech Republic (together with Slovakia that exhibited similar patterns) operated in an environment that was rather different from the one existing in other economies that used to be included in the groups like CEE.

Despite the fact that the Czech economy is export-oriented and has a large manufacturing sector, the country has openly adopted the position that it cannot and will not try to artificially soften the conditions for domestic producers.<sup>10</sup> The CNB has explained that there 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 global competition crucially needs. Though initially it was quite difficult, and in some cases painful, exporters have learned how to live with the tough exchange rate conditions and have factored the future evolution of these conditions into their expectations. Labor unions have realized 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 CNB 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

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<sup>8</sup> Globalization and liberalization of the financial markets made domestic monetary policy subject to arbitrage. The search for yield may be viewed as the attempt of domestic investors to avoid constraints imposed by their central bank's policy. And demand for "cheaper" loans denominated in foreign currencies is de facto arbitrage on the side of borrowers.

<sup>9</sup> 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 toward 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.

<sup>10</sup> 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 privatization revenues (and more recently of the inflow of EU structural and cohesion funds) into the CNB's foreign exchange reserves. Since spring 2008, the International Monetary Fund has classified the Czech de facto exchange rate regime as free floating.

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 of using 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 "favorable" nominal illusion. An appreciating currency will slow 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. 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 in the CEE region. Seemingly, sustained currency appreciation should create an incentive to borrow in a currency that is becoming cheaper over time, that is, in foreign currency. Nevertheless, the share of foreign currency loans provided to 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 the sense that they have ignored the opportunity to take advantage of appreciation by deciding that when borrowing they would do so in the domestic currency only.

There may also be other factors specific to a small open economy at play. First, if the economy is export oriented, a sustained exchange rate appreciation may work against the formation of overly optimistic expectations in the corporate sector,<sup>11</sup> which tames the potential for credit-enabled excessive investment and the creation of unprofitable capacity. It may also shift part of the existing domestic demand from nontradables to tradables, thus contributing to more balanced macroeconomic and structural dynamics. One should not forget that in an environment characterized 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.<sup>12</sup> 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.

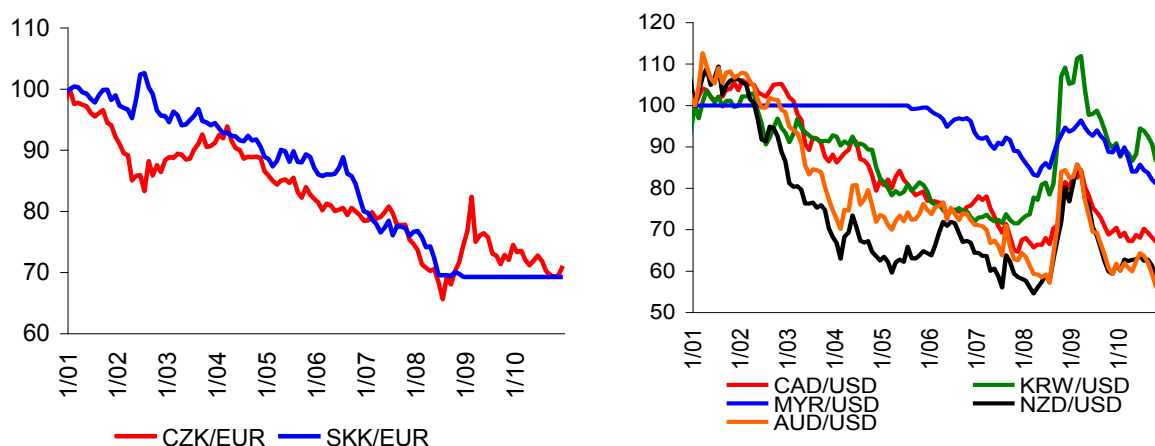
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<sup>11</sup> In a country with a high share of tradables in production (an export-oriented economy with a strong manufacturing sector), the monetary conditions and financial constraints on the corporate sector may be significantly influenced by changes 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 (projects profitable only under expectations of very low interest rates).

<sup>12</sup> 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 an 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

The Czech Republic was not the only country that permitted for sizeable appreciation of its currency, inflation target undershooting, or both in the pre-crisis period. Similar patterns could have been observed in other inflation targeters, for example, Canada, Korea, Norway, Slovakia, Sweden and Switzerland. The exchange rate obviously played a very important role in the monetary conditions in some small economies in the pre-crisis years. Positive outcomes in terms of price and financial stability were achieved in the countries in which central banks 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 worked well.

**Chart 17. Currency Appreciation in Selected Inflation-Targeting Economies**



Note: CZK - Czech koruna, SKK - Slovak koruna, EUR - euro.

Source: Thomson Datastream.

Note: January 2001 = 100. Decline means appreciation.

Note: CAD - Canadian dollar, USD - United States dollar, KRW - Korean won, MYR - Malaysian ringgit, NZD - New Zealand dollar, AUD - Australian dollar.

The explanation for the success depicted above is not a straightforward one. Basically, central bankers in small and open economies have been much more willing to accept that credit booms and asset-price bubbles can emerge without signs of inflationary pressures and that inflation measured in terms of consumer prices has not always signaled a buildup of imbalances 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. 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 for a long time even under rapid credit growth and asset price acceleration. When agents recognize 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.

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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).

