MNB Bulletin

Special issue
October 2013

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The aim of the Magyar Nemzeti Bank with this publication is to inform professionals and the wider public in an easy-to-understand form about basic processes taking place in the Hungarian economy and the effect of these developments on economic players and households. This publication is recommended to members of the business community, university lecturers and students, analysts and, last but not least, to the staff of other central banks and international institutions.

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Summary

DEAR READER,

Building on employees' valuable knowledge and experience, in March 2013 the Magyar Nemzeti Bank's management announced a two-round competition for Bank staff. Employees were asked to submit their papers written on current issues in the economy and central banking.

The employee competition proved to be a great success: a total of 43 papers were submitted in two rounds, the vast majority of which were written in groups by 103 employees from staff. 4 papers, prepared by 25 employees, won a gold degree. 27 papers won a silver degree, with contributions from no less than 91 employees. The jury awarded a bronze degree to 12 papers – the work of 24 employees.

This publication is a special issue of the MNB Bulletin, in which a collection of the entries for the competition is made available for the public. The Magyar Nemzeti Bank attaches great importance to making central bank analyses on various current economic and financial trends of general interest available to the wider public. Several papers will be found in the Bank's other publications, thereby reducing the number of articles to be published in the Bulletin. Accordingly, 11 of the entries have been chosen, which are being published by the Bank in the special issue of the Bulletin.

Consistent with the objectives of the invitation to participate in the competition, the papers encompass a wide spectrum of issues. Consequently, the articles in this issue cover a diverse range of topics.

Part of them analyse current issues in central banking and supervision. These include: 'Doing it differently or The impact of the financial crisis on central bank balance sheets in emerging economies', an article by Szilárd Erhart, Gergely Kicsák, Zsolt Kuti, Zoltán Molnár and Zoltán Monostori; 'Macroprudential supervision in non-euro area European countries', a material by Péter Fáykiss and Anikó Szombati; 'Measures taken by the Federal Reserve System and the European Central Bank during the crisis', a piece of work by Kristóf Lehmann, Róbert Mátrai and György Pulai; and 'Regulation on the prohibition on monetary financing – obligations and opportunities', an article by Attila Korencsi, Melinda Lakatos and György Pulai.

The following articles discuss developments in government debt, trade balance dynamics and the external balance of the Hungarian economy: 'Developments in public debt in Hungary between 1998 and 2012: trends, reasons and effects', by Gergely Baksay, Tamás Berki, Iván Csaba, Emese Hudák, Tamás Kiss, Gergely Lakos, Zsolt Lovas and Gábor P. Kiss; 'Dynamics of the trade balance and developments in exports and imports', by Katalin Bodnár, György Molnár, Gábor Pellényi, Lajos Szabó and Judit Várhegyi; and 'Developments in the external balance of the Hungarian economy: indebtedness and adjustment', by Mihály Hoffmann, Balázs Kóczián and Péter Koroknai.

The banking sector and household indebtedness are dealt with by 'Households: indebtedness and debt service ratio', written by Tamás Balás; 'Excessive household debt: causes, trends and consequences', written by Péter Bauer, Marianna Endrész, Regina Kiss, Zsolt Kovalszky, Ádám Martonosi, Olivér Rácz and István Schindler; and 'Impact of the credit supply on the Hungarian economy', written by Zsuzsanna Hosszú, Gyöngyi Körmendi, Bálint Tamási and Balázs Világi.

In addition to these major topics, the article 'Neutral interest rate in Hungary', written by Dániel Baksa, Dániel Felcser, Ágnes Horváth, Norbert Kiss M., Csaba Köber, Balázs Krusper, Gábor Dániel Soós and Katalin Szilágyi, also discusses a topical issue.

The above issues, together with other pieces of work, have and will constitute an important part of work within the Bank. Accordingly, the MNB Bulletin articles, as in the past, will aim to provide the wider public with information on professional work done within the Magyar Nemzeti Bank.

The Editorial Board

Dániel Baksa, Dániel Felcser, Ágnes Horváth, Norbert Kiss M., Csaba Köber, Balázs Krusper, Gábor Dániel Soós and Katalin Szilágyi: Neutral interest rate in Hungary

Central banks primarily achieve their inflation targets by changing their key instrument, the central bank base rate, to the required extent and with careful timing. If the inflation outlook deteriorates and the forward-looking inflation rate exceeds the target, monetary policy raises interest rates to cool the economy and reduce inflation. In the opposite scenario, the bank cuts interest rates to stimulate the economy and raise inflation. In order to decide whether the prevailing rate of interest stimulates or slows the economy, it is necessary to know where the interest rate threshold is for expansionary versus contractionary monetary policy. We call this point of reference the neutral interest rate or the natural rate of interest. Similar to potential output, the neutral interest rate is a theoretical equilibrium concept, not an observable variable. It is therefore difficult to grasp empirically and its point estimation is surrounded with a great degree of uncertainty. This essay looks at the individual factors influencing the neutral interest rate and gives an estimate for the range in which it may move in Hungary.

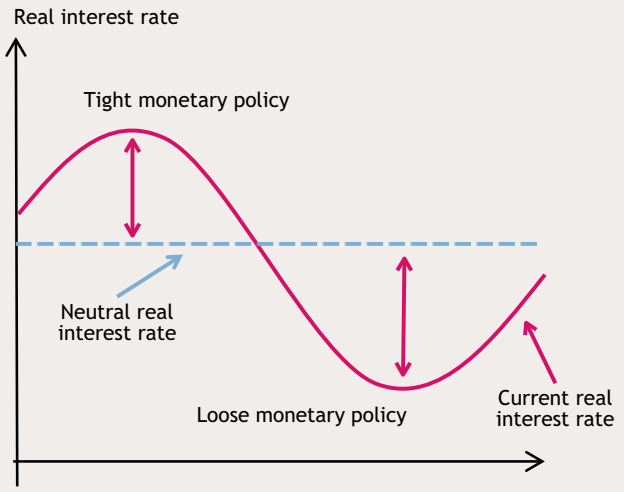
WHAT IS THE NEUTRAL INTEREST RATE?

The neutral interest rate is the focal point for medium-term monetary policy. A rate of interest reaches its neutral level if (1) the economy develops in accordance with demand and supply capacities (the output gap is closed), (2) there is no medium-term inflationary pressure, forward-looking inflation is on target, and (3) the risk premium is also in line with the medium-term target. In such a situation, monetary policy need not change the base rate for any reason, be it inflationary considerations, the real economy or stability.[1]

Just as the nominal interest rate equals the sum of the real interest rate and the expected rate of inflation, the same formula applies to the longer-term equilibrium values of these variables as well: the neutral nominal interest rate is equal to the sum of the neutral real interest rate and the medium-term inflation rate. The latter depends on the inflation target set by the central bank under inflation targeting:

Neutral nominal interest rate = neutral real interest rate + inflation target

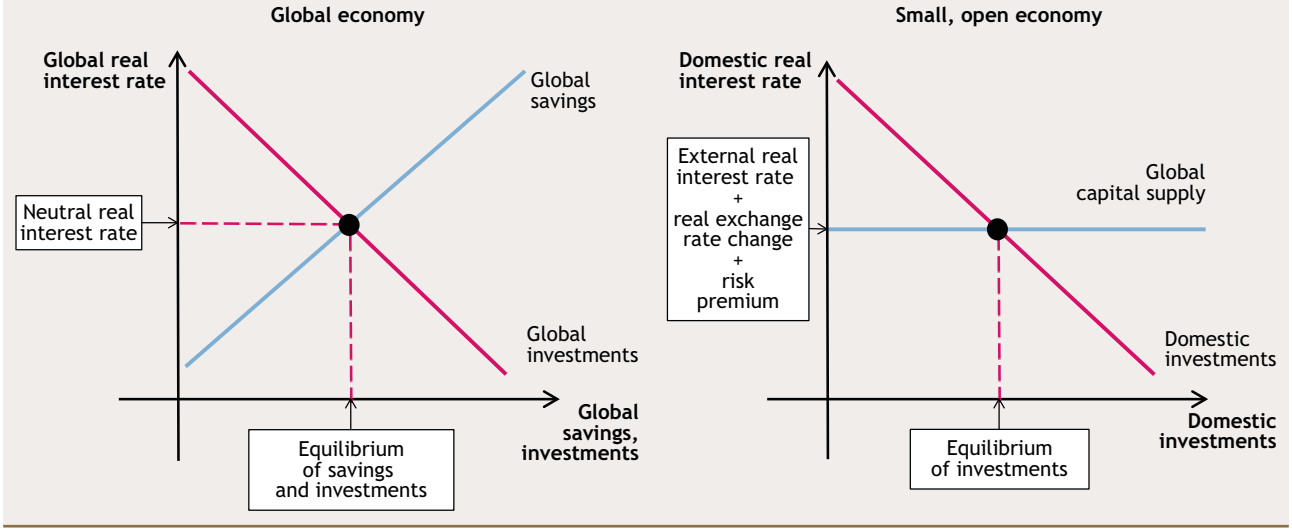
Chart 1
The monetary policy stance



Since the behaviour of economic agents is influenced by the real interest rate rather than the nominal interest rate, the impact of monetary policy on aggregate demand (and therefore the medium-term inflation outlook) depends on the relationship between the current real rate of interest and the neutral real rate of interest (Chart 1). If the current

[1] A similar, but wider concept, the long-term equilibrium interest rate is dependent on structural factors such as technological development and population growth. In this context, the neutral interest rate is more of a short-term concept.

Chart 2
Investments and savings – determinants of the neutral real interest rate



real interest rate is higher than the neutral real interest rate, then monetary policy becomes tight and constrains domestic demand, with a disinflationary effect. If the current real interest rate is lower than the neutral real interest rate, then monetary policy becomes loose and stimulates domestic demand, pushing towards higher inflation. In the following, we will focus on the neutral *real interest rate* at a given inflation target.

DEFINITION OF THE NEUTRAL INTEREST RATE — THEORETICAL CONSIDERATIONS

To start, we look at the factors determining the equilibrium real interest rate in a closed economy or across the global economy as a whole (Chart 2, left panel). The real interest rate can be understood as the price of borrowing necessary to finance capital expenditures. Within this framework, the neutral real interest rate is an increasing function of the propensity to invest (the higher the demand for credit, the higher its price) and a decreasing function of the propensity to save (the higher the supply of credit, the lower its price). Propensity to invest rises as productivity or business sentiment improves and economic uncertainty falls. The propensity to save is influenced by, for instance, precautionary considerations and demographic trends.

The equilibrium (neutral) level of the real interest rate in a small, open economy reliant on external funds is determined by the yield expectations of the international capital market (Chart 2, right panel). In other words: the price of capital is given for a small, open economy; at this given price, however, the country can attract unlimited amounts of funding. In such cases, the neutral interest rate can be derived from the so-called interest parity, which formulates the arbitrage condition that, at equilibrium, the yields available domestically and abroad should be even. According to this condition, the differential between domestic and foreign interest rates must cover the risk premium of domestic assets versus foreign assets, plus the expected real appreciation of the domestic currency. This means that investors expect higher yields for their greater risk in a more vulnerable country. However, if they expect the domestic currency to appreciate, they will be willing to accept lower rates of interest.

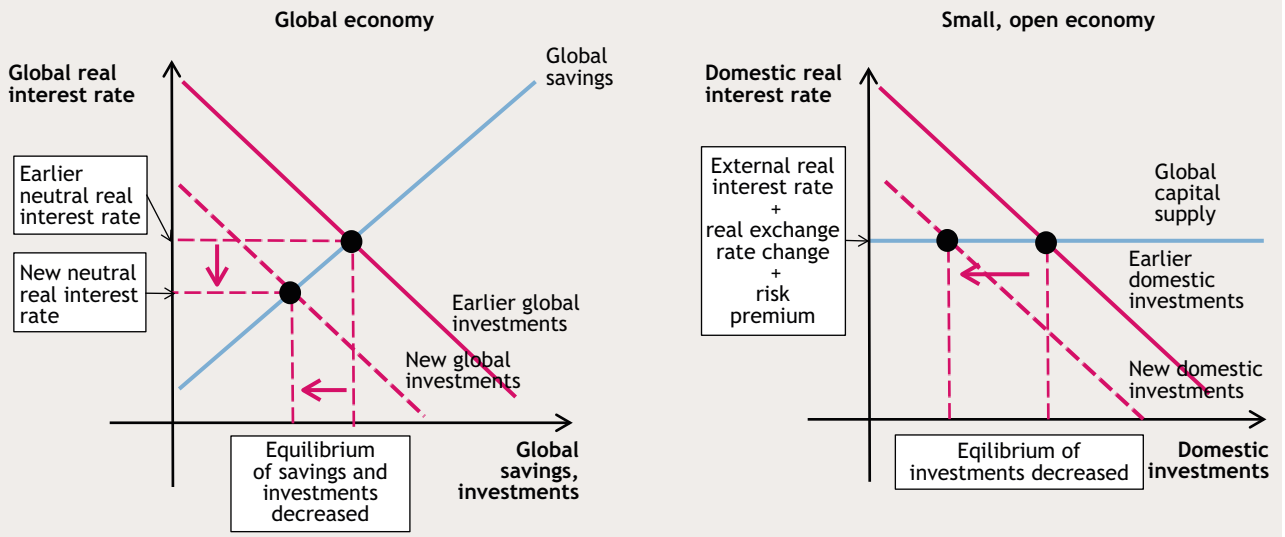
CHANGES TO THE NEUTRAL REAL INTEREST RATE IN THE CRISIS

The neutral real interest rate can change over time. Liquidity increased considerably at the global level before the crisis, due in part to the opening-up of the developing economies to the capital market. The increasing global capital supply was coupled with a very low level of the neutral real interest rate.[2]

The neutral real interest rate decreased further globally during the financial crisis (Chart 3, left panel). The weakening profit prospects of companies and the increased uncertainty in the expected economic path persistently

[2] Moreover, in what is called the period of Great Moderation starting in the mid-1980s, equilibrium rates of inflation tended to decrease globally, which further reduced the neutral *nominal* interest rate level. As a part of this process, the neutral interest rate decreased in the euro area compared to the preceding 10 to 15 years, thanks to the elimination of exchange rate risk by the common currency and the price stability achieved (ECB, 2004).

Chart 3
Neutral real interest rate before and after the crisis



reduced investments, which exerted downward pressure on the neutral real interest rate (the investment curve in the chart shifts to the left). At the same time, the propensity to save was subject to opposite effects. Precautionary motives intensified during the crisis, making households more likely to save. However, the major emerging economies also shifted towards a growth model which was more reliant on domestic demand, thus reducing the global propensity to save. Overall, the neutral real interest rate might have decreased during the crisis, mainly due to the fall in propensity to invest.

Several mutually opposing impacts affected the level of the neutral real interest rate in Hungary during the crisis (Chart 3, right panel). A decrease in the global real interest rate would, by itself, result in a lower domestic real interest rate. However, the risk premium on domestic assets increased during the crisis, pushing them in the opposite direction, towards a higher neutral real interest rate. The combined result of these impacts was that the neutral level of the real interest rate was not able to shift significantly.

EMPIRICAL RESULTS

It is difficult to quantify the neutral interest rate, as it is a non-observable variable. Accordingly, its value cannot be measured, only estimated. In light of the medium-term definition of the neutral interest rate, it appears an obvious choice to calculate the historic average of a real interest rate time series, which is a simple method for filtering out the cyclical factors affecting the real interest rate. However, this method treats the neutral interest rate level as a constant, whereas economic theory and international estimates suggest that it is better to consider it as a variable. Furthermore, this method disregards structural breaks, regime switches and other special events. Different methods are used in the literature to estimate the neutral interest rate (which changes over time); a frequent approach is to use the Kalman filter, which is also used in potential GDP calculations or quantification of the flexible-price real interest rate within the DSGE model framework, widely used by central banks. It is important to underline that there is no single "best method" for calculating the neutral interest rate and that the different methods will return different results, which is a sign of the uncertainty surrounding the quantification.

To determine the neutral level of the Hungarian real interest rate, we started with the real interest rate parity mentioned above, i.e. we looked at the stylised facts describing the changes in the key factors determining the real interest rate in Hungary (external neutral real interest rate, the pace of real appreciation, risk premium trend). The neutral real interest rate can decrease if the neutral level of the foreign (global) real interest rate falls, if Hungary's medium-term convergence outlook improves or if the perception of the risk of Hungarian assets improves in a sustained manner.

Euro-area real interest rates ranged between 0 and 2 per cent in the decade before the crisis (Chart 4). The European Central Bank (ECB) implemented significant easing during the crisis, which has pushed real interest rates below zero in recent years. Although the neutral level of the real interest rate may have also decreased during the crisis as argued above, we consider the decrease in the current real

Chart 4
Neutral real interest rates and historical averages in the euro area before and after the crisis

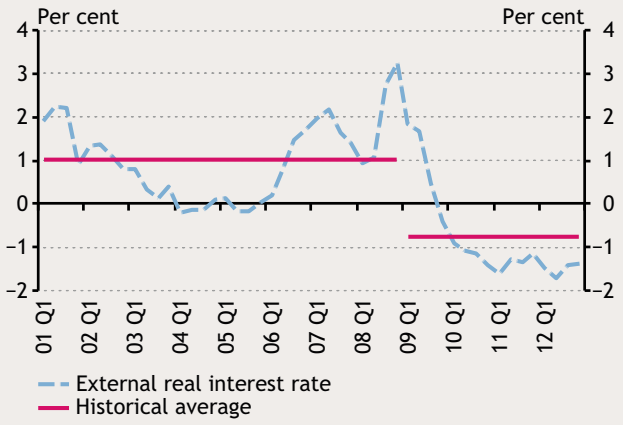
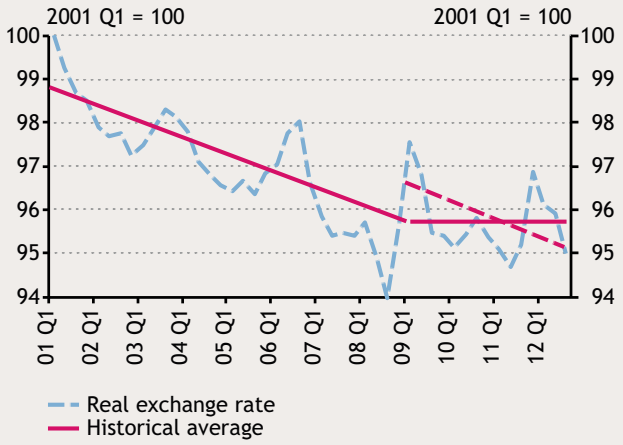


Chart 5
Real exchange rate and historical trend before and after the crisis

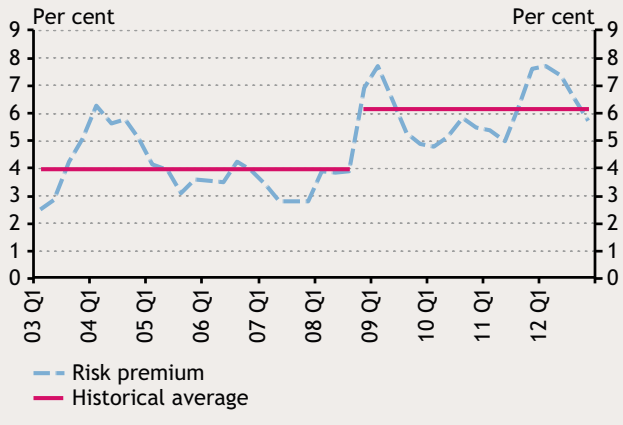
(downward shifts represent appreciation)



interest rate mostly as a change in the cyclical component. In other words, the neutral real interest rate may have decreased to a smaller degree than the actual real interest rate.

The convergence of the Hungarian economy has been coupled by a convergence in price levels. This is reflected by the sustained trend appreciation of the real exchange rate prior to the crisis (Chart 5). Although a structural break can be seen in the real exchange rate path at the beginning of the crisis, it is currently impossible to ascertain whether real appreciation has halted permanently or whether it will restart at a similar speed at some time in the future. This is illustrated by the two scenarios (the continuous and the dotted lines) in Chart 5.

Chart 6
Risk premium and historical averages before and after the crisis



Risk premium is the third factor determining the level of the Hungarian real interest rate. The premium was around 4 per cent in the period preceding the crisis (Chart 6).[3] Its long-term value may be lower than this, because in the period analysed the Hungarian economy was subject, in well-identifiable episodes, to a number of typically upside risk premium shocks (e.g. the shift in the exchange rate band in 2003). Risk premium increased considerably during the crisis; this can be interpreted in part as an increase in its trend component.

Thus, compared to the pre-crisis level, the external equilibrium real interest rate decreased and real appreciation may have slowed down, while the long-term risk premium increased. Table 1 summarises the stylised facts and presents the likely changes in the components of the neutral interest rate during the crisis; these are also indicated by arrows. This shows that there are arguments for both a lower and a higher neutral real interest rate as compared to before the crisis, and that there appears to be a rather wide band for the Hungarian neutral interest rate.

Beyond the stylised facts, we also relied on modelling to estimate the neutral interest rate. To do so, we used a simplified version of the Monetary Policy Model (Szilágyi et al., 2013), which captures the most important channels of the transmission mechanism of Hungarian monetary policy.

[3] Rather than a directly observable variable, the indicator shown in the time series in the chart is derived using several time series capturing developments in the risk premium. The various shifts can nevertheless be interpreted as percentage point changes because the indicator was established by calibrating the average level and spread on the basis of the *ex ante* risk premium time series calculated from historical exchange rate expectations.

Table 1
Components of the neutral real interest rate

		Before the crisis	After the crisis
↓	External real interest rate	1	(−1)−0
↔	Real appreciation	−1	(−1)−(−0.5)
↑	Risk premium	3	3.5−5
↔	**Domestic neutral real interest rate**	**3**	**1.5−4.5**

Chart 7
Estimated neutral (real) interest rate using Kalman filter

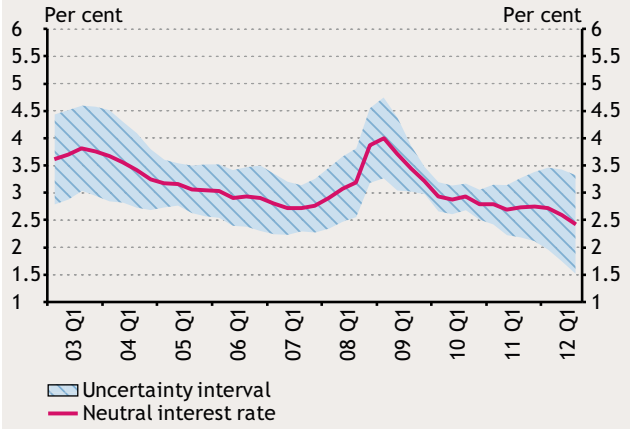
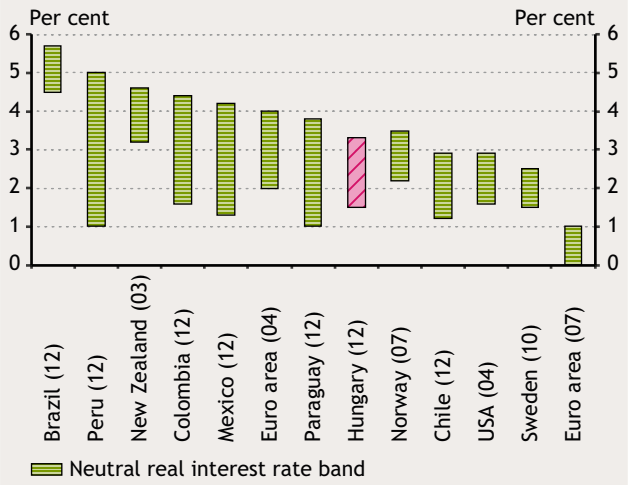


Chart 8
International estimates of the neutral real interest rate



Note: the numbers next to the names of the countries denote the date of the estimation, e.g. 07 = 2007.
Sources: Bernhardsen and Gerdrup (2007), Crespo Cuaresma et al. (2005), Labuschagne and Vowles (2010), Magud and Tsounta (2012), Mesonniera and Renne (2007), Sveriges Riksbank (2010).

The model-based Kalman filter allows for determination of the non-observable (latent) variables such as the neutral interest rate. We used neutral interest rate estimates based on vintage data to demonstrate the estimation uncertainty (Chart 7).[4] The estimate for the second half of 2012 is a band approximately between 1.5 and 3.5 per cent, which is not significantly different from the result in Table 1, but is a somewhat narrower interval. At the same time, we can see that the neutral interest rate is lower than its level 10 years ago. As we show below, research into other countries has also shown decreasing neutral interest rates.

We compared our estimate for the domestic neutral interest rate with the results for other countries (Chart 8). The intervals represent the ranges of neutral real interest rates calculated with different methodologies, also reflecting model uncertainty. The point estimates for Latin American countries using different methodologies are on average within a band of 200 to 250 basis points for the individual countries (Magud and Tsounta, 2012). A single methodology was used for the estimation for Hungary, where the interval reflects the historical uncertainty of this method (cf. the end of the period in Chart 7).[5]

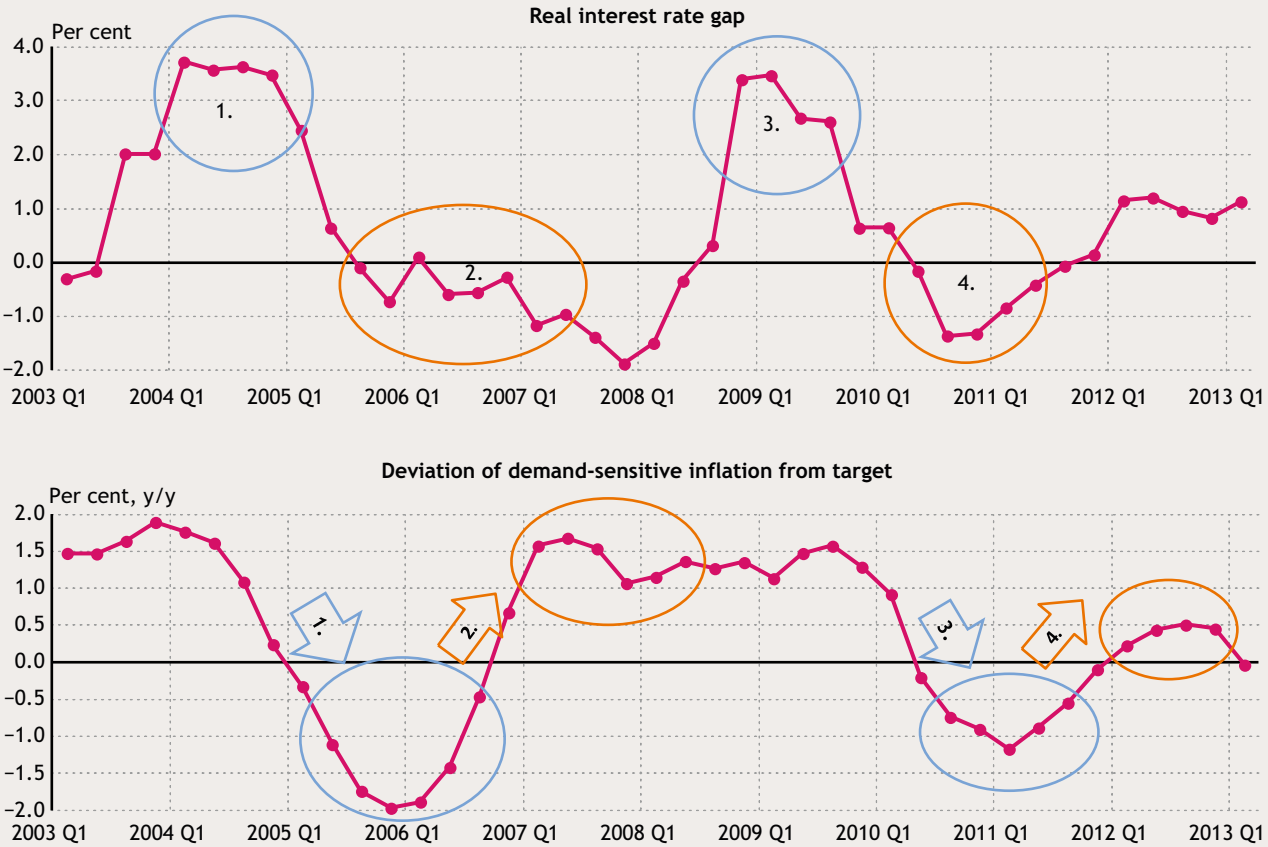
The chart shows that the 1.5–3.5 range estimated for Hungary appears typical in an international comparison. Lower neutral interest rates are found mostly in advanced economies, whereas most of the emerging economies expect similar or higher neutral real interest rates.

Given the high degree of estimation uncertainty, caution is recommended when applying the neutral interest rate in monetary policy decisions and communications; however,

[4] The model produced the real-time estimate for every quarter in the period from the third quarter of 2001 to the fourth quarter of 2012 based on the information available until that point in time. The two-year moving average of the neutral interest rate deviation can be calculated on the basis of the revisions compared to the estimate belonging to the last observation. We use the resulting time series to represent the uncertainty surrounding the point estimation. We defined the neutral real interest rate as the differential between the neutral nominal interest rate and the *ex ante* expected inflation target.

[5] Even within a single methodology, the degree of uncertainty may be rather large. For example, the estimation by Garnier and Wilhelmsen (2005) for a euro-area neutral real interest rate for 2004 has an interval of −2 to 5 per cent.

Chart 9
Historical analysis of the monetary policy stance



Note: The lending rates relevant for the economic agents are not equal to the interest rate level set by monetary policy. If the interest rate spread determined by the financial intermediary system changes to a significant degree, then the actual stance perceived by economic agents may differ to a certain extent from the deviation of the base rate from the neutral interest rate.

the rate may still be informative both for decision-makers and economic agents. The neutral interest rate is an important indicator of the monetary policy stance. Research indicates that the real interest rate gap (the differential between the real interest rate and the neutral real interest rate) is strongly correlated with future inflation, i.e. the indicator of the monetary policy stance carries information regarding future inflation (Neiss and Nelson, 2003; Horváth, 2009). Analysing the historical relationship between the real interest rate gap and the inflation gap on Hungarian data,[6] we find that tight monetary policy, exercising its impact via the transmission mechanism, was typically followed by lower inflation with a certain lag, whereas monetary easing led to higher inflation (Chart 9). Underlying inflation also helps deduce the relationship between the neutral and the current interest rate. For example, a strong undershooting seen in underlying inflation might be a sign of monetary policy being too tight in the sense that if monetary policy were to overestimate the neutral interest rate, then the rate of interest would be higher than "optimal" in the economy. Communication within a band and robustness testing with different methods may help manage estimation uncertainty. However, explicit references to the neutral interest rate are still rare in the communication of international central banks.

It is important to emphasise that the desirable base rate may persistently and significantly deviate from the neutral rate. The base rate is at its neutral level if inflation is in line with the target, the risk premium is at its trend level, the

[6] We calculated the real interest rate as the difference between the nominal interest rate and the expected inflation adjusted for taxes. Deflating with inflation adjusted for taxes results in real interest rate conditions that are relevant for the corporate sector. Given the significant changes in VAT, household real interest rate conditions are lower across the entire horizon. We calculated the inflation gap as the difference between the current and the equilibrium values of demand-sensitive inflation. (Further information about underlying inflation indicators can be found on the website of the MNB.)

output gap has been closed and the economy is expanding in line with its potential. This theoretically straightforward situation is rare, because economies are repeatedly subject to shocks that trigger responses by monetary policy, therefore the actual interest rate is rarely equal to the neutral rate. If there are major unused capacities within the economy, unemployment is persistently above the level determined by structural factors and there are no inflationary pressures, then the current interest rate must persistently and even significantly fall short of the neutral rate in order to reach equilibrium. If the economy is characterised by output above the potential level and inflation above the target, then an interest rate above the neutral level may be justified. The concept of neutral interest rate will not constrain decision-makers and is solely intended to help assess the monetary policy stance.

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Gergely Baksay, Tamás Berki, Iván Csaba, Emese Hudák, Tamás Kiss, Gergely Lakos, Zsolt Lovas and Gábor P. Kiss: Developments in public debt in Hungary between 1998 and 2012: trends, reasons and effects[1]

Over the past decade, increasing public debt has become one of the most important problems for the Hungarian economy, significantly constraining the room for manoeuvre for fiscal policy and in some periods even calling into question its sustainability. As a percentage of GDP, gross public debt increased in the first half of the decade, mostly as a result of the high government deficit, after which economic stagnation and the eventual recession, along with a weakening exchange rate prevented a reduction of the debt ratio with tighter fiscal policy. By the end of the decade, public debt stood at around 80 per cent of GDP, which is very high compared to Hungary's level of economic development and to regional competitors. As a result of tight fiscal policy and the one-off impact of the transformation of the private pension system, the rate of public debt has been declining modestly since 2010, but this has also been offset by the revaluation of FX debt as a result of HUF weakening.

In this paper, we discuss the factors that contributed to the historically high public debt-to-GDP ratio by the end of the 2000s and identify the different subsections of the period between 1998 and 2012 that led to this situation. We treat the consequences of high public debt separately, present a survey of international data to compare debt ratios and note the differences between Hungary and other EU member states in terms of developments in public debt during the crisis.

KEY FACTORS CONTRIBUTING TO CHANGES IN DEBT BETWEEN 1998 AND 2012

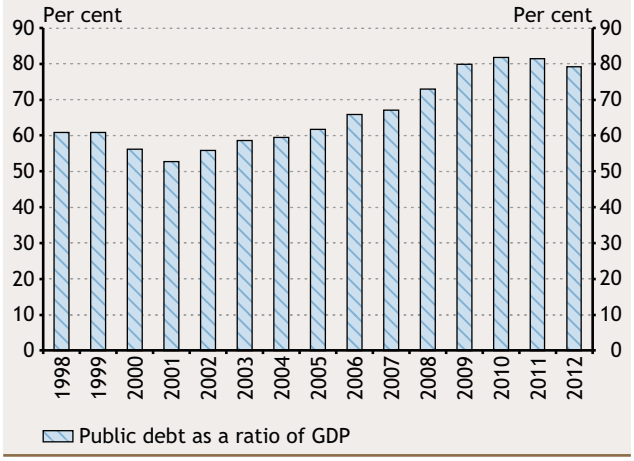
Gross public debt is the primary economic indicator reflecting the financial liabilities of a government as inherited from past fiscal policy. Every budgetary policy decision affects the gross debt ratio directly or indirectly, and there are numerous other elements of economic developments which also influence this ratio; nevertheless, most of the reasons for changes in the debt ratio can be grasped by looking at four macroeconomic indicators, which summarise all of these impacts. The ratio of debt to GDP can be broken down into the effects of the following four macroeconomic indicators, in addition to other factors:

- the primary budget balance (which excludes interest payments),
- the real interest payable on outstanding debt,
- the real exchange rate,
- economic growth, and
- other factors, since the financial claims and debts of a government may also change irrespective of the budget balance.

Once the real interest rate, the real exchange rate and real growth are known, one can determine how the debt ratio would change assuming a balanced primary balance, i.e. purely as the result of the aforementioned macroeconomic factors alone. The result will also be influenced by the size of the outstanding debt, since one unit of impact will reduce or increase a higher debt ratio to a greater degree.

[1] The time horizon for this analysis was set out in the call for applications underlying the article. Czeti and Hoffmann (2006) discuss the earlier trends in public debt for the period after the political transition.

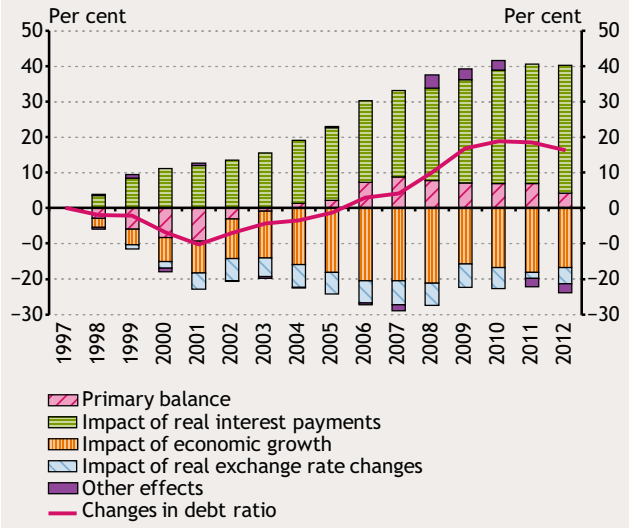
Chart 1
Public debt as a ratio of GDP



In an upward trend scenario, the literature refers to this as the 'snowball effect'.

The real interest rate paid on the debt and the real exchange rate can together be called the real financing cost of the debt and it typically increases the debt, as real interest rates tend to be positive. This effect can be offset, partially or even fully, by economic growth, as long as it is positive: if growth is high, the country can "grow out" of its debt. The combination of financing cost and economic growth determines that level of primary balance (debt stabilising primary balance), which is necessary to reduce the debt ratio.

Chart 2
Cumulative changes in the public debt-to-GDP ratio since 1997 and the reasons for change



A decomposition of the factors influencing public debt reveals the extent to which each of these contributed to the growth of the debt ratio by around 16 percentage points between 1997 and 2012 (Chart 1). First, we look at the overall impact of each factor over the period of 15 years (Chart 2) and then determine the periods of changes in debt over time on the basis of these factors (Chart 3).

Chart 2 shows that debt increased primarily because of the real interest expenditure on the outstanding debt over the period of 15 years from 1997, which indicates that the debt level may 'snowball' unless other factors offset this impact. The debt ratio can be reduced with tight fiscal policy and dynamic economic growth, but the circumstances usually did not favour either of these during the period in question in Hungary.

Throughout most of the 2000s, but primarily in the period between 2002 and 2006, fiscal policy allowed such high deficits that the primary budget balance less interest payments did not mitigate the debt in the 15 years under review; on the contrary, it increased it (the primary balance was negative on average over the entire period).

Until 2006, dynamic economic growth was able to mitigate the impacts of interest payments and, from 2002, the primary deficit, but as real GDP started to stagnate later, this effect disappeared and the recession in 2009 then actually added 5 percentage points to the debt ratio. It should be noted here that economic growth was strongly affected by fiscal policy cycles in Hungary for most of the 2000s. Overall, the fiscal impulse contributed substantially to the dynamic growth of the economy in 2002–2006, after which an impulse in the opposite direction reduced the rate of growth.[2]

The appreciation trend in the real exchange rate had a smaller effect. This factor was the result of the inflation differential between Hungary and other advanced economies. The nominal exchange rate was relatively stable, starting to weaken after 2008 and significantly impacting the debt only in 2011 and 2012.

There were several one-off factors which influenced gross nominal debt during this period. Of these, the most important ones were the IMF and EU credit facility loans in 2008 and the withdrawal of the government securities transferred from private pension funds to the government in 2011–2012.

[2] Hornok et al. (2008).

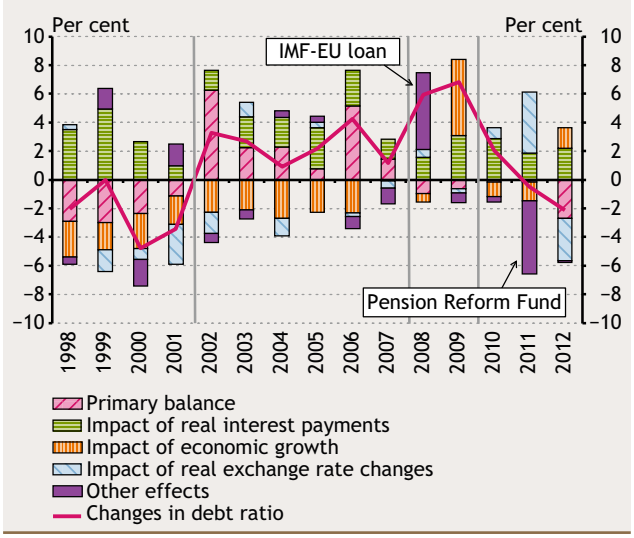
- In 2008, the Hungarian state took loans from the IMF and the European Commission in excess of its current financing needs. The debt management agency placed the surplus in currency deposits at the central bank or temporarily lent it out to domestic commercial banks. The concentrated drawdown of the credit increased gross debt by 5.5 per cent of GDP in 2008 (the net debt ratio, which is not analysed here, increased to a smaller degree since the amount placed as deposits or lent out was netted out). Later, however, this additional debt started to fall because, rather than issuing new debt, the debt manager used some of the FX deposits, which mitigated the debt-increasing impact of the government deficit in 2009–2010. Of the remaining credit, EUR 1.4 billion was used by the state to purchase MOL equities on the stock exchange, while the rest was held in FX deposits at the MNB.

- In 2011–2012, the majority of private pension fund members moved to the state pension system, and the private pension funds transferred to the Pension Reform and Debt Reduction Fund the securities portfolio of the switching members, which amounted to almost 10 per cent of GDP. This portfolio contributed significantly to the reduction of the debt ratio, resulting in a decrease of nearly 8 per cent of GDP. This exercised a debt-reducing effect via three channels (Table 1). At mid-2013, the Fund had additional securities and deposits worth around 2 per cent of GDP; this can be used for reducing gross debt in the future.

MAIN PHASES IN THE DEVELOPMENT OF PUBLIC DEBT

Looking at debt ratio over the years, it is clear that, rather than following a straight path, the debt ratio underwent periods of decrease and increase. Applying the same methodology as before, we divide the 1998–2012 period into phases based on the key trends of changes in public debt and look at the most important macroeconomic factors to establish the main drivers behind the changes in the debt ratio.

Chart 3
Annual changes in public debt vs. GDP and the reasons for change



1. **The years of prudent fiscal policy: 1998–2001.** The very high levels of debt in the middle of the 1990s was followed by a gradual decline in debt until 2001 as a result of accelerating economic growth and tighter fiscal policy, which improved the primary balance. As an overall result, gross public debt had fallen to 52.7 per cent of GDP by 2001, from 63 per cent in 1997.

2. **The years of high public deficit: 2002–2007.** The debt ratio started to increase after 2001, with the substantial deterioration of the primary budget balance as the most important factor between 2002 and 2006, although the relatively high real interest payments also contributed. On the other hand, an average economic growth rate of 4 per cent (some of which, however, was the result of the fiscal impulse) and, to a lesser degree, appreciation of the real exchange rate reduced the growth in debt.