Some central banks therefore understood that the risks of a hard landing from the buildup and bursting of large asset price bubbles warranted taking some risks in an attempt to moderate the problem. There were cases in which the asset price misalignment was sufficiently obvious that one could be confident enough to take the risk. In such cases, tightening monetary policy and accepting somewhat lower inflation relative to the target in the short term provided a possibility of avoiding a subsequent collapse in asset prices that could lead to large losses in terms of real output. In addition to tough inflation targeters in Norway, Sweden, and Switzerland, several other central banks 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 (Chart 17). 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 Bank for International Settlements (BIS) approach, in which a successful leaning-against-the-wind policy requires the central bank to tighten monetary conditions above the level consistent with fulfillment of the inflation target and reduces inflation below the inflation target. It is reasonable nominal appreciation of the currency that represents a direct and rapidly effective mechanism for achieving this in small open economies.<sup>13</sup>

## 5. Identifying Excessive Credit in a Converging Economy

One of the key lessons from the most recent financial crisis is that the authorities should pay attention to the risk of excessive credit growth; their macroprudential analyses must struggle to identify it no matter how difficult it is. A major problem in constructing an excessive credit growth indicator is determining what level of credit is excessive and might pose a threat to the financial sector. One traditional method is to apply the statistical Hodrick-Prescott (HP) filter, which obtains the trend from a time series. By comparing the actual credit-to-GDP ratio with its long-term trend obtained using the HP filter we can then estimate whether or not the credit level is excessive. This method is used quite routinely in the literature (Borio and Lowe 2002; Borio and Drehmann 2009). Hilbers et al. (2005), for example, consider a credit-to-GDP gap of greater than 5 percent to be an indicator of excessive credit in the economy.

Although the HP filter method is used quite often to determine trends in macroeconomic variables, it has its drawbacks. A time series trend is dependent to a significant extent on the length of the chosen time series, and the calculation is very sensitive to the smoothing parameter ( $\lambda$ ). A significant problem in terms of practical application in macroprudential policy is “end-point bias,” which generates a highly unreliable estimate of the trend at the end of the data period.<sup>14</sup> Macroprudential policy, which, by contrast, requires assessment of the trend on the basis of current (end-of-period) data, would therefore be reliant on indicators subject to a high degree of uncertainty. In the case of some CEE countries with relatively short time series, credit growth is incorporated directly into the trend itself by the HP filter (Cottarelli et al. 2005).

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<sup>13</sup> 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 emphasize that the strategy described above can be available in some specific periods only.

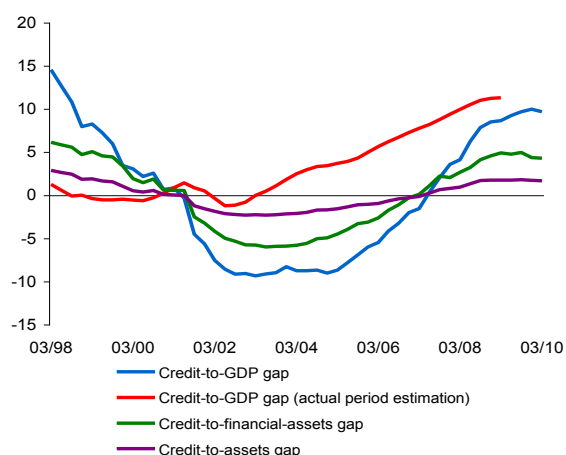
<sup>14</sup> One way of dealing with end-point bias is to extend the time series into the future by means of prediction. This, however, can introduce further uncertainty into the estimate linked with the quality of the prediction.



Another relevant question is whether the credit ratio should take into account other denominators besides GDP, such as financial assets or total assets of the private sector. Although GDP is correlated to a significant extent with private sector income and therefore serves as an indicator of the ability to repay a given amount of loans, holdings of financial assets (deposits and securities investments) and nonfinancial assets (for example, real estate) are also relevant to the evaluation of excessive credit.

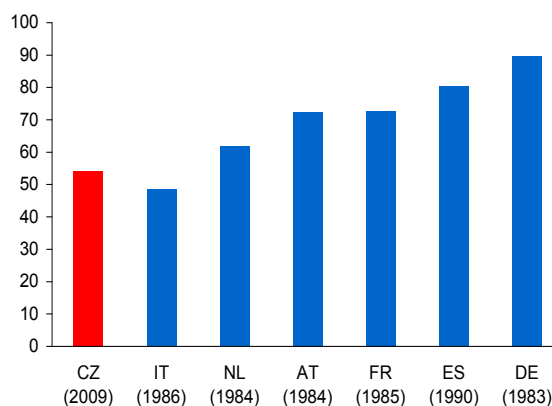
Chart 18 presents credit gaps with alternative denominators (GDP and financial assets and total assets of the private sector) calculated using the HP filter on data for bank loans in the Czech Republic with a high lambda (400,000) as proposed in Basel III. The filter is applied to quarterly data for the period 1998–2010, which, however, is regarded as relatively short from the international perspective (Basel III recommends at least a 20-year period). The estimates indicate that the current level of bank loans is below the long-term trend. However, the trend estimate is subject to a range of problems related to the short time series—above all to extraordinary factors linked with a fall in credit volume in 1998–2002, which was caused by a banking crisis in the 1990s, and the cleanup of bank balance sheets ahead of the privatization of large banks.

**Chart 18. Credit gaps in the Czech Republic with alternative denominators (in %)**



Source: CNB, authors' calculations

**Chart 19. Credit-to-GDP ratios for a similar level of economic development (in %; GDP per capita in 2005 USD = USD 17,000 approx.)**



Source: IMF IFS, authors' calculations

As regards simulating possible macroprudential policy in the past, it makes more sense to apply the HP filter recursively: in each past period using only the data that were available in that period. (At the end of 2005, for example, the trend value and therefore also the gap between the observed credit level and the trend is calculated on 1998–2005 data.) This simulates the situation that the macroprudential policy maker would hypothetically have found itself in had it been required to decide whether excessive credit growth was emerging. The calculated credit gaps expressed as a percentage of GDP indicate that the Czech Republic would have found itself in a situation of excessive credit as early as 2004 (Chart 18). However, the aforementioned drawbacks of the HP filter play an even greater role in the calculated gap, as the problem period of 1998–2002 influences the trend.

The main criticism of the HP filter technique, however, is that this method does not take into account economic fundamentals that affect the equilibrium stock of loans. An alternative method is to estimate the equilibrium private credit level in relation to key economic variables (such as the level of development of the economy measured in terms of real GDP per capita). In nutshell, this method says that if GDP per capita—as a proxy for the standard of living in an economy—is the main and only economic fundamental, all countries with the same level of development should have a similar equilibrium credit level. Poorer countries should have a lower equilibrium credit level than wealthier countries. A comparison of bank loans as a percentage of GDP for the Czech Republic in 2009 and selected euro area countries in years when they were at a similar level of economic development indicates, in contrast to the HP filter findings, that the credit ratio in the Czech Republic is below the level consistent with its economic level (Chart 19).<sup>15</sup>

Given that the CEE countries started from very low private credit levels, however, the estimation of a suitable econometric model on data for these countries would capture the rapid growth caused by convergence towards the average level of the advanced nations. As Égert et al. (2006, 14) point out, such estimated elasticities of the relationships between fundamentals and credit would be overstated. At the same time, the estimates would reflect not the equilibrium level but the present relationship between economic fundamentals and private credit.

For this reason, the existing literature suggests using out-of-sample (OOS) panel estimation: estimating the model on a different sample of countries and applying the elasticities obtained to the data for the countries for which the equilibrium credit level is being estimated. This approach assumes a priori that the stock of credit in OOS countries is at equilibrium on average, which is quite a significant assumption. Therefore, one needs to choose suitable OOS countries that best meet the need to estimate the correct equilibrium relationships between economic fundamentals and private credit. The existing studies on this topic normally use the developed countries of the EU or Organization for Economic Cooperation and Development as an appropriate OOS comparison (Kiss et al. 2006; Égert et al. 2006). For this study, the advanced EU countries were used as OOS countries. Owing to the current debate regarding the excessive debt of the PIIGS<sup>16</sup> countries, those were omitted from the calculation of the equilibrium credit level.<sup>17</sup>

A variety of econometric methods can be used for OOS estimation. Given the properties of the variables used, however, traditional panel methods run into the problem of non-stationary time series, the mutual regression of which can lead to spurious results. The traditional solution to the problem of non-stationary variables involves differentiating them. This step allows us to obtain the short-run relationship between the variables by regression, but the long-run relationship is lost in the differentiation. The long-run relationship between non-stationary variables can be better estimated if the variables are co-integrated. This fact is used by the error

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<sup>15</sup> This comparison of the level of economic development is based on average GDP per capita expressed in real USD and can be interpreted as the same volume of goods that could be bought in the United States with the average GDP of the given country in the given year.

<sup>16</sup> Portugal, Italy, Ireland, Greece, and Spain.

<sup>17</sup> However, nations that are structurally quite different from the CEE countries, such as the United Kingdom, remain in the sample of control countries. This may skew the results of the analysis toward higher equilibrium credit values for a given set of economic fundamentals.

correction model (ECM) method, which estimates not only the long-run relationship between the cointegrated variables, but also the potential short-run deviations from this long-run relationship.

We use the pooled mean group (PMG) estimation method, introduced for panel estimates by Pesaran et al. (1999). It, too, is based on this principle of short-run deviations from the long-run trend. This method can be used to estimate the long-run relationship between the credit-to-GDP ratio and other variables, which is identical for all countries, whereas the short-run deviations from this relationship can differ across countries. The PMG model, therefore, allows heterogeneity of the estimates for individual countries in the short run. However, the long-run relationship of the cointegrated variables is common to all the countries in the sample.

The data used for the OOS method were obtained from the International Monetary Fund's International Financial Statistics (IFS) database, which provides the required macroeconomic data with a sufficient history (which is vital for estimating long-run relationships). For this reason, we used data for a 30-year period (1980–2010). The available statistics on bank loans to the private sector were used as the credit indicator. These statistics slightly underestimate the total credit of the private sector, as they do not include nonbank financial intermediaries (for example, leasing) and cross-border loans. Data on aggregate household consumption, government debt, short-term interest rates, unemployment, inflation measured by the GDP deflator, and GDP per capita in dollar terms were also used.

A long-run cointegration relationship between the credit-to-GDP ratio, the household consumption-to-GDP ratio, and GDP per capita in US dollars was identified for the OOS set of countries. The GDP per capita variable in the long-run relationship captures the different degree of wealth of the economy, which therefore also influences the equilibrium private credit level (Terrones and Mendoza 2004).

The following equation gives estimates of the coefficients of the long-run relationship between the co-integrated variables and the values of the coefficients in the short run, which are given as the mean of all the estimates for the relevant countries.

$$\Delta(\text{credit/gdp})_t = \begin{array}{llll} -0.035(\text{credit/gdp}_{t-1} & -0.7\text{cons/gdp}_t & -0.13 \text{gdp/pop}_t) + & \text{long-run relationship} \\ (**) & (***) & (***) & \\ +0.87\Delta(\text{cons/gdp})_{t-1} & -0.07\text{inf}_{t-1} & +0.014 & \text{short-run deviations} \\ (**) & (*) & (***) & \end{array}$$

Note: \*, \*\*, and \*\*\* denote significance of the estimated coefficients at the 10%, 5%, and 1% levels, respectively.