Table 1
The impact on public debt of the portfolio taken over from the private pension funds
(as a percentage of 2012 GDP)

1. Total assets transferred (2+3)	**9.8**
2. The amount of securities and depostits as of end 2012 (est.)	2.0
3. Amount used for debt reduction (4+5+6)	**7.7**
4. Direct withdrawal of government securities	4.9
5. Debt repayment and redemption	1.2
6. Payment to the budget in 2011	1.6

Note: Our calculations were based on the assumption that the takeover of the pension fund assets did not influence other decisions and issue processes regarding the budget. On the other hand, we also disregarded the impact of the higher revenues from contributions.

Although consolidation of public finances started in 2006, the year 2007 should nevertheless be included in this period, as the primary balance was negative and the emergence of the crisis in 2008 provides a more marked dividing line. At the end of 2007, public debt stood at 67.1 per cent of GDP.

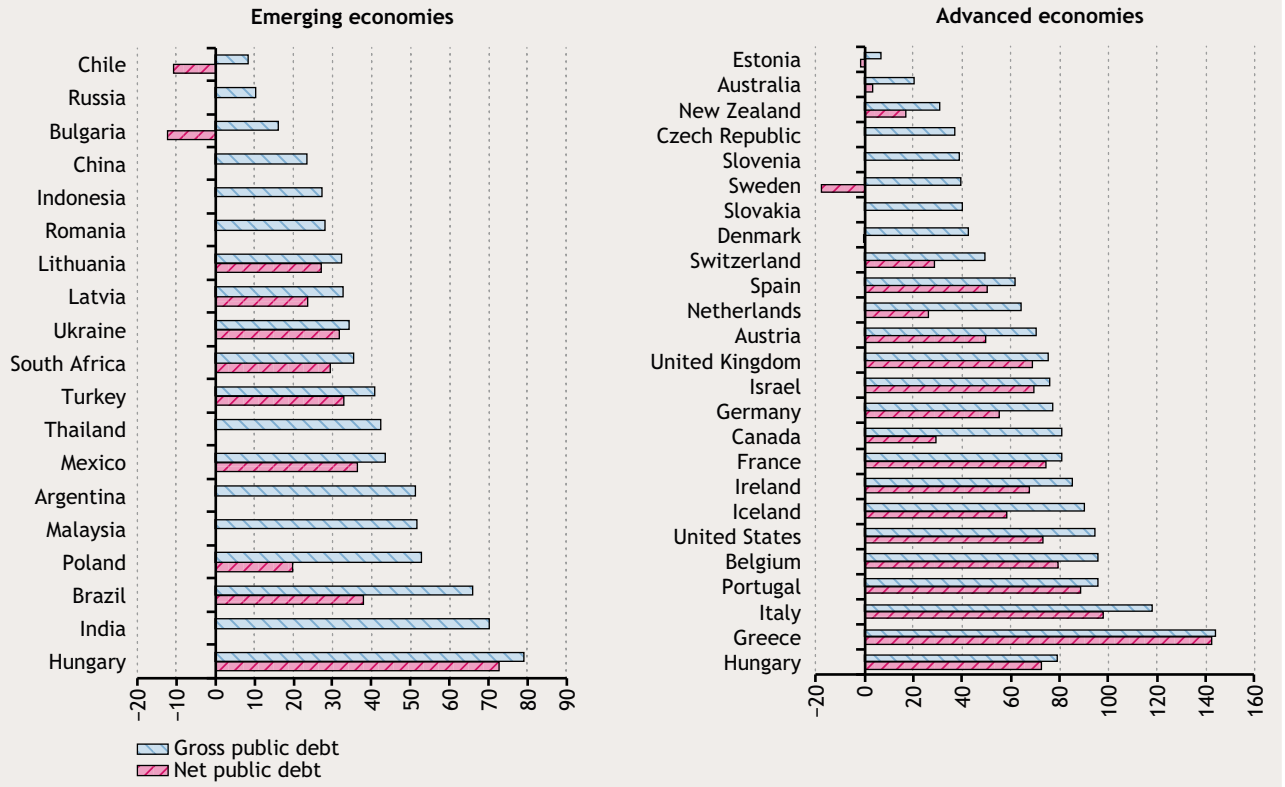
3. **The first years of the crisis: 2008–2009.** Even before the emergence of the crisis, it became clear that the high primary deficit was unsustainable even over the short term, and therefore major fiscal adjustments were implemented in several steps. As a result of the adjustments, the budget achieved a primary surplus as early as 2008. At the same time however, economic growth was replaced by stagnation and later, as a result of the financial crisis, by decline. In 2008, the debt ratio was boosted by the loan from the international organisations, which was mostly not used yet at the time, whereas in 2009 the recession had the same impact. In just two years, the debt ratio grew by 12.7 percentage points, of which these two factors caused 10.7 percentage points.

4. **Stabilising debt: 2010–2012.** In the past three years, public debt stabilised at around 80 per cent of GDP and even decreased in 2011–2012. The decrease was largely due to the withdrawal of the government securities transferred from the private pension funds to the state budget and the sale of further assets, which contributed nearly 8 percentage points to debt reduction. In the same period, changes of unprecedented magnitude in the HUF exchange rate caused major fluctuations in the debt ratio: in 2011, the year-end weakening of the HUF increased the total of foreign currency debts expressed in HUF, whereas the strengthening of the exchange rate reversed this effect in 2012.

HUNGARIAN PUBLIC DEBT IN AN INTERNATIONAL COMPARISON

Hungary's gross and net public debt as a percentage of GDP is extremely high in an international comparison. While a series of fiscal adjustments have resulted in favourable budget deficit indicators adjusted for the economic cycle in an international comparison, the 79 per cent gross and 73

Chart 4
Gross and net public debt as a percentage of GDP
(2008–2012 average, per cent)



Source: IMF (2013).

per cent net debt ratio averages of the years 2008–2012 are considerably higher than the relevant figures for other emerging economies (Chart 4).[3]

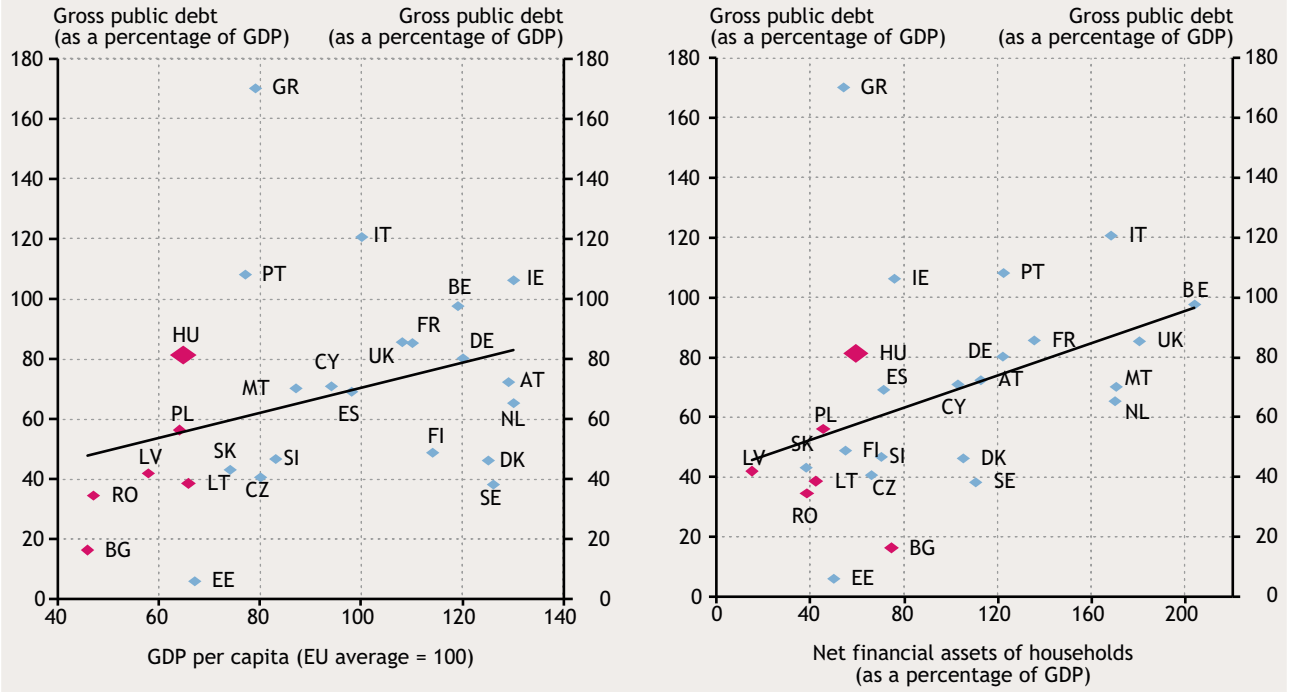
The gross and net indebtedness of the Hungarian government is not extreme compared to the advanced economies, but most of these countries – while they may have high indebtedness – still enjoy considerably lower financing costs. As a result, the net interest expenditure contributing to the budget deficits of advanced economies often remains below the level of the emerging economies, even in spite of their higher debt levels. One factor that may contribute to these lower financing costs is the fact that the higher level of development prompts investors to attribute lower sustainability risk to a given amount of debt. Greater revenue generation capacity of the government is a more secure safeguard for the future repayment of debt.[4]

Expressing the revenue generation capacity of the government with GDP per capita measured at purchasing power parity, we find that government indebtedness is very high in Hungary compared to the development level of the country (Chart 5). The debt ratio appropriate to Hungary's development level would be 50-60 per cent based on 2011 data.

Public debt is high even in comparison with the net financial assets of Hungarian households (Chart 5). This ratio is important because in several advanced economies, such as Belgium, Japan and Italy, a high public debt-to-GDP ratio is financed by domestic savings. In Hungary, household savings were far from covering the budget deficit in a period of permanently lax fiscal policy, partly because households increased their indebtedness over the same period. As a result, growth in public debt was coupled with

Chart 5
Gross public debt in relation to level of development and financial assets of households

(2011, per cent)



Note: Red dots denote emerging countries, blue ones advanced economies. We followed the IMF (2012) categorisation in allocating countries to the emerging versus the advanced category.
Source: Eurostat.

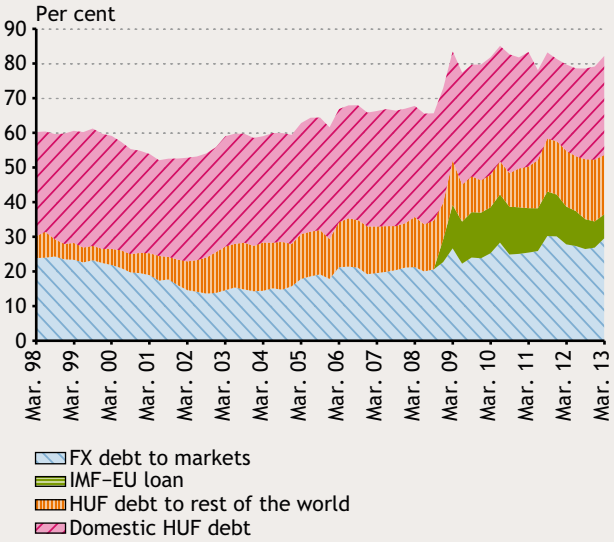
[3] This difference is even more apparent if we look at the net debt ratio after adjusting for the liquid financial assets of the public sector. In a number of emerging countries, the accumulated financing reserves – government FX deposits funding foreign exchange reserves, pension fund reserves and financial assets accumulated from oil and other commodity revenues – are coupled with considerable amounts of liquid assets to offset the gross debt.
[4] Box 3.2 in MNB (2011) summarises the key findings in the literature regarding the optimum level of public debt and the diverging debt limits of advanced and emerging economies.

increased reliance on external financing and rising external debt. The high external and domestic indebtedness caused permanent increases in financing risks and therefore in the premium expected on investments in Hungary.

CONSEQUENCES OF HIGH PUBLIC DEBT

There are several channels through which high public debt has an impact on the economy, even if its effects are difficult to quantify. Besides the debt level, the structure of the debt and the economic outlook of the country are also relevant for identifying the impacts of the debt ratio. However, the sovereign debt crisis in Europe has increased the importance of public debt in assessing the risks of individual countries and imposed tighter limits on fiscal policy than before. Research on public debt has intensified as a result, but there continues to be no general consensus as to what level of debt is optimal and what is the threshold above which the negative effects of the debt ratio become tangible.

Chart 6
Distribution of public debt by owner
(as a percentage of GDP)



Reinhart and Rogoff (2010) conducted research on historical data and found that 90 per cent of GDP is the threshold where debt starts to have a substantial negative impact on growth. Although many strongly criticised their methodology and results [e.g. Irons and Bivens (2010) and Checherita and Rother (2010)] put the threshold at a similar level for the euro-area members, noting that certain negative impacts may occur already at around 70–80 per cent.

High debt clearly has a negative impact on the budget: the interest paid on the debt is financed from the budget and furthermore weakens the country's balance of payments to the extent that it is paid to non-residents. High interest payments considerably limit the room for manoeuvre available for fiscal policy and reduce the funds available for expenditures more conducive to economic growth (e.g. investment, education, health care).

Moreover, a high level of debt increases the country's level of risk for investors, which raises the yields expected from the government and the private sector alike. These high yields cause a contraction in investments in the private sector, which reduces the growth outlook of the economy. This crowding-out effect does not only work through yields alone: the high government deficit contributing to indebtedness absorbs a higher share of the savings within the national economy, which also causes either a decline in private capital investments or a rise in external debt.

The growth in Hungarian public debt was financed mostly by savings from abroad. Within public debt, the debt owed to domestic agents continued to fluctuate around 30 per cent of GDP throughout, while foreign debt increased from 30 to 50 per cent of GDP, which is also reflected in the increase of net external debt. The ratio of public debt to foreign owners jumped when the EU/IMF loans were taken, while in 2011 there was an increase in foreign demand for the government securities.

The crisis intensified the negative effects of the high level of indebtedness. In an environment of risk avoidance, real yields increased and there were even more serious financing problems on the government securities market. In late 2008 and early 2009, the Hungarian debt management entity was unable to sell long-term Hungarian government securities. It was mostly due to the high outstanding debt and the unfavourable budgetary situation that Hungary turned to the international organisations for a stand-by credit facility in 2008.

As a result, the debt level increased and its currency composition changed significantly. From the previous level of around 30 per cent, the proportion of foreign exchange debt increased to above 40 per cent. This increased debt refinancing risks and also the uncertainty surrounding future changes in the debt, because depreciation of the forint was likely to increase the ratio of debt to GDP; as it did eventually occur.

The options available to Hungarian fiscal policy were highly constrained by the fact that public debt in Hungary was very high at the emergence of the crisis, compared to both the rest of the region and the level of the country's development. The doubts surrounding the sustainability of

the debt, the increasing risk avoidance of investors and their focus on fiscal policy forced Hungary to follow a procyclical fiscal policy of deficit reduction. Although this may have also had a positive impact on the country's long-term growth outlook and was necessary for the sustainability of the debt, it did not help to mitigate the economic decline over the short term. At the same time, countries with more favourable budget balances tried to offset the effects of the crisis with fiscal easing.

PUBLIC DEBT DYNAMICS IN THE PERIOD OF THE CRISIS — INTERNATIONAL COMPARISON

The recent economic crisis highlighted the issue of the indebtedness of countries. The almost unavoidable growth issues caused by the crisis were often aggravated by tensions concerning financial stability. There was an increase in the financing costs of countries with high public debt compared to their level of development, and their sensitivity to premium shocks also grew. Certain countries with moderate debt levels compared to their economic development now faced higher debt levels, due to the assistance provided to their banking systems. As a result, many countries showed markedly increasing debt ratios in spite of the increasing pressure to adjust.

In the following, we look at the main variables determining the debt dynamics (the primary balance of the public sector, economic growth and financing cost) to analyse the changes in the debt ratios of EU member states since 2008 (Chart 7). We compare the dynamics of Hungarian debt with three groups of countries within the EU: the core member states, the countries on the periphery of the euro area and the accession countries.[5]

Hungary was already struggling with a debt level that was high compared to its level of development and with growth problems when the crisis began. Yields increased, sources of funding dried up and the strict constraints on financing imposed the necessity to adjust immediately, despite the quick agreement with the EU/IMF on a credit facility. Thus, unlike in the EU core member states and most of the new accession countries, fiscal policy did not have the option of using anticyclical fiscal policy to mitigate the impacts of the crisis on the real economy. Despite a consistently low primary deficit, the debt ratio followed an upward trend, the underlying causes of which were a recession worse than the EU average, the increasing costs of financing the debt and the appreciation of foreign exchange denominated debts due to weakening of the HUF exchange rate. At the same time, the increase in Hungary's debt ratio was limited in a Europe-wide comparison; however, this was partly due to the impact of the private pension fund portfolio in reducing the debt.

Hungary experienced a recession that boosted its cumulative debt ratio to an extent comparable to the countries of the euro-area periphery. However, the cumulative financing burden generated by the debt remained below the figures typical in the euro-area periphery, although it exceeded the figures in the EU core member states. This was attributable in the beginning of this period largely to the lower financing costs ensured by the EU/IMF credit facility agreement and the fact that in Hungary interest payments were determined by lower yields and lower debt than in the countries of the euro-area periphery.

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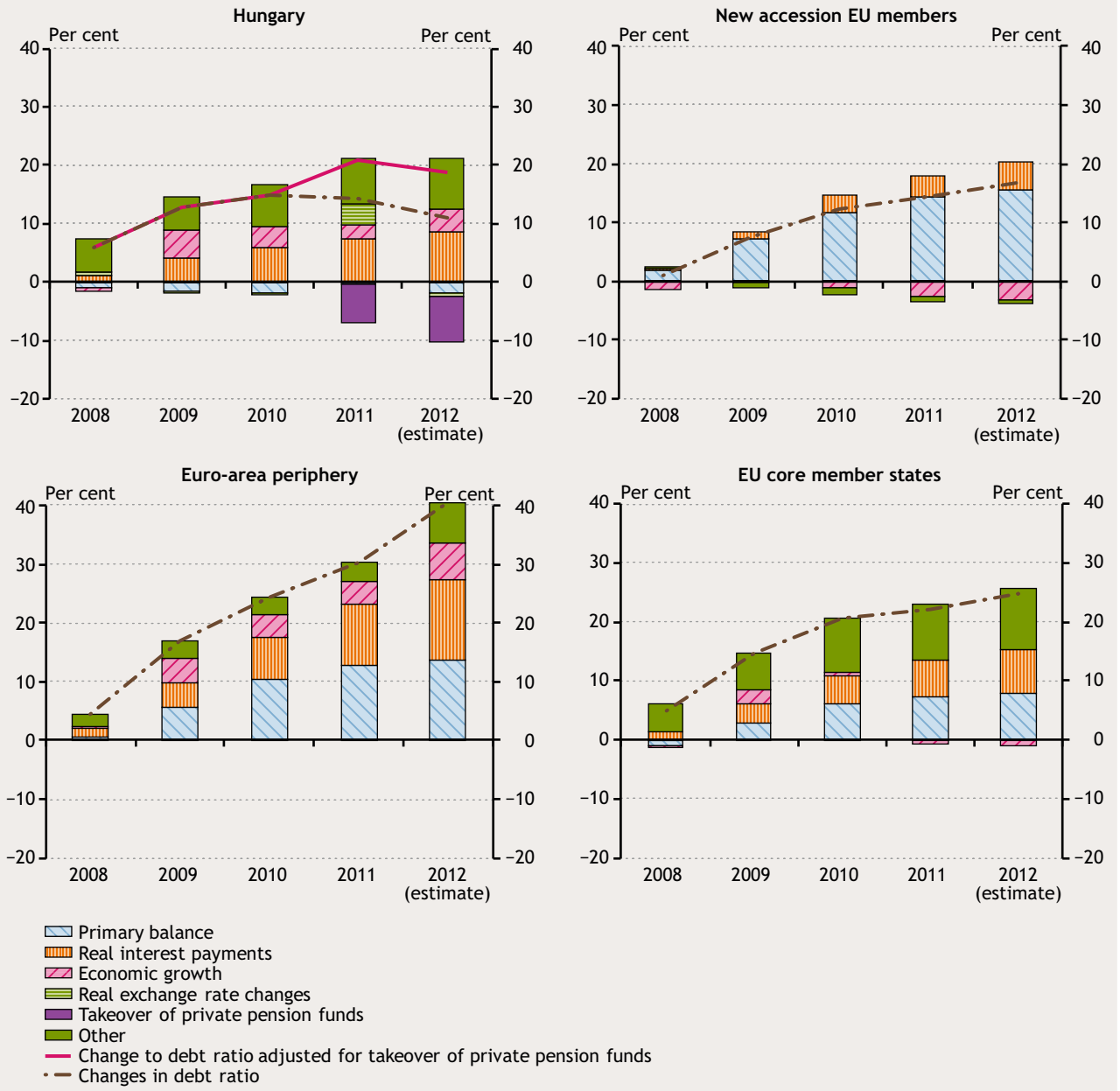
[5] Within each group of countries, there is relative homogeneity in terms of debt dynamics, except for the new accession EU members, among which there is considerable heterogeneity in terms of the rise of the debt ratio and the reasons for the same.

Chart 7
Decomposition of the cumulative change in the gross public debt ratios of different EU countries, 2008–2012
(per cent)



Note: (1) Included among the accession countries are the 12 member states which have joined the EU since 2004 (except for Croatia); the countries of the euro-area periphery are Greece, Ireland, Italy, Portugal and Spain, and the rest of the countries are treated as belonging to the EU core member states. (2) We used figures from the MNB for Hungary, which uses a cashflow-based approach, as opposed to the accrual-basis primary balances of the other countries. We did not adjust the Hungarian figures to the data of other countries, available on an accrual basis only, because cashflow balance is more consistent with the changes in debt. (3) The European Commission publishes decompositions to three components (primary balance impact, dynamic component and other) for each member state. We added Eurostat figures to these in order to create four-component decompositions for each group of countries. From the dynamic component, we separated the real economic impact; the residual value is not exactly equal to the impact of real interest payments, only an approximation. Instead of the implicit real interest on public debt, we were able to identify from the data available only the following expression:

$$\frac{i-\pi}{1+\pi},$$

where i is the nominal implicit interest and π is the GDP deflator. This is an accurate approximation of the implicit real interest rate, if (i) there are no substantive changes to the real exchange rates for the currencies in which the public debt is denominated and, if (ii) there is no substantive difference between the inflation and GDP deflator rates within the particular countries. This distortion due to estimation is low even in the case of the most heterogeneous group we have created.
Source: European Commission (2012a), Eurostat, MNB calculations.

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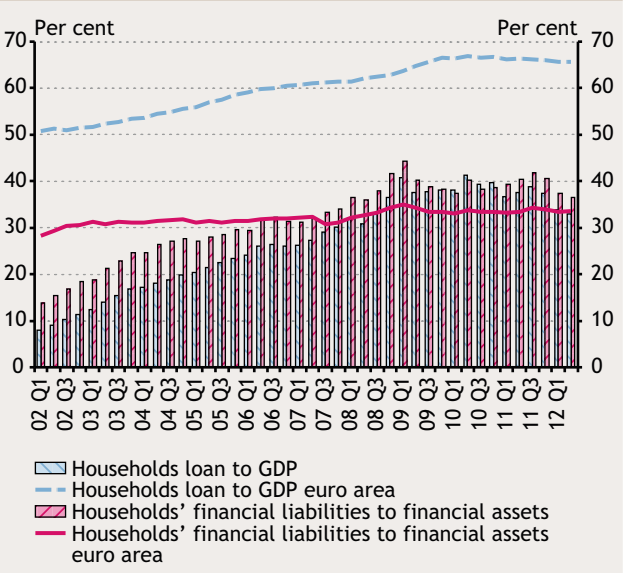
Tamás Balás: Households: indebtedness and debt service ratio

Before the crisis, the over-indebtedness of households represented an ever growing risk. Over the past years, mostly due to a decline in credit demand, but also to some extent because of tighter lending conditions, households have taken a net repayment position. This, together with the option of early repayment at preferential exchange rates, has significantly reduced the portfolio of households' outstanding foreign currency loans. Against this background, it is worthwhile to investigate the changes in household indebtedness and the debt service burden across various income brackets.

Even before the crisis escalated in 2008, there were already signs of household borrowing overheating in Hungary and mounting evidence which suggested that the level of household debt was becoming excessive. In its 2007 and 2008 Reports on Financial Stability, the Magyar Nemzeti Bank discussed these risks in greater detail, supplementing its review with the results of questionnaire surveys as well. However, once the crisis struck, the lending trends previously observed changed fundamentally, while at the same time government measures also had a profound impact on household indebtedness. Consequently, we believe it is important to re-examine the issue of household indebtedness.

While in earlier years households had essentially had a savings position, starting from the 2000s the level of household debt began rising at a dynamic rate. Broadly speaking, this occurred in two major waves. The first surge lasted from 2000 to 2003 and was fuelled by state-subsidised housing loans, while the 2004–2008 period saw yet another boom in household borrowing, this time, in the form of foreign currency lending. Nevertheless, Hungary's household debt-to-GDP ratio was roughly half of the euro-area average, and, as a result of early repayment scheme and subdued lending, this ratio has fallen dramatically over the past year. At the same time, looking at the relationship between financial liabilities and financial assets, the situation is far less encouraging. This indicator for Hungary shows a higher level of indebtedness, although comparisons may be rendered more difficult by the fact that a high proportion of Hungarian households own their homes. On the whole, based on these two indicators alone it cannot be confirmed whether Hungarian households are currently over-indebted.

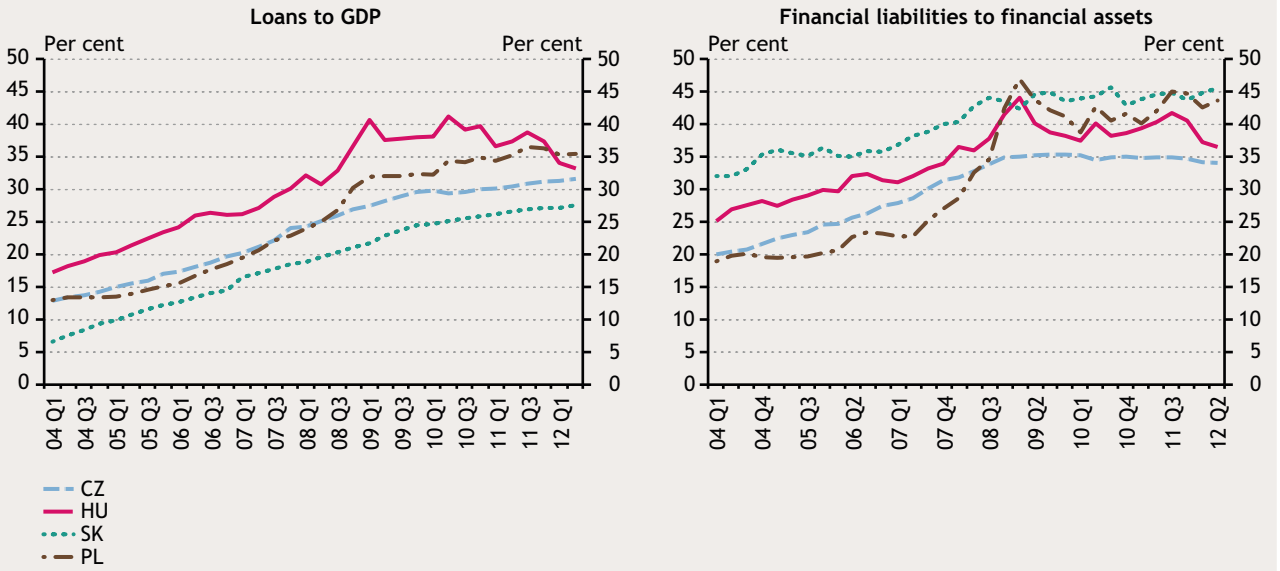
Chart 1
Indebtedness of Hungarian households in international comparison



Source: ECB, MNB.

Even looking at the more immediate region (the Visegrad Four), one cannot conclude that Hungary's household debt is excessive. Hungary's figures now approximate the regional levels for both of these indicators.

Chart 2
Indebtedness of Hungarian households in regional comparison



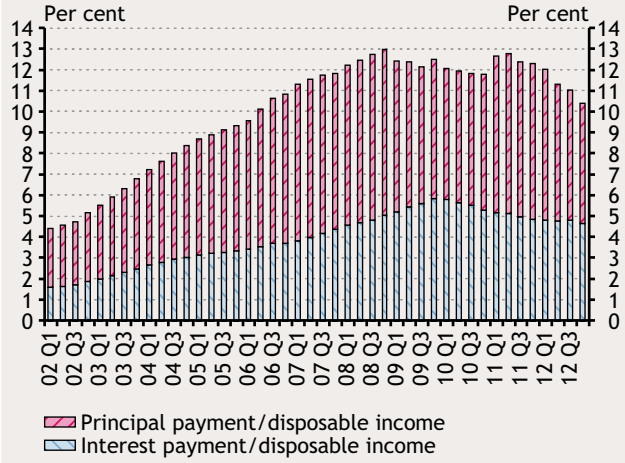
Source: ECB, MNB.

In addition to stock-type indicators, the debt service ratio, which is a flow-type indicator, is often used as a measure of indebtedness, as it provides valuable information concerning both interest levels and the maturity of liabilities. Consequently, it is more closely linked to the consumption and investment decisions of households, and therefore to economic growth as well. Although the indicator reached 13 per cent immediately before the crisis, households took a net repayment position afterwards. This was essentially due to an uncertainty-induced setback in credit demand, which was further compounded by tighter lending conditions. The possibility of early repayment at a preferential exchange rate resulted in further acceleration in the decline in loan portfolios. Moreover, the service burden was further eased by the extended exchange rate cap scheme, bringing down the debt service ratio to nearly 10 per cent.[1] In assessing this estimate, it is important to note that it is based solely on interest and principal repayments actually paid out by clients. In other words, interest pending because of a deteriorating portfolio and unpaid-yet-due principal repayments are not taken into account in these calculations. The higher the share of defaulting loans the larger the deviation between the debt service burden actually paid and outstanding. Given that the NPL (non-performing loan) rate currently stands at approximately 16-17 per cent, the 'outstanding' service burden would approach 12 per cent in relation to disposable income.[2]

Since a significant number of Hungarian households are indebted in a foreign currency, weakening of the forint has slowed the decline in the debt service ratio, and this was also further exacerbated by the rising interest burden. In an international comparison, this latter process sheds light on some rather substantial differences. In most countries featured in the sample, base rate cuts implemented over the three years following the onset of the crisis eased the interest burden on households. Wherever an increase in the interest-to-income ratio was observed, it was either caused by growth in lending activity (as was the case in Bulgaria, Slovakia and the Czech Republic) or by falling disposable income due to rising unemployment (such as in Greece). By contrast, Hungary saw the most pronounced increase, despite its shrinking loan portfolio. The underlying reason for this is that, in Hungarian household lending practice, interest rates linked to a benchmark rate are rare, even though many countries regularly apply such pricing methods. This has led domestic banks to attempt to offset higher CDS premiums, the increased levels of impairment due to a degrading portfolio, as well as the losses in revenue in the wake of the bank levy by raising interest rates on their existing retail loans. Nevertheless, the fact that they are capable of even retroactively passing on some of the losses resulting from regulatory shortcomings clearly indicates the dominance of banks in Hungary.

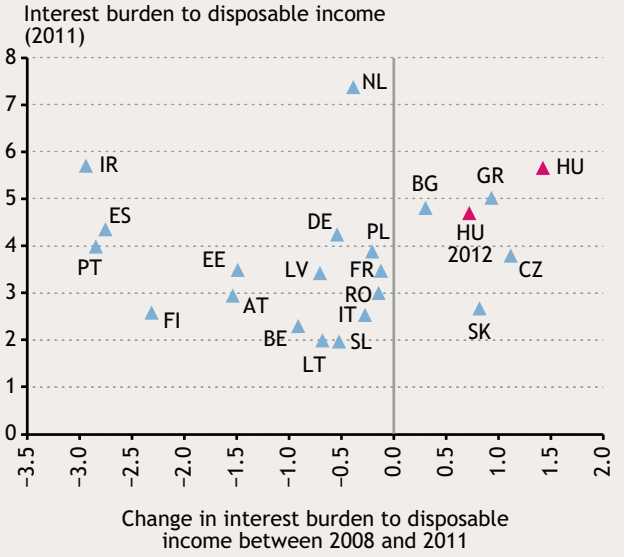
[1] By contrast, this is on par with the value recorded for the whole of the Eurozone in 2006 and is approximately 30 per cent below US figures.
[2] Defaulted repayments were intentionally left out of the calculations because, whenever households are faced with execution, they generally make payment by selling real estate or movable property, rather than from their available disposable income.

Chart 3
Average annual debt service ratio of households



Note: Calculations for household debt service burden are based on information provided by credit institutions. These include data concerning interest paid, which are then prorated to determine interest for other financial intermediaries. Principal payments are determined using opening and closing stocks and gross new disbursements. Early payments are excluded from the calculations and loan conversion is estimated at various rates for different periods.
Source: MNB estimate.

Chart 4
Changes in the interest-to-income ratio of households



Note: For the sake of comparability, the Hungarian interest burden was also determined using portfolio and interest data, rather than indicating interest rates actually paid. Therefore, the interest burden is higher than what is shown in Chart 2, as the latter does not feature the unpaid-yet-due interest on non-performing loans.
Source: Szigel and Fáykiss (2012).

Looking at the ratio of interest burden to disposable income, Hungary's 2011 figures still ranked among the highest. In the period since then, however, the interest burden has fallen notably due to a number of factors. Portfolios have been on a steady decline since the onset of the crisis, a process that the early repayment scheme accelerated. Additionally, the share of higher-priced products (personal, point-of-sale and auto loans) is steadily declining, which also mitigates households' interest expenses. By late 2012, this caused the indicator to drop to near 4.7 per cent.

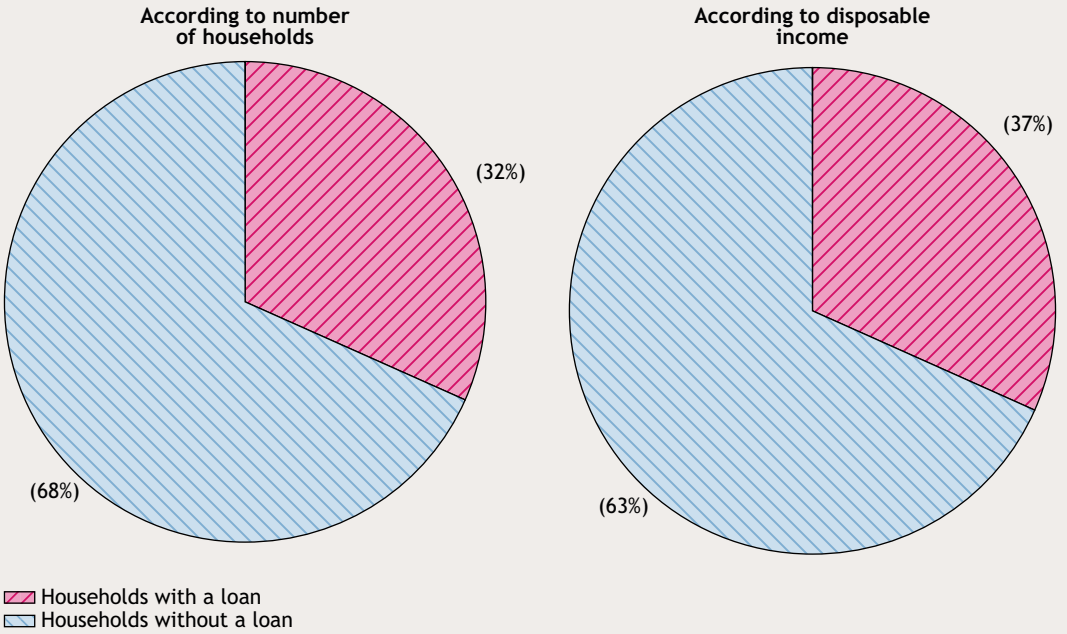
While neither stock nor flow-type indicators currently indicate over-indebtedness in the entire household sector, for households with a loan excessive debt can be seen as a valid risk. This is a particularly important consideration because stock-type indicators suggest significantly lower loan penetration among Hungarian households. Although comparative statistics based on an international micro-database are unavailable, it is reasonable to assume that Hungary's penetration rate of 32 per cent, representing 1.2 million households with a loan, is much lower than the penetration rates in developed countries. It is therefore also recommended to separately assess the distribution of the debt service ratio – or the share of debt service in relation to disposable income – from which we shall attempt to draw conclusions using the Household Budget Survey[3] (hereinafter: HBS) created by the Hungarian Central Statistical Office.

According to the most recent HBS, the distribution of the debt service ratio still indicates the same unfavourable trend as seen in previous studies. In 2010, the average debt burden for households with a loan in the lowest income quintile was already close to the critical 30-percent mark.[4]

[3] Conducted on a representative sample selected according to key demographic factors, the HBS features close to 10,000 households each year, all of them asked to maintain a detailed log about their monthly revenues and expenditures. In addition, the database contains important household parameters, as well as a short list of questions concerning loan applications. It comprises two parts: a personal and a household section. Carried out since 1993, the most recent survey was completed in 2010. As one of its drawbacks, some of the important factors — such as income distribution — do not provide representative results, because interviewers are unable to reach out to people in the lowest and highest income brackets. However, this does not affect the findings featured in this paper, as the poorest households typically do not have any loans and the richest are generally not at risk of being overly in debt.

[4] The literature abounds with estimates of exactly what households consider as the maximum acceptable instalment amount in relation to their income. It is most likely affected by the prospects of income growth, as well as by a number of other attributes (such as the number of members in a household and their consumption-to-income ratios, etc.). The 30 per cent used in our paper roughly matches the values featured in studies that have been published in this field.

Chart 5
Share of households with loans according to number of households and disposable income



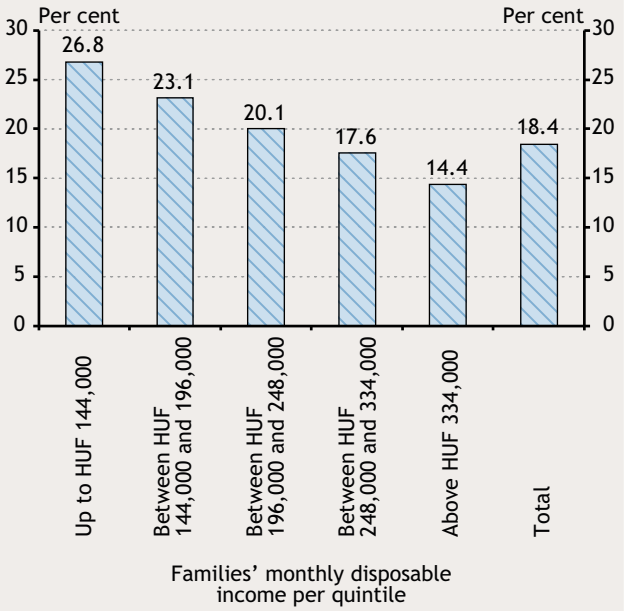
Note: Since the most affluent households with a loan are presumably under-represented in the HBS, the distribution according to disposable income must be viewed with reservations.
Source: CSO (2010).

Given that the Swiss franc has since appreciated 20 per cent against the forint and somewhat more than half of all household loans are denominated in Swiss frank, the debt burden in this income bracket may have easily exceeded this critical level.

Other factors probably could not have had a major influence upon this, either. The significant tax cuts and restructurings have tended to have a negative impact on households in the lowest income bracket. Since these families rank at the bottom based not only on current income but also on savings, only a fraction of them could have benefited from the option of early repayment at a preferential exchange rate. While repayment could indeed have significantly affected the entire spread, it had little impact on the number of families with a high debt service ratio.

Looking at the distribution of the debt service burden within the individual income quintiles, the situation is even more complex. Among the poorest households it averages around 30 per cent, but 35 per cent of them have even higher debt servicing, with 14 per cent of them seeing more than half of the family budget spent on loan instalments, which is already past a critical level. Focussing only the two lowest income brackets, the number of at-risk families with debt service ratios exceeding 30 per cent is estimated between 80,000 and 100,000.

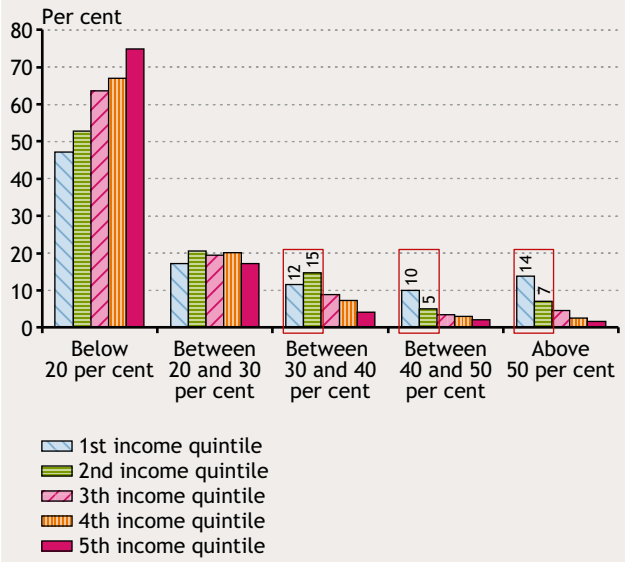
Chart 6
Average debt service ratio for each income quintile



Source: CSO (2010).

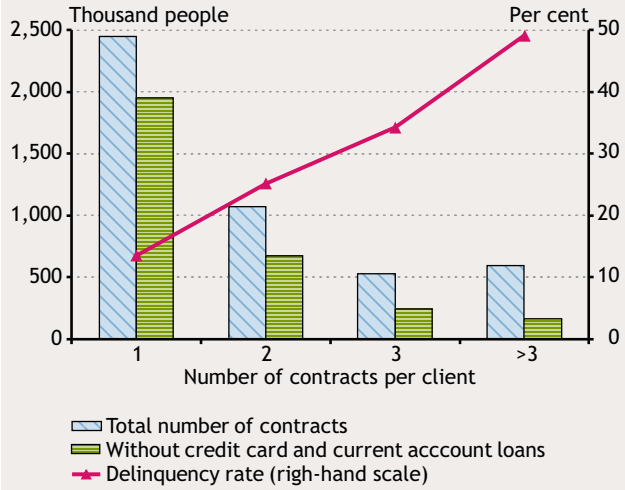
Last but not least, looking at the number of different loan contracts held by a single debtor, one can study indebtedness from a rather peculiar angle. According to data available via the Central Credit Information System (KHR), the higher the

Chart 7
Distribution of debt service ratio in each income quintile



Source: CSO (2010).

Chart 8
Correlation between number of contracts and non-payment



Source: KHR (30 September 2012).

number of contracts held, the higher the probability of default. This clearly relates to the fact that more contracts mean both higher credit exposures and a higher service burden.

CONCLUSIONS

As a result of government measures and the shrinking demand for credit, Hungary's household debt-to-GDP ratio has fallen to approximately half of the euro-area average. In parallel with this, the debt service has been declined to close to 10 per cent of disposable income, which, on an international scale, cannot be considered excessive. It is therefore probably safe to assume that over-indebtedness does not affect the entire household sector. At the same time, however, significant differences remain between individual income brackets regarding the distribution of the debt service ratio. In the lowest income bracket, families with a loan struggle with an average service burden amounting to 30 per cent of their income, whereas 14 per cent of them spend more than half of their earnings on instalments, which is already past the critical level. Focussing only the two lowest income brackets, the number of at-risk families with debt service ratios exceeding 30 per cent is estimated between 80,000 and 100,000.

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Péter Bauer, Mariann Endrész, Regina Kiss, Zsolt Kovalszky, Ádám Martonosi, Olivér Rácz and István Schindler: Excessive household debt: causes, trends and consequences

The decade preceding the 2008 recession was marked by a rapid rise in household debt in several regions. Strong household lending prior to the recession boosted economic growth in the affected countries, but indebtedness then became one of the main sources of vulnerability of these countries with the onset of the economic crisis. Economies that saw a rapid rise in household debt were characterised by a stronger drop in domestic demand and a longer-than-average recovery time. This analysis focuses on the evolution of household debt in Hungary. As the weight of foreign currency denominated loans within total lending in Hungary was elevated, we examine in detail the spread of foreign currency lending among households and its consequences.

Viewed from an international perspective, household lending in Hungary rose sharply from the low level prevailing in the early 2000s. This expansion first appeared in HUF-denominated lending, and from 2004 this was followed by an increasing preponderance of foreign currency lending among consumer and housing loans. During the pre-crisis era, the rise of foreign currency lending was also high by regional standards. Based on our estimates, the rise in debt was a balanced process until 2006–2007, whereas after that the loan volume exceeded its long-run equilibrium level. In addition to declines in real incomes, foreign currency denominated loans also contributed substantially to this process. Since 2009 household behaviour has been shaped by strong deleveraging. Households became net loan repayers, gradually decreasing their level of debt. Due to the revaluation of foreign currency denominated loans, deleveraging is a prolonged process, and thus the high loan volume may continue to hamper a recovery in household consumption.

INTRODUCTION

Since the outbreak of the crisis household consumption spending has declined sharply in Hungary. Although households saw windfall gains several times over the past years (thanks to sharp cuts to personal income tax or the disbursement of real yields on private pension funds), at the middle of 2013 the level of household consumption was still more than 10 per cent lower than the pre-crisis level. Weak consumer demand may be closely linked to deleveraging among households and the strengthening of precautionary motives. As long as the volume of household debt exceeds the equilibrium value which is sustainable over the long term, high indebtedness may hold back growth in consumption.

This analysis presents an overview of the accumulation of household debt – in particular foreign currency loans – and the intensity of deleveraging among the Hungarian population, as well as its impact on consumption.

The first part of this analysis examines the initial period of household lending in Hungary in the late 1990s, followed by the phases of its dynamic rise from the early 2000s and the supply and demand factors that drove these processes. The second part makes regional comparisons. The third part presents stylised facts on the deleveraging that began in the wake of the crisis, and the final section attempts to estimate the presence of deleveraging and its impact on consumption using an error correlation model.

THE ACCUMULATION PROCESS OF HOUSEHOLD LOANS AND UNDERLYING CAUSES BEFORE THE CRISIS

The start of lending and the spread of foreign currency loans

In the 1990s, household lending was practically non-existent due to high inflation and high nominal interest rates. On the supply side, following their privatisation banks mainly focused on the large enterprise segment, as the predominance of foreign ownership and export activity implied lower risk compared to other segments. The high barriers to entry to the household credit market, which were time-consuming and costly to overcome (e.g. underdeveloped bank branch networks), also held back lending (see Bethlendi and Bodnár, 2005).

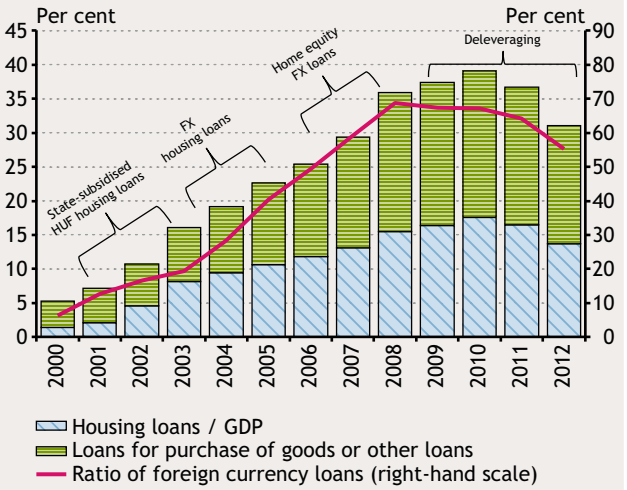
Conditions allowing household lending developed at the end of the 1990s. Under the crawling peg exchange rate regime, the exchange rate served as a nominal anchor, and thus inflation and long-term yields fell progressively and lower nominal interest rates boosted demand. The improved income position and long-term (permanent) income expectations of households – resulting from macroeconomic stabilisation and initial progress in economic integration – also fuelled household credit demand. On the supply side, as the large enterprise sector became saturated, banks turned to household lending, which was riskier but also prospectively more profitable.

The supply of consumer loans was the first to increase, followed by a growing housing loan market with the appearance of state-subsidised loan schemes in 2001. The conditions on state-subsidised housing loans were tightened in late 2003 as budgetary expenditures due to interest subsidies rose rapidly. However, household demand for cheap credit remained high, and fierce competition between lenders facilitated the spread of foreign currency loans which were already available in the vehicle financing segment (Chart 1).

The dynamic rise in the number of foreign currency loans from 2004 – the first wave of foreign currency lending – was driven by both supply and demand factors. Households' revenue position deteriorated substantially in the wake of the fiscal adjustment announced in 2006. The hike in direct and indirect taxes, cuts to social transfers and more sluggish growth of other business revenues all contributed to a drop in real incomes. Households tried to offset the decline in consumption caused by falling real incomes by taking out loans, which in 2007–2008 triggered the second wave of foreign currency lending, characterised by lower

Chart 1
Household loan volume as a percentage of GDP and the ratio of foreign currency loans

(2000–2012)



Source: MNB.

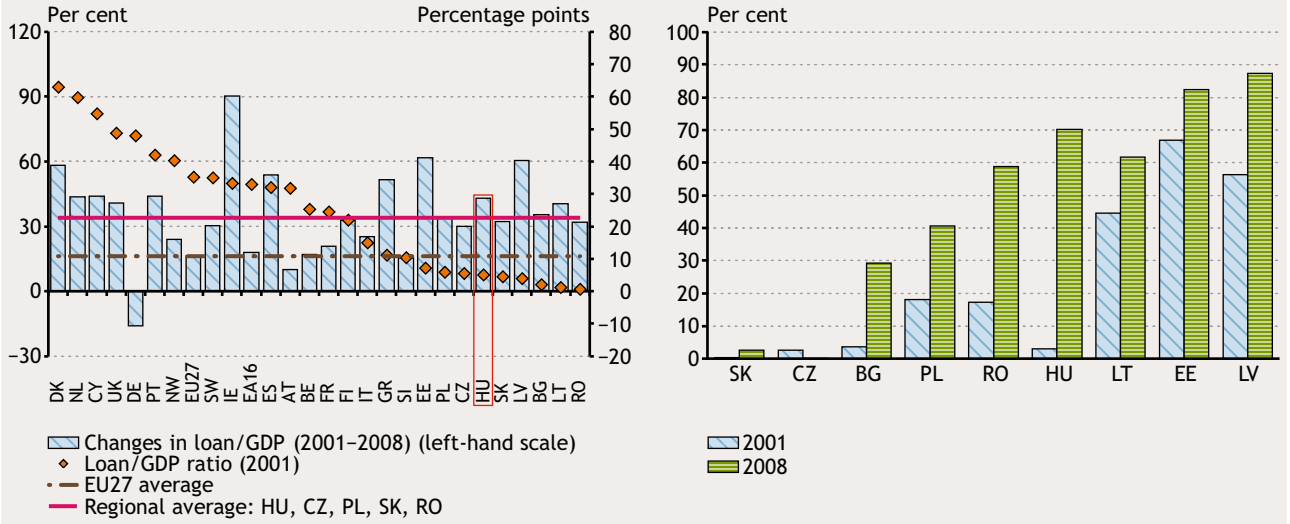
interest rates and thus lower instalments. The appearance of home equity loans – which accounted for the majority of new loans granted – also helped to smooth consumption. The expansion in lending was bolstered by the ample funding available on international financial markets.

Indebtedness of Hungarian households before the crisis in an international comparison

The pre-crisis indebtedness of households was high in an EU comparison, similarly to other new member states (Chart 2, left panel). Credit in these member states expanded rapidly in the context of convergence. It was not the level of debt per se, but rather the rate of increase that stood out in an EU comparison.

This rapid rise in lending, however, was coupled with varying popularity of foreign currency loans in the new member states (Chart 2, right panel), which can be classified into three groups based on the ratio and denomination of foreign currency loans. Foreign currency lending was already well established in the Baltic states, and their already elevated ratio increased slightly during the period under review. These foreign currency loans were essentially all denominated in euro (98 per cent in Latvia and Estonia and 97 per cent in Lithuania). The second – more heterogeneous – group consisting of Hungary, Romania, Poland and Bulgaria saw foreign currency lending spread during the period of credit expansion. Swiss franc denominated loans accounted for the lion's share of lending in Hungary and Poland (88 and 96 per cent in 2008,

Chart 2
Developments in the household loan-to-GDP ratio within the European Union and the ratio of household foreign currency loans in the region



Source: Eurostat, MNB.

respectively), in contrast to Romania and Bulgaria, where euro denominated loans proved most popular (79 and 96 per cent in 2008, respectively). The Czech Republic and Slovakia make up the third group, where foreign currency lending remained insignificant.

The spread of foreign currency lending in the period under review was also driven by the favourable global money market environment and the related low global interest rates. There was a strong influx of foreign investment into new member states which also spurred foreign currency lending, as banks had an incentive to place these foreign funds in foreign currency assets in order to avert exchange rate risk and due to the high capital requirement stemming from open foreign exchange positions.

Several empirical studies examined why foreign currency lending patterns differ across new member states despite the same external supply conditions. Some of the main findings are summarised below.

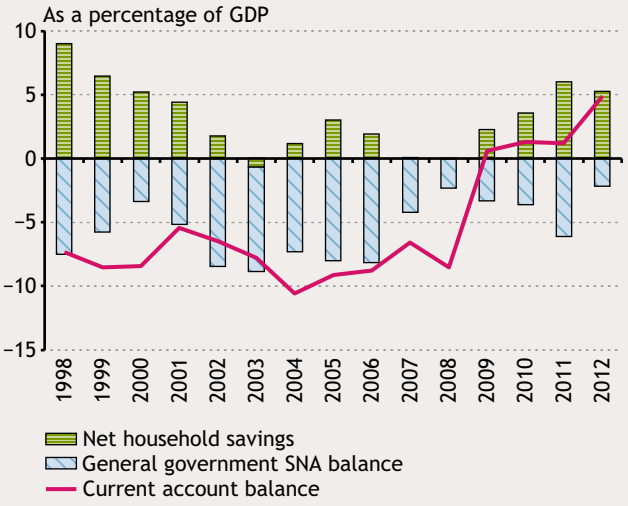
Supply effects

- Access to foreign funding contributed to the spread of foreign currency lending (Basso et al., 2007) (Chart 3, left panel), however, the impact of the ownership structure of the creditor banks (foreign or Hungarian) was not significant, as illustrated by the panel regression results of Rosenberg and Tirpák (2008).
- A strong correlation between financing structure and foreign currency lending can be identified (Rosenberg and Tirpák, 2008). In the countries where credit expansion was accompanied by a significant increase in the loan-to-deposit ratio, banks mainly used foreign funds to finance loans which they granted in foreign currency, thereby passing on the exchange rate risk to customers (e.g. Baltic states, Hungary, Romania, Bulgaria, Poland). After 2001, loosening fiscal policy drained a large chunk of private sector savings, which contributed to the bank sector using foreign funding to fuel its domestic lending (Chart 3, right panel).
- Low international interest rates also contributed to banks opting for foreign funding (from parent banks or the market), while the optimistic global financial climate saw risk appetite increase and looser credit conditions across the board.
- Growing competition reduced margins on domestic markets, pushing banks to try to increase their loan volumes in order to maintain profitability.

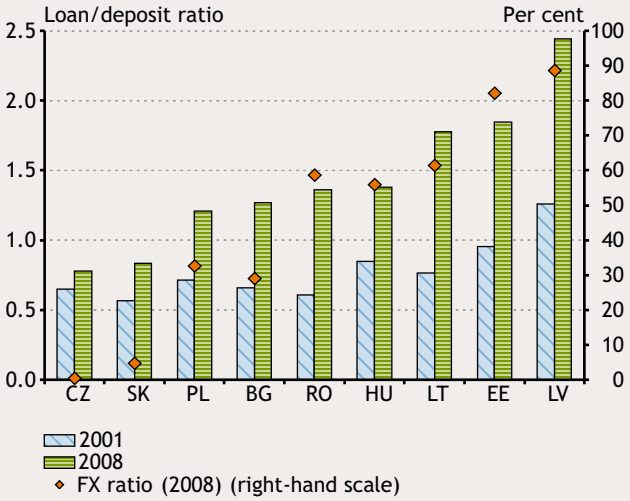
Demand effects

- The difference in interest rates between the Hungarian forint and foreign currencies was a major factor driving the spread of foreign currency lending (e.g. Basso et al., 2007; Rosenberg and Tirpák, 2008; Brzoza-Brzezina et

Chart 3
Funding capacity of the general government and households, the current account balance, and the loan-to-deposit ratio in the Central and Eastern European and Baltic regions



Source: MNB.



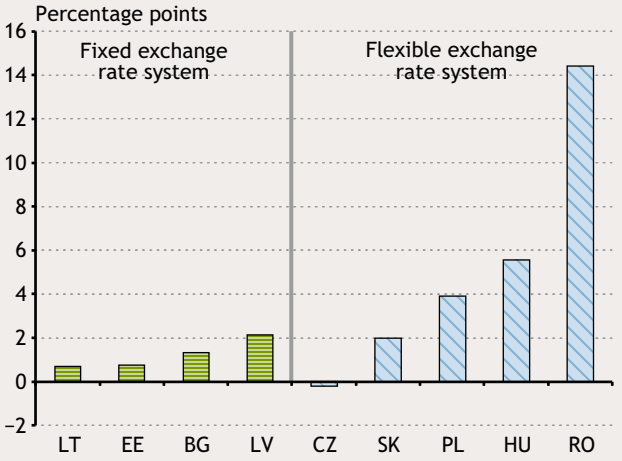
Source: Eurostat, MNB.

al., 2010). The interest rate differential also reflects development of the risk premium, alongside exchange rate fluctuations. As a result, the swings in economic policy (in Romania, for instance) and the loose fiscal policy (in Hungary, for instance) may have contributed to the large interest rate differential in certain countries.

- The significance of the interest rate differential may be dependent on the credibility of the exchange rate regime. A larger interest rate differential is needed in flexible exchange rate regimes to affect demand for foreign currency loans, while a small differential might be sufficient in a fixed exchange rate regime (Rosenberg-Tirpák, 2008) (Chart 4).

- Households are backward-looking in forming their exchange rate expectations, which implies that historically low volatility in exchange rates may increase demand for foreign currency loans (Cuaresma et al., 2011). A credible fixed exchange rate regime is an implicit exchange rate guarantee for the population (such as the ones prevailing in the Baltic states). If monetary policy avoids exchange rate volatility in a flexible exchange rate regime *(fear of floating),* the low exchange rate volatility coupled with the ensuing volatile domestic interest rates may fuel demand for foreign currency loans (Basso et al., 2007) (as in case of the exchange rate band applied by Hungary until 2008).

Chart 4
Interest rate difference compared to the euro
(average for 2001–2008)



Note: Three-month money market nominal interest rates.
Source: Eurostat, national central banks.

- Households' medium-term income expectations improved greatly following EU accession.

Institutional setting

- The institutions of a country, the development of its financial markets, its legal system and regulatory environment all have an impact on the spread of foreign currency lending.

– Csajbók et al. (2010) stress the importance of access to long-term fixed interest rate loans denominated in domestic currency.[1] If only variable interest rate loans are available, fear of floating and the ensuing volatility of domestic interest rates may increase demand for foreign currency loans. As the availability of long-term fixed-interest loans depends on the availability of long-term domestic funds in the banking sector, this factor is approximated in their estimation by the presence of a local covered bond market.

– New member states display a variety of regulatory environments. Some countries made efforts to curb foreign currency lending even before the crisis by requiring banks to inform their customers about the risks and tightening the conditions of foreign currency lending, for instance in Poland and Latvia by late 2007, as well as by imposing larger risk weights and provisioning requirements on foreign currency exposures, as in Latvia and Romania (Rosenberg–Tirpák, 2008).

Alongside such general aspects, country-specific factors also shaped the extent to which foreign currency lending spread in the various countries. As mentioned earlier, the abolishment of subsidised housing loans in Hungary spurred the spread of foreign currency lending as demand turned towards foreign currency loans. Poland imposed regulations that curbed the spread of home equity loans. In addition, its monetary policy did not avoid exchange rate volatility in the 2000s, so the nearly 30 per cent depreciation of its currency in 2002–2003 reinforced households' awareness of exchange rate risk and temporarily foreign currency lending (alongside unchanged household lending growth). In Romania, approximately 80 per cent of foreign currency loans were denominated in euro, for which the income remitted by the large Romanian migrant population working in the euro area provided a natural hedge.

Theoretical reasons behind the rise of foreign currency lending

Numerous studies have addressed the theoretical reasons behind the spread of foreign currency lending. Foreign currency lending can be considered as the lending-side of the phenomenon known as financial dollarization in the literature. The name originates from the fact that private sector deposits and loans in developing countries are for the most part denominated in more stable and more liquid foreign currency (typically the US dollar). The "original sin" theory proposed by Eichengreen and Hausmann (1999) states that developing countries cannot borrow abroad in their domestic currency and/or borrow over the long term even domestically. This situation stems in part from the shortcomings in a country's institutions and economic policy, and in part from imperfect global money markets. These factors also appear in later theories, which also stress demand factors alongside supply factors. In other words, they examine why firms and households opt to borrow in foreign currency. Three main branches can be distinguished within this theory that spur the spread of dollarization through the portfolio allocation of risk-averse decision-makers, domestic market failures and the quality of domestic institutions and economic policy (Yeyati, 2006).

According to the portfolio approach, risk-averse resident investors maximise the following utility function:

$$\max_{xj} U = E(r) - Var(r)/2, \tag{1}$$

where $r = \Sigma_j x_j r_j$ is the real return rate on the portfolio in which assets denominated in currency *j* represent a proportion of x_j. Real returns on assets denominated in local currency are shaped by changes in the inflation rate, while those on assets denominated in foreign currency are shaped by unexpected shifts in the real exchange rate. If the principle of uncovered interest rate parity is fulfilled, it can be demonstrated that the ratio of foreign currency within the optimal investment portfolio (with minimal variance) is:

$$mvp = \mathrm{var}(\pi)/\mathrm{cov}(\pi, e), \tag{2}$$

where π is inflation and *e* is the nominal exchange rate. Based on the model, if the variance of inflation is relatively greater than the fluctuations of the real exchange rate, assets denominated in local currency are riskier, which tips the balance in favour of dollarization.

The market failures theory proposes that dollarization stems from market imperfections and externalities that render foreign currency denominated loans relatively cheaper. Broda and Yeyati (2006) make two key assumptions: one is that there is a positive correlation

[1] These types of loans were available over the entire period in the Czech Republic and Slovakia, and between 2001 and 2003 in Hungary.

between the insolvency of borrowers and depreciation of the real exchange rate, and the other is that creditors are not perfectly informed about the currency composition of loans. In this case, the borrower invests in a project with a gross rate of return of *p*R* (where *p* is the domestic price index). Exchange rate $e \in \{e^a, e^f\}$ at the end of the period (domestic currency / foreign currency), where $e^a < p(e^a) < 1 < p(e^a) < e^m$ and $\Pr ob(e = e^a) = q$, where the actual rate is normalised to 1. In this scenario, the borrower's problem can be expressed (at real value) as follows:

$$\max_{\lambda} \pi = \left(q / p(e^a)\right) * \left(p(e^a)R - (1-\lambda)r_h - \lambda e^a r_k\right) \quad (3)$$

where λ is the foreign currency ratio of the borrower's liabilities, r_h is the domestic currency interest rate and r_k is the foreign currency interest rate. It follows from the expression that $\pi' = \left(q / p(e^a)\right) s > 0$, where *s* is the additional return which creditors in domestic currency demand to offset their losses on domestic currency denominated assets in the event of insolvency due to depreciation. In this case, the borrower opts to borrow in foreign currency (λ=1). Overall, debtors opt for the relatively cheaper foreign currency loans. The reason these loans are cheaper is that the creditors lending in foreign currency run the risk of a smaller loss in the event of insolvency.

According to the institutional approach, the quality of local institutions could possibly contribute to the spread of dollarization. One of the institutional factors leading to partial dollarization is that the financial markets of developing economies are not deep enough, so long-term borrowing is only feasible in foreign currency. This however, cause open FX position in the bank's and client's balance sheets, which has the potential to cause significant losses in the event of sudden depreciation. Viewed from this angle, dollarization is a collateral cost of institutional system quality.

DEVELOPMENTS IN HOUSEHOLD INDEBTEDNESS SINCE THE CRISIS

The expansion of lending in general and foreign currency lending in particular came to an end as the global financial crisis hit in 2007–2008. Demand for credit from households waned and a process called deleveraging began, caused by a rapid rise in unemployment and wage restraints by firms during the crisis, whilst government measures to quickly restore fiscal balance also reduced household incomes. Unfavourable long-term income prospects caused a shift in the borrowing behaviour of households: growing precautionary considerations generally led to greater propensity to save and consumer spending fell.

On the supply side, global liquidity shrank as deleveraging among banks began during the recession, rendering the refinancing of foreign funding more expensive and limiting funding opportunities. The sharp portfolio deterioration sparked greater risk aversion. The government decree on prudent lending effective from March 2010 helped scale back foreign currency lending, as did the act banning foreign currency denominated mortgage lending that came into force in August 2010 (Balás and Nagy, 2010).

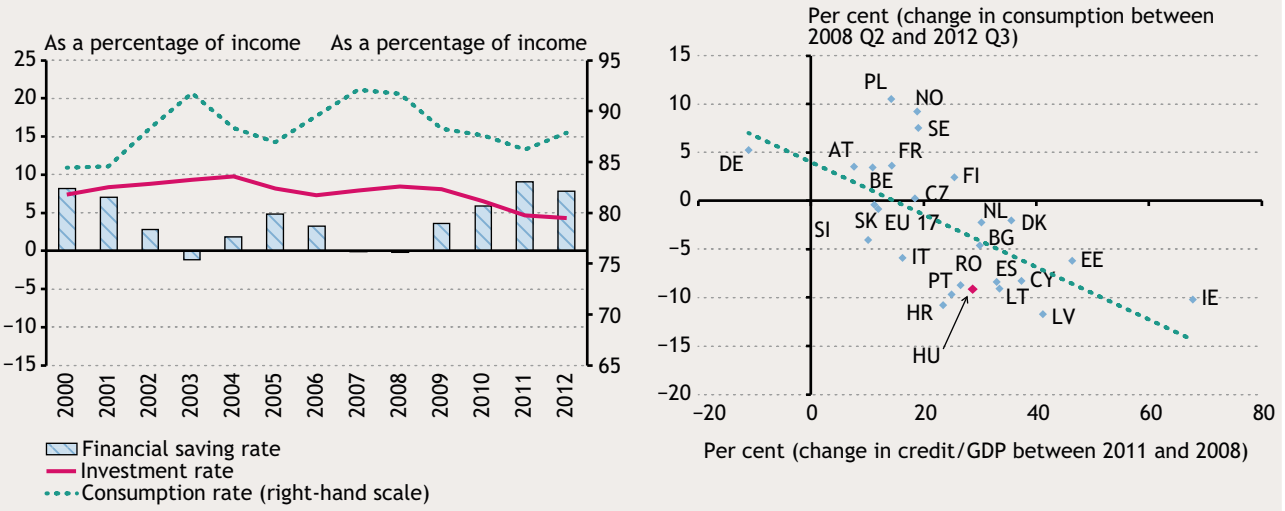
Households became net loan repayers, mostly due to declining credit demand and, to a smaller extent, to tightening credit conditions. Adjustment was quick, with the consumption rate declining steeply in 2009 over the course of a single year and essentially stagnating ever since. Households also adapted their investment rate, albeit more gradually compared to consumption (Chart 5, left panel). The deteriorating income position of households and greater uncertainty prompted them to delay investments to avoid having to cut back their already weak consumption in proportion to disposable income even more in the context of deleveraging, while increasing their net savings.

International examples reveal that the fall in consumer spending in the context of deleveraging is proportionate to the rate of credit expansion registered prior to the crisis. The decline in Hungarian consumption in the wake of the crisis was comparable to the Baltic states, which were also characterised by large foreign currency debt (Chart 5, right panel).

Deleveraging by deeply indebted households has continued since the crisis. The sector continues to repay more on existing loans than is taken out in new loans. The high exchange and interest rates slow down households' repayment of their debt, denominated for the most part in Swiss franc.

The deterioration in global risk appetite during and after the crisis and the debt problems affecting the euro-area periphery were typically reflected in strengthening of the Swiss franc. The further appreciation of the Swiss franc, a safe-haven currency, against the euro was halted by the Swiss central bank's September 2011 announcement that it would introduce an exchange rate floor of EUR/CHF 1.20.

Chart 5
Spending of income and deleveraging by households

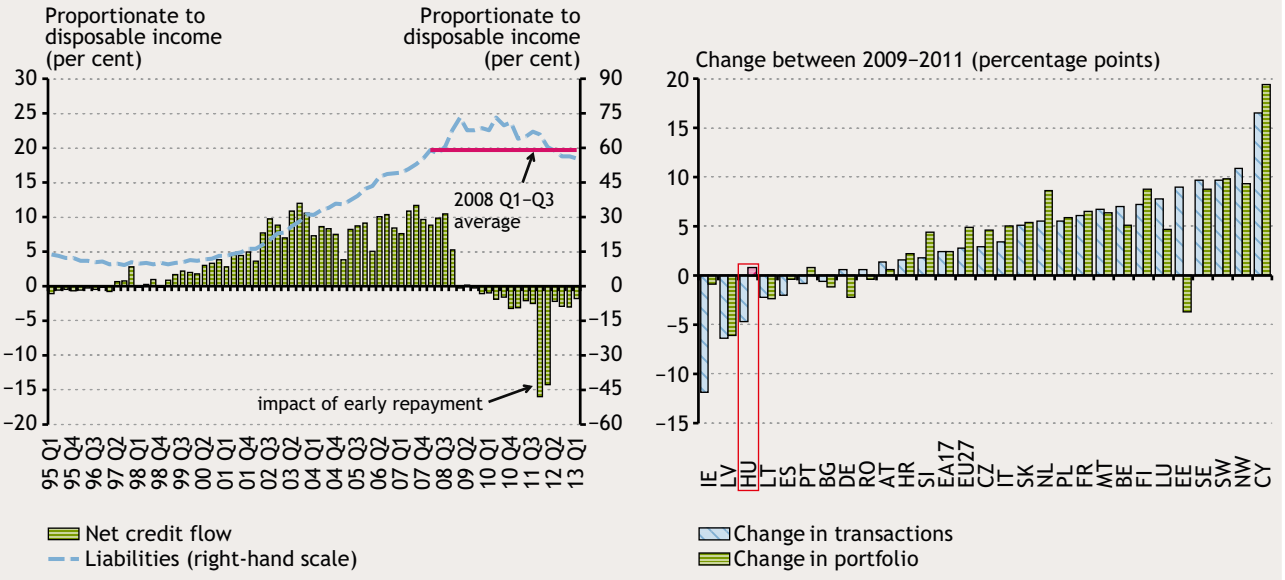


Source: Eurostat, MNB.

The elevated exchange rates since the recession coupled with higher interest rates have also increased households' repayment burden. In the wake of the crisis, interest rates on Swiss franc denominated mortgage loans rose higher than the level warranted by the cost of funds and risk (MNB, 2010). Cuts to euro-area and Swiss base rates after the crisis were felt to a far greater extent in Central and East European countries with floating exchange rate regimes and substantial household foreign currency loan portfolios (Poland and Romania). Similar to Lithuania and Latvia, the pricing of foreign currency loans is typically pegged to reference interest rates in Poland. In the region, Bulgaria, which had also seen the spread of variable interest rates, showed similar developments in client interest rates to Hungary. Mortgage loans in Hungary are also more expensive compared to Western Europe, which feature far lower profit margins to the total portfolio than in Hungary.

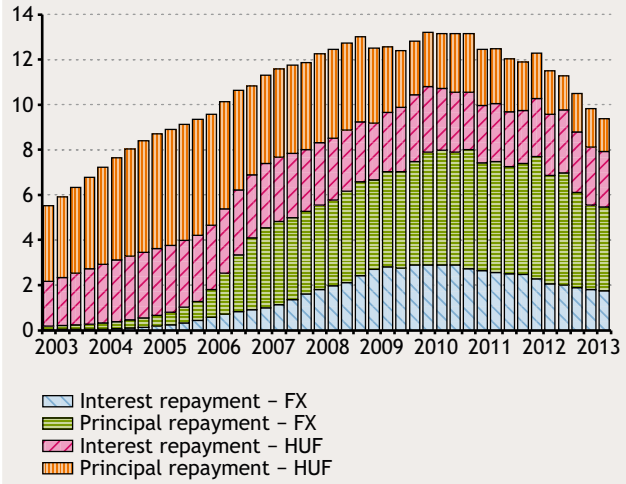
The elevated exchange and interest rates have kept the debt-to-disposable income ratio high since 2008. The debt-to-income ratio finally returned to pre-recession levels in late 2012 following the early repayment scheme, which saw

Chart 6
Developments in the debt-to-disposable income ratio and the debt-to-GDP ratio



Source: Eurostat, MNB.

Chart 7
Aggregate repayment burden as a proportion of disposable income



Source: MNB.

the foreign currency mortgage portfolio shrink by 24.1 per cent (Chart 6, left panel). An international comparison reveals that the decline in the debt-to-GDP ratio – including revaluation – between 2009 and 2011 falls short of the level warranted by transactions (Chart 6, right panel).

The negative impact of Swiss franc appreciation and the high interest rates on loans also translated into a sustained high repayment burden-to-income ratio among households (Chart 7).

DELEVERAGING – EMPIRICAL ESTIMATE

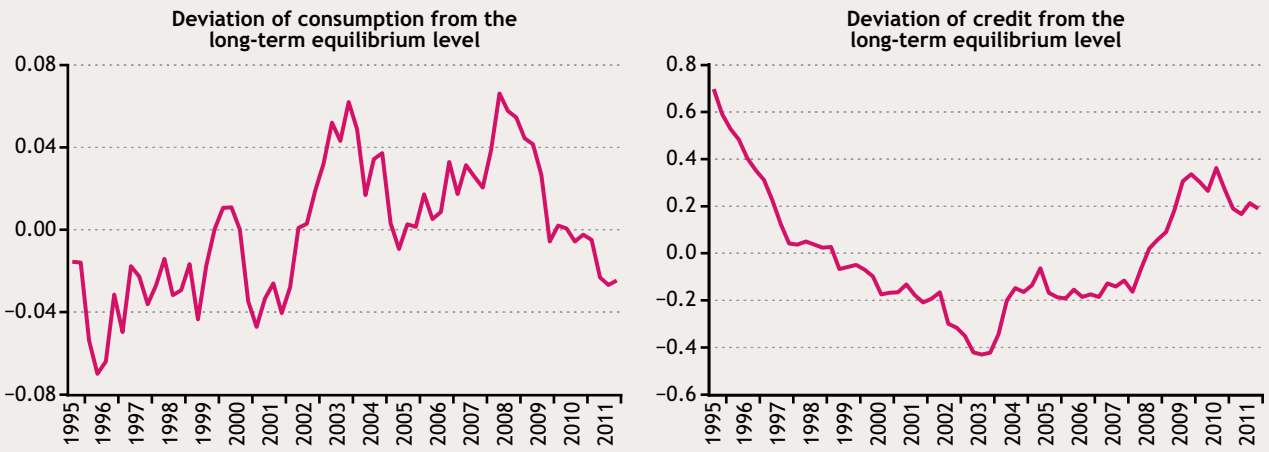
We tested the strong deleveraging of households since the crisis empirically in the error correction model framework widely used in the literature. Endrész and Virág (2012) model household lending and consumption. The model allows us to examine whether credit market imbalance impacts consumption, i.e. if households become excessively indebted, do they cut back consumption and to what extent?

The estimate reveals two long-term relationships corresponding to a consumption and credit equation of customary form. In terms of short-term adjustment, in the event of a rise in either consumption or lending above the long-term equilibrium level, a decline in their level helps restore their own equilibrium. Simultaneously, excessive indebtedness decreases consumption. In other words, credit market imbalance impacts consumption, which proves the presence of balance-sheet effects.

At the onset of the crisis, households found themselves confronted with a wealth, income, exchange rate and credit shock, which pushed the level of indebtedness which had hitherto been acceptable far above the equilibrium point allowed by fundamentals (Chart 8). The gap exceeded 50 per cent during certain periods, meaning that the credit stock was 50 per cent higher than the level warranted by their income and wealth position and credit interest rates. Consumption was excessive even before the crisis. The gap only widened after the shocks. Excessive debt and consumption led to a strong adjustment from 2009, with households consuming less, saving more and cutting demand for credit.

Due to its flow-like nature, consumption reverts back to its long-term equilibrium level determined by the model fairly quickly. By late 2009, consumption had already adjusted based on the long-term consumption equation. The credit

Chart 8
Deviation of consumption and credit from the long-term equilibrium level



Forrás: MNB.

stock, however, is slower to adjust due to longer maturities and its stock-like nature. Overshooting on the credit market further dampens consumption and moves away from its equilibrium level – in a negative direction. Waning consumption decreases credit demand, thereby accelerating the deleveraging process to the equilibrium level. The excessive indebtedness of households has gradually improved over past years, but the debt-to-income ratio may still be higher than the equilibrium level. Until the debt level is fully adjusted, any recovery in households' consumer demand will remain weak, even alongside currently rising real incomes.

Overall, the estimate corroborates the strong deleveraging in household consumption witnessed and suspected during the crisis.

CONCLUSIONS

In this analysis, we reviewed the process that led to the accumulation of debt by Hungarian households and its main consequences. Our findings show that, by international standards, household credit in Hungary rose sharply from the low level prevailing in the early 2000s. The expansion first appeared in HUF-denominated lending, followed from 2004 by an increasing dominance of foreign currency lending among consumption and housing loans. The growth of foreign currency lending was high in a regional comparison in the pre-crisis period. Based on our estimates, the rise in debt was a balancing process until 2006–2007, at which point the credit stock exceeded the equilibrium level. Along with falling real incomes, foreign currency denominated loans also contributed substantially to this process following the onset of the crisis. Since 2009 household behaviour has been shaped by a strong deleveraging trend. Households settled into being net loan repayers, and gradually decreasing their debt. Due to the revaluation of foreign currency denominated loans, deleveraging is a protracted process, and thus the high credit stock may continue to hamper a recovery in household consumption.

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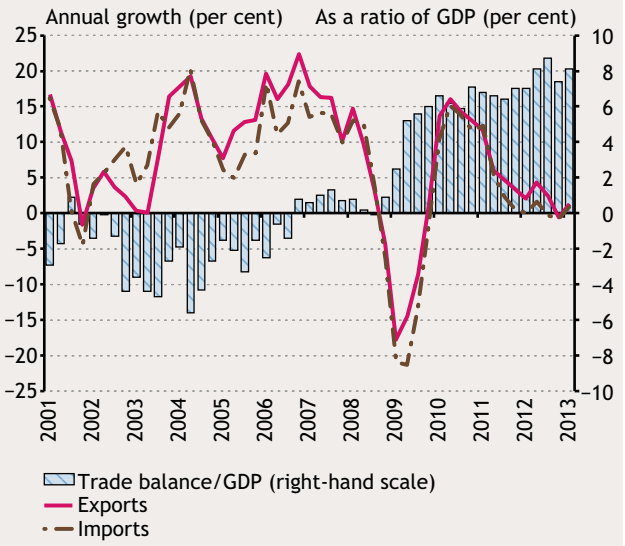
Katalin Bodnár, György Molnár, Gábor Pellényi, Lajos Szabó and Judit Várhegyi: Dynamics of the trade balance and developments in exports and imports

This article examines how the trade balance (or net exports) changed during the crisis. In the early-to-mid-2000s, Hungary ran a trade deficit as external indebtedness grew. Since the crisis, balance sheet adjustments by economic agents have substantially reduced imports for consumption and investment purposes, whereas exports (and imports of interim products) grew during the same period. As a result, the trade balance moved into a large surplus. However, in this fifth year of the crisis, exports still remain below their pre-crisis levels, due not only to cyclical factors, but also potentially to long-term, structural reasons. To reduce external debt in the medium term, export-led growth will be required, which may come from faster growth on Hungary's export markets, an increase in market share or higher domestic value added of exports. Our analysis has identified challenges in all three areas.

INTRODUCTION

Hungary's balance of trade was negative from the mid-1990s, but then returned to a considerable surplus since the start of the crisis. As a consequence of rapid growth in domestic consumption in the first half of the 2000s, there was a steep increase in imports, resulting in a trade deficit in excess of 4 per cent of GDP by 2003. This was followed by a gradual improvement in the trade balance, as exports picked up and domestic demand weakened. Even before the crisis, the balance of trade had showed a minor surplus equal to around 1 per cent of GDP. The balance of trade improved further, by about 6 per cent of GDP in 2008–2009, due to a significant fall in external trade, which then resumed growing, albeit at a gradually declining rate after a brief rebound. Import dynamics have been consistently lower than export dynamics, resulting in a further increase in the trade surplus (Chart 1). This analysis identifies the reasons for these changes.

Chart 1
Growth in the volume of exports and imports and the balance of trade



Source: CSO.

The crisis revealed that the previous growth model based on external borrowing was no longer sustainable. The risk appetite of markets declined, and debts accumulated prior to the crisis decreased only gradually. This also resulted in a permanent deterioration in Hungary's risk rating. All of these factors point to a debt service burden in excess of pre-crisis levels and more limited opportunities to borrow in the near future (MNB, 2010). In this environment, domestic demand can only grow slowly and exports may become the main engine of growth. Accordingly, in order to evaluate Hungary's medium-term growth outlook, it is important to understand the extent to which exports and imports have contributed to the developments in the balance of trade and whether these changes reflect the

effects of the business cycle or reveal long-term, structural developments.

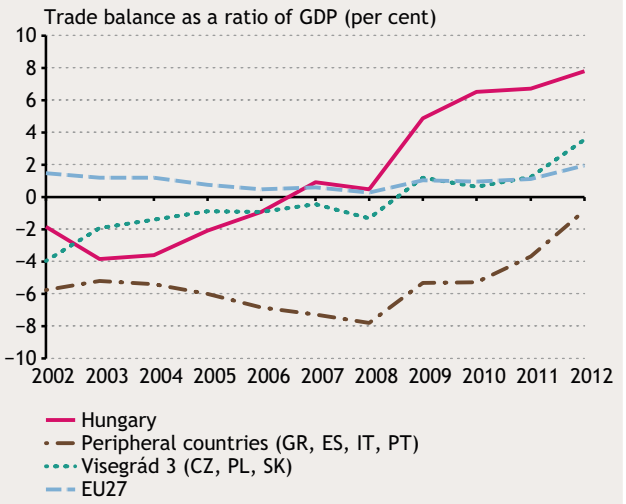
In the first part of our analysis, we look at the trends in the balance of trade from the pre-crisis years up to 2012 and compare these to the trends observed in other European countries. We then investigate how imports and exports have adjusted during the crisis and analyse the key factors determining the opportunities for export-led growth. We compare Hungary to several different groups of countries in the course of our analysis. We analyse the developments in external trade in comparison to the European Union average. We compare Hungary to the Visegrád group as well (the Czech Republic, Poland and Slovakia), which are our primary competitors in terms of exports and competitiveness. We also look at the average indicators of the EU periphery (Greece, Italy, Portugal and Spain). Similarly to Hungary, these countries had also accumulated high external debts prior to the crisis, and therefore domestic demand and thus developments in imports can be best compared to these countries.

CHANGES IN THE BALANCE OF TRADE

Hungary ran a trade deficit for years before the crisis. Prior to the 2000s, the trade deficit had been a reflection of an equilibrium process of convergence, but afterwards it reflected a rapid increase in domestic demand. Even as Hungary's exports grew quickly, the level of imports exceeded that of exports, due in part to the rapid, credit-fuelled expansion of consumption and capital investment from the early 2000s, combined with a lax fiscal policy as well. A similar process took place in other countries of the region, but their trade deficits were lower. At the EU level, the balance of trade was almost nearly balanced (as was the current account), but this concealed major differences between different groups of member states. Low interest rates and financial integration in the euro area led to dynamically increasing domestic demand in the countries of the periphery, which, combined with their relatively weaker export performance, resulted in significant trade deficits there (Chart 2).