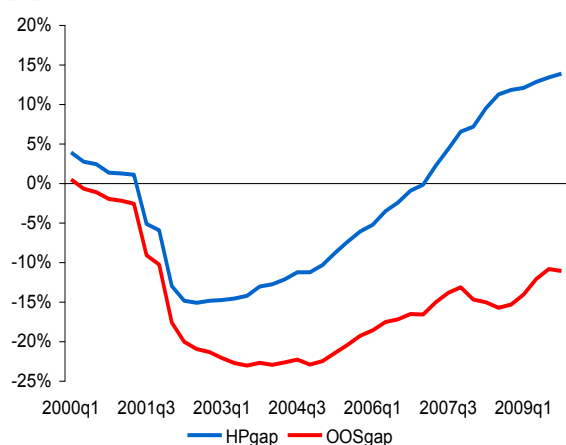
*Credit/gdp* represents the ratio of private sector credit to GDP, *cons/gdp* denotes the ratio of household consumption to GDP, *gdp/pop* is GDP per capita in dollar terms, and *inf* is the change in the price level, expressed as the year-on-year change in the GDP deflator.

Besides the aforementioned variables, other factors that might affect the explained *credit/gdp* ratio were included in the model. For example, the government debt-to-GDP ratio might capture any crowding out of bank lending to the private sector.<sup>18</sup> Also, the real interest rate, or changes therein, should, as the cost of financing, be in a negative relationship with the

<sup>18</sup> For this reason, we would expect a negative relationship between the government debt ratio and loans to the private sector. The fact that a less indebted government sector would be able to provide more significant support if the banking sector ran into serious problems is relevant for assessing whether the current private sector credit level is excessive with regard to financial stability.

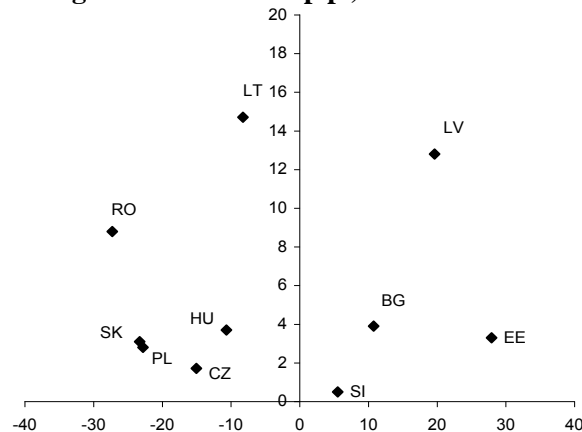
explained variable. However, as the final specification of the model indicates, these variables were not significant even at the 15 percent level. On the basis of the model, short-run deviations from the long-run trend are given as a function of the change in the consumption-to-GDP ratio and as a function of inflation. Based on the estimated coefficients, we can conclude that in the long-run relationship the credit-to-GDP ratio increases with increasing wealth of the economy and with an increasing consumption-to-GDP ratio. This factor then positively affects the explained variable in the short-run relationship as well, while inflation acts in the opposite direction. These conclusions are in accordance with intuition as regards the effects of the variables used on the credit-to-GDP ratio.

**Chart 20. Comparison of credit-to-GDP ratios for the Czech Republic: HP versus OOS (in p.p.)**



Source: CNB, IMF, authors' calculations

**Chart 21. Credit-to-GDP gap via out-of-sample and NPL change in 2009 (gap in p.p.; change in NPL ratio in p.p.)**



Source: IMF, authors' calculations

The estimated parameters of the model were applied to data for the Czech Republic to obtain values of the “equilibrium” credit ratio.<sup>19</sup> The OOS calculations imply significantly different conclusions regarding excessive credit compared to the calculations using the HP filter (Chart 20). According to the HP filter, the credit-to-GDP gap indicates for the Czech Republic excessive credit in the recent period, whereas the econometric estimate does not confirm this excessive credit level (values in the positive part of the chart indicate excessive private credit-to-GDP ratios). Although statistical filtering techniques such as the HP filter do have a role to play in the analysis as a first step in the interpretation of the available data, a broader set of indicators and methods should be employed to determine a country’s position in the credit cycle.

An analysis of relationship between an increase in nonperforming loans during the crisis year 2009 and credit-to-GDP gaps estimated by OOS before the crisis (in the second half of 2008) for all CEE countries of the EU indicates that the most indebted countries experienced the largest increase in credit risk (Chart 21). After developing further the methods based on economic fundamentals such as the OOS, we are considering using the results in calibrating countercyclical capital buffers once Basel III is implemented.

<sup>19</sup> We applied the parameters also to other CEE countries. The results and the accompanying discussion of the consequences for the countercyclical capital buffer are discussed in Geršl and Seidler (2011).

## 6. Taming a Credit Boom: Future Challenges

Generally, it may very difficult to try to tame credit booms in small economies and limit the probability of the boom-and-bust development in certain periods. These are primarily macroeconomic phenomena associated with broad socioeconomic movements reflected in the buildup of excessively optimistic expectations about future income and asset prices growth. In its Financial Stability Reports published in the pre-crisis times, the CNB pursued this particular view: that the growing risks for financial stability were to a large degree determined by the macroeconomic factors and associated primarily with the emergence of excessively optimistic expectations regarding the future development of income and asset prices.<sup>20</sup> For this reason, a macroeconomic, or more precisely, broad macroprudential approach is needed. Monetary policy should constitute an important part of the approach. However, even a well-developed autonomous monetary policy may have a very limited room for maneuver. In small economies, higher interest rates on domestic currency loans may help only if the banks historically have not established markets for mortgages in foreign currencies. In countries with floating, desired monetary tightening can be achieved, but only to some extent, via a combination of currency appreciation and policy rate adjustment, with a simultaneous application of various macroprudential measures, including fiscal ones. Countries with fixed exchange rates or high level of euroization can use less standard monetary policy tools (such as various reserve requirements) only.