Since the crisis, Hungary has been among the EU members best able to adjust its net exports. Prior to the crisis, major imbalances had built up within the European Union in terms of the current account and, within that, the balance of trade. Although improvements in the balance of trade across the EU as a whole do not appear significant (amounting to 0.6 per cent of GDP in 2007 and rising to 1.9 per cent in 2012), this masks major differences between the different countries. Besides the peripheral countries, which had previously accumulated large foreign debts (mostly

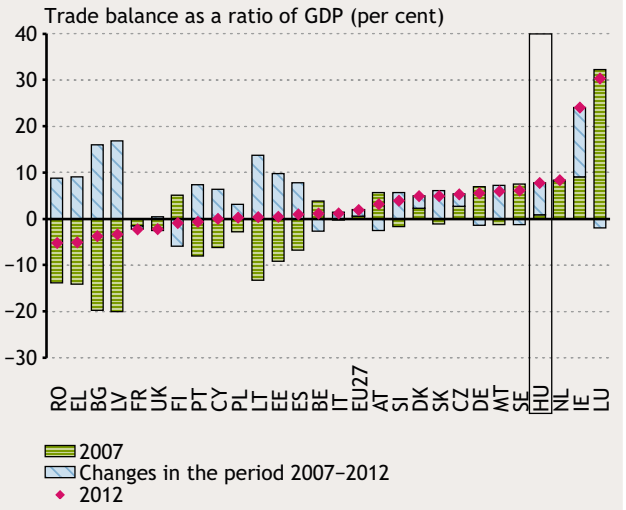
Chart 2
Balance of trade as a percentage of GDP in EU countries



Source: Eurostat.

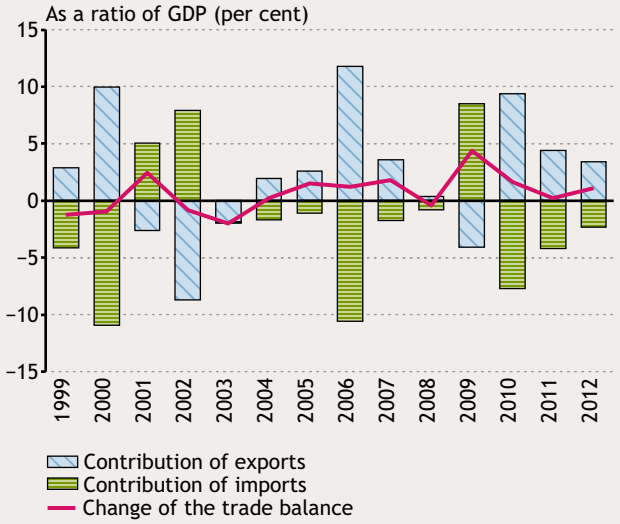
Greece, Portugal and Spain), as well as the Baltic countries, the greatest degree of adjustment was observed in Hungary. At the same time, net exports declined in several countries previously reporting positive trade balances, although adjustment processes were most pronounced in countries that had recorded high deficits before the crisis (EC, 2012). Although to a less significant extent than in Hungary, major changes in the balance of trade occurred in all other Visegrád countries as well. Hungary currently runs a trade surplus of nearly 8 per cent of GDP; one of the highest in the EU (Chart 3).

Chart 3
Balance of trade as a percentage of GDP in EU countries, before and since the crisis



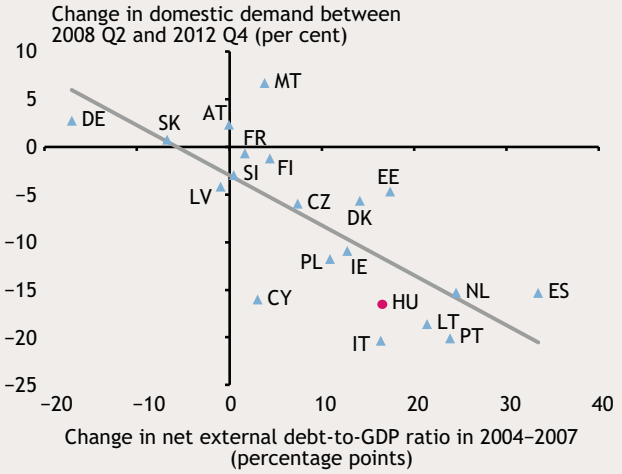
Source: Eurostat.

Chart 4
Impacts of exports and imports on developments in the trade balance



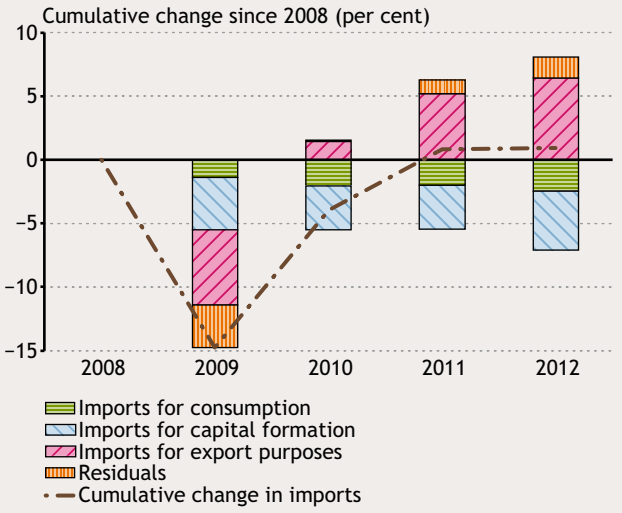
Source: CSO.

Chart 5
Relationship between pre-crisis debt accumulation and the fall in domestic demand in EU countries



Source: Eurostat.

Chart 6
Contribution of GDP expenditure items to changes in import volumes



Note: We calculated the import content of expenditure items from the 2008 balance sheet of intersectoral relations. Imports cannot be fully decomposed to the contributions of the expenditure items. The residual member reflects the change in import content over time, caused, among other things, by changes in relative prices and the expenditure structure.
Source: CSO, MNB calculations.

The trade balance improvement was caused by a greater degree of adjustment in imports. Net exports started to improve as early as 2006, at the same time as the consolidation of fiscal policy. Exports and imports both fell during the crisis, but a more marked decline in imports resulted in a significantly improved trade balance. Trade in goods has started growing again since the crisis, but export growth has remained persistently higher than import growth. As a result, the trade surplus continued to rise, approaching 8 per cent of GDP in 2012 (Chart 4).

IMPORT ADJUSTMENT

Domestic demand in Hungary has fallen considerably since the start of the crisis due to balance sheet adjustments by economic agents. In an international comparison, consumption and investment demand has fallen most notably in countries that had accumulated high foreign debts before the crisis (Chart 5). In Hungary, all three sectors contributed to the growth of external debt in the beginning and middle of 2000s. In public finances, major consolidation was necessary. A large proportion of households and firms borrowed in foreign currency from the domestic financial sector, which also contributed to the fact that Hungary's need for adjustment was among the highest within the EU and that balance sheet adjustment continues to this day.

The moderate growth in imports is primarily attributable to the decline in domestic demand. A significant proportion of domestic demand items originate from imports (according to 2008 figures, 34 per cent of household consumption and 52 per cent of investments were imported). As a result, falling domestic demand since the onset of the crisis has decreased imports as well. The recent growth in imports, observed since 2009, is attributable solely to the recovery in exports (the average import content of which was 56 per cent in 2008, Chart 6).

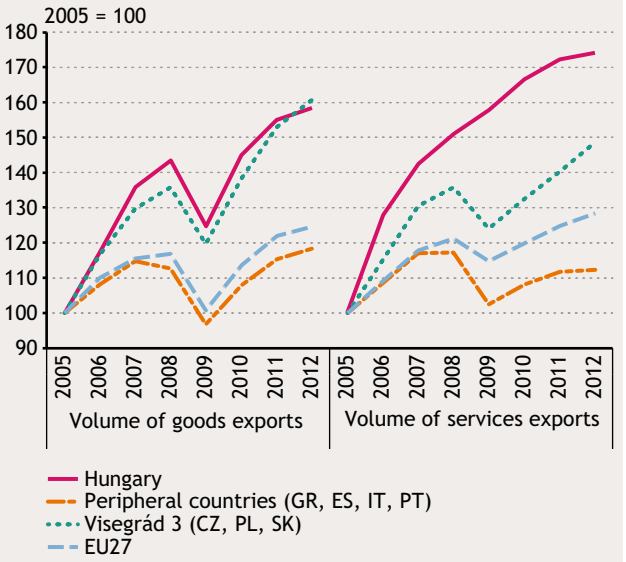
Due to continued balance sheet adjustment by Hungarian economic agents, the coming years will only see a slow recovery in domestic demand. Households and firms remain heavily indebted, possibly necessitating further balance sheet adjustment. In addition, a more uncertain growth outlook has also triggered an increase in precautionary savings and a decline in investment demand. As a result, imports are only expected to exhibit moderate growth in the coming years.

DEVELOPMENTS IN HUNGARY'S EXPORT PERFORMANCE

Hungary's volume of goods exports has increased, but the rate of growth has been subdued since the mid-2000s (Chart 7). In 2009, exports shrank primarily due to a steep decline in external demand. In subsequent years, demand for imports in Hungary's export markets gradually recovered. As a result, export volumes in 2011 exceeded the pre-crisis level. In an international comparison, one positive feature is the fact that export dynamics are higher in Hungary than in other countries which accumulated similarly excessive debts. However, compared to the countries in the region that are Hungary's direct competitors and have similar export structures, these dynamics were already lower in the post-crisis years. The fact that the competitiveness of certain large corporations which settled in the country in the 1990s weakened globally during the crisis, especially in the electronics sector, may have contributed to this. These companies were thus forced to cut their output and reorganise production chains. Some responded to the changed circumstances with layoffs and others by shutting down factories, which led to a slowdown in Hungary's export growth. The contraction in the electronics sector was partly offset by an expansion in automotive capacities, as a result of which both output and exports of the machine industry as a whole increased.

Hungary's service export volumes are growing dynamically. Service exports are much lower than the country's exports of goods (approximately one fifth of the latter). However, the balance of trade in services has been continually positive since the late 1990s. Growth in service exports was uninterrupted throughout the crisis, albeit its dynamics slowed slightly. This positive performance may reflect the fact that the decline in demand during the crisis was less pronounced for services than for goods. After all, demand for services is less dependent on cyclical changes (certain types of business services do not depend on production level: accountancy services, for instance, are in demand even as production decreases) or on external financing. Furthermore, protectionist measures, which were increasingly implemented in exports of goods during the crisis, are also less typical among services (Borchert and Mattoo, 2010).

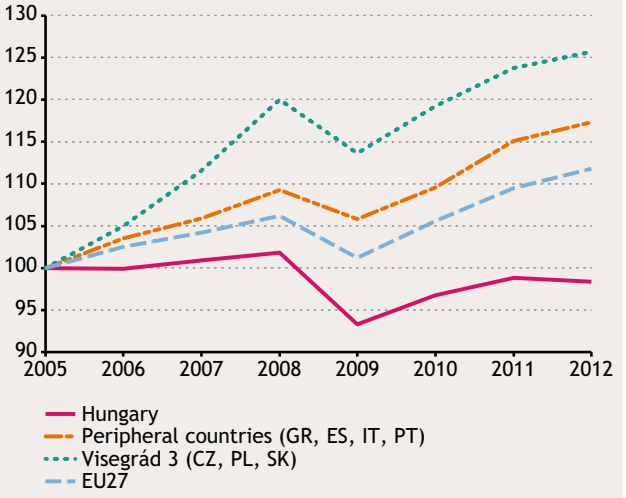
Chart 7
Export volumes
(2005 = 100)



Source: Eurostat.

For quite some time, the increase in Hungary's export price index has fallen short of the prices of our regional competitors and EU member states (Chart 8). This may

Chart 8
Export price index
(2005 = 100)



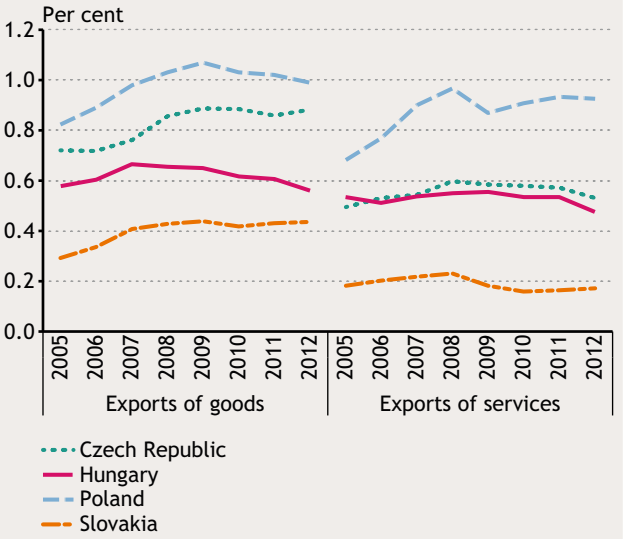
Source: Eurostat.

reflect several factors (Munkácsi, 2009). One possible explanation may lie in Hungary's export structure: starting in 1995, the composition of exports shifted towards products with high technological content. After the millennium, however, Hungary was only able to increase its exports in areas where products with high technological content could be sold at lower prices. Moreover, sectoral specialisation also represented a shift towards products with lower unit values. Another possible explanation is that Hungary's inability to increase the rate of its export growth, despite the persistently low price index, may indicate competitiveness problems. Calculations by Benkovskis and Wörz (2012) suggest that, in other countries in Central and Eastern Europe, the export price index may have risen mainly due to improvements in non-price competitiveness (product quality as perceived by consumers). The competitive disadvantage of Hungarian exports may have been in part brought about by a less marked improvement in product quality. Additionally, Hungary's price competitiveness was unfavourable as well, as prices adjusted for quality improvement fell less in Hungary than elsewhere in the region during the 2000s.

The increase in Hungary's market share in exports of goods fell behind the Visegrád countries even before the crisis, and Hungary's market share at current prices has been decreasing since then. In the years before the crisis, Hungary's export market share grew quickly, at a pace outstripping that of other EU member states. However, the growth rate of export market share lagged behind the growth of our regional competitors right after the millennium (Chart 9). To some extent, this may be a natural process, as the country's external trade with the European Union may have approached its equilibrium by the millennium. In addition, Hungary's long-standing low price index may have also contributed to more moderate growth in market share at current prices. At the same time, Hungary has been unable to increase its market share calculated from volumes since the onset of the crisis (Chart 10).

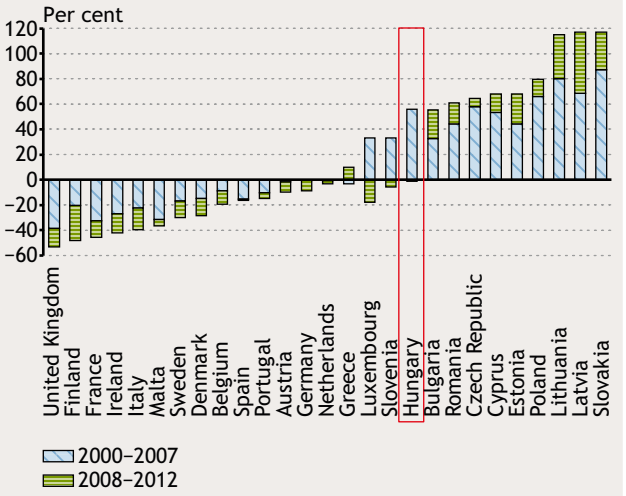
Hungary's export market share for services reveals more favourable trends. Export market share for services grew dynamically until around 2004–2005, but since then the rate of growth has been lower than that of regional competitors. Since then Hungary's market share has decreased, especially in 2012, but so have the market shares of its regional counterparts. Last year's decline was due mostly to a fall in tourism exports (Chart 9).

Chart 9
Market share in global exports, at current prices



Source: WTO.

Chart 10
Changes in global market shares in terms of goods export volumes

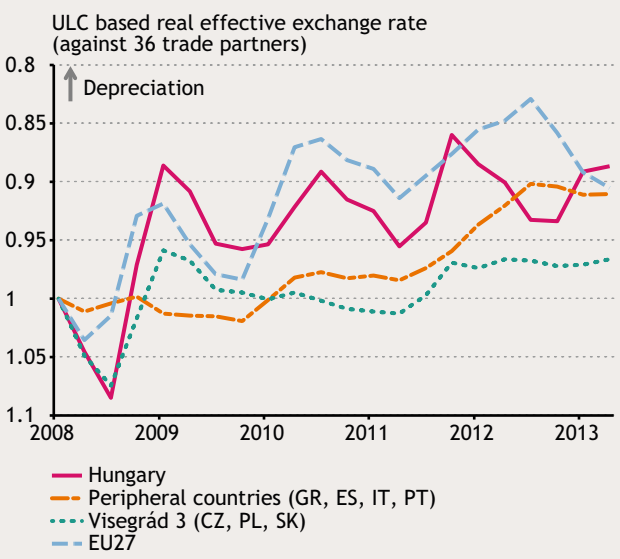


Source: CPB Netherlands, Eurostat.

Hungary's export market share has been impacted by several cyclical factors since the crisis:

- **Hungarian goods exports react particularly sensitively to international business cycles.** The country's export market share tends to decrease at times of global recession and increase during upswings. This is due to the

Chart 11
Changes in unit labour cost (ULC) based real effective exchange rate



Source: Eurostat.

fact that a major part of Hungarian exports consist of semi-finished and intermediate products. These respond to changes in demand even more sensitively than consumer goods, as a result of the inventory behaviour of global production chains.[1]

- **Structural changes in industry may have temporarily worsened Hungary's export market share, especially in 2011–2012.** A decline in capacity in the electronics sector preceded the launch of newly built automotive sector capacities. In the near future, this could be offset as the automotive industry's output begins to pick up.

- **By contrast, depreciation of the exchange rate may have slightly improved the country's export market share.** Although Hungary's real exchange rate has depreciated relatively steeply compared to other European countries (Chart 11), the expected positive outcomes of this depreciation may have been limited by a number of factors. In light of the high volume of foreign currency debt of the private sector, improving price competitiveness could well have been offset by the deteriorating balance sheet position of firms. Furthermore, given that imported raw materials represent a high proportion of exports, the impact of the exchange rate on net exports may be limited. Finally, the bulk of Hungary's exports are destined for a small number of foreign-owned corporations, which keep their books in euros and therefore do not necessarily respond to short-term changes in exchange rate. Market services may have been more strongly affected by the exchange rate: in the first half of 2009, for example, when the forint depreciated sharply, there was a quick and considerable surge in shopping tourism.

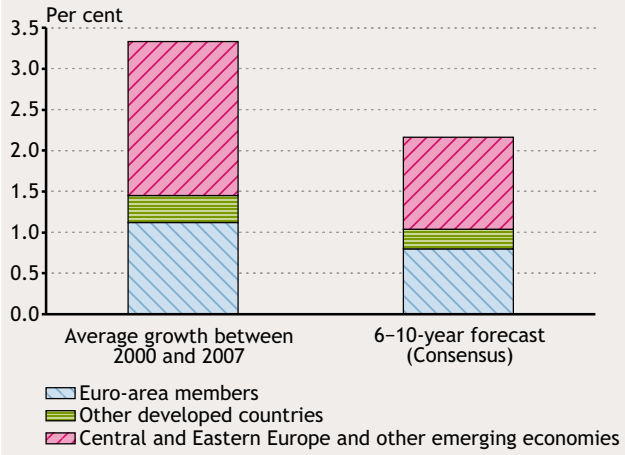
THE CHALLENGES OF EXPORT-LED GROWTH

Looking forward, exports may be the engine of growth over the medium term. In the wake of the global economic crisis, it has become apparent that the growth model based on intense external borrowing requires adjustment. Investors' risk appetite is expected to remain below its pre-crisis levels over the long term, and therefore, less external funding will be available. As a result, convergence must continue in a manner that prevents any significant deterioration in the external balance (MNB, 2010). This also presupposes a better balance of trade than before the crisis. There are three potential ways of achieving export-led growth. First, exports at current prices could increase if both demand on export markets and the volume of exports grow, or if Hungary can achieve better prices on its export markets. Second, improving the competitiveness of exporting companies could result in increasing market shares and thus growing exports. Third, even at an unchanged level, exports may contribute to economic growth to a greater degree if their domestic value added content increases. In the following, we review the extent to which these factors could assist in the transition to an export-led growth model, and examine the key challenges faced by Hungarian exports.

Hungary's export markets may only grow at a more sluggish pace than before the crisis. The period before the crisis was characterised by an underestimation of investment risks. Many countries accumulated debt positions that later proved unsustainable and will take a long time to correct. In overindebted countries, therefore, slow growth can be expected. In addition, global relations in trade and finance also mean that the growth prospects of countries not directly affected by debt have also worsened. Over the long term, certain demographic processes (the aging and shrinking of populations) represent further challenges, especially in more developed regions (Chart 12).

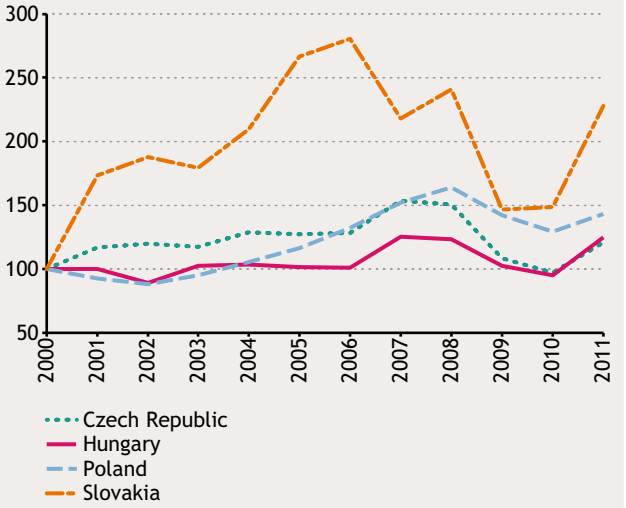
[1] Manufacturers maintain buffer inventories to hedge against the unexpected changes in demand for finished goods, and the volume of such inventories also depends on the expected level of demand. For instance, if sales prospects improve, end-product manufacturers will order intermediate products in volumes sufficient to meet expected demand and maintain a larger buffer inventory. This, moving up the production chain, has a multiplier effect, so that the volatility of orders and production may constantly rise. Altomonte et al. (2012) used European foreign trade figures to study this phenomenon.

Chart 12
Growth in Hungary's key export markets



Note: Weighted average of GDP growth for countries with at least a one-percent share in Hungarian exports, with the weights reflecting respective shares in 2011 exports.
Source: Eurostat, CSO, Consensus Economics, MNB calculations.

Chart 13
Changes in investment volume in the manufacturing industries of the Visegrád countries



Source: Eurostat.

Changes in the geographical and product structure of exports may mitigate the negative impacts of a slower global growth environment. If Hungary can export to regions characterised by relatively higher growth rates and specialise in sectors with relatively better development prospects, its effective external demand will decelerate less than the global economy as a whole. However, entering new markets and changing product structures are extremely costly options for individual Hungarian exporters, and the outcomes are uncertain. A more active engagement in global production chains could be a viable alternative to this strategy. Well-capitalised multinational corporations are also working to strengthen their foothold in the faster-growing markets. By establishing supplier relationships, smaller Hungarian companies could increase their exposure to more dynamic markets at a lower cost and less risk.

In the medium term, competitiveness problems could hinder the expansion of market share. In addition to cyclical factors, the weak dynamics of Hungary's export market share may reflect structural problems as well. The capacities of the export sector are expanding more slowly than in other countries of the region: investment activity in the manufacturing industry has, for a long time, lagged behind the rest of the Visegrád countries, even with recent large-scale investment projects in the automotive industry included (Chart 13). This suggests that Hungary's ability to attract capital may have weakened over the past decade compared to its regional competitors. However, a more in-depth analysis of these issues already exceeds the bounds of this study.[2]

The exchange rate may help improve Hungary's share in goods exports over the medium term, but its impact may remain limited. In economic history, successful episodes of export-led growth have typically been accompanied by an undervalued exchange rate (see for example Rodrik, 2008). In addition to boosting the competitiveness of well-established exporting companies, a weak exchange rate could also make it easier for new exporters to enter the global market. This could be a potentially significant impact: in countries exhibiting significant export growth, new exporters have accounted for almost half of all growth in exports (Freund and Pierola, 2012). However, there is disagreement in the literature as to whether it is the undervalued exchange rate that is responsible for positive export performances or whether the undervalued rate and fast growth are joint symptoms of the same underlying reason.[3] Furthermore, estimates based on figures from manufacturing (e.g. Campa, 2004; Das et al., 2007) suggest that a weaker exchange rate is limited in its ability to facilitate the entry of new exporters to markets. Accordingly,

[2] For a detailed analysis of the issue, see for example Gál (2007) and Martonosi (2013). The Competitiveness Research Network coordinated by the European Central Bank is currently assessing the competitiveness of European economies, including Hungary. The research relies on a wealth of product- and company-level data to obtain the most comprehensive picture about the competitiveness of individual economies and companies, and their impacts on economic output. For the first results, see for example ECB (2013).

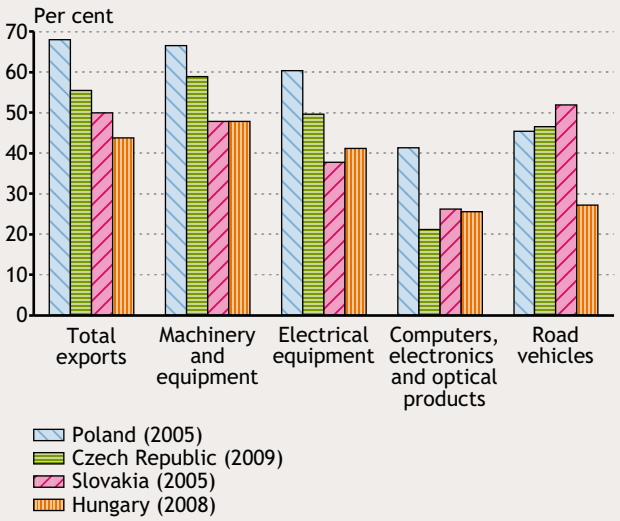
[3] For example, a high rate of savings may lead to undervaluation compared to the equilibrium exchange rate while also contributing to fast economic growth, cf. Berg and Miao 2010.

it is the improved productivity of companies, rather than an undervalued exchange rate, which may play a more decisive role in increasing the number of exporters. Productivity is nevertheless correlated with imports: estimates on Hungary (Halpern et al., 2011) indicate that, in the 1993–2002 period, one-third of the increase in productivity originated from imports of capital goods. As depreciation of the exchange rate makes it more expensive for future exporters to import capital goods, under extreme circumstances, it may even hinder their entry to export markets.

The exchange rate may have a relatively stronger impact on service export market shares. According to Eichengreen and Gupta (2012), the exchange rate has a more pronounced influence on exports in the service industries than on exports of goods. This impact could be particularly notable in modern services (e.g. communications, IT and administrative services). This could have several reasons, such as the lower import content of modern services, the lower costs of entry to export markets or the greater price elasticity of demand of these services. At present, the weight of these advanced sectors within Hungary's service exports is low; therefore, the export-inducing effects of the exchange rate have been limited so far. Looking forward, however, an exchange rate consistently weaker than before the crisis may boost exports of these services to a higher degree.

Finally, as the import content of Hungarian exports is high, there could be potential for growth by increasing the local value added content. Compared to other Visegrád countries, the local value added content of exports in Hungary is low (Chart 14). This may suggest that Hungarian exporters have specialised in the production of components with lower profit margins (and therefore with a lower added value at current prices). In this case, the same composition effect may be reflected in the value added content, which keeps the export price index low. On the other hand, a low local added value content may also indicate competitiveness problems. It is possible that Hungarian suppliers have not been able to integrate properly into international production chains. On a similar note, it is also possible that exports taking place outside the production chains of multinational corporations are weaker than in other countries.

Chart 14
Local value added content of exports



Note: Estimates based on input/output tables for the year shown in brackets after the name of each country.
Source: Eurostat, MNB calculations.

CONCLUSION

In this analysis, we examined developments in the balance of trade during the crisis. The substantial adjustments seen since then were due primarily to setbacks in domestic demand and the related import demand, triggered by the balance sheet adjustments of Hungarian economic agents. In light of the ongoing balance sheet adjustments and the increasing adoption of precautionary behaviour, imports for consumption and investment purposes may only grow at a moderate pace even over the medium term. Exports may nevertheless grow, which will also boost imports of intermediate products.

The volume of Hungary's goods exports is growing at a slower rate than before the crisis. This may be due in part to the fact that, on a global scale, certain large corporations which settled in Hungary during the 1990s saw their competitiveness weaken during the crisis, especially in the electronics sector. The decrease in their output has not yet been offset by the recent expansion in the automotive industry. At the same time, growth in Hungary's volume of service exports was uninterrupted even during the crisis, due in part to the fact that demand for these services is less sensitive to business cycles. The price index of exported goods and services was already at a rather low level before the crisis. While this can be explained in part by the geographical and product structures of Hungarian exports, the low export prices may also reflect lagging competitiveness.

Hungary's share in exports of goods has been decreasing since the crisis and its services export share is stagnating. Several cyclical factors have influenced the country's share of the export markets since the onset of the crisis. External demand has contracted considerably, which has hit Hungarian exports very hard, given the significant weight of semi-finished and intermediate products. Structural changes

in industry may have also contributed to a temporary decline in Hungary's export market share. On the other hand, the country's real exchange rate has depreciated to a greater extent than in other European countries, which may have mitigated these effects.

The crisis has revealed that the previous growth model based on external borrowing is no longer sustainable. Therefore, future growth must not come at the price of significant deterioration in the external balance. As long-term growth prospects for Hungary's export markets are low, this might pose challenges to an export-led recovery. This obstacle may be overcome by having Hungary's exports realigned further towards faster-growing regions. Increasing Hungary's export market share may also be limited by structural factors, as reflected by the slow growth in export sector capacities. The exchange rate can play a limited role in increasing the country's market shares over the medium term, particularly in the service industry. Finally, improving the value added content of exports might also represent a potential for growth.

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Szilárd Erhart, Gergely Kicsák, Zsolt Kuti, Zoltán Molnár and Zoltán Monostori: Doing it differently or The impact of the financial crisis on central bank balance sheets in emerging economies

This study investigates changes in central bank balance sheets and the non-conventional central bank measures triggered by the crisis. The trend of rapid expansion in central bank balance sheets and the resulting higher need for sterilisation is not solely a Hungarian phenomenon, it represents a challenge for many central banks around the world. Responding to a variety of exchange rate and financial crises since the end of the 1990s, the central banks of emerging economies have gradually increased their foreign exchange reserves. Due to the large weight of foreign exchange reserves in the balance sheets, total assets of the central banks in emerging countries also increased considerably. Later, after the 2008 financial crisis, advanced economies saw sudden increases in their central banks' balance sheet totals following non-conventional operations and asset purchase programmes. The expansion of central bank balance sheets and the increase in the surplus liquidity of the financial intermediary system has caused changes to central bank liabilities and their structures. Following an assessment of the global situation, we present eight case studies analyzing, central bank balance sheets of emerging economies.

INTRODUCTION

The reasons for the expansion in central bank balance sheets differ widely. In emerging economies, balance sheet totals have been increasing since as early as the late 1990s, due to the rise in their assets and, within this, their foreign exchange reserves. This made it necessary to reconsider the liability side of central bank balance sheets and sterilisation. The financial crisis of 2008 and the ensuing non-conventional measures, asset purchase programmes and central bank loans have led to a similar situation in the advanced economies.

Sterilisation, in other words the absorption of the increased liquidity from the financial intermediary system due to asset-side trends, became a more important task than before. Central bank securities and deposit operations played a key role in sterilisation. In emerging economies, the increase in currency holdings contributed significantly to offsetting the liquidity surplus.

In this Bulletin article, following the introduction, we present the overall structure of central bank balance sheets and summarise the key findings concerning the expansion of central bank balance sheets in the economic literature. We then discuss the transformation of central bank assets and the related actions to adjust liabilities, with special focus on the sterilisation instruments. Finally, we outline brief case studies of eight emerging economies.

THE STRUCTURE OF CENTRAL BANK BALANCE SHEETS

The responsibilities of a central bank stipulated by law (currency issuance, monetary policy operations, account management and payments, foreign exchange reserve management, etc.) all impact the central bank's balance sheet (Table 1). Central banks have no direct influence over several of these factors, which are therefore called *autonomous factors* in the literature on central bank balance sheet and liquidity management.

The most important autonomous factors are net receivables vis-à-vis the rest of the world (E2), which – in small, open economies – are influenced primarily by the amount of foreign exchange reserves,[1] the receivables from the

Table 1
Simplified central bank balance sheet structure

Assets	Liabilities	
E1. Receivables from banks	F1. Liabilities to banks	
	a. deposits	
	b. securities	
	F2. Settlement accounts of banks	
E2. Net receivables vis-à-vis the rest of the world	**F3. Currency in circulation**	} Autonomous factors
E3. Receivables from the government	**F4. Deposits by the government**	
E4. Other domestic receivables	**F5. Net other items**	

government (E3), and the liabilities to the government (F4) and, finally, the currency in circulation (F3) and other items (E4 and F5) in the central bank balance sheet.

The growth of central bank balance sheet totals in recent years is attributable largely to the measures by central banks on the asset side (items E2, E3 and E4) (cf. below for details).

LITERATURE REVIEW

Starting from the 1990s, economic research began to focus on the independence of central banks, including operational independence, and on the impacts of fiscal policy measures on the central bank (management of government debt, foreign exchange reserves, etc.) (Hawkins, 2003). Furthermore, the experience from different exchange rate and financial crises in the late 1990s (Asian crisis, Russian crisis, Argentine crisis) motivated many central banks to boost their foreign exchange reserves, which resulted in significant changes to their balance sheets (Antal and Gereben, 2011). Aizenman and Glick (2008) analysed the efficiency of sterilisation in Asian and South American countries.

Following the 2008 financial crisis, the subject has come to the fore due to the changes in the balance sheets of central banks and financial enterprises. Filardo and Yetman (2011) undertook a detailed analysis of the balance sheets of Asian central banks, discussing the reasons and consequences of the expansion of their balance sheets. Mehrotra (2012) also chose Asian central banks to analyse the monetary policy impacts of using central bank bonds.

Krekó et al. (2012) published a comprehensive study of non-conventional operations, another new branch in the literature, which is related to our analysis. Non-conventional operations are primarily impacting the balance sheets of central banks in advanced economies.

Our study adds a number of observations to what is already available in the literature. We provide a detailed overview of the global reasons for the changes in central bank balance sheets. In addition, we focus our analysis on the sterilisation practices of certain countries in the Central and Eastern European region, which have received less attention in earlier analyses. Our case studies provide up-to-date information on the practices in countries already discussed in the literature.

CENTRAL BANK ASSETS

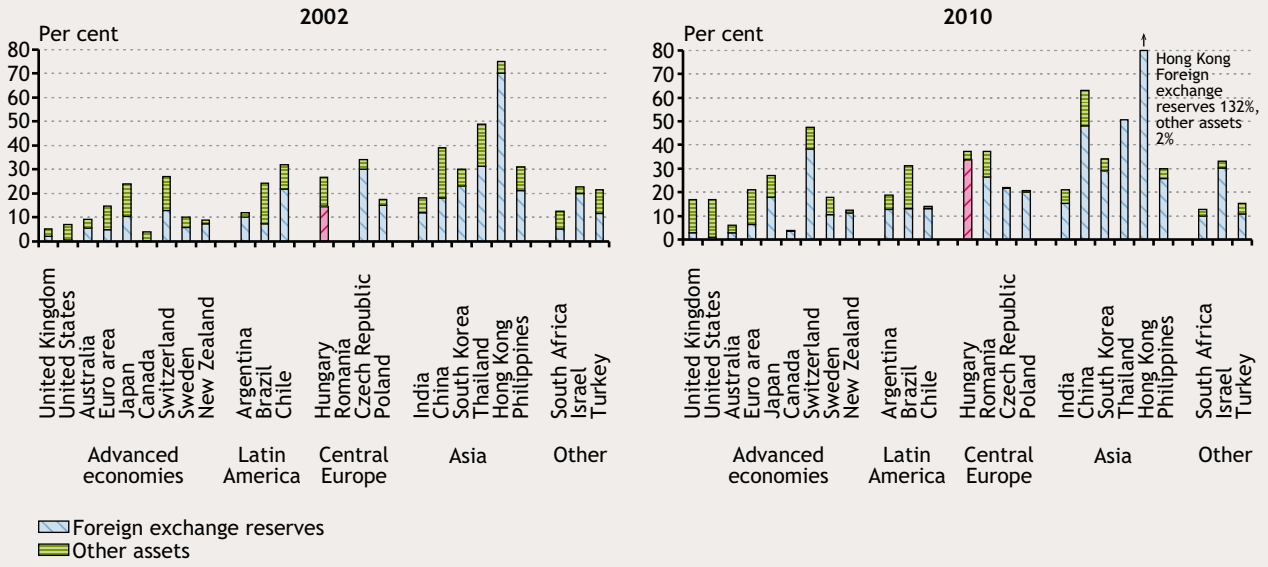
Central bank balance sheets expanded considerably in both emerging economies and (for somewhat different reasons) advanced economies. Foreign exchange reserves continue to be the key, dominant item on the asset side of central bank balance sheets; however, the actions taken by central banks in response to the crisis have triggered an increase in receivables from domestic sectors, especially in the advanced economies.

In 2002, the average ratio of central bank assets to GDP was 12 per cent (disregarding Switzerland and Japan),[2] with this ratio rising to 19 per cent after the 2008 financial crisis. In certain countries (United States, euro area, United Kingdom), the proportion of other assets (e.g. government securities) increased spectacularly, primarily as a result of non-conventional central bank operations, while the increase in foreign exchange reserves played a role in only a few of the advanced economies.

[1] A central bank is able to influence the amount of foreign exchange reserves, but does not have full control over changes in foreign exchange reserves in the event of an intervention. As a result, net receivables vis-à-vis the rest of the world are typically reported as autonomous items.

[2] Intervention in Switzerland and quantitative easing in Japan throughout the 2000s has bloated their balance sheets; their special situations and the extreme shifts in their figures would have had an above-average impact in shifting the sample *(outlier effect)*.

Chart 1
Foreign exchange reserves and other assets as a pecentage of the GDP



Note: The figures for balance sheet totals for the United Kingdom, United States and China in the chart on the left are from 2001. The figures for the United Kingdom, United States, Australia, the euro area, Japan, Canada, India, Korea, Thailand, Hong Kong and the Philippines in the chart on the right are from 2011.
Source: IMF–IFS, OECD MEI, Hawkins (2003), Filardo and Yetman (2011), central banks.

Emerging economies responded to the challenges of the financial crisis primarily by increasing their foreign exchange reserves, which rose to 86 per cent of their central bank balance sheet total. The process of boosting reserves had started earlier. Several countries started to increase foreign exchange reserves significantly in the wake of the exchange rate crises of the late 1990s resulting in serious real economy costs. The trend of reserve accumulation was further reinforced by increased economic openness. As a result, the ratio of central bank assets to GDP in emerging economies was already much higher (29 per cent) in 2002 than in advanced economies. Although many central banks have made their exchange rate arrangements more flexible over the past decade by switching from a fixed or quasi-fixed system to a wider currency band or a floating exchange rate, many countries still continued to buy foreign currency to retain competitiveness and prevent appreciation of the domestic currency, which also resulted in higher foreign exchange reserves. Hence, the emerging economies held, on average, central bank assets worth 34 per cent of GDP in 2010, 5 percentage points more than in 2002. Of all the emerging economies, it was the Asian central banks that boosted their balance sheets to the greatest extent. In raw material exporter countries, a trade surplus also contributed to an increase in reserves.

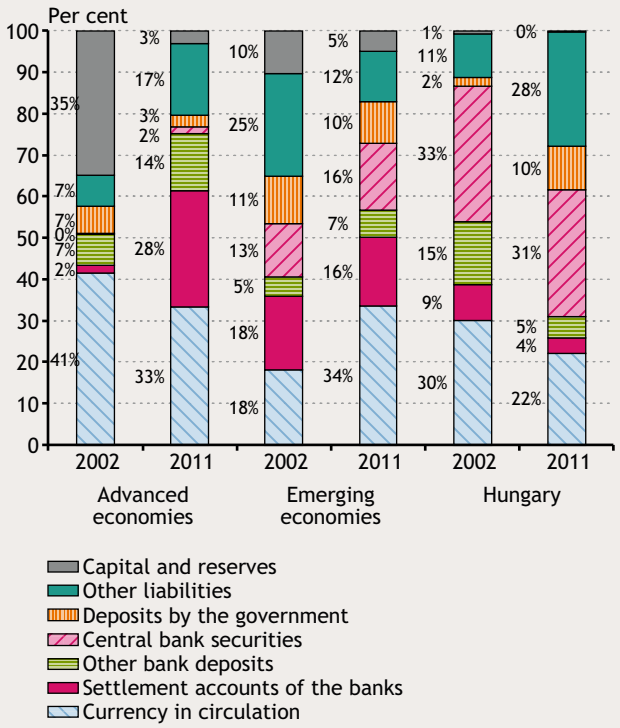
CENTRAL BANK LIABILITIES

Transformation of assets triggered changes of liabilities as well. In respect of liabilities, we see substantial differences between the trends observed in different groups of countries,[3] which can be attributed mostly to the differences in the objectives of the central banks and to the development of their financial intermediary systems.

In 2002, central bank liabilities were dominated by currency (41 per cent) and capital and capital reserves (35 per cent). The weight of capital items within the central bank balance sheet had fallen considerably by the early 2010s, presumably due to central bank losses and the constrained fiscal room for manoeuvre and also to the expansion of the central bank balance sheets. The increasing popularity of cashless payment instruments also caused a decrease in the currency ratio. At the same time, the importance of

[3] There is a lack of comprehensive time series and cross-section figures relating to central bank liabilities; therefore, we used the following four sources of data to investigate the subject:
– BIS figures – (2002, sample per continent and country; Hawkins, 2003);
– IMF IFS Central Bank Survey and Non standardised survey (2002-, 2011);
– Filardo and Yetman (2011) (2001 and 2010 figures);
– Data collected by the authors (for 2011).

Chart 2
Weights of individual liability items within central bank balance sheets



Note: We used 2010 figures for Asian central banks and Switzerland; otherwise 2011 figures. Brazil, Mexico and Peru are missing from the 2011 sample of emerging economies, which may distort slightly upward the ratio of central bank securities within the group of emerging economies.
Source: IMF–IFS, Hawkins (2003), Filardo and Yetman (2011), central banks (2011).

settlement accounts increased significantly throughout the advanced economies, from 2 to 28 per cent. This may be due to underlying changes in the terms of central bank settlement accounts,[4] which commercial banks, responding to the contraction in interbank market liquidity, exploited and increased their own liquidity reserves. In addition, the weight of other bank deposits and other liabilities increased considerably in the euro area, which caused the structural change observed in the advanced economies (Chart 2).

On the liability side of emerging countries' central bank balance sheets, currency and settlement account balances, which incorporated the mandatory reserves, represented near equal weights in the early 2000s; capital and reserves were somewhat lower, as were central bank securities and government deposits. From that position, it was the ratio of currency that increased the fastest until the early 2010s (from 18 to 34 per cent) for numerous reasons (rapid economic growth, a cash-intensive period of financial development, black-market economy). The weight of central bank securities also increased, albeit to a smaller degree. The ratio of government deposits and settlement account deposits did not change substantially, while the weight of capital items fell, due to reasons similar to those in the advanced economies (central bank losses and limited fiscal room for manoeuvre, also, in part, the expansion of central bank balance sheets).

KEY ISSUES RELATED TO STERILISATION VIA CENTRAL BANK SECURITIES

The changes to the liability structure outlined above were mainly attributable to the fact that sterilisation, the absorption of increased liquidity from the financial intermediary system, became a more important task than before. Central banks sought to transform the set of instruments available to them in such a manner as to ensure that they could respond to the greater need for sterilisation in increasingly sophisticated ways, increasing the ratio of market-conform solutions. As a result, central bank securities played a key role in sterilisation in the emerging economies; we have therefore taken a separate look at these securities.

The maturity of central bank securities was typically around 0.5 years in the emerging economies. For sterilisation purposes, the Czech, South African, Polish and Hungarian central banks used securities with maturities of 1 or 2 weeks, well below the average. The central banks of Chile, Mexico, Thailand and Korea were able to issue securities with the longest maturities.

The value of central bank securities as a percentage of GDP was the highest in Hong Kong, which held the highest foreign exchange reserves. But growth was the most dynamic in Thailand, Israel and Hungary, as the value of securities as a percentage of GDP grew by more than threefold in the period 2000–2010.

Mehrotra (2012) indicates that the Asian central banks primarily used central bank securities to sterilise the surplus liquidity generated by the rise in foreign exchange reserves. This study ran empirical analyses and revealed that central banks faced with higher inflation and stronger capital inflows tended to choose longer maturities for their sterilisation instruments. A further disadvantage of

[4] Several countries introduced interest rates tied to central bank interest rates and limits on account balances were removed.

Table 2
Value of central bank securities as a percentage of GDP and their average maturity

	Total outstanding (as a percentage of GDP)			Maturity distribution (at the end of 2010)			
	2000	2005	2010	Below 1 year	Between 1 to 3 years	Above 3 years	Average remaining maturity (years)
Asia							
China	0	12.2	10.3	70.3	29.7	0	
Hong Kong SAR	8.2	9.2	37.5	91.9	4.5	3.6	0.5
South Korea	11	17.9	13.9	63.5	36.5	0	0.8
Thailand		8.4	23.6	68	26	6	1
Latin America							
Argentina	0	4.6	4.7	88.1	11.9	0	0.5
Brazil	7.3	0.3					
Chile	29.9	15	8.6	25.9	36.6	37.6	3.4
Mexico	0	2.7	2.7	61	36	3	1.1
Peru	0.7	3.4	0.8	100	0	0	0.3
Other							
Czech Republic	18.3	23.5	19.1	100	0	0	0.01
Hungary	3.5	0.2	11.3	100	0	0	0.02
Israel	5.7	14.5	18.4	100	0	0	0.5
Republic of South Africa		0.3	1	100	0	0	0.5
Poland			4.4				0.01

Source: Filardo et al. (2012), the central bank of Poland.

sterilisation instruments with shorter maturities is that they may contribute to taking short-term positions. The study finds that, given the increase in inflation risks in Hungary, the central bank should consider extending the sterilisation maturities. In response to the 2008 crisis, several central banks cut the average maturities of their securities, although they began to lengthen maturities again as the consolidation process started. The case study of the central bank of Chile in this paper reveals that the maturities of central bank securities became shorter only temporarily during the crisis.

Overall, the need for sterilisation increased as a result of the rise in foreign exchange reserves and was managed by many central banks by the intensified issuance of securities. Sterilisation by issuing central bank securities is easier if the budget deficit and government debt is low, because that allows a central bank to act practically as the sole sovereign issuer on the market and enjoy greater room for manoeuvre (Korea, Chile). Higher domestic savings and demand for securities can make the process even easier, so that the market may even have two issuers appearing, and in this way, it should not be a problem to manage higher government debt and sterilisation (Israel).

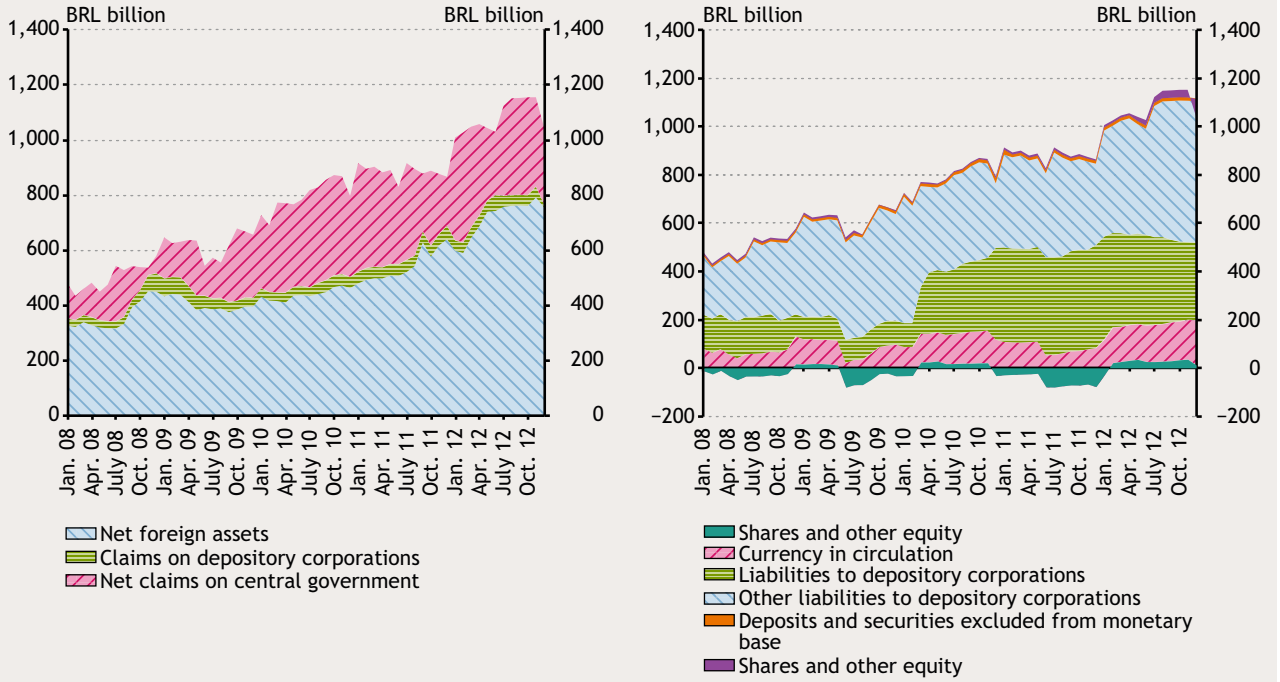
CASE STUDIES

In addition to briefly outlining the general trends, we have prepared case studies of emerging economies to present the trends in the individual countries and the resulting changes to the sterilisation instruments of central banks. We selected countries for our analysis with the aim of compiling a sample of countries similar to Hungary in terms of macroeconomic and other relevant criteria (vulnerability, central bank operations, exchange rate system, etc.). Looking at macroeconomic criteria, we find that Hungary is a vulnerable country primarily because of the high government debt, the limited growth outlook, the high proportion of short-term funds and the ratio of foreign exchange reserves to short-term funds, i.e. the low value of the so-called Guidotti indicator.

Brazil

The balance sheet of the central bank of Brazil (Banco Central do Brasil, BCB) grew from 19.1 to 23.4 per cent of GDP from 2008 to the end of 2012, which represents nominal growth of two and a half times. Most of this growth was attributable to foreign exchange reserves; consequently, the

Chart 3
Assets and the liabilities of the Brazilian central bank



central bank's reserves cover short-term external debt by a factor of 4.5, which is a reserve indicator that investors focus on. The Guidotti indicator is at 450 per cent. The changes in foreign exchange reserves are dependent on the open market operations of the Brazilian central bank, in relation to its floating exchange rate policy. Growth in the period was attributable primarily to purchases of foreign currency through interventions in the domestic foreign exchange market, and secondly to returns on reserve investments and also to other factors such as the increase in the price of securities in which the reserves were invested.

Over the short term, the BCB uses six-month repo transactions to absorb the liquidity of the banking system, but the main role in the sterilisation process is played by the system of mandatory reserves. The BCB stipulates different reserve rules for different types of deposits. The reserve requirements became more loose when the crisis broke out, but have been slowly but gradually increased since 2009. In making these small incremental raises, the BCB is balancing between the need to achieve the inflation target and stimulating growth.

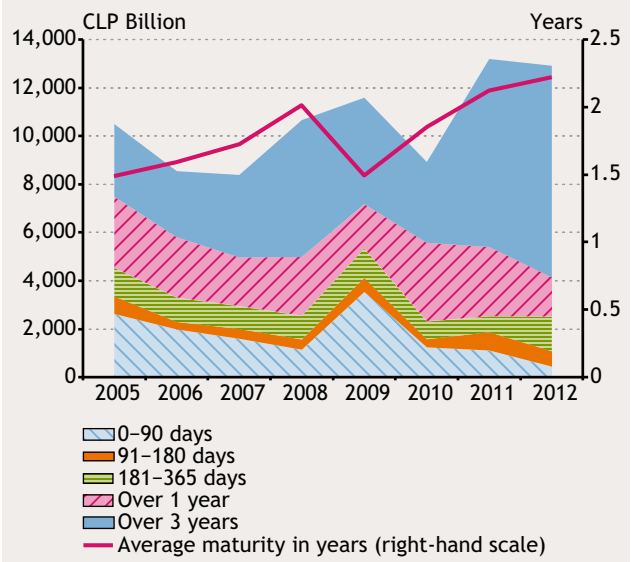
Immediately after the onset of the crisis, the BCB set up a credit line to boost growth and lending, with the aim of ensuring the foreign exchange liquidity of domestic companies and primarily the export sector. These tools are no longer among the monetary policy instruments applied by the Brazilian central bank.

Chile

The balance sheet of the central bank of Chile (Banco Central de Chile, BCC) has been growing considerably for a long time now. The period of growth before the crisis can be divided into three sections: first, the financing for rescuing the banking system in the first half of the 1980s; second, the increase in foreign exchange reserves first in the 1990s;[5] and third, the intensive interventions between April and September 2008, immediately before the crisis. The latter was a response by the central bank to the extreme growth in short-term external debt. The country's international reserves resumed their strong growth in 2011, rising by 42 per cent nominally (to 14 per cent of GDP). The increase of reserves in 2011 also improved the Guidotti ratio considerably. This is in part due to the fact that 90 per cent of the main source of the reserves, namely sterilisation bonds, are held by domestic agents, and in part due to the fact that while the country's external debt also increased, this mostly took the form of long-term debt, as a result of which Chile's overall vulnerability decreased. Another major item on the asset side of the central bank balance

[5] In the narrow-band exchange rate system maintained until 1999, the central bank used interventions to constrain appreciation, but the foreign exchange revenues of the government (the copper exports of a state-owned company) also contributed to the increase in surplus liquidity.

Chart 4
Maturities of the securities issued by the Chilean central bank

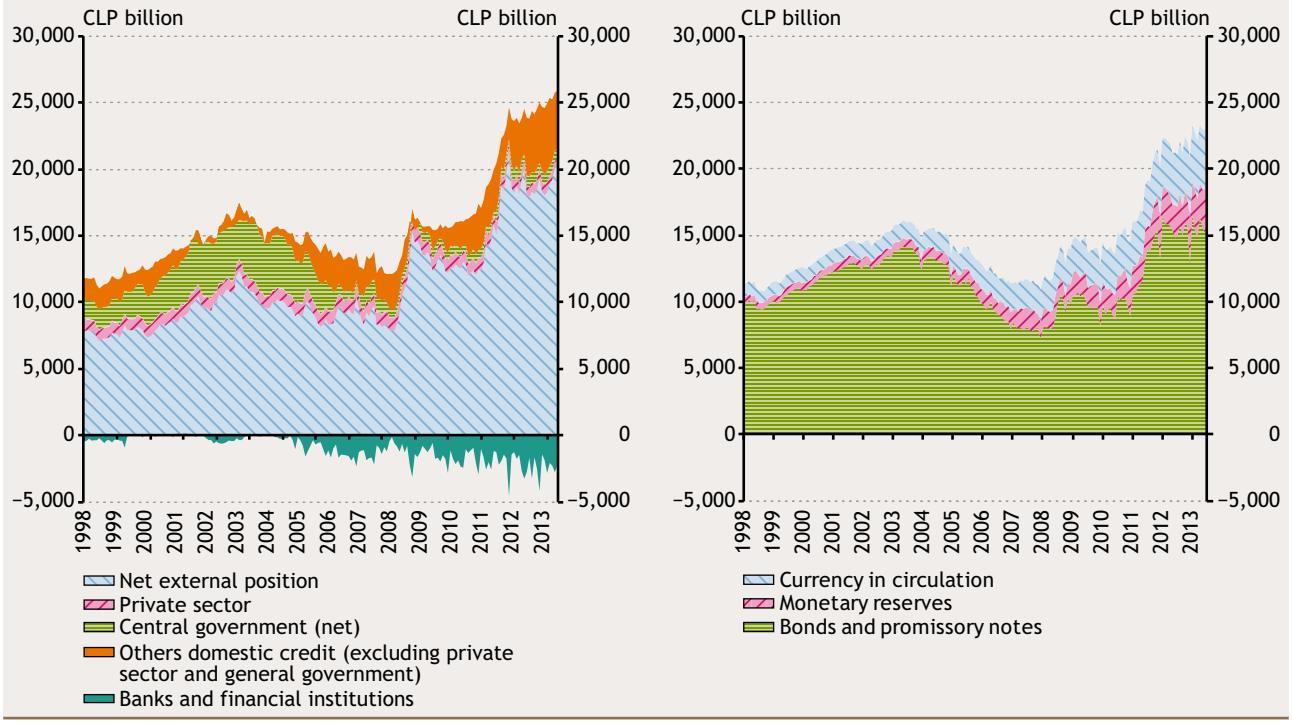


sheet is a loan portfolio approximating 15 per cent of the balance sheet.

Growth on the asset side was predominantly financed by the increase in sterilisation instruments (to 11 per cent of GDP), a result of repeated interventions. Also on the liability side, currency continued to grow, as did equity, which turned sharply negative in 2009 and 2010. This was mostly due to the appreciation of the peso by 20 per cent, which caused a considerable revaluation in the central bank's liabilities denominated in USD. Later, in 2011, the central bank's equity started to increase (although it was still negative). All of this demonstrates that financing the foreign exchange reserves from pesos is causing considerable losses to the Chilean central bank.

The Chilean central bank has one of the most diverse offerings of bonds. The most important reason for issuing the bonds is the fact that the government does not issue peso securities, as its budget achieved a surplus of 1 or 2 per cent of GDP on average in every year throughout the 1990s (as a result, total government debt is still only 11 per cent of GDP). In the absence of government securities, the central bank was left with the task of developing the market of sovereign peso bonds and building the yield curve. Central bank bonds also stand at 11 per cent of GDP, their maturities are up to 20 years, and, along with fixed-interest papers, inflation-indexed bonds also play a rather important role. The ratio of papers with shorter maturities increased temporarily during the financial crisis, and then in 2010 the ratio of securities of over three years increased considerably, and the average maturity of the central bank's securities became longer once again. Another

Chart 5
Assets and the liabilities of the Chilean central bank



characteristic of these securities is that there used to be many, fragmented series, and moreover, their payment terms also deviated from international standards (they were annuity-type papers). Recently, however, the central bank has issued longer series of conventional bonds. Besides banks, other investors can also make purchases on the primary market and the issues also serve short-term liquidity management purposes. The central bank also has yield-curve building objectives, in which it takes into account monetary policy considerations as well.

In order to implement monetary policy, the central bank uses open-market operations to approximate interbank interest rates to the base rate. As another monetary policy instrument, the BCC introduced an instrument called FLAP (Facilidad de Liquidez a Plazo, term liquidity facility) in July 2009, when the base rate was 0.5 per cent; it used FLAP to provide liquidity to the banks for 90–180 days at the prevailing base rate, underpinning its communications in which it declared its intention to keep the base rate low over the long term.

The BCC did not use any lending stimulus, because credit activities were uninterrupted and growing at an appropriate rate.

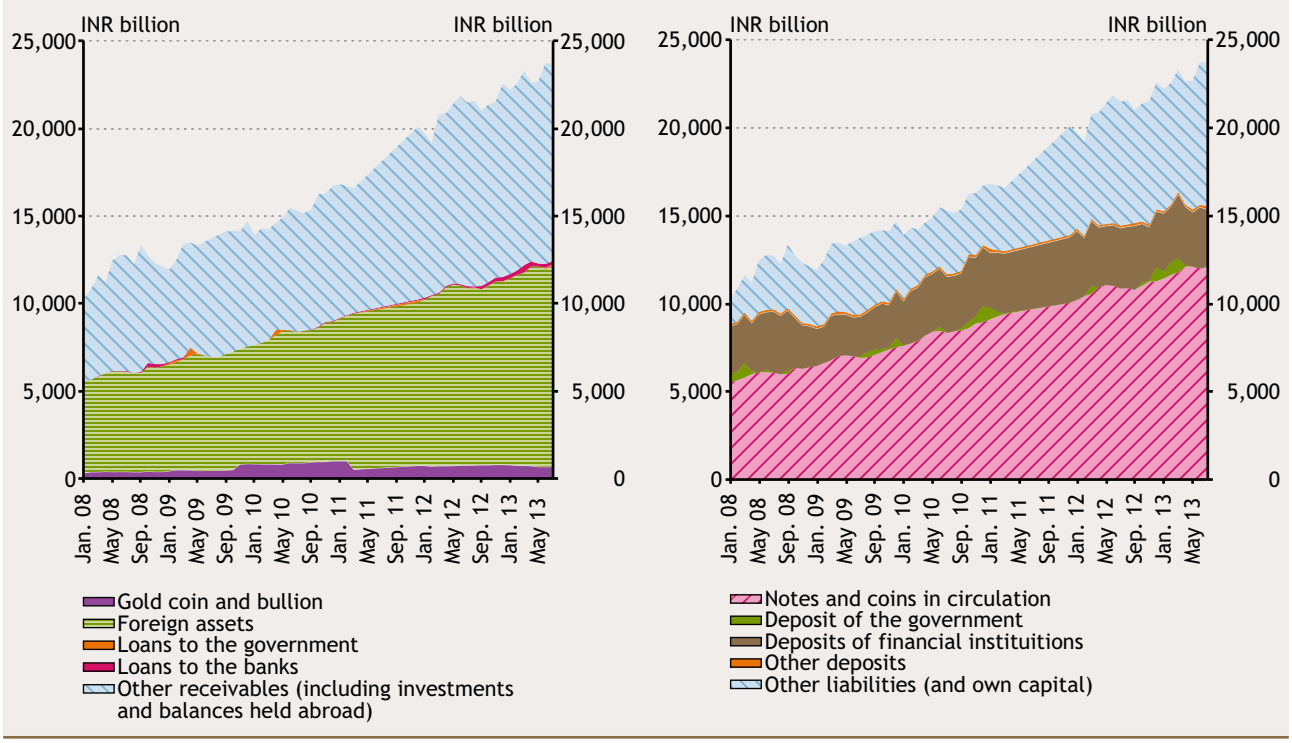
India

The total assets of the Indian central bank (Reserve Bank of India, RBI) have doubled since early 2008, although this growth is relatively small when expressed as a percentage of GDP, at nearly 1.5 percentage points (from 21.6 per cent to 23.2 per cent). Expansion of the balance sheet was primarily due to the increases in gold and foreign exchange reserves, which in turn was mainly connected to high inflows of foreign capital. At their new higher level, the reserves cover short-term external debt several times over and the Guidotti indicator was above 350 per cent in mid-2013.

The central bank manages liquidity with short- and medium-term repo transactions and by stipulating a minimum reserve ratio for banks. However, the growth in foreign reserves was offset on the liability side mostly by currency in circulation, which was a large contributor to the persistence of inflationary pressures.

Instruments specifically aimed at boosting growth include the Export Credit Refinance Facility, which is intended to stimulate lending to the export sector. The Indian central bank raised the refinancing facility in 2012 from 15 per cent

Chart 6
Assets and the liabilities of the Indian central bank



of export loans to 50 per cent of the loans disbursed. In case of the decreasing inflationary pressures, the central bank will stimulate growth with monetary easing, which it plans to achieve by cutting the base rate and the minimum reserve requirements.

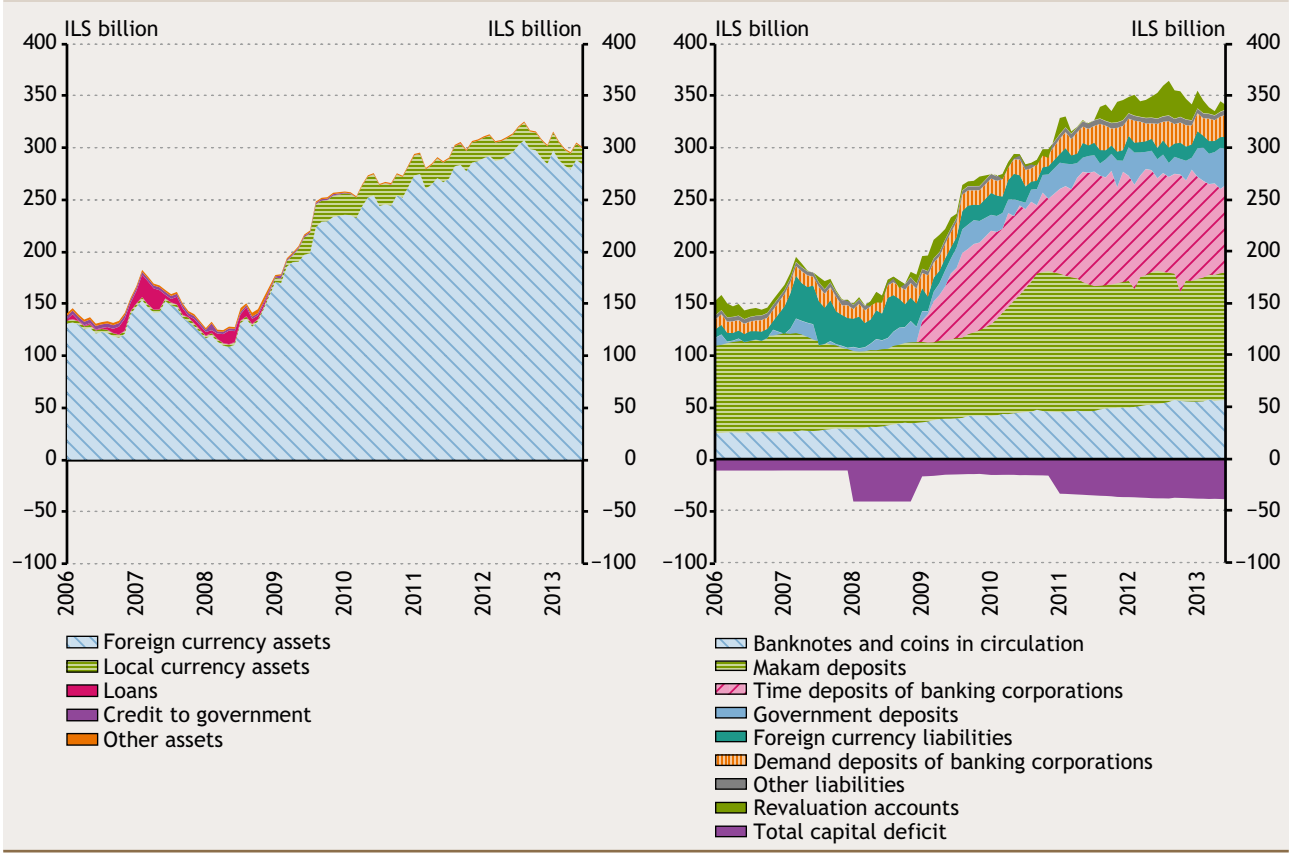
Israel

The balance sheet of the central bank of Israel (Bank of Israel, BoI) grew substantially, expanding by nearly two and a half times in the period 2008 to mid-2012. In the past year, however, the central bank balance sheet decreased slightly, amounting to 32 per cent of GDP in mid-2013. This increase is attributable mostly to the central bank's interventions: for the first time after 1997, the BoI entered the spot currency market in March 2008 and it continued to buy foreign exchange more or less continuously until 2011. At that point in time, the dynamic growth in GDP and the related increase in short-term debt demanded an increase in the reserves and, furthermore, the appreciation pressure generated by the high inflows of capital also had to be offset with interventions on the currency market. Besides the reserves, the only major item on the asset side of the central bank balance sheet is domestic securities. BoI gives the banks one-day and one-week loans, but demand for these is low as there is surplus liquidity across the system.

The banking system can place deposits with the central bank for one day, one week or any other term depending on the situation on money markets. The other group of sterilisation instruments is makams, which are discounted bills with maturities ranging from 3 months to 1 year; these also contribute to the development of the securities market. They are subject to secondary trading on the stock market and changes in their prices are of key importance in terms of the market's inflation expectations. Following interest rate rises starting in 2010, makams attracted considerable speculative interest, and therefore the central bank has recently sought to reduce their importance. Tax was levied on non-residents' yields on makams.

In an international comparison, the sterilisation instruments of the banking system have a total which is rather high compared to the size of the economy: bank deposits and makams together account for 26 per cent of GDP. The state of Israel and the central bank may compete for sources of funding, because government debt and the sterilisation

Chart 7
Assets and the liabilities of the Israeli central bank



bond total are both high, but the longer maturities of government debt make segmentation easier.

Instruments also include one-week repos of both directions, but these have not been used since 2009. The central bank employs active liquidity management, conducting all of its lending and liquidity absorption operations with variable-priced, pre-announced quantities, which means that the concept of availability does not apply to any of the instruments.

Sight deposits originating from the minimum reserve requirement are also shown under liabilities. Current accounts are liable to a 6 per cent rate and other short-term funds to 3 per cent. In order to further offset inflows of hot capital, the central bank imposed a further 10 per cent reserve ratio on foreign exchange denominated derivatives in January 2011, as this instrument reduces the yields of non-residents realised in shekels. No interest is paid in any of these cases. Besides bank deposits and makams, the third major liability item is currency in circulation.

In early 2009, the Israeli central bank reduced the base rate to 0.5 per cent and therefore, to provide further monetary stimulus, it started buying government securities on the secondary market. The aim of these purchases was to bring down the longer segments of the yield curve and thus improve lending and business conditions. The central bank applied three criteria in conducting this programme:

- It had to limit itself to purchases on the secondary market to avoid an accusation of monetary financing.
- The central bank sterilised the resulting surplus liquidity, although this had only marginal importance in view of the interest rate being close to zero.
- The purchases did not jeopardise the fundamental goals of monetary policy (inflation).

The total amount purchased ended up at ILS 18 billion, equal to approximately 7 per cent of the central bank balance sheet at the time. It is estimated that the scheme cut long-term yields by 30–40 basis points. When the yield on 20-year bonds fell to 6.1 per cent by the end of the summer of 2009, the central bank stopped the purchases. Given the constant capital inflow pressure, the purchases of government securities and the interventions on the currency market played an important role in reducing the appreciation pressure exerted on the exchange rate. A rate hike cycle started in September 2009 and as interest rates have not returned to near zero since then there has been no further consideration of asset purchases.

The only instruments the central bank of Israel also uses today are liquidity management facilities, as justified by the constantly increasing path of lending by the banking system.

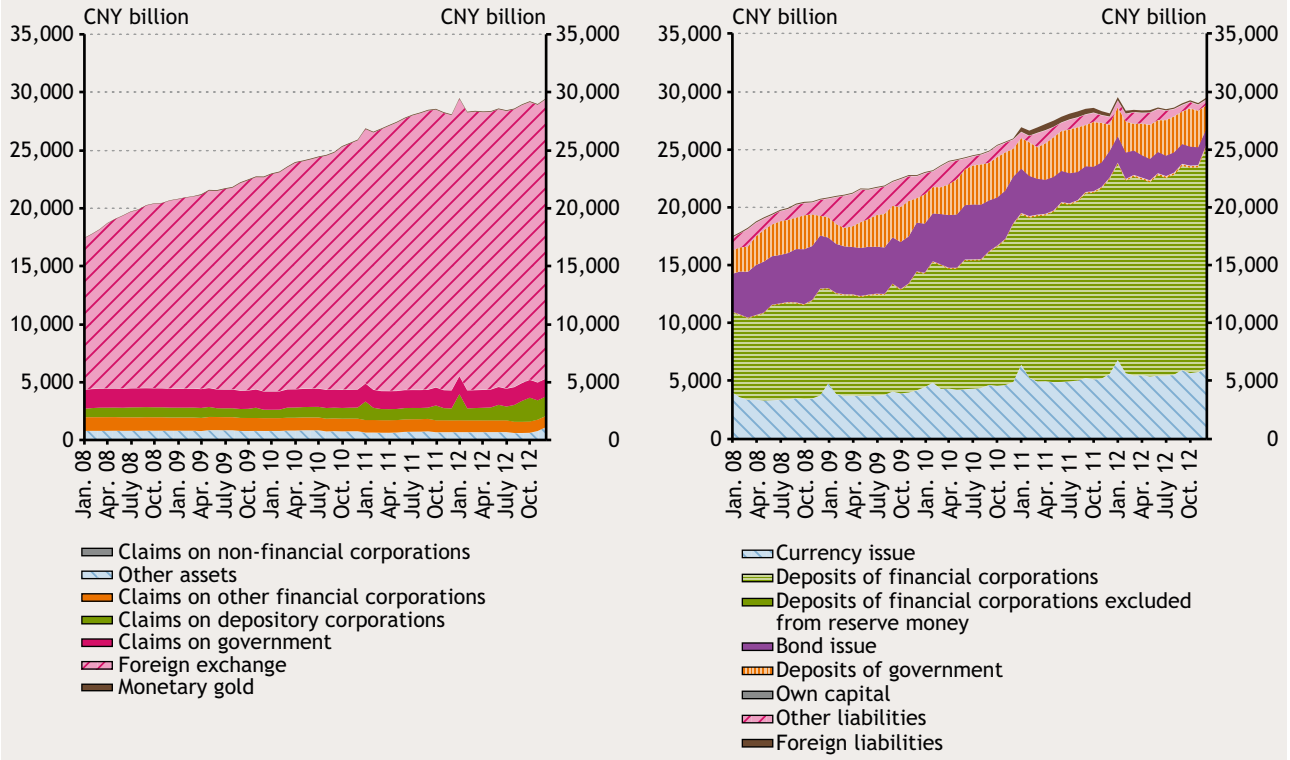
China

The balance sheet of the Chinese central bank (People's Bank of China, PBC) grew from CNY 17,000 billion in January 2008 to CNY 28,000 billion by the end of 2011, which however represented a decline of 5 percentage points expressed as a ratio to GDP. The growth in the assets of the central bank is almost entirely due to the increase in foreign exchange reserves, accumulating from the foreign exchange purchases of the central bank in the course of its managed floating of CNY. Its immense foreign exchange reserves are equal to eight times its external debt and its Guidotti ratio is therefore above 800 per cent. The intervention of the central bank on the currency market is aimed at preventing any substantial appreciation of CNY, as the central bank works on underpinning exports and therefore growth.

On the liability side, required reserves and currency grew the most. Notably, however, there has been a continued decrease in bonds issued since 2008. The central bank started to issue three-month, six-month and one-year central bank bonds in 2003. Since December 2004, it has also been selling longer-term, three-year central bank bonds. It sells the shorter securities to credit institutions reporting fast growth in credit and exhibiting substantial surplus liquidity. Central bank bonds decreased as planned, both nominally and as a ratio of GDP, from 15 per cent in 2006–2008 to 6 per cent in 2010–2011. In addition to the bonds, the Chinese central bank introduced other instruments as well (minimum reserve regime, FX swap, OMO). It is apparent that the PBC sterilises the surplus liquidity generated by the growth in foreign exchange reserves by using the minimum reserve rate. Also, it sets reference credit and deposit interest rates to influence banks' interest rates and it issues central bank bonds with short maturities.

Each year, the PBC relies on the economic stimulus objectives of the state leadership to determine its planned loan issuing and uses the reference credit interest rate to motivate the banks to achieve the loan quantity target. The sectors supported by lending activities are micro and small businesses, key national projects and agriculture (especially rural areas and small producers).

Chart 8
Assets and the liabilities of the Chinese central bank



South Korea

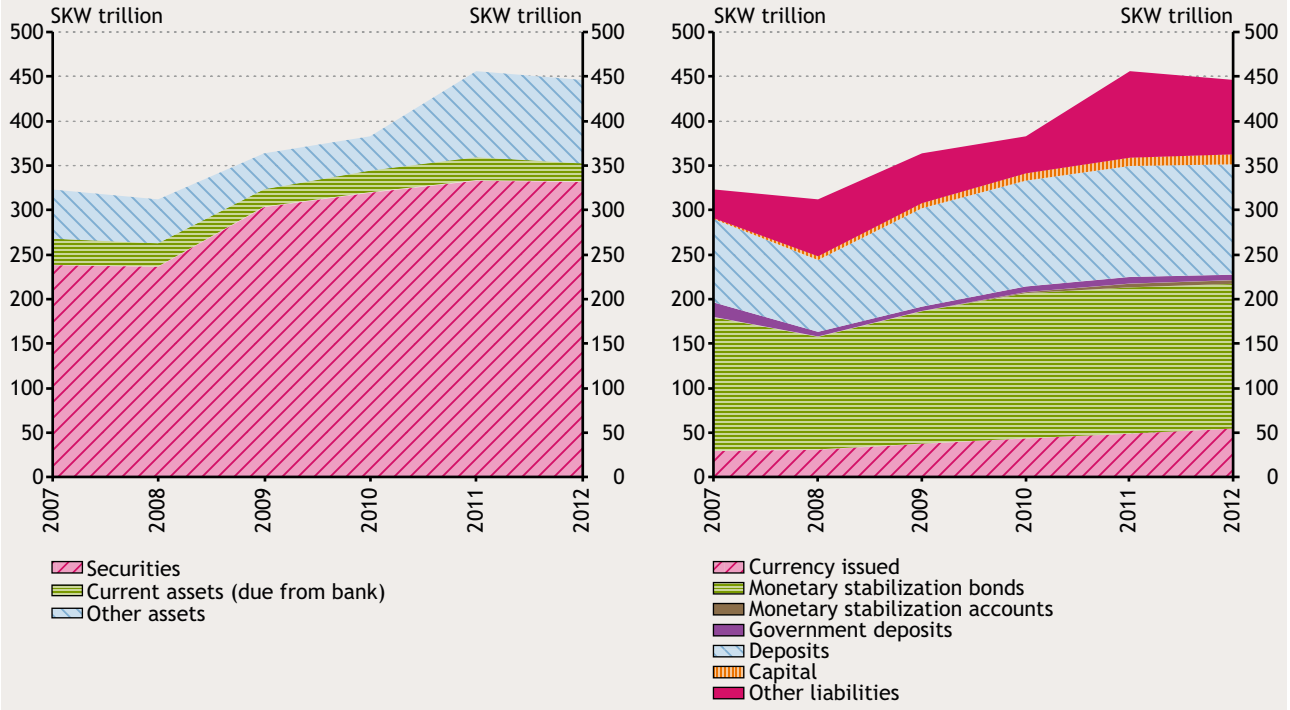
The balance sheet of the central bank of South Korea (Bank of Korea, BoK) increased nominally by almost one and a half times in the period 2008–2012, mostly due to the substantial increase in foreign exchange reserves, which is the dominant item on the asset side. At the end of 2012, the country's international reserves were equal to 29 per cent of GDP, which was several orders of magnitude higher than short-term debt.

The liability-side instruments used by the South Korean central bank are among the most complex of all emerging central banks. Most of the reserves are financed by currency (5 per cent of GDP), sterilisation bonds (Monetary Stabilization Bonds, MSB, 14 per cent) and bank deposits (11 per cent). Although the largest item under liabilities is bonds, the base rate is the fixed rate of the one-week liquidity absorption repo or the minimum rate of the one-week liquidity injecting repo. The central bank operates a ±100 bps interest rate corridor around the base rate.

On their current accounts with the BoK, credit institutions must raise 0-7 per cent minimum reserves for their debts with less than 2-year maturity, the rate depending on the type of the deposit. They may hold a maximum of 35 per cent of the reserve in cash. No interest is payable on the reserves, although on one occasion since the outbreak of the crisis, in December 2008, the central bank paid KRW 0.5 billion on them, which improved their capital adequacy and credit supply.

As for open-market operations, the central bank can buy and sell securities to influence the liquidity in the system. At the moment, this is limited to the MSB, although it was expanded temporarily in 2008–2009 as a result of the crisis, to include the papers issued by the Korea Housing Finance Corporation (KHFC). The MSB was originally introduced due to the underdeveloped government securities market. Its maturities range between 14 days and 2 years, and the average maturity is currently 1.5 years. Since June 2009, the central bank has also issued MSBs with longer maturities to absorb liquidity, and at the same time it also first introduced interest-bearing MSBs, for which there are market building arguments too. Nearly 80 per cent of the structural liquidity management instruments have 2-year maturities. There are no conflicts surrounding issuing by the state and by the central bank, because Korea's budget deficit has been low recently, and even government debt is only 34 per cent of GDP. The total assets of the banking system is equal to one and a half times GDP, and therefore sterilisation by the central bank is less of a burden on banks' balance sheets. Furthermore, the Monetary Stabilization Account introduced in 2010 contributes to

Chart 9
Assets and the liabilities of the Korean central bank



interest rate transmission with variable-priced deposit tenders. The instrument is used for fine-tuning in the event of unexpected liquidity shocks.

The Korean central bank has a large number of non-conventional instruments, some of which it had been operating even before the crisis. Using the Aggregate Credit Ceiling (preferential credit facility for small and medium-size businesses), the BoK supplies each bank with a certain line of credit that must be used for financing small and medium-size businesses and other selected entities. The rate of interest on these loans to credit institutions is 100-200 basis points below the base rate. The limit for this instrument was raised across the banking system after the crisis broke out; even so, it accounts for barely 2 per cent of the central bank balance sheet.

The BoK has also purchased corporate bonds through the Bond Market Stabilization Fund in order to improve corporate financing terms, which helped prevent major declines in the total loan portfolio. A catalyst in the process was the participation in the scheme of the Small & Medium Business Corporation, a not-for-profit state organisation supporting small and medium-size companies. The central bank and the government joined forces to set up the bank recapitalisation fund with a maximum amount of SKW 20 trillion; the fund purchased a variety of subordinated and hybrid bonds and equities to support the recapitalisation of the banks.

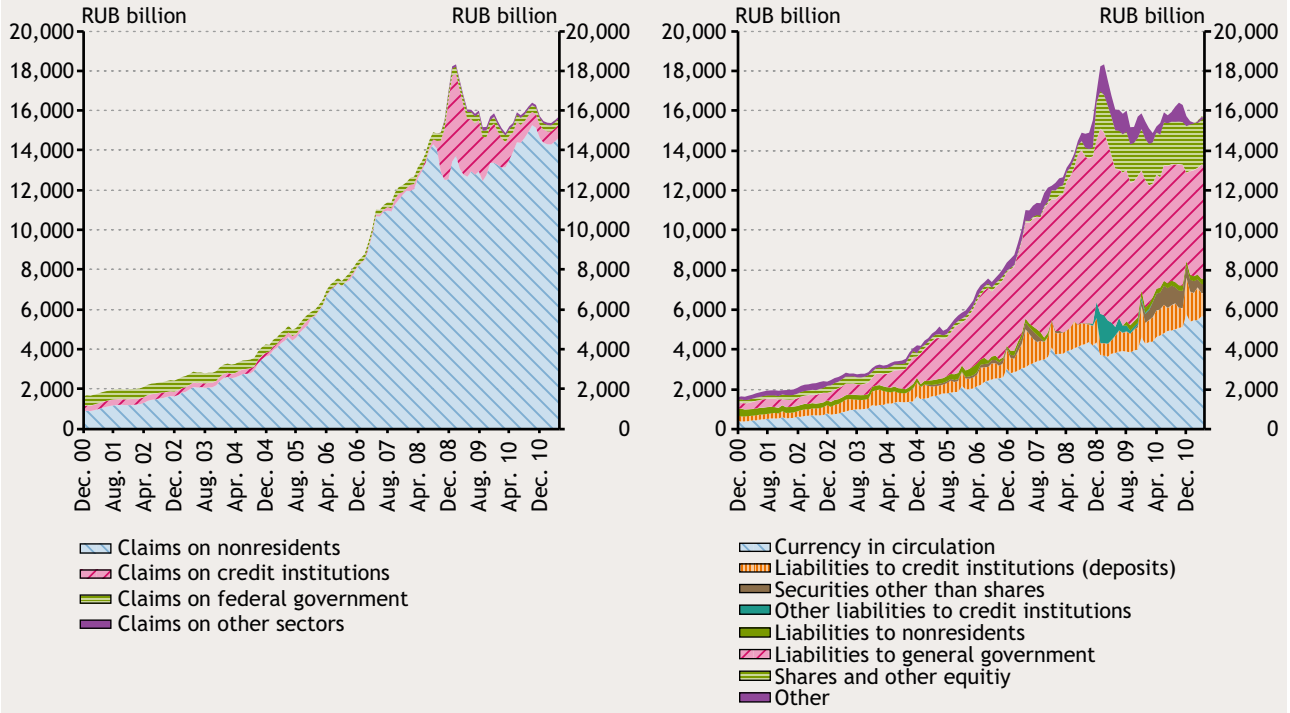
Bank of Korea also signed swap agreements with the US, Japanese and Chinese central banks back in 2008, but these have already expired. The foreign currency was used via several channels. A total of USD 26.6 billion was lent to the banking system via variable-priced swap and credit tenders. The central bank also used USD 10 billion of its own foreign exchange reserves. As the exchange rate weakened, the terms for corporate clients with foreign currency loans worsened; in such instances, the BoK relaxed the relevant capital rules to help extend the tenors. In addition to the above, it implemented a number of macroprudential measures, especially with the aim of reducing vulnerability arising from the external debts of the banking system.