The basic recommendation for small and converging economies is to avoid as much as possible the expansionary effects of the foreign banks' operations and capital inflows by making financial sector work as nearly as possible as if it was a purely domestic one. This means that local banks ideally would use domestic sources for lending activity and carry on their business mainly in domestic currency. A sufficient base of deposits from domestic entities, therefore, seems to be one of the prerequisites for a stability of the banking system. Such a base makes the system resilient to sudden evaporations of resources from abroad or from financial markets. In addition, the strong ability of the domestic banking sector to accumulate domestic savings via deposits secures the long-term funding for the investments so needed for boosting the convergence process. And the currency structure of borrowing is linked to the one of saving. If people have long-term incentive to save in domestic currency, they will also view borrowing in it as natural.

Generally, there is no one-size-fits-all solution available for countries. In any country, the authorities have to search for a specific combination of macro- and microprudential measures to succeed. The efficiency in providing such a combination is critically dependent on the organization of regulation and supervision in a country.

### 6.1 The organization of supervision at the national level

The stability of the financial sector in small converging economies very much depends on the ability to establish independent, strong, and respected supervision. Among the key reasons behind recent financial turmoil in mature economies were the deficiencies in financial sector

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<sup>20</sup> An example of the macro view is a statement from 2006 Financial Stability Report (page 13): "The Czech Republic is currently facing a risk of excessively optimistic expectations regarding its future development, driven by the high GDP growth rates, which, however, may not present a faithful picture of the improvement in household income."

regulation and failure of supervisors to understand risks and act accordingly. Whereas a process or redesigning of regulatory rules is fully under way, strengthening of supervisory practice is much less in the focus of the policy makers. And while the regulation is being decided mainly on the EU level, improving the conduct of supervision is primarily a domestic task. It is not realistic to expect that new regulations adopted on the European level will rapidly improve the stability of national markets. And regulation is just a prerequisite for stability—the quality of supervision may matter even more. Banking remains largely a local business based on specific knowledge of local markets. National supervisory institutions have the strongest incentives to use information on local markets and perform supervisory work as responsibly as possible. All this constitutes an important argument for performing banking supervision at the national level.

The important lesson of current crisis is that meeting the principles for effective supervision is important, but organization might be even more important. What really matters are the relations among all decision makers that have something to do with financial stability. The recent changes to the structure of the financial system made a strong case for the integration of sectoral supervisors into a single national supervisor. The experience gained while handling the crisis also made the integration of supervisory structures in a central bank attractive. All stakeholders expect a central bank to act as a lender of last resort—r even a market maker of last resort—but without sufficient information and knowledge of the state of affairs this is a difficult task. We strongly recommend that small European economies expecting to adopt the euro in the future integrate regulation and supervision in independent national central banks. The merits of this model are numerous. It allows a focus on systemic risk (integration of prudential supervision of individual entities and risk assessment across the financial sector as a whole), information-sharing synergies, strong technical and professional support, and independent and apolitical decision making, among other benefits. We regard the existence of strong, independent institutions of consolidated financial market supervision across all segments as the key step toward enhancing the communication and coordination of measures adopted in the EU. Consolidation of financial market regulation and supervision at the national level in a central bank will create conditions for the effective exchange of truly relevant data, data integration, and potential consolidation of analytical work.

In a period when financial imbalances accumulate, the decision-making body (the board of a central bank) enjoys full information coverage from the real economy—financial markets as well as supervisory departments. This has important preemptive potential, since the body has a strong incentive to react (for example, with monetary tools) if the signs of overheating are accompanied by the signs of relaxed lending standards and deteriorating credit quality. The division of tasks between a central bank and a stand-alone supervisor creates the risk of delayed actions due to disrupted information flows and reliance on actions of other stakeholders. In real crisis, the single institution is ideally placed for cooperating with government and acting expeditiously.

There is a traditional argument against integration of the central bank and the supervisory body based on the potential conflict between monetary policy and financial stability. Judging from the experience of the Czech National Bank, we regard the risk of materialization of this potential conflict as marginal. Moreover, decision making on monetary policy and supervision can be effectively separated within a single institution. We believe that the integration of both roles in a single institution will increase the sense of responsibility of monetary policy makers for financial stability and vice versa. The last crisis provides enough evidence that the supervisory

bodies of the Financial Services Authority sort often ignored warnings of central bankers regarding the impact of cycles on financial stability. Finally, despite the separation of responsibilities in some countries hit by crisis, monetary policy makers could not ignore the situation in the banking sector and adjusted policy to stabilize it. To conclude, there is hardly any conflict between monetary policy and financial stability. Whatever conflict exists, it is impossible to avoid even if the institutions responsible for the two functions are separated—the final outcome is the same, but the way to it is more tortuous.