One unusual feature is that, according to the law on the central bank, the BoK may give secured loans to companies in an emergency, if the access to funds via the traditional channels becomes difficult. The Monetary Council decides on each specific case.

Russia

The balance sheet of the Russian central bank (Central Bank of Russia, CBR) has increased by around 20 per cent

Chart 10
Assets and the liabilities of the Russian central bank



nominally since the outbreak of the crisis, i.e. at a slower rate than other emerging central banks. At the same time, however, it has grown several-fold compared to the start of the decade. The asset side of the balance sheet is dominated by foreign exchange reserves, which grew in nominal terms (in RUB) more than fifteen-fold from the start of the decade to 2008 and reached 45 per cent of GDP. In the first years of the crisis, foreign exchange reserves decreased due to the central bank's intensive selling on the currency market with the aim of strengthening the RUB exchange rate, but by mid-2011 the bank replenished the reserves to the initial level. The country's short-term external debt amounts to 4 per cent of GDP, which means that foreign exchange reserves are ten times higher than the Guidotti rule.

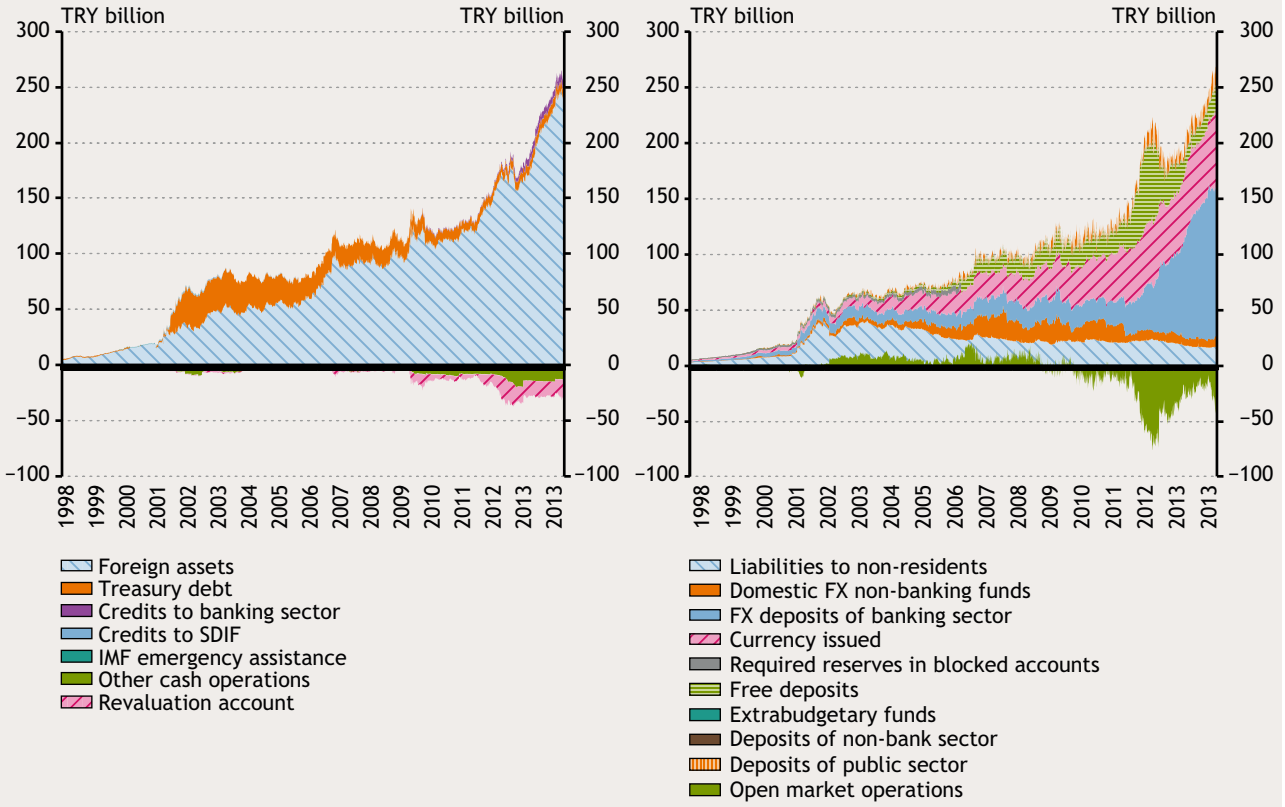
The CBR finances its foreign exchange reserves primarily with deposits of the central government, currency and equity. The first item represents the largest item on the liability-side of the balance sheet as the state finances one third of the balance sheet mostly in foreign exchange (Reserve Fund RUB 1,800 billion, National Wealth Fund RUB 2,300 billion) and to a smaller extent in roubles.

Monetary policy relies on a varied range of instruments, suitable for both supplying and absorbing liquidity. The CBR is active on both the active and passive sides, although with the exception of the year 2008, the absorption of liquidity has dominated, mostly in overnight deposits. Banks can place deposits with the central bank for slightly longer maturities as well, tom-next or seven days. Sterilisation does not take up too many resources. Liabilities to banks account for less than 5 per cent of the total assets of the banking system.

Turkey

The balance sheet of the Turkish central bank (Türkiye Cumhuriyet Merkez Bankası, CBRT) has grown substantially, growing nearly three times in nominal terms (in TRY) between 2005 and the summer of 2013 to reach 14 per cent of GDP. At present, the asset side is dominated by foreign exchange reserves, which are equal to 15 per cent of GDP. There are also two negative items (money market operations and revaluation account) and loans to banks and government debt reported on the asset side. After the end of 2001, domestic government debt still accounted for 30-50 per cent of all assets; this ratio started to decrease in 2005. Since the central government now holds deposits of almost equivalent amounts at the CBRT, the central bank's net position vis-à-vis the state is essentially zero. The government's deposits with the central bank have no maturities and pay no interest, therefore the central bank achieves interest income from the government.

Chart 11
Assets and the liabilities of the Turkish central bank



There are substantially higher liabilities in the balance sheet than the government's deposits, with two of these dominating, namely foreign exchange from domestic banks (which includes the minimum reserves and voluntary deposits of foreign exchange) and currency in circulation. Other sources of funds for the CBRT include the voluntary TRY deposits of domestic banks, foreign nationals' currency deposits for terms of 1 to 3 years, domestic foreign exchange from sources other than banks and, as a negative figure, the value of open-market operations (securities repos). The low ratio of currency and the high ratio of bank deposits to GDP stands out in an international comparison.

The CBRT supplies liquidity as an asset-side instrument to implement its monetary policy focused on price stability (inflation target and special attention to external balance). The one-week repo policy instrument provides funding for commercial banks. There are also one-month repos, overnight deposits and credit, also emergency deposits and credit at penalty interest. The CBRT often uses a mixture of these instruments to modify monetary policy conditions. The central bank provides to the banking system EUR and USD in the form of facilities with high interest rates, essentially acting as lender of last resort. The relevant maturities have been reduced from the previous one month to one week.

The minimum reserves scheme is rather unconventional. The reserve ratio was reduced in October 2011, but the CBRT still absorbs considerable funds from the banking system. Also in 2011, it allowed banks to keep some of their reserves in foreign exchange or gold; the banks are motivated to take advantage of this possibility because the minimum reserves bear no interest. Minimum reserves in foreign currency grew threefold and gold grew sixfold in the period between 2011 and 2013; the latest figures from the World Bank put total gold reserves at 15.9 per cent of all reserves. The measure has had the impact of weakening the lira and reducing TRY yields, especially on the FX swap market. The Turkish central bank used this instrument to improve financial stability, as the reserves can serve as a kind of buffer in the event of intense capital movements. We have seen therefore how much the reserve scheme has boosted the central bank's gross foreign exchange reserves (by about a third in 2012). However, as there are considerable forex deposits placed with the central bank, the net foreign exchange reserves amount to only a third of the gross

figure, and the country's Guidotti ratio calculated from this stood at around 100 per cent in the summer of 2013.

The government securities portfolio purchased back in 2001 matured in 2010, therefore the central bank started a further, limited round of secondary-market purchases the same year, in accordance with the original goals of monetary policy, to cover the liquidity surplus and the funds for repo operations. The central bank set a limit on the new portfolio equal to 7 per cent of its balance sheet and limited the term to 5 years. At the moment, the government securities held by the central bank account for 3.2 per cent of its total balance sheet.

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Péter Fáykiss and Anikó Szombati: Macroprudential supervision in non-euro area European countries

In addition to monetary policy, macroprudential policy can be fundamentally used by countries to contain risks threatening the stability of their financial systems. As macroprudential policy becomes more important, European countries have also begun to consider the establishment of national macroprudential frameworks. This process is underway in two fields: creation of an institutional background, and the development and operation of an appropriate macroprudential toolkit.

Concerning the first field, three basic options are available. In countries with microprudential oversight systems embedded in the central bank, the central bank typically takes on the role of a macroprudential authority. In the case of all other institutional arrangements, either a financial stability committee composed of representatives of the supervisory authority, the government and the central bank is set up, or the earlier institutional structure is maintained and the cooperation between the parties involved is reinforced in order to ensure the well-foundedness of systemic interventions.

As for the other field, the establishment of a toolkit designed to enable the macroprudential authority to act in a direct way at the systemic level is underway. Some countries already have experience concerning the operation of such toolkits: the authorities have already made specific decisions concerning certain macroprudential interventions based on capital or liquidity requirements.

Examining the current practices of the European countries analysed in this study, we can see that the Hungarian macroprudential framework currently being established is in many ways consistent with the practices described below. In many respects, the institutional background[1] *(competences and responsibilities) of the macroprudential supervision evolving in Hungary even appears to be more coherent than those set up in some of the countries discussed.*

INTRODUCTION

In addition to monetary policy, countries can fundamentally use macroprudential policy to control the development of credit booms and other risks threatening the stability of their financial systems. Macroprudential policy essentially aims to mitigate the frictions and exaggerations of financial intermediation on a fundamentally preventive, pre-emptive basis. Macroprudential supervision has a double objective: (i) to rein in the frequently strongly procyclical behaviour of the financial intermediation system, and (ii) to prevent the build-up and concentration of significant systemic risks. To achieve its goal, it uses tools building on the so-called microprudential toolkit (ensuring the stability of the individual institutions), calibrated to a systemic level.

Macroprudential supervision is a relatively new area of economic policy, created largely as a result of the present crisis, and therefore its framework has not yet been perfected, even in the most developed countries and in the European Union. The European Systemic Risk Board (ESRB) only began its activity in 2011, and establishment of the macroprudential mandates at the level of the member states is still at an early stage.

[1] The main tendencies have already been established with the adoption of the law on MNB in late 2011, building on international examples and on the unfortunate lessons drawn from the excessive spread of foreign currency lending. The primary macroprudential authority will be the central bank of Hungary (MNB), which shall be responsible for the management of the macroprudential policy by introducing measures to ensure a healthy amount of credit outflow and to decrease systemic liquidity risks and the probability of bankruptcy of systemically important institutions.

Macroprudential policies, therefore, can be considered as a branch[2] of financial stability policy. Within this, however, they specifically focus on prevention, and their main task primarily lies in the avoidance of systemic risks. The predominant objective of macroprudential policies is to reduce the cyclicality of the financial system, but they also aim to take steps to develop transparency and the infrastructure intended to boost systemic resilience. They are to act in complement to or as an alternative to interest rate policy within central banking policies, without (theoretically) ever interfering with the management of inflation targets.

As a result of the preventive nature of macroprudential policy, macroprudential decision-making – which usually implies a commitment to bear certain costs over the short term in order to achieve uncertain stability targets which are also dependent on various external factors over the long run – is subject to a great degree of uncertainty and distrust. These decisions therefore require a necessarily subjective judgment in the assessment of the risk indicators and the inevitability of the interventions, and even in the ex-post evaluation of the effectiveness of the steps taken with the aim of risk mitigation. In such a context, it is crucial that institutions with macroprudential powers should set not only general objectives, but also establish well-defined, clear and consistent intermediate objectives. Regarding the highly cyclical nature of the financial system, these intermediate objectives typically relate to the maintenance of a healthy pace of lending. Resilience may be strengthened by minimising sources of contagion, i.e. by restricting institutions or exposures representing a high threat of systemic risk. It is also recommended to limit the channels of contagion, by preventing the formation of systemic liquidity risks and by developing the infrastructures supporting interbank operations.

International experience shows that if political decision-makers designate an authority as responsible for macroprudential policy and there are a set of intermediate macroprudential objectives reflecting general public consensus, the macroprudential authority needs to be vested with specific tools and instruments to attain these objectives. If this fails to happen, the supervisory authority will not be able to fulfil its intended function, however hard they may try.

Our study provides a short overview of the macroprudential framework developed in certain European countries outside the euro area. We describe how macroprudential analysis is conducted (with the active cooperation, and sometimes predominant contribution, of the central bank), identify the institutions responsible for macroprudential supervision, and enumerate the measures taken to date as well as the instruments these central banks will be entitled to use in future.

We need to stress that as far as macroprudential frameworks are concerned, there is as yet no unequivocally recognised best practice. Each country must develop a macroprudential supervision model that best suits it, in consideration of the characteristics of its national financial markets, the structure of its national financial supervisory institutions, and any other features to be taken into account. Nevertheless, a review of international experience might prove to be particularly useful from a Hungarian point of view. In fact, the positive and negative lessons of the models applied by countries with financial systems comparable to those of Hungary may play a key role in the creation of the Hungarian macroprudential framework.

The first section of this paper presents the macroprudential supervisory systems of the non-euro area EU countries which seem to be the most relevant for Hungary. As this field is comparatively new, we shall only engage in the detailed description of countries which already have a macroprudential supervisory system of a certain level of consistency.[3] To offer a complete overview, the second part of our study briefly examines the practices of some other European countries which may be considered as relevant models for Hungary.

OVERVIEW OF THE MACROPRUDENTIAL SYSTEMS OF NON-EURO AREA EU MEMBER STATES

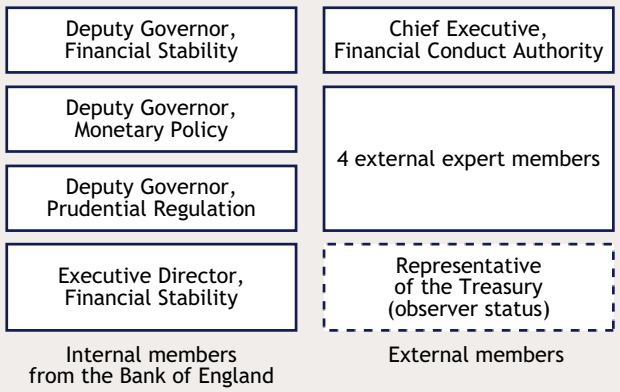
The United Kingdom

During the financial crisis, three banks had to be transferred into state ownership in the UK, and the bank rescue had a serious impact on the budget. The Turner review commissioned by the British Treasury concluded that the previous supervision model, based only on ensuring

[2] The other main sector of financial stability policies is the crisis management toolkit, including the 'lender of last resort' (LOLR) function provided by the central banks, as well as deposit insurance and bank resolution.

[3] Therefore, we shall not discuss Latvia, Lithuania, the Czech Republic, Bulgaria, Romania, Denmark and Poland. Also in Croatia, a new addition to the EU, the complex macroprudential supervision framework is only under construction.

Chart 1
Members of the British Financial Policy Committee (FPC)



Source: BoE.

compliance with the Basel capital standards, was insufficient to prevent the build-up of systemic vulnerability. The structure built on mutual and equal cooperation between the Treasury, the central bank and the supervisory authority proved inadequate. The supervisory philosophy focused on the assessment of formal compliance with the relevant regulation, but failed to tackle systemic impacts and to question the sustainability of the individual institutional practices.

The new structure was set up by mid-2013 as a result of a supervisory reform initiated by the UK government. In the new context, the Financial Policy Committee (FPC), a high level committee of the Bank of England, is responsible for the identification and management of financial systemic risks. The (micro- and macro-) prudential oversight of all entities in the financial sector is now directly exercised by the central bank, in particular by the Prudential Regulation Authority (PRA). As an independent organisation, the Financial Conduct Authority (FCA) is responsible for market conduct supervision and consumer protection, also ensuring the competition surveillance necessary to maximise consumer well-being.

Coordination between the Bank of England, the Treasury and the independent consumer protection authority (FCA) is managed within the FPC: the external bodies attend the FPC meetings, while the head of the PRA is also on the FCA Decisions Board.

Institutional responsibility

As the macroprudential decision-making body of the Bank of England, the FPC is exclusively responsible for the stability of the financial system and – in case a financial crisis should occur – for taking the necessary official measures. The mandate of the FPC defines a double set of objectives: the primary aim is to identify and monitor, and – if necessary – to take action to mitigate or manage systemic risks, with a view to protecting and enhancing the resilience of the financial system. The secondary objective is to support the economic policy of the government, including the growth and employment targets. The combination of these two sets of aims ensures that the resilience of the system may not be enhanced at any cost. The interventions of the FPC shall not exert a significant negative impact on the capability of the financial sector to contribute to the short-term and long-term growth of the British economy.[4]

Monitoring

The FPC's risk assessment will be based on several sources of data and information. For the purpose of the operation of the tools directly applicable by the FPC (see below), a basic set of indicators has been established which reflect not only the current status of the key financial indicators, but also their evolution over time. Additionally, direct institutional supervision (PRA), market supervision (FCA) and market information will be channelled into the decision-making process, as well as stress tests. The FPC communicates its opinion on the systemic risks in its financial stability report issued twice a year, and also discloses its position concerning the key risks and the recommended steps to address such risks following its quarterly meetings.

Macroprudential instruments

As far as the toolkit is concerned, the FPC may issue directly applicable decrees in three areas. These include quarterly determination of the countercyclical capital buffer (CCB) ratio, regular calibration of the sectoral capital requirements, and from 2018 (i.e. the introduction deadline set out in the Basel III framework) regular calibration of the leverage ratio. Furthermore, the FPC will have a special power to issue supervisory and regulatory recommendations

[4] Bank of England (2013), *The Financial Policy Committee's powers to supplement capital requirements. A draft policy statement.* http://www.bankofengland.co.uk/financialstability/Documents/fpc/policystatement130114.pdf.

on a comply-or-explain basis which target the responsible authorities through public calls.

The countercyclical capital buffer ratio

Since the crisis, there has been international consensus concerning the necessity of a tool to support the dynamic variation of the capital position of banks, in accordance with financial cycles. Therefore, the Basel III framework introduced the countercyclical capital buffer (CCB) as a primary macroprudential instrument. The CCB basically serves two purposes. First, it is able to build up an additional capital buffer in the ascendant phase of the financial cycles which, during a downturn in times of recession, provides a cushion for banks to absorb losses that are higher than anticipated. Second, it may provide incentives for banks to rein back on excessive or underpriced exposures in periods of boom. Pursuant to the CRD/CRR regulations enacting the Basel III requirements into European law, the designated authority must determine the countercyclical capital buffer ratio quarterly based on a standard model, a single European recommendation and other circumstances subject to the subjective judgment of the authority.

Sectoral capital requirements (SCR)

Crises may be actuated by the build-up of clearly identifiable, high-risk portfolios or by the formation of asset price bubbles. For this reason, effective risk prevention may necessitate systemic risk-based calibration of the standard risk weights of banks' balance sheet items. With this tool at its disposal, the macroprudential authority has the power to better influence banks' lending policy, enabling it to incentivise or (if appropriate) restrain lending for certain specific sectors. The FPC plans to impose a higher capital requirement than the minimal ratio on three sectors, which may be decreased during times of recession. These include loans granted for residential property; commercial property (including mortgages); and intra-financial sector loans.

Leverage ratio

The Committee assessing the potential toolkits of the FPC[5] proposed the leverage ratio as a third regulatory instrument to be transferred to the decision-making powers of the macroprudential authority. This indicator is typically well-suited for objectively identifying – and, after a certain point, stopping – any build-up of systemic risks, as it compares banks' assets (on- and off balance sheet items) to their elements of regulatory capital actually capable of bearing losses, without the consideration of risk weighting.[6] As a result, the leverage ratio also takes into account exposures considered to be low-risk according to the models used by the banks and the Basel framework, and which accordingly have a lower risk weighting.

As mentioned before, macroprudential tools can only achieve their goal if they handle the risks encountered in a given period of time in the most targeted way, preferably as part of a wider regulatory/supervisory regime. This means that the FPC cannot be entirely confident in attaining its goals by using these three tools. It is also entitled to recommend the use of further tools, either publicly or behind closed doors, and the addressee must respond to the recommendation within a given timeframe, based on the comply-or-explain principle.

Sweden

In Sweden, the Financial Crisis Committee (FCC), an intergovernmental body, has recently reviewed the organisational changes in the Swedish institutional structure necessary to prevent and, if needs be, effectively manage financial crises.[7] Although Sweden only experienced a relatively modest direct impact as a result of the crisis, the FCC considers that a dedicated macroprudential body, and clear responsibilities and close cooperation between the concerned parties are necessary to continuously monitor systemic risks, to quantify risks, to model their potential evolution, and to identify the appropriate tools to decrease systemic risks.

The FCC examined the following aspects, in order to determine the suitable organisational structure:

- sufficient experience and analytical background and the ability to develop new tools;
- the quality and well-foundedness of decision-making;
- resource efficiency;
- appropriate delimitation of responsibilities;
- compliance with EU requirements; and
- continuity.

Institutional responsibility

The FCC proposes to set up a macroprudential council to ensure close coordination between the Swedish supervision

[5] Interim FPC.
[6] Common equity tier 1 – CET1.
[7] Financial Crisis Committee (2013), *Preventing and managing financial crises*. http://www.government.se/content/1/c6/20/77/23/79d3ce4b.pdf.

(Finansinspektionen) and the central bank (Riksbank). In the council, the two authorities would regularly discuss the current status of systemic risks, and if any of the parties concludes that one of the tools allocated to it should be deployed, it would initiate a preliminary consultation on the matter in the council. In addition to the two members mentioned above, the Swedish Ministry of Finance would also act as an observer in the body, and two independent external members would guarantee the impartiality and professional quality of the decisions. The power of decision, however, would always lie with the owner of the tool, i.e. the central bank or the supervisory authority. The operating conditions of the council should be enacted into legislation, and the publication of its detailed minutes would ensure its accountability vis-à-vis the general public.

The FCC intends to expand the financial stability objectives of the Swedish supervisory authority by empowering it to ensure not only the shock-absorbing capacity of the financial system, but also its functional operation, i.e. its uninterrupted contribution to financing the real economy. The idea behind this is that the maintenance of financial stability cannot be a goal in itself, because even though system stability may be guaranteed through the use of draconian measures, this could endanger the intermediation activity itself, and consequently the financing of the real economy.

In reviewing the functions of the central bank, the FCC reached the conclusion that the role played by the central bank in ensuring financial stability should also be enhanced. While the central bank previously focussed mainly on ensuring smooth cash flow, it needs to set a more complex set of goals for the future, which also builds on the obligation to maintain a robust, functional and operational financial system. The law on the central bank will stipulate that the Swedish central bank shall be one of the centres of macroprudential policy, and as such shall also have special responsibilities in the reduction of systemic liquidity risks. In the future, the central bank shall draw on its toolkit normally used to achieve monetary policy goals for the purposes of financial stability, to ensure that the members of the financial intermediation system are less exposed to the detrimental effects of potential liquidity shocks.

Monitoring

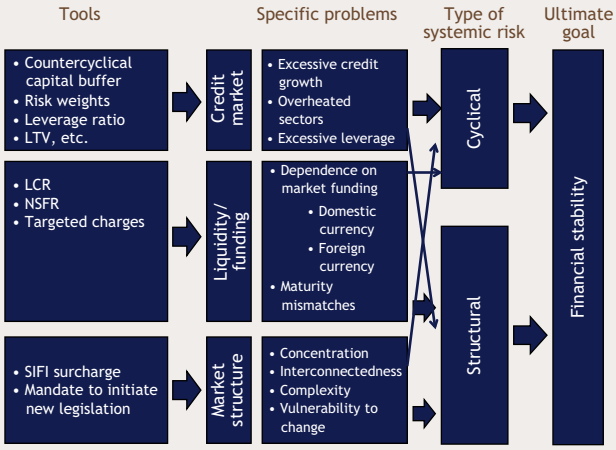
Monitoring systemic risks will be a general responsibility of both authorities. This necessitates further preparations, as the oversight of the whole financial system will represent a new field of examination for the supervisory authority. Consequently, the interactions of financial system risks with other macro variables and the assessment of the role of the mediation system in the enhancement of growth will fundamentally be the competence of the central bank, which may discuss its opinion on such with the supervisory authority on the occasion of the biannual sessions of the macroprudential council. The supervisory authority can best support this work by providing banking and market information and opinions. The general public will be able to follow these developments by way of the financial stability report to be issued twice a year.

Macroprudential instruments

The previous section outlined the creation of the macroprudential institutional background in Sweden which is currently underway. Although the toolkit to be used has not yet been enacted into law, a study published by the Riksbank in 2012[8] compiled a set of instruments it recommends for the consideration of the legislators.

Based on earlier analyses, the Swedish authorities have recently decided on the use of two instruments. First, in order to manage liquidity risks, as of 2013 they have imposed LCR (liquidity coverage ratio) requirements on the four largest banks, with an obligation to cover EUR- and USD-denominated liabilities by liquid assets also denominated in these same currencies. Second, the four largest banks will be bound to maintain a Common Equity Tier 1 (CET1) ratio of 10 per cent from 2013 and of 15 per cent from 2015 in order to decrease the probability of

Chart 2
The proposed Swedish conceptual framework



Source: Riksbank.

[8] Sveriges Riksbank (2012), "Creating a Swedish Tooklit for Macroprudential Policy", *Riksbank Studies*, November.

Table 1
Macroprudential capital requirements in Norway from July 2013

	July 2013	July 2014	July 2015	July 2016
CET1 minimum	4.5%	4.5%	4.5%	4.5%
Capital conservation buffer	2.5%	2.5%	2.5%	2.5%
Systemic risk buffer	2%	3%	3%	3%
SIFI capital buffer	–	–	1%	2%
Cumulative capital requirements	9%	10%	10%	10%
Cumulative SIFI surcharge	9%	10%	11%	12%

Note: The concepts used in the table are defined in the CRD/CRR package:
http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=OJ:L:2013:176:0001:0337:EN:PDF,
http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=OJ:L:2013:176:0338:0436:EN:PDF.
Source: http://www.regjeringen.no/en/dep/fin/press-center/press-releases/2013/new-legislation-on-capital-requirements-.html?id=720596.

insolvency, and thus to contain the risk they represent in relation to the entire economy.

MACROPRUDENTIAL PRACTICES OF SOME NON-EU COUNTRIES

Norway

Although Norway is not an EU Member State, it is a member of the European Economic Community (EEC), and as such, it applies the prudential regulations in force in the EU and is also a non-voting member of the macroprudential institutional system of the EU.

A report published in 2012 in Norway examined whether each macroprudential tool is used and, if applicable, in what institutional context.[9] The Norwegian model is relevant for Hungary because of a certain similarity in the institutional structure. Three institutions are responsible for the stability of the financial system: the Ministry of Finance, responsible as regulatory authority for the enactment of the appropriate prudential framework and establishing mandates in legislation; the supervisory authority (Finanstilsynet); and the central bank (Norges Bank) which functions independently from these two, and which has previously not had any macroprudential instruments to ensure financial stability.

Institutional responsibility

In Norway, the concept of financial stability is connected with the safe operation of financial markets and payment systems; therefore, the establishment of a macroprudential approach is not expected in the near future. The 2012 report analysed how the most typical macroprudential tool, the countercyclical capital buffer could be phased in, how it would interfere with the existing instruments of the authorities, and whether the use of any other tools described in international publications may be justified in Norway. The institutional responsibility therefore continues to be shared between the three authorities, and in considering the introduction of each tool, they are to examine on an ad hoc basis which authority would be best suited to propose its calibration and to make the relevant decision.

Monitoring

Likewise, the identification of systemic risks is also the competence of two institutions: the Norges Bank analyses the current exposures in the subchapter on financial stability of the inflation reports, and the supervisory authority examines the operation of financial markets and their impact on the entire economy in its risk reports published since 2003. No dedicated forum exists for the comparison and discussion of the two analyses.

Macroprudential instruments

In its 2012 report, the inter-institutional committee primarily focussed on the countercyclical capital buffer ratio. It considered its introduction quite necessary, although opinions were divided concerning its operation. Most opinions held that the central bank should be responsible for both the preparatory analyses and calibration and the decision on the value of the ratio.

It has also been proposed that the supervisory authority should have direct regulatory instruments at its disposal in order to be able to enforce responsible lending practices (LTV, PTI).

[9] Finanstilsynet and the Ministry of Finance (2012), *Macroprudential supervision of the financial system – organisation and instruments. Report of a working group consisting of representatives from Norges Bank, the Financial Supervisory Authority of Norway,* January, http://www.regjeringen.no/pages/36861944/report_makropru.pdf.

On 22 March 2013, the Norwegian government announced the introduction of a comprehensive macroprudential framework. The key elements of this framework are illustrated in Table 1.

Furthermore, the Government announced that the applicable quarterly value of the countercyclical capital buffer ratio will be determined by a decree of the Ministry of Finance, based on the risk assessment performed by the central bank in cooperation with the supervisory authority. The authorities will also pay special attention to the evolution of the leverage ratio.

SWITZERLAND

The recent financial crisis represented a great shock to the large Swiss banks. The federal budget had to spend a substantial amount, some USD 60 billion, to rescue one of the largest Swiss banking giants. Although at present it appears that the state will close the transaction with some profit,[10] the demand for a reform of the Swiss financial oversight system has emerged at the national level. As a first step in this process, the Federal Assembly (the bicameral parliament of Switzerland) drew up a report in May 2010 on the key lessons learnt from the financial crisis, proposing legislative changes to more precisely define the powers and responsibilities of the SNB (Schweizerischen Nationalbank – the Swiss central bank) and the FINMA (Finanzmarktaufsicht – the Swiss financial supervisory authority).[11] The process continued with the creation of the Financial Stability Working Group[12] by the Swiss Ministry of Finance in April 2011, with two fundamental aims: the working group was to review the current operation of Swiss macroprudential supervision and make specific proposals to strengthen oversight. Hereinafter, we mainly use the findings of this working group[13] to describe the structure and practices of Swiss macroprudential supervision.

Institutional responsibility

In the current Swiss oversight system, neither institution has a clearly delimited, exclusive responsibility in macroprudential issues. Both the central bank (SNB) and the financial supervisory authority (FINMA) perform macroprudential tasks, and based on their statutory mandates they are both responsible for the stability of the financial system. Cooperation between the two organisations is supported by a bilateral memorandum of understanding (MoU). To enhance cooperation with the regulatory authority, both institutions have also concluded a MoU with the Ministry of Finance, which sets out the process and mechanism of the initiation of macroprudential legislation.

Monitoring

The monitoring activity related to macroprudential supervision is mainly performed by FINMA, the financial supervisory authority. With regard to the substantial insurance sector, supervision also covers non-banking risks (insurance, reinsurance, investment funds, etc.) with a particular focus on systemically important institutions. The central bank has restricted access to individual institutional data, but cannot access qualitative information concerning and originating from market players (risk assessments, internal documents of credit institutions, management proposals, etc.).[14] Overall, therefore, the Swiss macroprudential supervisory framework divides the competences concerning both the responsibilities and the monitoring activity between several players, which necessitates very robust and smooth inter-institutional cooperation.

Macroprudential instruments

The Swiss authorities can make use of a substantial set of instruments in macroprudential matters. In addition to the awareness-raising (communication) activity of the central bank, the supervisory authorities may (and actually have an explicit statutory mandate[15] to) impose an additional capital buffer on institutions of systemic importance, to set more stringent capital requirements for certain activities (such as mortgage lending), and to use diversification provisions (management of SIFIs, partner limits etc.), and they may also prescribe the recourse to central clearing houses for certain OTC products.

In some cases, however, the working group set up by the Ministry of Finance considers that further tools would be

[10] http://www.nzz.ch/meinung/kommentare/der-snb-stabfund-muss-ein-mahnmal-sein-1.18042598.

[11] http://www.parlament.ch/e/dokumentation/berichte/berichte-aufsichtskommissionen/geschaeftspruefungskommission-gpk/berichte-2010/Documents/bericht-gpk-ns-ubs-kundendaten-usa-2010-05-30-res-e.pdf.

[12] The members of the working group: Eveline Widmer-Schlumpf, head of the Federal Department of Finance (Chair); Alexander Karrer, Deputy State Secretary at the State Secretariat for International Finance; Thomas Jordan, Deputy Chairman of the governing board of the SNB; Patrick Raaflaub, CEO of FINMA; Daniel Roth, Head of Legal Services at the Federal Department of Finance.

[13] http://www.efd.admin.ch/dokumentation/zahlen/00578/02460/index.html?lang=en.

[14] The SNB may only access these data through individual agreements concluded with the banks. However, the SNB does not have the power to compel the credit institutions to enter into such agreements.

[15] http://www.admin.ch/ch/d/sr/952_0/.

advisable. The most important examples are the LTV (loan-to-value) and PTI (payment-to-income) limitations, but the option of using the macroprudential tool of dynamic provisioning has also been discussed.

In the first half of 2013, Switzerland was the only developed country where one of the key macroprudential tools proposed by the Basel III framework, the so-called countercyclical capital buffer, was already in use. In order to restrain the real estate market bubble,[16] which threatened to overheat the property sector of the Swiss economy, in February 2013, the Swiss government decided, at the proposal of the SNB, to establish a capital add-on requirement on banks for their mortgage portfolios, equal to 1 per cent of their risk-weighted asset (RWA) value. This measure actually represents the first "real-life" test of the countercyclical capital buffer, and the lessons from Switzerland may also be useful for Hungary in the future.

CONCLUSIONS

As macroprudential policy becomes more important, European countries have also started to consider the establishment of national macroprudential frameworks. This process is organised around two fundamental areas: creation of the institutional background, and the development and operation of an appropriate macroprudential toolkit.

The European Systemic Risk Board (ESRB), responsible for macroprudential policy at a European level, has already issued recommendations for both areas;[17] the deadline provided for the establishment of the institutional background expired on 30 June 2013, and an assessment of conformity with the recommendations shall soon begin. Although the recommendation provides that macroprudential policy can be pursued by either a single institution or a board, we consider that ex-post accountability might be less effective in the case of macroprudential authorities taking the form of boards, which involves a higher risk of 'inaction bias' or lack of intervention. This was confirmed by several British reports inquiring into the reasons of the crisis.

On 6 June 2013, the Hungarian government also submitted to the National Assembly a proposal concerning a new law on the central bank, recommending that the MNB act as the primary macroprudential authority. Compared to the other non-euro area countries, this is a strong institutional mandate.

Actual creation of the macroprudential toolkit is expected to occur following the establishment of the institutional background and the entry into force of the relevant EU legislation (CRD/CRR) on 1 January 2014. The objectives indicated by the ESRB in these recommendations are mainly of an interim nature,[18] and the body recommends assigning at least one tool, if possible, to the competence of the macroprudential authority for each objective. International comparison shows that the toolkit of the non-euro area macroprudential authorities which have already been set up is narrower than indicated in the recommendations, and only covers the countercyclical capital buffer and some additional instruments affecting mortgage loan provision and the SIFI issue.

The toolkit proposed by the draft law on MNB is closer to the requirements set out by the ESRB, and therefore the Hungarian macroprudential authority is expected to be in a better position to effectively combat future systemic risks.

This article is based on information available in the period to 1 August 2013.

[16] Over the past ten years, Switzerland has seen a 77 per cent surge in real estate prices. The Swiss mortgage stock has now reached more than 135 per cent of GDP. (http://www.portfolio.hu/vallalatok/penzugy/drasztikus_banki_eloirassal_fekezi_svajc_az_ingatlanbuborekot.179756.html).

[17] http://www.esrb.europa.eu/pub/pdf/recommendations/2011/ESRB_2011_3.en.pdf?80b17062dcc1dd228c657e5e6ba992e1; http://www.esrb.europa.eu/pub/pdf/recommendations/2013/ESRB_2013_1.en.pdf?45aa8f7118880cd50a8b6d42c3a5195a.

[18] Prevent or minimise excessive credit growth and leverage, prevent or minimise excessive maturity mismatch and market illiquidity, contain the indirect/direct concentration of exposures, prevent dependence on the rescue of banks by the State, enhance the resilience of financial structures.

Mihály Hoffmann, Balázs Kóczián and Péter Koroknai: Developments in the external balance of the Hungarian economy: indebtedness and adjustment

Developments in Hungary's external assets and external liabilities are particularly important in assessing the external vulnerability of the economy. Focusing mainly on the financing processes, this study presents an overview of the structure of the foreign funds between 1998 and 2012, and points out correlations between capital flows and real economy developments in Hungary.

ABSTRACT

As typical for all emerging economies, post-transition Hungary was characterised by a significant external imbalance and a substantial current account deficit. The economic transformation and the undercapitalised economy ensured favourable returns on investment, funded by the investments of foreign investors. Accordingly, from 1998 to the beginning of the 2000s, Hungary saw a substantial inflow of direct investment, which – mainly by financing investment projects – generated relatively rapid economic growth without increasing the indicator capturing the vulnerability of a country, i.e. net external debt.

From the mid-2000s however, a very unfavourable trend began to emerge. The current account balance was still in deficit, but the deficit was no longer primarily financed by FDI-type funds, but rather by foreign loans. Indeed, state overspending and the surge in households' borrowing – initially denominated in forint and subsequently in foreign currency – was financed by external loans; both the state and the banks disbursing the loans relied heavily on foreign funds. Further exacerbating the situation, for the most part these loans were not spent on investments, which would have driven future economic growth, but served instead to increase domestic consumption; consequently, the spending of foreign loans did not ensure the subsequent ability to repay the loans disbursed. And while the adjustments by the state from 2006 decreased the public deficit spectacularly, households' consumption smoothing behaviour prompted the population to borrow even more (denominated in foreign currency), thus significantly reducing households' net financial savings. As a result, the crisis emerging at the end of 2008 hit the Hungarian economy at its weakest: due to the significant external imbalance, the economy relied heavily on external funds, and net external debt was very high with a remarkably large public debt. Meanwhile, the private sector had an enormous foreign currency loan portfolio, and the potential growth of the country fell so steeply that it also decelerated, to a large degree, the real convergence process relative to more developed countries.

Amidst the heightened uncertainty following the outbreak of the crisis, risk avoidance grew to such an extent that, owing to poor economic fundamentals, non-resident economic agents lost confidence in Hungarian investments. The consequences were felt severely in several areas. On the one hand, Hungarian government bonds could not be sold; on the other hand, the maturity of foreign financing was shortened considerably, ultimately forcing Hungary to borrow from the IMF and the EU. Thirdly, owing to the high risks associated with loans to the private sector, the banking system was not willing to disburse loans. Meanwhile, due to increased unemployment, deteriorating incomes and heightened uncertainty, households were not willing to take out loans. Consequently, Hungarian banks started to repay their foreign loans (or, in a different interpretation, parent banks began to withdraw their funds). In parallel with the shortfall in foreign funds, the real economy was also hit by the crisis. Household consumption fell due to decreased income, increased uncertainty and the freeze in lending. In the wake of dwindling external and internal demand and the limited availability of financing, corporate investment began to drop, which was also reflected in household consumption.

At the same time – in addition to the significant impacts in other areas – the financing and real economy crisis improved the country's external balance to a large degree. The downturn in imports generated a substantial surplus on the foreign trade balance, which – combined with a significant increase in EU transfers in the new budget cycle – resulted in a current account surplus, after years of sizeable deficits. As regards the savings of sectors, a net savings position emerged in Hungary as a result of a surge in the financial savings of the private sector stemming from declining consumption and investments, while the public deficit remained low. On the financing side, the large external inflows observed previously were followed by the repayment of foreign loans after the outbreak of the crisis, which reduced the net external debt of the country.

Consequently, the external balance was restored in the flow indicators. Stock indicators, however, still lag behind in international comparisons, which may necessitate further adjustment in the future. With the weakening exchange rate, Hungary's external debt decreased only slowly, and the country's external debt ratio is still considerably higher than those of other countries in the region. At the same time, because of the country's significant open position in FX, a potential devaluation of the exchange rate would pose further risks to the economy. Reducing external debts would be also important from the perspective of economic growth: following the crisis, economies with relatively low external debt suffered a smaller downturn or succeeded in achieving more pronounced growth. Since another potential withdrawal of foreign funds by banks points to a continued slump in the credit market and hence, a more protracted recovery process from the economic crisis, an increase in foreign direct investment would be a welcome development, which may also pave the way to reducing high debt levels.

INTRODUCTION

In our analysis, we examine developments in the balance of payments between 1998 and 2012. In view of the complexity of the subject and the space limitations of this study, our analysis is not intended to be exhaustive, but it nevertheless takes account of the most important correlations.[1] Net external lending, which is a crucial factor from the standpoint of external balance, can be examined using three approaches: from the aspect of the real economy, based on financing structure (financial account) and according to the savings of individual sectors.

1. With the real economy approach, the current account balance consists of three main elements. The first item is the balance of goods and services, i.e. the net export balance of a country. The second part is the income balance, i.e. the sum of income outflows and inflows (profits, bond yields, dividend payments, remittances by those working abroad). The third main category is the balance of transfers to and from the country. These three items determine the current account balance. If a fourth element, the capital account, is added to these three main items – which is also called, together with current transfers, the transfer account and reflects current transfers supporting investment – we obtain the net lending[2] of the country in question (Chart 1).

2. The net lending of the country can be also split up between the sectors of the economy: the government, corporations and households. Ultimately, the portion of income generated by the sectors of the economy that is not spent on consumption or accumulation indicates the country's net lending. In other words, the sum of the net financial savings of individual sectors (households, corporations, state budget) equals the country's net lending.