Besides enhancing the organization of supervision, it is also very important to establish operational internal relations among expert teams contributing to understanding the developments in the economy and influencing the conduct of policies. If financial stability experts conclude that there are growing risks to financial stability, the governing body has to consider measures to limit the risks. Again, in integrated institution things can proceed more smoothly. In one institution, the governing body can directly and immediately address departments responsible for monetary policy and supervision. If the country's overall financial structure involves more than one central institution, effective action is rather difficult. Prior to most recent financial crisis, financial stability reports of some central banks highlighted the growing risk to financial stability without invoking any response from the supervisory agencies. In one institution, there is a much higher probability of action.

Supervisors should listen more carefully to financial stability experts and take macroeconomic developments into account in their thinking. Clearly, they have to act somehow if a general consensus emerges that macroeconomic imbalances and asset market booms are likely to end in a hard landing. The autonomy of the financial stability team of the supervisory body is very important. First, supervisors tend to be naturally technocratic and by definition look at the behavior and status of individual institutions. Such behavior may lead to underestimation of business- and credit-cycle-induced risks. Second, it might be difficult for supervisors to emphasize the growth of risks, since these could be viewed as a failure of their work. Third, supervisors are not ready to communicate risks publicly, because it could cause a panic reaction. The opinions of financial stability analysts may be viewed as research results, which are much easier to communicate publicly.

## 6.2 Setting a new macroprudential framework

The CNB supports the idea that inclusion of a separate financial stability objective and a macroprudential policy into an overall policy framework is essential for securing more stable developments in the financial sector. Our view is that the macroprudential policy objective should be to prevent systemic risk from forming and spreading in the financial system, thereby reducing the probability of financial crises with large real output losses for the entire economy. By suppressing channels of formation and spread of systemic risk, macroprudential policy should, first, act preventively against signs of financial instability in the future and, second, mitigate the impacts if prevention fails.

From a general perspective, and given the character of the Czech economy and its financial system, the time dimension of systemic risk should be regarded as dominant. The time dimension reflects the buildup of systemic risk over time. The source of this dimension is procyclicality in the behavior of financial institutions contributing to the formation of unbalanced financial trends, which sometimes slip out of the control of institutions themselves or of their regulators (see, for example, Brunnermeier et al. 2009; Borio and Drehmann 2009). However,

the cross-sectional dimension should not be underestimated. Especially in a small open economy, connections between institutions in the domestic economy and their links with the international economy can both be sources of contagion. While acknowledging the greater importance of the time dimension, the approach to macroprudential policy must therefore cover both dimensions. Given the aforementioned characteristics of systemic risk, macroprudential policy can be defined as the application of a set of instruments that have the potential to reduce the vulnerability and thereby increase the resilience of the system by creating capital and liquidity buffers, by limiting pro-cyclicality in the behavior of the financial system, or by containing risks that individual financial institutions may create for the system as a whole.

All this implies that the main source of the time element of systemic risk is the financial cycle. One of the primary objectives of macroprudential policy must therefore be to create incentives for financial institutions to behave less pro-cyclically (Geršl and Jakubík 2010). A key variable describing the evolution of the financial cycle over time is leverage. In its narrower sense, this term concerns the relation between the assets of an economic agent and the debt that was used to acquire them.<sup>21</sup> In its increasingly used broader sense, it approximates the overall nature of the financial cycle and the position of a given economy within it: the indebtedness of economic agents, stocks, and dynamics of loans; the availability of external financing; the size of interest rate margins and credit spreads; the ratio of assets and capital in financial institutions; the length of the lever of financial market investors; and so forth.

**Chart 22. The financial cycle and the evolution of systemic risk**

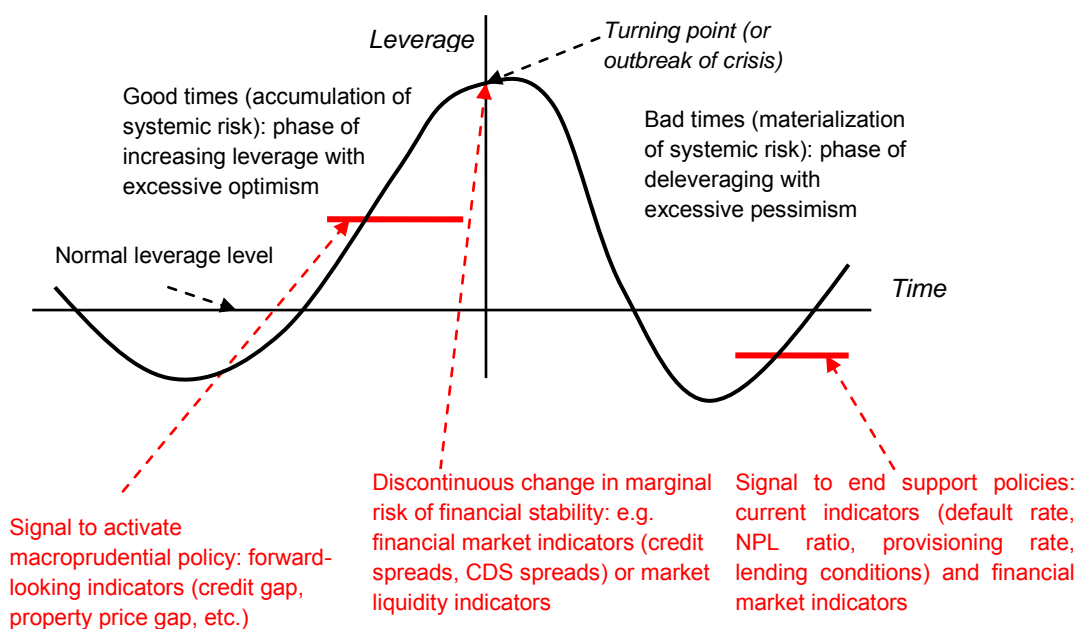


Chart 22 shows the evolution of leverage over the financial cycle. The leverage increases until the financial cycle turns over. Sometimes the turn is disorderly and presents itself as the