3. The breakdown according to the financial account of the balance of payments divides the balance of payments based on the types of inflows into debt-type (typically a type of loan) and non-debt type items (direct investment or shares).

Theoretically, the three approaches yield the same result. Indeed, real economy processes are reflected in financing developments: for example, if the current account balance is positive, as has been typically the case in the Hungarian economy in recent years, the financial account will indicate an outflow of funds (negative balance) and vice versa. This means that the total balance of payments should theoretically be zero.[3]

[1] Our review is primarily focused on financing and savings processes, and touches upon the driving forces behind changes in the foreign trade balance only to the extent absolutely necessary.

[2] Since EU transfers can be shown both in the current account (in the row of current transfers) and in the capital account, in analysing the external position of the country, we assess changes in the current account and the capital account together, i.e. the net lending of the country. When the balance of the current account and the capital account shows a surplus, the country's net lending is established; when the balance is negative, the country has a net borrowing.

[3] Data derived from the different approaches should be identical; however, temporary differences are likely to arise due to non-integrated data sources, incomplete observation and the different handling of the exchange rate, which are then indicated in 'net errors and omissions'. Nonetheless, developments in the real economy and financing appear to be largely similar over the long run.

Chart 1
Net lending according to the real economy approach

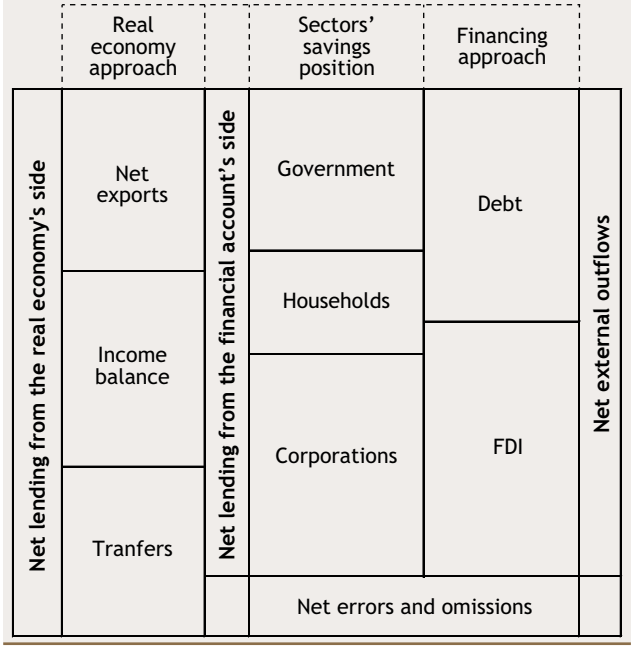
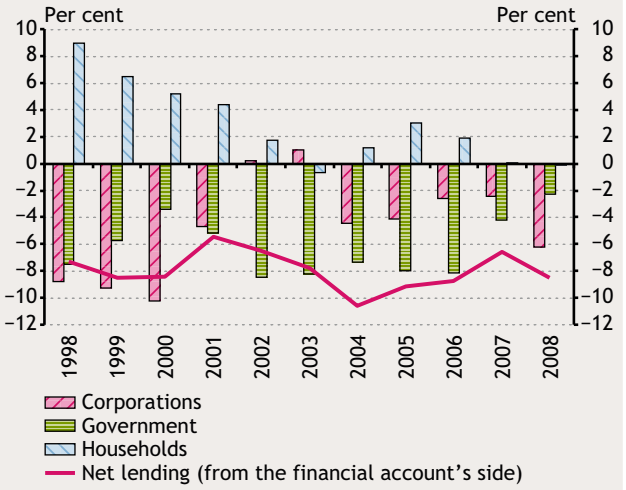


Chart 2
Division of Hungary's balance of payments into the savings positions of sectors between 1998 and 2008

(as a proportion of GDP)



Source: MNB.

In a small, open, emerging economy such as Hungary, the behaviour of the sectors shows that the corporate sector and the public sector typically produce a financing requirement which is partly covered by the savings of households. While companies need funds to cover their investment needs, public finances typically contribute to achieving economic and social goals by allowing expenditures to exceed revenues, i.e. by accepting a budget deficit. Accordingly, convergence is nearly always associated with external inflows, which is reflected in the deficit on the balance of payments. The crisis which occurred during the review period resulted in a significant increase of the net lending derived from the balance of payments of Hungary and also affected the inflow of foreign funds. Accordingly, our analysis divides the processes observed into two parts: from 1998 to the crisis and between 2008 and 2012.

PRE-CRISIS PERIOD

In the period preceding 2008, owing to the financing requirement of the state and the corporate sector, the economy relied on external funds, which household savings were increasingly unable to offset (Chart 2). The savings position of the Hungarian sectors suggests that at the end of the 1990s *households* had a substantial – but gradually decreasing – amount of savings, while the financing requirement of the corporate sector and the government was rather high. During this period, household savings were boosted by the fact that the financial intermediary system's lending to households was still subdued. At the same time, the steep increase in borrowings – attributed primarily to subsidised housing loans – eroded the sector's net lending, which remained consistently low between 2002 and 2008. The considerable financing requirement of the corporate sector – which can be observed over the entire time horizon – is a result of companies' investment/production activities. The financing requirement of the *government*, in turn, showed a declining trend at the end of the 1990s, before starting to rise again from 2000. During the period of significant budgetary imbalance between 2002 and 2006, the financing requirement of the state was close to 8 per cent of GDP on average. The adjustment that followed, however, tempered the state's financing requirement considerably. In view of the lax fiscal policy pursued between 2002 and 2006, based on the concept of Ricardian equivalence[4] we would expect households to have more substantial net savings which, however, did not materialise to a great degree. At the same time, the adjustment in 2006

[4] According to the Ricardian equivalence, households and corporations respond to the temporary easing measures of the government by accumulating more funds in savings in proportion to their income, in consideration of an expected future increase in tax burdens. To put it more simply, over the long run, the private sector uses its financial savings to smooth out its consumption path that is influenced by the short-term imbalances of fiscal policy.

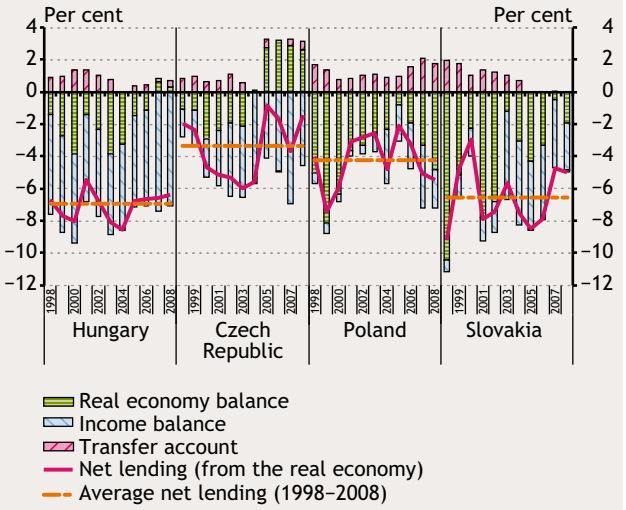
prompted a decline in savings, i.e. a mild consumption smoothing compared to the previous level; in other words, households also supported consumption by restraining their net savings. Overall, the behaviour of the sectors indicates a substantial external financing requirement in the period between 1998 and 2008.

In the pre-crisis period, in line with Hungary's peers in the region, the balance of payments showed a rather large deficit, owing to the income outflows in the context of the country's substantial amount of external debt. From the side of the real economy, from the end of the 1990s to 2008, Hungary's external financing requirement was around 7–8 per cent. One main reason for this was the negative *income balance,* arising from the fact that non-residents which had obtained significant ownership interests via their large capital investment during the privatisation period transferred their annual income to their home countries. Subsequently, the income balance was further deteriorated by the interest paid on the rising amount of debt. Meanwhile, owing to the high import content of household consumption and production for exports, Hungary's *real economy balance* was also negative for the most part during the pre-crisis period. Net exports turned positive from 2007, which – amongst other things – reflected booming exports and the decline in household consumption on the back of adjustments by the state. At the same time, Hungary's *transfer account* did not start to grow immediately after Hungary's accession to the EU, which can be probably attributed to the peculiarities of the EU's system of grants (Chart 3). The balance of payments (deficit) followed a similar course in other countries of the region, and its direction also reflects inflows. However, the balance observed in the region falls significantly behind that recorded in Hungary. Even the composition of the balances shows differences: while in Hungary and the Czech Republic the balance of payments was mainly determined by the income balance, in the case of Poland and Slovakia negative net exports were a decisive factor as well.

At the beginning of the period, in Hungary the majority of inflows represented non-debt funds (primarily direct investment); however, in the 2000s debt-type funds gained ground. Breaking down the balance of payments on the basis of the financial account, we find that the vast majority of foreign inflows were composed of direct investments up until 2002. In other words, funds arrived in Hungary through the acquisition of ownership interest in companies and greenfield investments. From 2003, however, this correlation changed markedly, with debt-type funds gaining ground over the increasingly subdued inflow of direct investments (Chart 4). That notwithstanding, this did not reduce the high level of inflows, which – as we pointed out in relation to the balance of payments – varied between 7 and 8 per cent in the pre-crisis period.

Chart 3
Changes in net lending in Hungary and its peers in the region

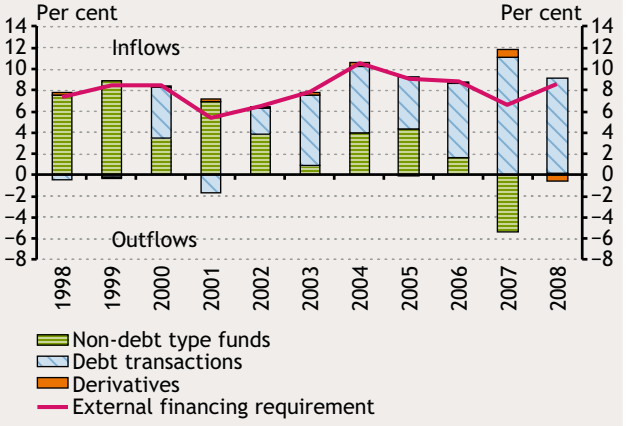
(as a proportion of GDP)



Source: MNB, Eurostat.

Chart 4
Structure of inflows to Hungary between 1998 and 2008

(as a proportion of GDP)



Source: MNB.

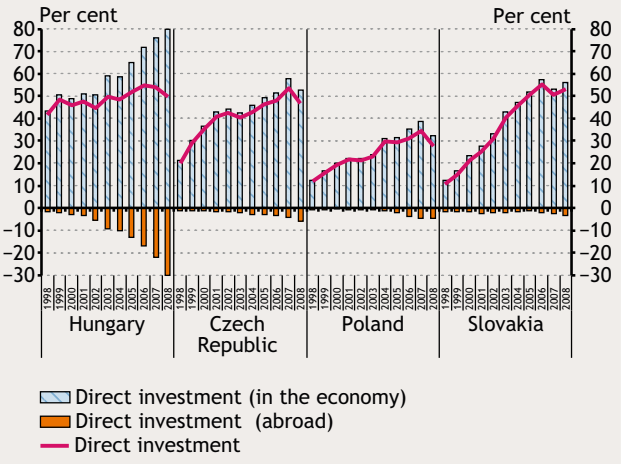
Initially, Hungary enjoyed a significant advantage over its regional competitors at the end of the 1990s in terms of foreign direct investment; however, its peers caught up gradually by 2008. As mentioned above, as a result of privatisation, non-residents acquired substantial ownership interests in the corporate sector. This was also reflected in the high level of foreign direct investment in Hungary at the beginning of the review period. Foreign direct investment, however, only increased very moderately between 1998 and 2008 in Hungary (Chart 5). This was partly caused by the fact that, while net foreign direct investment did not increase in Hungary, gross figures reflected a more pronounced shift. Indeed, large corporations in Hungary (accounting for nearly 30 per cent of domestic GDP by 2008) invested large amounts of capital abroad. Meanwhile, our regional competitors – especially Slovakia and the Czech Republic – recorded a consistent increase in the level of foreign direct investment until 2006. Nevertheless, even by the end of the review period they still did not reach the level observed in Hungary. The level of foreign direct investment outflows in other countries in the region was significantly lower than in Hungary.

Hungary's net external debt increased steeply until 2008 and approached the stock of foreign direct investment. By 2008, net external debt rose to above 50 per cent compared to 15 per cent at the end of the 1990s. This can be mainly attributed to a change in the type of inflows starting from 2002. While foreign funds had previously arrived in Hungary in the form of capital investment, starting from 2002 the inflow of debt-type funds gained ground, in line with banks' foreign currency lending as described below. By the end of the review period, the net level of debt-type funds approached the volume of FDI in Hungary (Chart 6). While net external debt was on the rise from 2003 in several other regional countries, its volume rose to excessively high levels in Hungary. And the fact that Hungary was subsequently hit by the crisis particularly hard was precisely because of the significant vulnerability caused by the high level of external debt. By contrast, the external debt of peers in the region was far lower: in Poland it was nearly 15 per cent of GDP before the crisis, in Slovakia it hovered around 0 per cent, while the assets of the Czech Republic in debt-type funds exceeded its liabilities.

From 2001 households started to borrow extensively, which eroded their net lending. Studying the details of household sector developments, we find that loans to households started to grow from 1998 and then accelerated from 2001. In addition to the gradual development of the financial intermediary system, this can be attributed in the beginning to the state-subsidised housing loans and later to a surge in foreign currency lending, which led to the accumulation of a significant household loan portfolio by 2008. Although households' net savings consistently declined from 1998 due to borrowing, savings dipped to low points in both 2003 and 2007–2008 (Chart 7). Thus households, typically a net saver sector, could only slightly offset the high financing requirement of the rest of the sectors between 2003 and 2008.

Chart 5
Changes in the level of foreign direct investment in Hungary and other countries in the region between 1998 and 2008

(as a percentage of GDP)



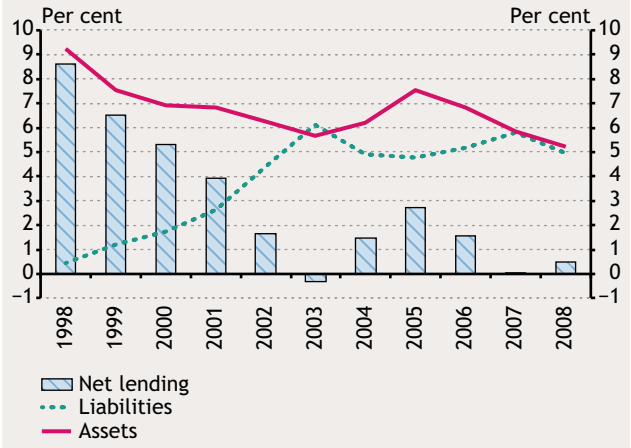
Note: Hungarian data of 2008 reflect the stock cleared from capital investment flowing through.
Source: MNB, CNB, NBP, NBS.

Chart 6
Changes in net external debt in Hungary and other countries in the region between 1998 and 2008

(as a percentage of GDP)

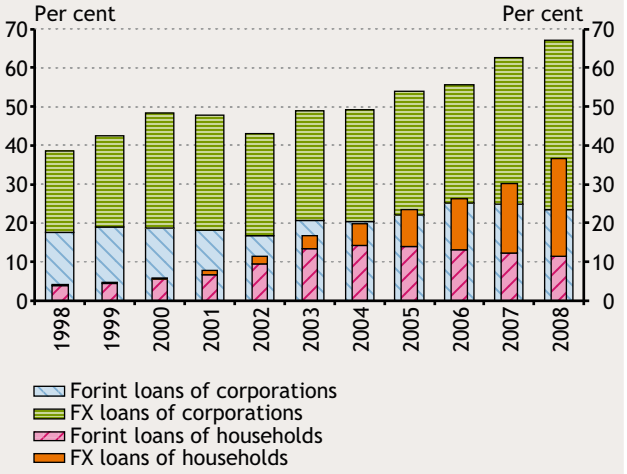
Source: MNB, CNB, NBP, NBS.

Chart 7
Breakdown of households' savings processes between 1998 and 2008
(as a percentage of GDP)



Source: MNB.

Chart 8
Loan holdings of households and corporations between 1998 and 2008 broken down by denomination
(as a proportion of GDP)



Source: MNB.

Instead of recourse to expensive forint financing, corporations and households became increasingly indebted in foreign currency. As understood so far, internal net savings of the economy were extremely low. Forint financing became increasingly expensive owing to the high nominal forint interest rates emerging in the context of the high inflation environment. In view of the relatively stable forint exchange rate and loose foreign monetary conditions, borrowers decided to take out foreign currency loans (Balás and Nagy, 2010).[5] Consequently, households and companies became indebted in foreign currency to a larger degree. From the start, FX-denominated loans contributed to the accelerated growth of the household loan portfolio observed from 2001, but this was mainly due to car loans at that time. Subsequently, owing to tightened subsidies from 2004, FX loans gained ground in housing loans. In 2008, the corporate loan portfolio exceeded the loans of households by nearly twofold, both in respect of forint and FX-denominated loans (Chart 8).

The external debt of Hungary – particularly in view of FX loans – is also reflected in the widening of the open FX position of households and corporations (Chart 9). Rising foreign currency debt implied wider open FX positions even from a sectoral perspective. The two largest sectors with an open position were the corporate sector and the household sector. Since many companies producing for exports have regular foreign currency income, the open position in their case implied a smaller risk than for households, whose income was nearly exclusively denominated in forints. The gap in the net foreign currency position can be also observed for the public sector; even at the end of 2008, however, its width was less pronounced than in the case of the corporate and household sectors, thanks to the foreign currency reserves of the MNB.

Chart 9
Open FX position of certain sectors between 2003 and 2008
(as a proportion of GDP)

Source: MNB.

[5] Balás T. and Nagy M. (2010), "Exchange of foreign currency denominated loans into forint", *MNB Bulletin*, October 2010.

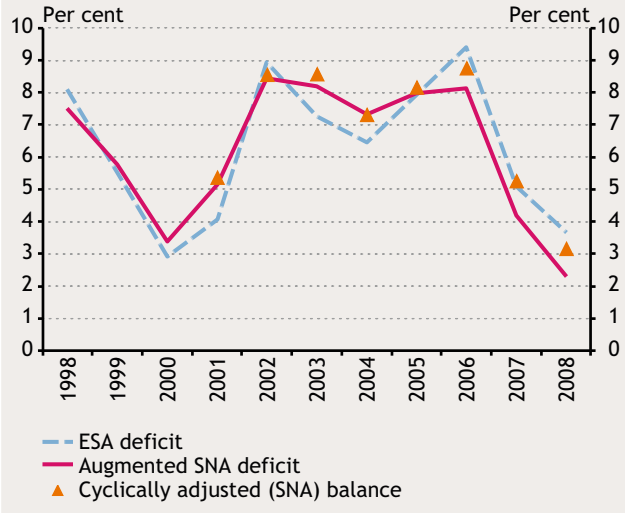
Meanwhile, as the crisis approached, non-resident agents were increasingly reluctant to undertake a forint exchange rate position, i.e. they were less willing to finance Hungarian economic agents in forint. Hungary's net external debt rose steadily in the period 2003 to 2008, and by the end of 2008 it exceeded 50 per cent of GDP.

The public deficit was still declining in the late 1990s, but after the millennium it started to climb and remained at high levels between 2002 and 2006 until the fiscal adjustment package lowered it in 2006 (Chart 10). The public deficit fell between 1998 and 2000 and reached its low point in 2000. Subsequently, however, it shifted upwards and between 2002 and 2006 a consistently high level of deficit – hovering around 8 per cent – was observed. The government's easing reached its peak at this point, followed by an adjustment in 2006. As a result, the deficit was reduced, and the net financing requirement of the public sector was lowered significantly. However, since this decline was accompanied by the diminishing net lending of households due to their consumption smoothing behaviour, it did not considerably reduce Hungary's external financing requirement.

CRISIS AND ADJUSTMENT

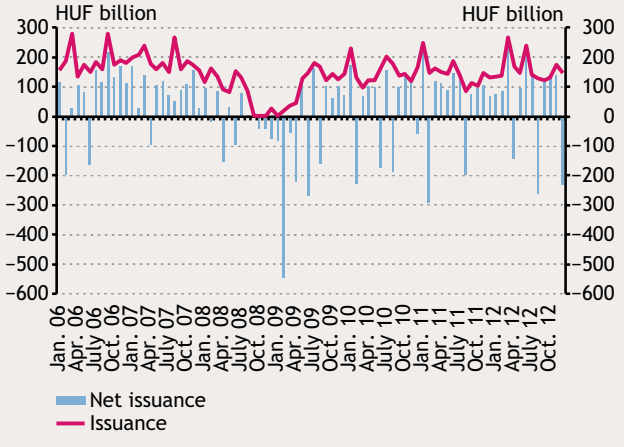
After the bankruptcy of Lehman Brothers, investors' risk tolerance declined. Consequently, the ability to finance the central government from the market was called into question, which was finally resolved by the loan from the IMF/EU. Although the public deficit was relatively low thanks to the adjustments from previous years, high accumulated debt with a large share of foreign currency debt combined with the risk aversion of investors prompted a substantial sale of government papers by non-residents in the autumn of 2008. In addition to selling Hungarian instruments, non-residents also participated less and less in Hungarian government paper auctions, which ultimately led to the suspension of government bond issuance for six months (Chart 11). In this situation, the Hungarian government turned to international organisations to be able to finance the deficit and maturing bonds. Thanks to the foreign currency loans extended by the IMF/EU, temporary financing difficulties were resolved, but the ratio of foreign currency in public deficit rose to close to 50 per cent from 30 per cent; in other words, the exposure of public accounts to foreign currency increased significantly. It should also be noted that the maturity of Hungary's external funds shortened considerably during the crisis and the resulting heightened uncertainty, which significantly increased the country's foreign currency requirement. In other words, the foreign currency denominated loan borrowed by the state – which increased the foreign currency reserves of the central bank as well – was warranted even by reasons beyond the financeability of the government. It is also important to mention that because of the crisis and the heightened risk aversion, the maturities of the country's external funds decreased, significantly increasing the country's FX reserve requirements. Therefore, the loans extended by the international institutions were also justified beyond the financing needs of the government. Moreover, since parallel to the FX loans taken up by the state the

Chart 10
Indicators of public deficit between 1998 and 2008
(as a proportion of GDP)



Source: MNB.

Chart 11
Issuance of forint-denominated government bonds with a maturity of over one year
(monthly figures)



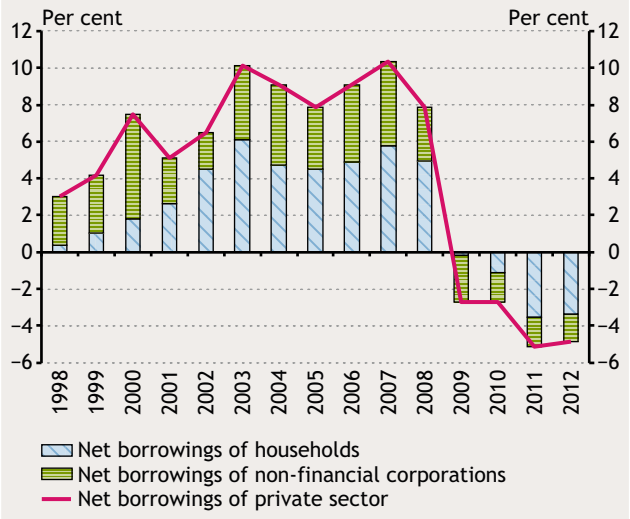
Source: MNB, ÁKK.

central bank's foreign currency reserve increased as well, at the level of public finances consolidated with the MNB, foreign currency exposure grew far less significantly than mentioned above.

Risk avoidance gave rise to a significant change in banks' behaviour as well: in contrast to the previous ample supply of loans, lending to the private sector dropped drastically. While banks extended loans to the private sector in a volume corresponding to 8–10 per cent of GDP, after the outbreak of the crisis lending decreased to such a degree that both the household and the corporate sectors became net loan repayers (Chart 12). Besides the credit supply of banks, the private sector's plunging credit demand also contributed to the decline in lending: rising unemployment, falling incomes, the spread of precautionary savings and the recognition of risks associated with foreign currency lending all may have played a role in the downturn in households' credit demand (Sóvágó, 2011).[6] In parallel with this, the decline in external and internal demand and the increased uncertainties surrounding future economic growth also undermined corporate credit demand.

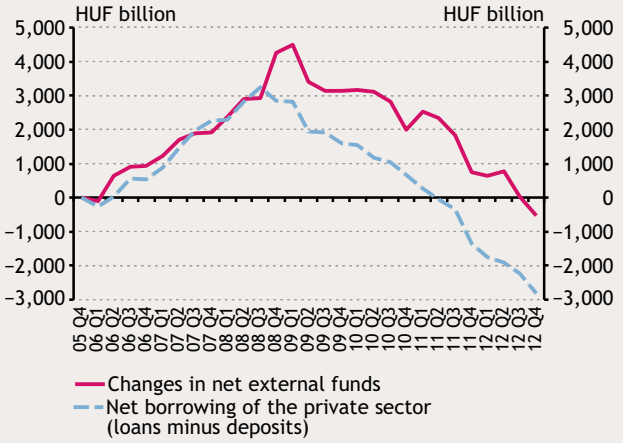
In parallel with the steep fall in lending, non-resident owners withdrew substantial amounts of funds from Hungarian banks. Up until 2008, banks financed loan disbursements in excess of deposits growth by borrowing external funds (Chart 13). The outbreak of the crisis changed banks' balance sheets fundamentally. Net loan disbursement (difference between disbursements and placements of deposits), which previously required financing resources, began to decline abruptly due to the increased net savings of the private sector. In addition to the downturn in loans due to demand and supply reasons (particularly in the corporate sector), this increase in net savings can be traced back to the growing deposit portfolio. Along with these factors, banks used their extra funds mainly for the repayment of foreign liabilities.[7]

Chart 12
Net borrowings of the private sector
(as a proportion of GDP)



Source: MNB.

Chart 13
Changes in banks' external liabilities
(cumulated transactions)



Source: MNB.

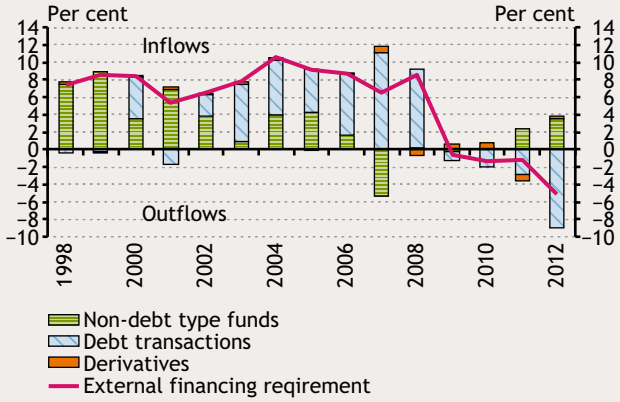
Overall, non-resident economic agents (investors, parent banks, banks) significantly reduced their financing directed to Hungary. As a consequence, the balance of payments on the financing side turned around after the outbreak of the crisis: in the net sense, no external funds reached the Hungarian economy, which also meant that the existing indebtedness was followed by a slow decline in external debt (see below).

Financing developments were also reflected in the changes in certain sectors' financial savings: due to the steep decline in lending, the net lending of the corporate and household sectors increased sharply, despite the lack of any material fiscal easing. Shrinking external and internal borrowing options led to a surge in the net financial savings (i.e. savings reduced by borrowings) of the private sector. At the same time, from the side of the real economy,

[6] Sóvágó S. (2011), "Demand and supply factors in corporate lending", *MNB Occasional Papers*, No. 94.

[7] The break in the previously observed, close covariance between changes in net loan disbursement and net external funds can be attributed to the increased MNB bill portfolio of the banking sector. This means that Chart 13 can be interpreted in such a way that, without the increase in the portfolio of the MNB bill, parent banks may have withdrawn even more funds from the Hungarian banking system.

Chart 14
Financing of the external financing requirement as a proportion of GDP



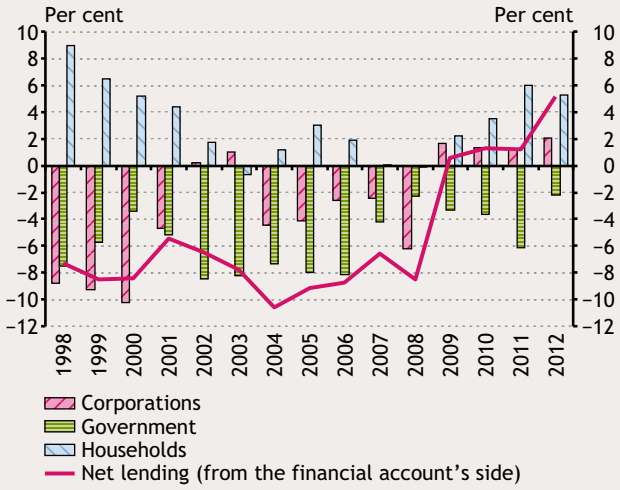
Source: MNB.

the expansion was driven by the decreased consumption and investment ratios; i.e. in reality it was the economic downturn that led to the steep increase in the private sector's financial savings. Meanwhile, except for 2011[8] which was a year largely influenced by one-off transactions, the financing requirement of the government remained moderate even after the crisis, which points to further adjustments in the context of decreased tax revenues during the recession.

Rising EU transfers also played an important role in the increase in net lending. In the new EU budget period (2007–2013) far more EU grants were allocated to Hungary than in the previous period: in 2012, the amount of EU transfers rose to 4 per cent of GDP compared to 1 per cent in 2007 (Chart 16). Therefore, the steep rise in EU transfers following the crisis can be linked to the EU budget cycles. Another important fact to note is that the growth in the net lending of the private sector can be also partly linked to the increase in EU transfers: households and non-financial corporations received substantial amounts of funds in the form of direct aid.

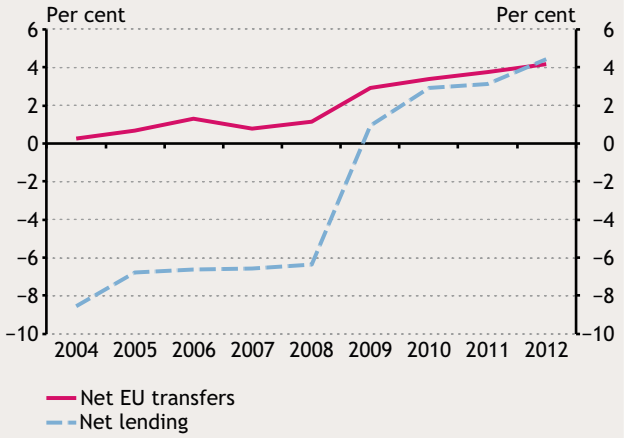
The impacts of the decline in external financing, the suspension of lending and the underlying reasons were all felt in the real economy as well: consumption and investment fell drastically and, in parallel to the financing crisis, the real economy was hit by a crisis as well (Chart 17). In the wake of the adjustments carried out since 2006, annual growth in households' consumption expenditures began to decline, but their consumption then fell sharply in the context of scarce lending due to the financing crisis, and the increased unemployment and general uncertainty triggered by the crisis. As a result of the global financial crisis, in addition to plunging external demand, internal demand dropped as well which, combined with increased uncertainty, led to a marked decline in the investment spending of corporations. The downturn in the main domestic absorption items could not be offset by the increase in the foreign trade balance resulting from the fall in imports in the context of weakening consumption and investment, and as a consequence, the Hungarian economy fell into recession.

Chart 15
Net lending of specific sectors
(as a proportion of GDP)



Source: MNB.

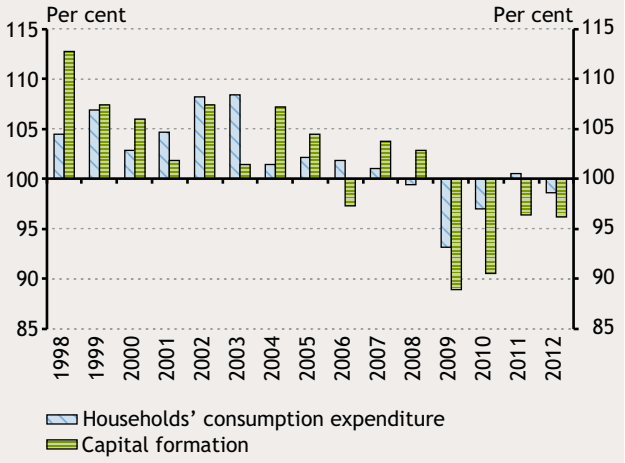
Chart 16
EU transfers and net lending
(as a proportion of GDP)



Source: MNB.

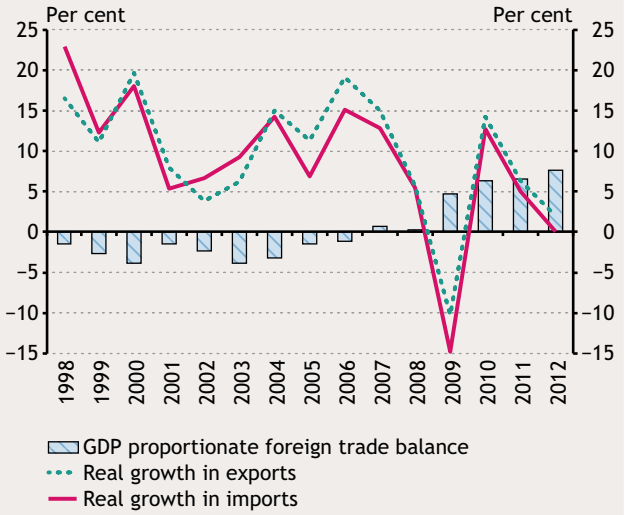
[8] The spike in the government's financing requirement in 2011 was fundamentally associated with one-off items (payment of pension fund real yields; corporate VAT refund).

Chart 17
Real growth of the main items of domestic absorption
(previous year = 100)



Source: HCSO (Hungarian Central Statistical Office).

Chart 18
Developments in foreign trade



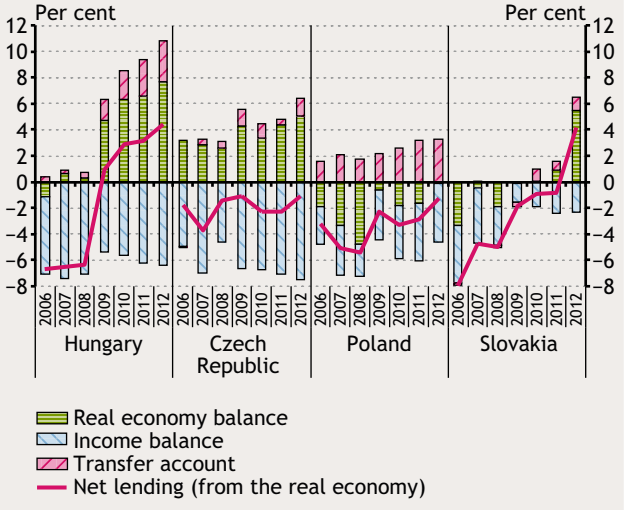
Source: HCSO.

In parallel with the developments on the financing side, there was a turnaround in Hungary's foreign trade balance and accordingly, the current account balance, as well. In conjunction with the significant decline in the main items of domestic absorption, imports decreased as well, and thus the foreign trade balance produced a significant surplus despite falling exports in the context of reduced external demand. Since 2005, real growth in exports has consistently exceeded growth in imports, but due to the significant difference between their levels, the foreign trade balance did not turn positive until 2009. The foreign trade surplus continued to grow thereafter, and by 2012 it had reached 7–8 per cent of GDP. It should be noted, however, that the expansion of trade has gradually declined in recent years and dropped to a very low level lately, which – in the context of declining external demand caused by the slowdown in global economic growth – may suggest that the Hungarian economy faces competitiveness problems as well.

Other countries in the region experienced similar trends as Hungary, but to a much lesser extent. The crisis resulted in an improvement in the foreign trade balance of the rest of the Visegrád countries as well and, in line with the new EU budget period, the EU transfers received by these countries increased, giving a boost to their net lending (Chart 19). It is an important difference, however, that – except for Slovakia's data, which suggest moderate net savings in 2011 – it was only in Hungary where external financing turned into a significant surplus after the outbreak of the crisis, while in the rest of the countries the improvement was only sufficient to moderate the previously accumulated, high deficit. It is also worth noting that the EU transfers received by Hungary, which were significantly higher than those going to the Czech Republic and Slovakia, also contributed to this result.

As uncertainties about the Hungarian economy increased, the exchange rate weakened markedly, which had a mixed impact on the external balance. On the one hand, changes in the exchange rate reinforced the adjustment process which had commenced in the current account balance and the financial account. Indeed, the weakening

Chart 19
Factors determining net lending in the region
(as a proportion of GDP)

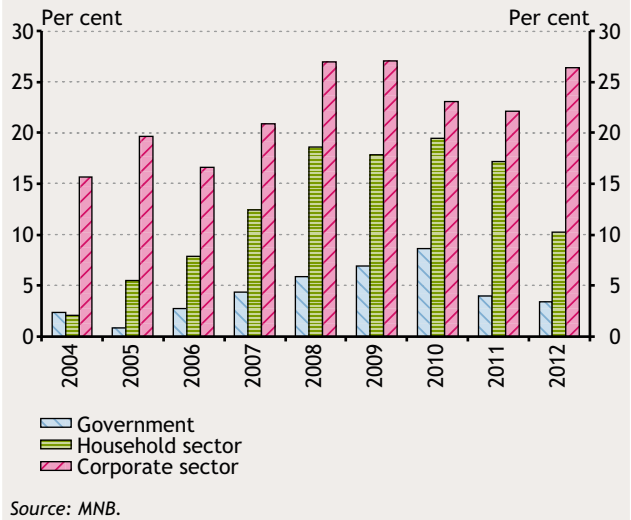


Source: MNB, Eurostat.

of the exchange rate increased the risk of the Hungarian banking system, which in turn reduced the amount of inflows and may have contributed to the growth of net exports through the improvement of export competitiveness and the continued deceleration of imports in the context of the elevated level of instalments.[9] On the other hand, the weakening of the exchange rate has negative effects due to the open FX position of specific sectors, which remains wide despite continuous loan payments. Because of households' large FX-denominated loan portfolio, the weakening of the forint exchange rate increases the interest burden and loans outstanding of households, prompting the sector to further reduce expenditures which, in turn, impairs the recovery from the crisis.

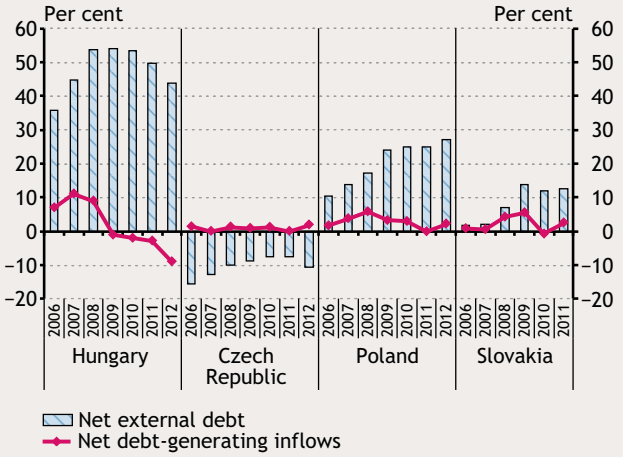
Despite the considerable net lending of the Hungarian economy, owing to the weaker exchange rate, the net external debt ratio – a key indicator of the country's vulnerability, which played an important role in the crisis which hit Hungary very severely – did not drop below pre-crisis levels until the end of 2012. Despite the financing and real economy crisis, in recent years the developments in the current account of Hungary appear to be sustainable as opposed to the deficit, which was extremely high even before the crisis and was thus deemed as being unsustainable over the long run. This notwithstanding, developments in the external balance shows that further adjustment is needed. Along with transaction data (i.e. flow indicators), investors tend to attach great significance to stock indicators, which are influenced not only by the surplus of the current account, but also by changes in the forint exchange rate. The weaker forint exchange rate restrains the decline in stocks, thereby decelerating the adjustment process commenced in the external debt ratio. And, owing to the extremely poor start, the level of Hungary's net external debt is far higher than those reported by regional countries, even despite the fact that the Hungarian data has been declining steadily for years, whereas the external debt ratio of its peers has been on the rise.

Chart 20
Open FX position of certain sectors
(as a proportion of GDP)



Source: MNB.

Chart 21
Net external debt of regional countries
(as a proportion of GDP)

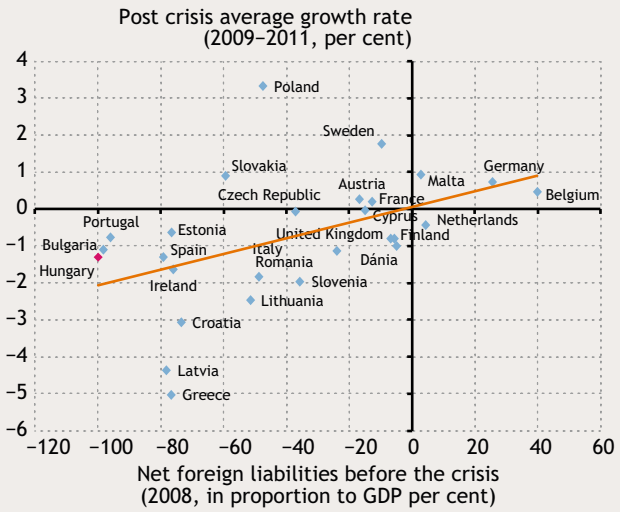


Source: MNB, CNB, NBP, NBS.

Hungary's external debt ratio is still high in international comparison which, combined with the vulnerability of the Hungarian economy, may restrain future economic growth. Although rising debts were once considered an inevitable consequence of the capital accumulation process in emerging countries prior to the crisis, after the onset of the crisis debt proved to be the greatest impediment for the economies of indebted countries. A high debt ratio implied a competitive disadvantage in and of itself. The higher the debt ratio a country had at the onset of the crisis, the more it was to have limited growth in subsequent years, and this disadvantage is likely to persist in the coming period as well (Chart 22).

[9] It is important to note that we only mentioned the most important effects exerted on the external balance; in reality, the balance-improving effects further impeded the recovery of the Hungarian economy from the crisis.