<sup>21</sup> The term *leverage* is used in number of areas and therefore has number of different definitions. In the financial market area it generally describes the ratio between the total investment and owned funds of an investor and indicates the degree of use of borrowed external funds. In the case of banks, it refers, for example, to the assets-to-equity ratio.



eruption of financial crisis. Leverage then starts to decline, although in the early phase of the crisis it remains high (given falling nominal GDP it can even rise in the initial post-crisis years). The deleveraging phase can last several years, and in the event of a deep crisis the leverage ratio can, after a time, fall below its long-term normal value. Although the leverage level is high on both sides of the crisis point, the economic situation is very different on either side. In the pre-crisis optimistic phase there is a financial boom occurring, whereas in the post-crisis phase the economy is exposed to financial stress. Consequently, the leverage ratio adjusts to economic conditions after a considerable lag, so stock measures have only a limited information value as a guide for the macroprudential policy response during the financial cycle.

The two main tasks of macroprudential policy—to prevent systemic risk and, if prevention fails, to mitigate the impacts when it materializes—are given by the existence of two phases of development of systemic risk. From the prevention perspective, the main task of financial stability analysis is timely identification of the marginal contribution of the current financial environment to the accumulation of systemic risk (see the left-hand side of Chart 20). This contribution, which can be termed *the risk of future financial instability*, adds to the buildup of systemic risk in a phase of increasing leverage against a backdrop of easy access to cheap credit and overoptimistic expectations regarding future income and asset prices. At a certain moment, however, economic agents will radically revise their expectations as a result of particular information or a particular event, and a change will occur. Aspects of crisis will start to become apparent and a phase of materialization of the risk accumulated in the preceding phase will occur in the form of financial stability. Banks will revise upward their view of the credit, market, and liquidity risk in their balance sheets; increase their credit margins or credit spreads; and tighten their lending conditions. Subsequently, a process of deleveraging will start, during which the systemic risk will gradually “de-accumulate.”

Chart 22 illustrates how the process of accumulation of systemic risk (on the left-hand side) is followed by the materialization of systemic risk (on the right-hand side). The magnitude or intensity of materialization is easier to observe. Compared with the risk of financial instability, it has the opposite time profile. This is a reflection of the financial stability paradox: sources of systemic risk have a tendency to increase when banks and their clients consider their business risks to be the lowest. In other words, a system is most vulnerable when it looks most robust. In boom times, when the risk of future financial stability is increasing, the current indicators of existing financial risks are usually improving—default rates and NPL ratios are falling and banks are provisioning to a lesser extent and reporting smaller credit losses. On the basis of current risk measures, the resilience of the financial sector can seem very high at such times.

The primary objective of macroprudential policy must be to act preventively against growth in systemic risk in the risk accumulation phase, when conditions are being created for future financial instability. During this phase, analyses have to be focused primarily on the identification of latent risks being generated in the balance sheets of financial intermediaries and their clients. When identifying hidden risks, it is important to realize that indicators based on present levels of financial variables provide information about the degree of materialization of systemic risk but not about the probability of financial stability in the future.<sup>22</sup> In pursuing their

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<sup>22</sup> In this sense, in the pre-crisis period the CNB regularly drew attention in its analyses and its Financial Stability Reports to the fact that the existing NPL ratio could not be considered evidence of low risk, since at a time of rapid credit growth, new loans, which are naturally of higher quality initially, dilute the proportion of problem loans.

objectives, authorities must focus on a set of forward-looking indicators providing information on the possibility of the future materialization of systemic risk as a result of currently emerging financial imbalances. This refers mainly to “gap” indicators based on the assessment of deviations of factors determining the degree of leverage from their normal or equilibrium values.<sup>23</sup> For example, deviations of the ratio of credit to the private sector to GDP or the ratio of property prices to income from their long-term trends would seem to be relatively reliable indicators. Such indicators send out a signal several years ahead about financial imbalances in financial institutions’ balance sheets and about the potential for the creation of dangerous bubbles.<sup>24</sup> (For more details, see Borio and Drehmann 2009.)

When assessing systemic risk during the accumulation phase, authorities must first of all reach a general consensus on the normal or sustainable values of the relevant indicators and then continuously assess whether the deviations of actual values from normal levels are becoming critical. In the systemic risk accumulation phase, this process will not be easy. It is quite difficult to distinguish normal cycle fluctuations and long-term trends from a dangerous financial cycle in timely fashion. Preventive macroprudential tools are not usually activated until a consensus has been reached that the critical values of individual indicators—or rather, a combination of a set of forward-looking indicators—that have a strong information content regarding the current level of risk of future financial instability have been exceeded. These indicators of the time dimension of systemic risk will also have to be used when assessing the moment at which the prematerialization effects are ceasing to act in a systemic fashion and the anticrisis measures and support policies can therefore be discontinued. These two critical moments that macroprudential analysis is tasked with identifying are marked by red lines in Chart 22.

The main intermediate target of the preventive instruments used in the accumulation phase of the time component of systemic risk is to increase the resilience of the financial system by creating buffers that are then used in the period of materialization of this risk.<sup>25</sup> Sufficient capital buffers and a suitable level of provisions increase the ability to absorb unexpected and expected losses, while stable balance-sheet liquidity enhances the ability to absorb source shocks. The secondary intermediate target is to reduce the amplitude of the financial cycle by suppressing lending growth and preventing excessively long maturity transformations. Experience with the use of macroprudential tools in some countries suggests that their individual effect on the financial cycle is limited (Borio 2010). However, a combination of macroprudential tools and macroprudentially applied microprudential instruments (for example, those that create additional capital requirements for risk exposures) could help to eliminate manifest excesses over the financial cycle.

In the systemic risk materialization phase, the macroprudential policy priorities will be to prevent the elements of instability from escalating, to reduce the probability of panic adjustment

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<sup>23</sup> A complicating factor is the fact that the risk of financial instability emerges at longer and irregular intervals, reflecting the fact that the financial cycle is usually longer than the normal business cycle.

<sup>24</sup> It is much more difficult to obtain reliable forward-looking indicators of the cross-sectional dimension of systemic risk. Such indicators are often obtained from prices on financial markets. However, their reliability as risk indicators is reduced by the limited efficiency of financial markets.

<sup>25</sup> The main point of macroprudential buffers is to reduce the probability of sudden or panic changes in the behavior of financial institutions during a crisis. Capital buffers, for example, allow banks to lend to the private sector even when their losses on previously granted loans are rising and negatively affecting their capital adequacy. Liquidity buffers can prevent panic sales of assets under pressure caused by a need to obtain liquidity quickly to cover deposit withdrawal requests or by investors’ unwillingness to roll over short-term bonds issued by banks.

by financial institutions and their clients in response to the revision of expectations, and to mitigate the negative impacts of the significantly worse conditions. Countercyclical buffers created in good times can be regarded as the most important macroprudential tool for this phase. In a systemic crisis, however, a whole range of monetary policy instruments and regulatory and supervisory measures can become macroprudential in nature. On a concrete level, macroprudential policy in this phase will act via built-in stabilizers (the release of buffers and the use of central banks' automatic facilities) or crisis management tools (government guarantees for bank assets, bad asset transfer programs and balance-sheet cleanups, and capital injections for ailing institutions). Active communication with the financial markets and the public, including disclosure of stress tests results, in order to reduce the level of uncertainty about the stability of the financial sector will also be important. For example, the CNB moved into more active communication mode during the financial crisis and since February 2010 has been providing the public with quarterly information about the results of its macro stress tests of the banking sector. Communication is a very important tool in the systemic risk accumulation phase as well.

As to Basel III, internal analysis in the Czech National Bank indicates that the Czech banking sector will not have substantial problems with implementation. Higher capital requirements that focus on common equity tier 1 capital, limiting leverage, and regulating liquidity will not harm the functioning of the Czech banking system, as it already now features sufficient (tier 1) capital buffer, high liquidity, and relatively low leverage.

## **7. Conclusion**

This paper focuses on the banking sector developments and credit in the Czech Republic with the emphasis on the pre-crisis years. It explains that even though the Czech economy had experienced a credit boom similar to those in other converging economies, the features and quality of the boom were different. The approach of the CNB, which acts as both a monetary and supervisory authority, has also been different. The only measures of a macroprudential kind targeted at credit growth consisted of open communication and public warnings. Prudent macroeconomic policies and tough monetary conditions were the key ingredients of macroprudential policy toolkit. This helped to produce a specific macroeconomic environment that has had a strong impact on the risks associated with the operation of the banking sector and its lending activity. The key building block of monetary conditions was sustained nominal currency appreciation under the regime of a floating exchange rate. It helped to discipline wage dynamics, slow the growth rate of nominal income down, and restrict optimism regarding its future trend.

One of the major challenges for macroprudential policy makers in the converging economies during the pre-crisis years was detection of the equilibrium trajectory of credit in the economy in order to evaluate a period of the excessive credit growth. Although statistical filtering techniques such as the HP filter do have a role in such an analysis as a first step in the interpretation of the available data, a broader set of indicators and methods should be employed to determine a country's position in the credit cycle. These methods should reflect the developments of economic fundamentals and thus enable one to identify whether a country is in the state of excessive credit growth or just catching up to more advanced countries in its economic development.

We conclude that once the good times set in, it may be quite difficult to try to tame credit booms in small converging economies and limit the probability of the boom-and-bust development. These are primarily macroeconomic phenomena associated with broad socioeconomic movements. If the international economy in the future starts undergoing a dynamic drive again, accompanied by credit and asset price booms, the authorities should apply a concerted set of microprudential and macroprudential measures including fiscal ones to tame the immoderate optimism. Monetary policy should be part of the approach. Monetary policies might need to step in directly via interest-rate or exchange-rate channels or indirectly via macroprudential/microprudential tools changing its transmission. Still, plenty of courage, luck, and communication skills would be needed to succeed.

And finally, the stability of the financial sector in small converging economies very much depends on the ability to establish independent, strong, and respected supervision. Since banking largely remains a local business based on specific knowledge of local markets, we strongly recommend to the small economies that are expected to adopt the euro in the future the integration of regulation and supervision in independent national central banks. These integrated authorities should include a separate financial stability objective and macroprudential policy in their frameworks. Such a bank's dominant focus should be the time dimension of systemic risk. In this setting, the main task of financial stability analyses has to be timely identification of the marginal contribution of the current financial environment to the accumulation of systemic risk: the buildup of unbalanced financial trends over time due to the pro-cyclicality in the behavior of financial institutions. Factors mitigating pro-cyclicality embodied in regulation should ensure the accumulation of buffers, and better supervision should prevent the bank managers from taking excessive risks. In addition, an important precondition for efficient and effective implementation of macroprudential policy is constitution of an operational framework linking the analytical findings with the decision-making follow-ups.

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