Chart 22
Pre-crisis net foreign position of certain countries and their post-crisis economic growth



Note: In addition to debt, net foreign claims include the balance of direct investments as well.
Source: Eurostat.

SUMMARY

Before the outbreak of the crisis, the Hungarian economy struggled with severe external imbalances: the easing of liquidity constraints gave rise to a surge in borrowing, which reduced the savings of households. This, together with the significant financing requirement of the corporate sector, kept the current account deficit at high levels. The situation was exacerbated by the fact that, partly owing to the surge in foreign currency lending, the deficit was financed predominantly from external borrowing. Due to a reliance on external funds and accelerating external debt, the crisis which started at the end of 2008 caught the Hungarian economy in a particularly vulnerable position. The credit crunch forced economic participants to carry out severe adjustments. In the context of subdued lending and increased risks, consumption and investment slumped, while savings rose. These developments –combined with higher EU transfers – generated a surplus in the current account balance; Hungary became a net saver and started to repay its external debts. Despite the favourable developments, the external indebtedness of Hungary remains extremely high, which may necessitate further adjustments in the future.

Zsuzsanna Hosszú, Gyöngyi Körmendi, Bálint Tamási and Balázs Világi: Impact of the credit supply on the Hungarian economy

We examine developments in credit supply in recent years and the significance of its role using different approaches and various methods. Based on these, we can establish that credit supply is a significant factor in terms of the development of the Hungarian economy both during crisis periods and during the normal economic cycle. The procyclical behaviour of the financial sector considerably contributed to the excessive credit outflow before 2008, and to a large extent, it was the driver behind economic activity during that period. At the same time, the economic downturn, lasting since 2008, is also significantly attributable to the credit supply behaviour of the banking system. Taking a closer look at the corporate credit market, we can state that the contraction which has ensued since the onset of the crisis until now was attributable to the tightening of supply and a decline in demand, in a fifty-fifty ratio. However, the picture may be qualified further according to the size of the companies: in the case of large enterprises the shrinkage of the credit portfolio is attributable more to the fall in demand, while in the case of small companies to the tightening of supply. Analysing the issue broken down by industries, we find that not all competitive and export eligible industries can borrow in the required volume, while there are other industries which, compared to their economic prospects, encounter much more generous credit supply – most probably out of necessity. Such distortions in the distribution of resources may generate welfare losses.

INTRODUCTION

During the crisis, which started in 2008, the volume of disbursed loans and economic growth both declined considerably. In order to understand this process, however, it is essential to clarify the extent to which the slowdown of lending can be attributed to diminishing credit demand and/or to the contraction of credit supply. The identification of credit demand and supply factors is also not independent of the issue of whether the decline in the growth of the real economy is caused by the curtailment of lending, or the other way around. Namely, if it is the decline in credit demand that dominates the processes, restrained lending is predominantly attributable to the slowdown of economic growth and the decline in investment activity; however, if the determinant factor is the decrease in credit supply, then the reduction of lending may have a negative impact on economic growth. A more in-depth understanding of the processes may be helpful in developing the proper economic policy instruments to address the problems.

In this article, we describe the role of credit supply using approaches that in part have been published already, considering the results generated by the various methodologies. With the help of aggregated time series, first we indentify and study the importance of credit supply shocks relying on the structural vector autoregressive (SVAR) model, describing the entire economic system simultaneously. We quantify the relation of the functioning of the credit institution system to economic growth, relying on the Financial Conditions Index (FCI), received as a result of the enhancement of this model. Following the analysis of the simultaneous systems, we present a partial equilibrium model, which focuses on the corporate credit market and divides the portfolio decline observed in that area into demand and supply factors. Next, we move on to the detailed disaggregated review of corporate lending, examining the extent of changes in demand and supply by corporate size, industry and export eligibility, based on the data of the Central Credit Information System. Due to its level of detail, this review may also serve as a basis for the development of targeted economic policy measures.

AGGREGATED APPROACHES

Identifying and defining the importance of credit supply shocks – SVAR model

One of the most common methods for identifying credit supply – i.e. defining which part of the change in credit volume and interest can be attributed to the behaviour of the financial intermediary (banking) sector – is to estimate *structural vector autoregressive* (SVAR) models. In the case of the Hungarian economy, a study by Tamási and Világi (2011) applies this method using quarterly data between Q1 1995 and Q4 2009. The key feature of the method is that the values of the estimated parameters are primarily determined by the data rather than the assumptions of a predefined model; at the same time, it is possible to identify with them the structural shocks that can be interpreted in economic terms.

A credit supply shock implies an unexpected change in a fundamental feature of the financial intermediary system (technology, preferences, expectations, etc.), and the impact thereof on lending practice. The model identified two types of credit supply shock: one of them is connected to the behaviour of banks' management/staff, while the other is suitable for capturing the credit supply changes induced by the economic policy environment.

In the case of the first type of credit supply shock, we set out from the fact that, with rising probabilities of bankruptcy and in an increasingly risky economic environment, banks are unlikely to pursue an expansive lending policy. A plausible explanation for the parallel increase in risk and credit disbursement is that, due to some exogenous reason, the risk assessment of the banking system has changed. Thus, we regard it a positive credit supply shock when corporate bankruptcy ratios and the credit portfolio increase together. The advantage of the applied identification pattern is that it is unlikely that other shocks are able to generate the constellation used for the identification of the shock; therefore, this is a rather robust procedure. However, its disadvantage is that it is too conservative: it does not always identify the credit supply shocks induced by the change in risk assessment.

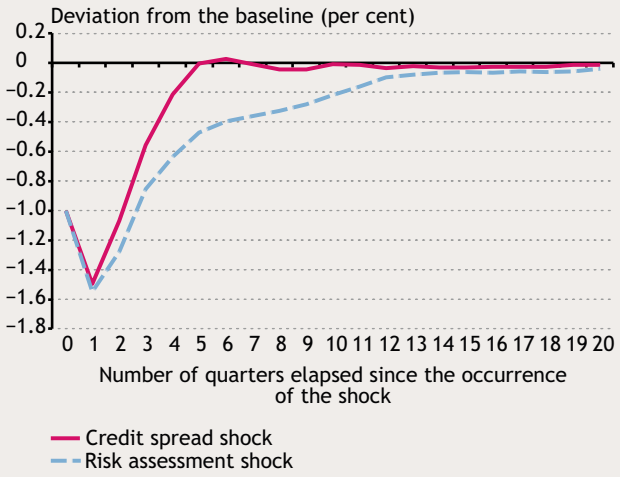
The second credit supply shock can be identified by the exogenous increase in the interest margin, which may be prompted by changes in several factors. First, the change in the margin may be caused by altered intensity of competition. Second, the various types of taxes imposed on banks also influence the margin: for example, banks can pass the impact of the new tax on to customers at a rate depending on the flexibility of the credit demand function, and they do so primarily by increasing the margins. Third, in line with the argument used in the case of the banking tax, it is obvious that credit spread shocks can be also connected to banks' capital constraints coming into effect. Because if banks' regulatory capital falls below the minimum for whatever reason, they will be forced to execute a capital increase which, in turn, will make lending more expensive for them and they may try to pass the increased expenses, at least partially, to customers. It may have similar effects if banks are forced to adjust their behaviour due to their liquidity position. Moreover, the credit spread shock may be also connected to the exogenous change in regulatory rules as they significantly influence the liquidity and capital adequacy limits of banks. Developments in the interest margin may be traced back to other factors as well, such as changes in the cost of funds or the impact of the economic cycle on credit risk; however, these factors are already described by the systematic behaviour of the model, and thus they cannot be considered as exogenous shocks.

The question arises, however: do the two, differently identified credit supply shocks truly capture different phenomena? In order to resolve these doubts, we present the impulse responses of the two credit supply shocks in the case of a few key variables. As illustrated in Charts 1.a – 1.d, the impacts of the two shocks differ significantly. In the case of a risk assessment shock, the reaction of the credit portfolio and real GDP is larger and more permanent than in the case of a credit spread shock. In the first year, the risk assessment shock, resulting in a 1 per cent decrease in the credit portfolio, generates a 0.21 per cent fall in real GDP on average, while a negative credit spread shock of a similar magnitude results in a fall of 0.18 per cent for the same period. It should be also noted that in the case of risk assessment shocks, credit expansion is not accompanied by a substantial decline in the margin. This gives rise to another distinct difference in interpretation: the risk assessment shock primarily captures the *quantitative adjustment* (credit rationing), while it follows from the construction of credit spread shocks that they represent the credit supply changes accompanying the *price adjustment*.

Most economists agree that the current economic crisis is predominantly attributable to the behaviour of the financial intermediary system. At the same time, it is less obvious whether during normal periods the financial sector plays a significant role in the trends of macroeconomic cycles. In the case of the Hungarian economy, this issue may be analysed with the SVAR model, using the method of variance analysis (variance decomposition).

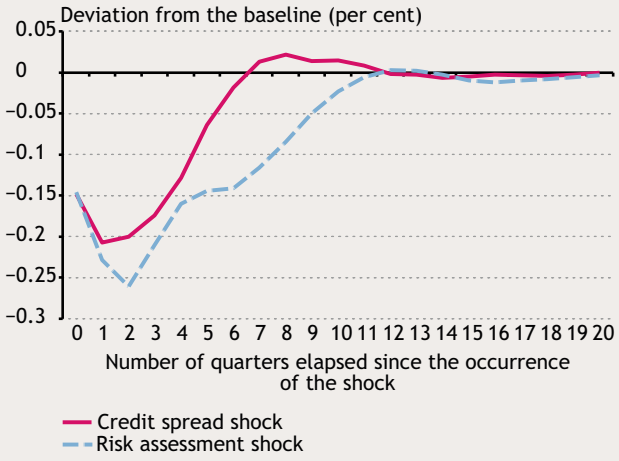
In order to compare the impact of credit supply shocks with other factors, we need to identify two additional structural

Chart 1.a
Impulse responses of the corporate credit portfolio to the different credit supply shocks upon a shift of −1 per cent in lending



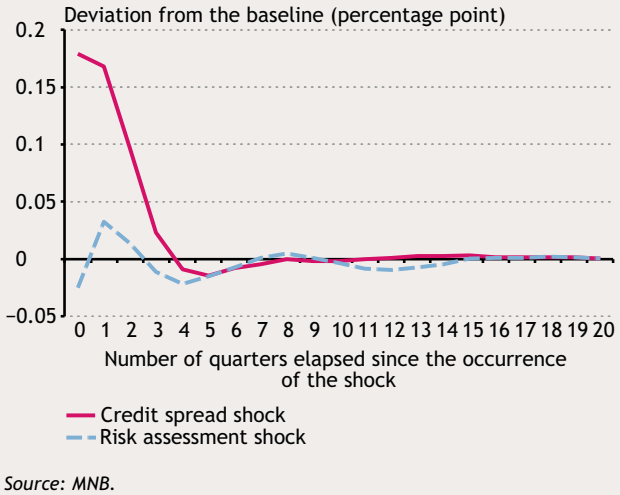
Source: MNB.

Chart 1.b
Impulse responses of the real GDP level to the different credit supply shocks upon a shift of −1 per cent in lending



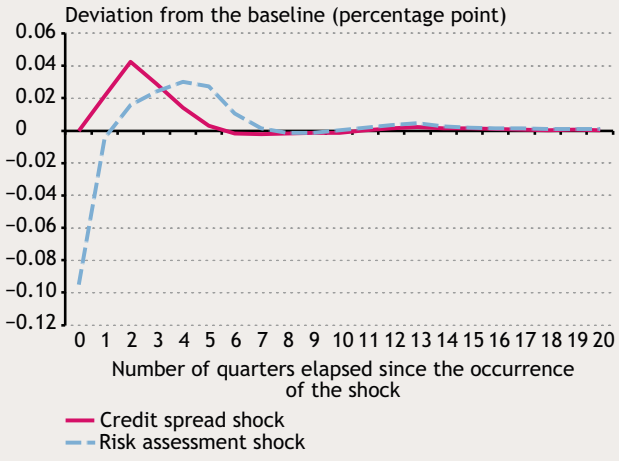
Source: MNB.

Chart 1.c
Impulse responses of the corporate interest margin to the different credit supply shocks upon a shift of −1 per cent in lending



Source: MNB.

Chart 1.d
Impulse responses of the corporate bankruptcy ratio to the different credit supply shocks upon a shift of −1 per cent in lending



Source: MNB.

shocks: a monetary policy shock; and, following the model of Vonnák (2010), the expected risk premium shock of foreign investors. In small, open economies, the latter shock has a considerable impact on the development of the economic cycle; therefore it is important to examine it. In the following, we refer to these two latter shocks jointly as macroeconomic shocks because, as opposed to credit supply shocks, these have been regularly analysed in standard macroeconomic SVAR literature.

Relying on the variance analysis, we can determine the percentage at which individual shocks explain the unconditional variance of certain endogenous variables characterising the business cycle. Since the variance analysis pertains to the entire sample and the crisis period has only a small weight in the sample, the conclusions drawn from it help to answer the question above, i.e. whether the banking sector influences the economic cycles in normal periods.

Table 1 shows the percentage at which the unconditional variance of the macroeconomic variables is explained by the four identified structural shocks together. We found that the identified shocks explain almost 40-50 per cent of

Table 1
Part of the unconditional variance of the macro variables explained by the shocks identified
(per cent)

BUBOR	Nominal effective exchange rate	Real GDP	Consumer price index
45	51	42	42

Source: MNB.

Table 2
Decomposition of the part of the variance of the macroeconomic variable explained by structural shocks
(per cent)

	Risk assessment shock	Credit spread shock	Monetary policy shock	Risk premium shock
BUBOR	11	18	28	43
Nominal effective exchange rate	24	19	26	31
Real GDP	24	23	20	33
Consumer price index	24	26	26	24

the individual variances, which is essentially consistent with the results described in the international literature, according to which various technological and demand shocks also play an important role in developments in the economic cycles. This study is not intended to identify these shocks.

Table 2 illustrates the rate at which the variance of the individual variables, of *the part explained by the identified shocks,* is attributable to individual structural shocks. We found that in the case of BUBOR, of the four structural shocks the role of the risk premium shock is dominant, followed by the monetary policy shock, while the role of the two credit supply shocks is significantly smaller. The macroeconomic shock has also larger significance in the case of the nominal exchange rate, but it is much less dominant than in the previous case. However, in the case of real GDP and CPI, the role of credit supply and macroeconomic shocks is completely balanced. In both cases, they explain roughly a fifty-fifty ratio of the variance part captured by the identified shocks.

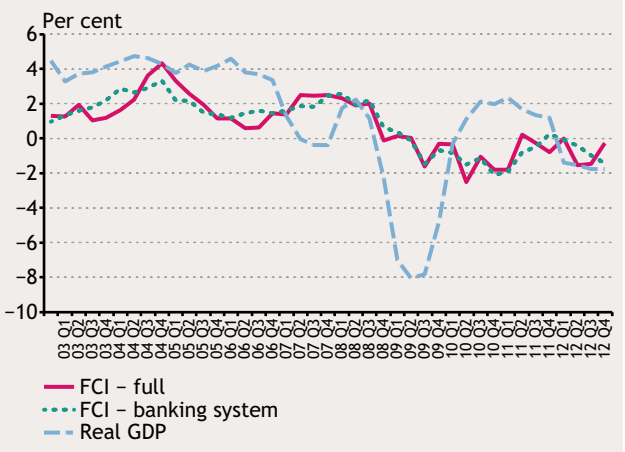
In summary, it can be stated that the dynamics of the most important macroeconomic variables (except the interest rate) are influenced by credit supply shocks roughly to the same extent as by the monetary policy and risk premium shocks, to which the literature has attached special significance until now. In other words, we may conclude that the functioning of the banking sector has a significant impact on economic cycles not only during periods of crisis; indeed, it is as responsible for developments in the economic cycle during normal periods as changes in the monetary policy or investors' risk appetite.

Relationship between economic growth and the banking system – Financial Conditions Index

In addition to short-term interest rates and the nominal exchange rate representing the behaviour of the money market, the Financial Conditions Index (FCI) consolidates the information included in the other price, quantitative and qualitative variables characterising the financial intermediary system into a single indicator variable. The FCI measures the impact of the financial sector on the real economy: specifically, the annual growth rate of the FCI shows the rate at which the financial and banking system contribute to the annual growth rate of real GDP.

The weights of the variables determining the FCI are derived from a VAR (vector autoregressive) model based on

Chart 2
Growth rate of real GDP and contribution of the FCI



Source: MNB.

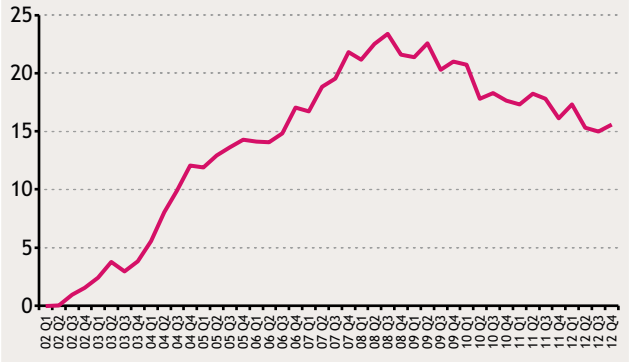
the Bayesian structural VAR model developed by Tamási and Világi (2010). However, in calculating the FCI we also use the time series of the consumer credit volume (including the home equity loans), as well as the bank interest margin associated with them. In addition to the full FCI, partial indices may also be calculated. Thus, for example, the banking system FCI without the money market impact is generated by the weighting of loans and interest margins. The weights of loan volumes and interest margins are calculated in the index based on the impulse responses of credit supply shocks, while the weights of BUBOR and the exchange rate are calculated based on the impulse responses of the monetary policy and risk premium shocks.

In Chart 2 the annual growth rate of the FCI shows the rate at which the financial intermediary system contributes to the annual growth rate of real GDP.

The chart reveals that at the end of 2008, i.e. before the start of the financial crisis in Hungary, the contribution of the Hungarian financial intermediary system to economic growth was significantly positive, despite the fact that from the end of 2006 the growth of the real economy had already decelerated due to other factors. On the other hand, the financial intermediary system greatly contributed to the economic downturn after 2008 and its behaviour became procyclical. At the trough, the annual slowdown of real GDP was 8 per cent, a quarter of which was generated by the financial sector. In 2012, the banking sector partial index system made a continued negative contribution to the growth of the real economy; at the same time, as a result of improving interest conditions, the impact of the full FCI is neutral.

Analysing the FCI level, we can compare individual periods as regards the tightness of financial conditions. When the index of financial conditions in Q1 2002 is set to 0, Chart 3 indicates whether the financial conditions in subsequent quarters were tighter or looser by comparison (the lower the level, the tighter the conditions). According to the chart, financial conditions are still much tighter than in early 2008, before the outbreak of the crisis.

Chart 3
Development of the FCI level



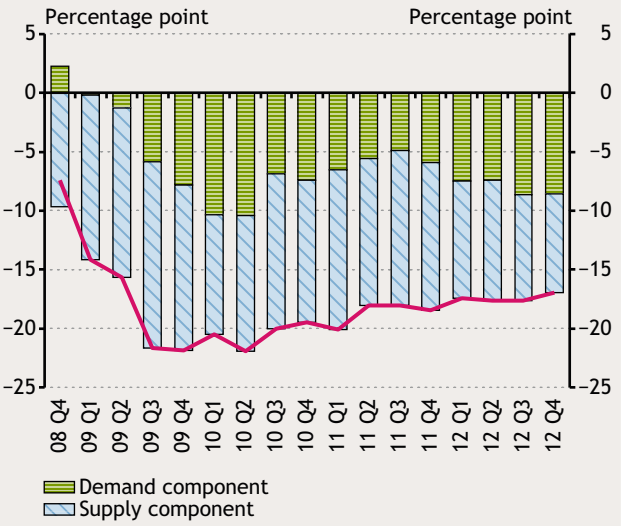
Source: MNB.

Identification of demand and supply in the corporate credit market – a partial equilibrium model

The equilibrium model used by Sóvágó (2011) divides the change in lending into parts explained by demand and supply factors. Demand and supply are identified by a simultaneous econometric model, using a panel database. It estimates a supply and a demand function. The supply equation contains the price and non-price conditions of lending, the creditworthiness of borrowers, as well as the variables capturing the liquidity position of banks. Real interest, as a price variable, also appears in the demand equation in addition to the variables related to economic activity. The applied method assumes an equilibrium, as the interest rates on loans are market clearing prices. At the same time, the imperfections of the credit market (e.g. the information asymmetry) were included in the supply equation considering two channels: on the one hand, through the results of the bank lending survey, which captures the non-price conditions of credit supply, and on the other hand, through the corporate bankruptcy ratio, which approximates the borrowers' creditworthiness. Accordingly, supply may shrink due to creditors' increased risk avoidance, which is reflected in stricter lending conditions, or due to the deterioration of the companies' creditworthiness, which is captured by a rise in the corporate bankruptcy ratio.

Chart 4, which breaks down changes in the annual growth rate compared to Q3 2008 into supply and demand components, illustrates the cumulative impact of credit supply and demand on lending. Based on this, after the onset of the crisis, supply restraints were primarily responsible for the weakening of lending activity. Credit demand started to decrease only later; in Q1 2010 the extent of the impact of the demand and supply on lending was similar. Due to the change in supply and the strengthening of demand, supply constraints became more pronounced by the end of 2011; the relative weight of the demand and supply factors was about 1/3-2/3 at the time. As a result of weakening economic activity, demand played a more marked role in the changes in the amount of new loans, and thus, by the end of the year demand and supply factors contributed to the cumulated decrease in the corporate credit portfolio almost to the same degree once again.

Chart 4
Changes in the annual growth rate of loans to non-financial corporations compared to September 2008 and the breakdown thereof to demand and supply components



Note: The line and bar charts indicate cumulated values.
Source: MNB, Sóvágó (2011).

DISAGGREGATED APPROACH – ANALYSIS ACCORDING TO COMPANY SIZE AND INDUSTRY

In order to quantify the sectoral impacts of credit supply, based on micro databases we first prepared a model similar to the systems used for bank credit assessments for the 2007–2011 period. In this context, considering corporate characteristics and the general macroeconomic environment, we estimated the probability of default for companies with outstanding loans.[1] Using year dummies, we measure the role of the macroeconomic environment in changes in the risk attached to companies with outstanding loans in the specific years. Subsequently, based on the average corporate characteristics of the companies with loans, we can establish the extent to which banks have responded to changes in the economic environment by changing lending standards – for example, the extent to which the conditions companies must meet became stricter after the crisis compared to the pre-crisis period. With this method, we can also estimate the role played by the tightened supply and the downturn in credit demand in the change of the volume of new credit amount during the years of the crisis.

According to our estimates performed on the database of the corporate Central Credit Information System, between 2007 and 2011 roughly 50 per cent of the change in the volume of credit disbursements is attributable to supply reasons. Due to the deteriorating economic situation, banks face higher credit risks, to which they respond by increasing credit margins and by narrowing the range of companies to which they extend loans. According to our estimates, the risk of new loans extended increased significantly, despite the fact that banks strive to lend to lower-risk companies.

The tightening of credit conditions affects various partial segments of the corporate credit market to a different degree; therefore, we should examine the issues according to the size, industry and export eligibility of the companies as well.

Table 3 illustrates developments in loan disbursements before the crisis and in the last year of the sample, broken down by size (micro, small, medium and large companies) based on the methodology outlined above. We found that fewer loans were extended in all four categories, but the decline in the case of micro-companies, which are the riskiest and most dependent on the domestic macroeconomic environment, was considerably larger than in the other groups. It is also clear that this could be primarily attributed

Table 3
Changes in new loan amount broken down by corporate size

	New loan portfolio (HUF billions)				
	2007	2011	Change (per cent)	Demand (per cent)	Supply (per cent)
Micro	1,730	828	−52.14	−61.68	9.54
Small	1,120	999	−10.80	28.48	−39.29
Medium	1,160	785	−32.33	−4.66	−27.67
Large	1,460	1,250	−14.38	−49.32	34.93
Total	5,470	3,862	−29.43	−14.26	−15.17

Source: CCIS.

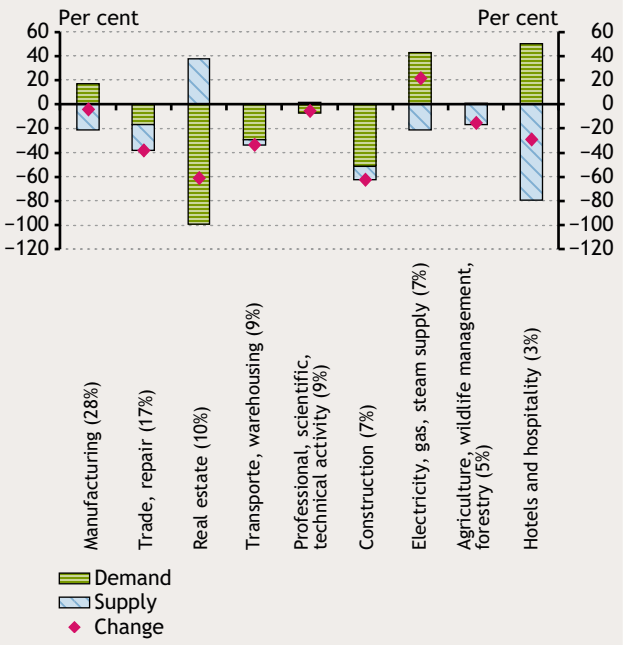
[1] Upon credit assessment banks usually consider not only the probability of default, but also the loss given default; however, we have no data available concerning the latter, and thus we limited our analysis to the probability of default.

to the fall in demand, as credit conditions were even eased somewhat in this segment. By contrast, for medium-sized, and particularly for small companies the decline is more attributable to contraction on the supply side; i.e. in the case of these company groups, the tightening credit conditions presumably represent real obstacles for the companies.

In the large corporate segment, the downturn in lending was due to weaker demand, even though banks eased supply conditions. The reason for this is that this segment is the least risky group; accordingly, as a result of increasing risk avoidance, banks wish to shift their lending toward this segment and therefore, credit market processes are not hindered by supply constraints. At the same time, as a result of postponed investment in the context of an uncertain macroeconomic environment, demand lags behind that observed during the years preceding the crisis which, on the whole, leads to restrained loan disbursements.

When we perform the same calculations in a sectoral breakdown, we find significant heterogeneity (Chart 5, Table 4). Sectors where the change generated by the demand and supply is different in its sign deserve special attention. The shift in credit demand observed between 2007 and 2011 is presumably connected to the economic prospects of the sector, which could be largely explained by the protracted structural shift in demand. Sectors hit by a more significant downturn as a result of the recession are characterised by higher bankruptcy rates and lower investment activity, which in turn reduces their credit demand. Thus, we can also measure the viability of an industry by the decline in its credit demand. Based on the argument presented above, the banking system functions well if it eases credit supply constraints for the more viable sectors, i.e. if the credit constraints are tighter where there is a protracted fall in demand. When the demand effect is positive while the supply effect is negative, over this time horizon it may suggest that, although the sector is viable and would be able to achieve higher output, credit supply constraints impede this – such sectors include agriculture, manufacturing, electricity, gas, steam supply, air-conditioning, as well as hotels and hospitality.

Chart 5
Changes in amount of new loans from 2007 to 2011 broken down by sector



Note: In the chart the figures in the bracket after the name of the industries indicate their share in the full credit portfolio in 2011.
Source: CCIS, MNB.

Table 4
Changes in amount of new loans broken down by sector

	New loan portfolio (HUF billions)				
	2007	2011	Change (per cent)	Demand (per cent)	Supply (per cent)
Agriculture, wildlife management, forestry, fishery	260	220	−15.38	1.15	−16.54
Manufacturing	1,190	1,140	−4.20	17.23	−21.43
Electricity, gas, steam supply, air-conditioning	181	220	21.55	43.09	−21.55
Construction	532	200	−62.41	−51.69	−10.71
Trade, repair	1,360	841	−38.16	−16.84	−21.32
Transport, warehousing	361	240	−33.52	−29.36	−4.16
Hotels and hospitality	172	122	−29.07	50.47	−79.53
Real estate	845	329	−61.07	−99.05	37.99
Professional, scientific and technical activity, administrative and service supporting activity	346	327	−5.49	−7.23	1.73

Source: CCIS.

However, if the demand effect is negative and the supply effect is positive in a sector, the banking system is lending to companies that are in fact less viable. Such sectors include, for example, real estate transactions, and credit conditions were not tightened significantly for the construction industry either, which suffered a steep decline. This phenomenon is presumably attributable to involuntary lending by banks, i.e. they continue to lend to companies which were granted loans previously, but due to increased risks, they are no longer creditworthy. Such disbursements take place because for lack of these loans, the former, large loans would default, thereby significantly increasing loan losses.[2]

The sectors are also heterogeneous in terms of the size of borrowers. For example, in 2011 the share of large companies in all companies varied between 0.2 and 12.8 per cent in the different sectors. As we found, banks tightened credit conditions to different degrees depending on size; therefore the results of the demand-supply decomposition by sector may be also influenced, besides the viability of the industry, by the typical company size of the individual sector. Thus, we also performed our estimates without the large companies. This resulted in a much more homogenous picture in respect of the supply effect: except for real estate transactions, we measured a supply effect of roughly -20 and -30 per cent in the key sectors, and the contrast in the sign of supply-demand effects moderated or did not even materialise.

The sectoral differences in the tightening of credit supply could be also explained by the heightened risk of certain sectors, or if the sectors were riskier from the start; this, however, was concealed by the favourable economic environment preceding the crisis. Table 5 illustrates the average probability of default and changes in the probabilities of default, broken down by sector. According to our findings, among the key sectors the largest surge in risk occurred in real estate, professional, scientific, technical, administrative and service support activities and in the hotel and hospitality sector. We found nevertheless, that the supply effect was usually less contractive in the very same sectors.

We measured the long-term prospects and profitability of the sectors not only on the basis of changes in credit demand. The long-term viability of a sector is largely determined by the expected medium-term demand for the given sector's products and services. An economy that accumulates large external debt is forced to adjust and downsize the debt portfolio when external financing becomes more expensive. This is typically accompanied by a fall in internal consumption and a rise in net exports, i.e. demand shifts from the sectors producing for domestic consumption to those producing also for exports. As a result, the decline in credit supply could be partially warranted in the case of non-exporting sectors with an expected, protracted downturn in relative demand; however, this might generate welfare losses for sectors that improve the trade balance.

With that in mind, in the following we attempt to illustrate with various indices the export capacity of the individual sectors (Table 6). We used three indices for this exercise: the share of exports in the sector's sales, the ratio of

Table 5
Average probability of default and its developments in individual sectors

	Average probability of default (per cent)		
	2007	2011	Change
Agriculture, wildlife management, forestry, fishery	1.98	2.30	0.31
Manufacturing	1.62	2.75	1.13
Electricity, gas, steam supply, air-conditioning	1.60	1.65	0.05
Construction	3.29	4.94	1.64
Trade, repair	1.96	3.72	1.76
Transport, warehousing	2.06	4.33	2.27
Hotels and hospitality	1.74	3.12	1.38
Real estate	3.49	7.35	3.85
Professional, scientific and technical activity, administrative and service supporting activity	1.41	4.58	3.17

Source: CCIS.

[2] However, it should be noted that we were unable to control several factors – e.g. the interest rate, state guarantees and available collaterals – during the analysis, which may influence the results as well. Furthermore, a few credit contracts of extreme amount may also cause distortions. An example for this is manufacturing, where in 2011 a single loan agreement was concluded for the amount of HUF 300 billion, and if we remove this single observation from the sample, the supply effect changes roughly to minus 20 per cent.

Table 6
Export capacity of industries in the years following the crisis

	Export sales / Total sales (per cent)	Exports/imports (per cent)	Export capacity based on the input-output table (per cent)
Agriculture, wildlife management, forestry, fishery	10.3	**291.6**	**113.5**
Manufacturing	**58.9**	**122.8**	**139.4**
Electricity, gas, steam supply, air-conditioning	4.1	31.7	80.8
Construction	3.0	55.3	19.6
Trade, repair	14.3	38.6	78.7
Transport, warehousing	**22.4**	**108.0**	**103.8**
Hotels and hospitality	2.0	31.2	17.5
Real estate	2.8	84.8	27.3
Professional, scientific and technical activity, administrative and service supporting activity	16.6	**142.1**	44.0

Source: CCIS, MNB.

exports to imports (in the case of net exporter companies this figure is above 100 per cent) and the index based on the input-output table for domestic output. The latter was calculated as follows: we examined the output growth of individual sectors in the case of an export demand increase of one unit, and the share of individual sectors in the output growth. We derived the same ratio for the entire national economy output and then divided the two by each other. If the result exceeds 100 per cent, it means that the growth of export demand increases the production of the industry more than the growth of domestic demand. This ratio could be useful as it can capture not only the industries producing directly for exports, but also when other exporting sectors have a large weight in the demand of a certain sector.

Manufacturing and transport & warehousing proved to be export eligible sectors based on all three indices. Accordingly, based on this approach, these are the sectors that should experience credit supply constraints to the smallest degree. By contrast, we found that credit supply in manufacturing might be a bottleneck, while in the sectors fully depending on domestic demand – construction and real estate – credit supply was not tightened perceivably.

In summary, supply side credit contraction according to company size mainly impacts small- and medium-sized companies, although this is not justified based on their credit demand; on the other hand, the lack of disbursements to large companies is attributable to the lack of demand. All of this suggests that the contraction of credit supply – primarily by size – does not follow the sectoral restructuring of resources which would be desirable for balance, and thus it can generate welfare losses. According to our estimates, the relative shift in credit supply does not support the sectors facing a better outlook over the long term, while – presumably due to involuntary lending – the banking system assumes excessive risks in other sectors. At the same time, these sectoral results may be significantly distorted by events that have no structural explanation; therefore, in order to draw more detailed conclusions it is always necessary to perform a robustness analysis as well.

CONCLUSIONS

In this study, we quantified the effects of credit supply on the Hungarian economy based on aggregated and disaggregated approaches, basically relying on three methods. The first method – the SVAR and the FCI, which is derived from the former – is based on aggregated data, and considers the simultaneous interaction of the financial sector and the real economy. The second method is a partial equilibrium method, i.e. it focuses on the credit markets and handles the events of other parts of the economy as exogenous; and finally, the third method is based on disaggregated data.

All three methods unanimously demonstrate that credit supply factors play an essential role in developments in lending activity both in the pre-crisis period and the period elapsed since the outbreak of the crisis.

With the help of the SVAR model we demonstrated that in the period since 1995 credit supply shocks have explained the fluctuation of the interest rates, exchange rate, lending and real GDP at least to the same extent as the monetary policy and risk premium shocks. Furthermore, we demonstrated with the help of the FCI that the procyclical

behaviour of the financial sector considerably contributed to the excessive credit outflow before 2008, which, to a large extent, generated economic activity during the period. At the same time, the economic downturn, lasting since 2008, is also largely attributable to the credit supply behaviour of the banking system.

Based on the partial equilibrium model, following Q3 2008 the decline in lending was initially caused mainly by the fall in credit supply, followed by a decline in credit demand. By the beginning of 2010, the two effects reached similar levels; however, subsequently the effect of constrained supply was more pronounced again. From 2012 credit demand weakened again, and thus by the end of 2012 the corporate credit contraction seen since the outbreak of the crisis was explained by the demand and supply effects to a fifty-fifty ratio.

The results of the analysis performed on the disaggregated databases of the corporate Central Credit Information System are consistent with the above. Based on the findings, the downturn in lending between 2007 and 2011 is attributable to supply factors to a degree of roughly 50 per cent. As far as company size is concerned, reduced supply primarily hit small- and medium-sized companies. Furthermore, the relative shift in credit supply does not support the sectors that are expected to face better prospects over the long term, while – presumably due to involuntary lending – the banking system assumes excessive risks in other sectors. All of this suggests that the contraction of credit supply does not follow the sectoral restructuring of resources, which would be desirable for balance, and therefore, it may generate welfare losses.

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Attila Korencsi, Melinda Lakatos and György Pulai: Regulation on the prohibition on monetary financing – obligations and opportunities

The prohibition on monetary financing restricts the central bank financing of institutions within the public sectors of the EU and member states, thereby strengthening the budgetary discipline and the commitment to price stability as the primary objective of monetary policy. However, compliance with the prohibition does not mean that there is no leeway left for the efficient fulfilment of central bank functions. The exceptions specified in the law allow central banks to attain the objectives and fulfil the basic tasks of the European System of Central Banks. The regulations concerning the prohibition on monetary financing also apply to the non-euro area central banks – thus to the Magyar Nemzeti Bank as well – and compliance with such regulations is monitored by the European Central Bank. This article aims to provide a comprehensive overview of the key elements of the prohibition and the possibilities provided by the exceptions by presenting the central bank's lending practice, the purchase of debt instruments and the functions of the fiscal agent.

The European Central Bank and member state central banks cannot grant credit to the public sector of the EU and of the member states. The central bank funding of publicly-owned credit institutions other than central bank money supply is irreconcilable with the prohibition on monetary financing. In respect of debt instruments, the purchase of securities issued by the public sector on the primary market is prohibited, and purchasing on the secondary market may not serve the circumvention of the prohibition either. Central banks may act as fiscal agents for the state; but any role they assume must comply with market conditions.

SUMMARY

The prohibition on monetary financing, which restricts the central bank financing of the institutions belonging to the EU and member state public sector, strengthens budgetary discipline and the commitment to price stability, as the primary objective of monetary policy.

The prohibition on monetary financing is a European Union rule prescribing an obligation of adaptation; although it sets boundaries, compliance with the prohibition does not prevent central banks from effectively fulfilling their central bank functions. On the one hand, EU law sets out prohibition rules to be strictly observed, but on the other hand it also allows for exceptions, which allow central banks to efficiently achieve the goals and fulfil the basic tasks of the European System of Central Banks (ESCB).

The provisions pertaining to the prohibition on monetary financing also apply to Magyar Nemzeti Bank (MNB); compliance is monitored by the European Central Bank (ECB); national central banks, including the MNB, must also submit reports on compliance annually.

In this article, we wish to give an overview of the key elements of the prohibition. We address the following topics: the central bank's lending practice, purchase of debt instruments and fiscal agent functions.

In case of **central bank lending,** the prohibition on monetary financing limits the financing of the public sector, the granting of emergency liquidity assistance to credit institutions and financial support to deposit insurance and investor compensation schemes. According to the prohibition, the ECB and member state central banks, including the MNB, may not grant overdraft facilities or any other type of credit to EU institutions, the member states' central government, regional or local public administration bodies or public undertakings. It is irreconcilable with the prohibition on monetary financing, if a central bank

finances a publicly-owned credit institution outside of the scope of central bank money supply (i.e. using means other than the monetary policy instruments, lending related to payment and settlement systems or emergency liquidity assistance).

The granting of emergency liquidity assistance can be an important instrument for maintaining the stability of the financial system and preventing potential contagion impacting the banking system and money markets. At the same time, it must not aim at monetary financing; therefore this extraordinary form of credit is available only on a temporary basis and only for credit institutions deemed solvent.

The financing of deposit insurance and investor compensation schemes is essentially not a central bank function. Central banks may only assume a role under extraordinary circumstances similarly to the granting of emergency liquidity assistance, e.g. when the stability of the financial system is at stake.

The prohibition on monetary financing restricts the **purchase of debt instruments** in two respects. On the one hand, it prohibits the purchase of debt instruments issued by public sector institutions, as already mentioned in the section on central bank lending, in the primary market, except for certain cases of foreign exchange reserve management. On the other hand the purchase of debt instruments issued by the public sector on the secondary market – which is otherwise permitted – must not be used for circumventing the prohibition. In the latter case the ECB sets control threshold values – typically GDP-proportionate – and performs the annual audit of compliance with the prohibition based on them.

Finally, central banks may act as **fiscal agents** for the state; however, when doing so they must act under actual market conditions.

CONTENT OF THE PROHIBITION ON MONETARY FINANCING

The purpose of the prohibition on monetary financing is to ensure that the maintenance of budgetary discipline and price stability as the primary goal of the monetary policy, is not compromised. This is necessary because financing of the EU and member state public sector institutions by central banks eases pressure on budgetary discipline. In addition to the prohibition rules pertaining to monetary financing, which must be strictly adhered to, EU law also allows exceptions that enable central banks to fulfil their functions efficiently. Therefore, the prohibition is objective-oriented, and as such it is not excessive. This provides ample leeway in the application of monetary policy and financial stability instruments, and foreign reserve management. The prohibition on monetary financing is defined by Article 123 of the Treaty on the Functioning of the European Union (TFEU) in a way that it prohibits or restricts certain forms of financing. In the framework of the prohibition, the ECB and the member state central banks must not grant overdraft facility or any other credit to the following range of institutions, and neither shall they purchase debt instruments directly (on the primary market) from these institutions:

- EU institutions, bodies, offices or agencies;
- central governments, regional, local or public authorities, other bodies governed by public law, or public undertakings of the member states.

However, this rule shall not apply to publicly-owned credit institutions which, in the context of the supply of reserves by central banks, shall be accorded the same treatment by national central banks and the ECB as private credit institutions.

The instruments of central bank money supply – in the case of which the same rules apply to publicly-owned credit institutions as to private credit institutions – are as follows: (i) monetary policy instruments, (ii) intra-day credit granted for the smooth operation of the payment and settlement systems, and (iii) granting of emergency liquidity assistance to credit institutions struggling with temporary liquidity difficulties, subject to individual assessment.

The Statutes of both the ESCB and the ECB also allow the ECB and national central banks to act as fiscal agents for the EU and state institutions; thus the performance of financial agent functions is a legitimate function for central banks, and if it is pursued in accordance with market conditions, it does not conflict with the prohibition on monetary financing.

The detailed rules on the prohibition on monetary financing, prescribed in the TFEU, are determined by an EU regulation.[1] The MNB must also apply – based on the provisions of the

[1] Council Regulation No. 3603/93/EC (13 December 1993) specifying definitions for the application of the prohibitions referred to in Articles 104 and 104b (1) of the TFEU.

TFEU, and the ESCB-ECB Statutes – the provisions pertaining to the prohibition on monetary financing.[2]

In view of the fact that the prohibition on monetary financing is set out in mandatory EU law (the TFEU and the regulation) directly applicable to all and in full, it is not necessary to incorporate these regulations into national laws. However, if national laws affect these directly applicable EU regulations, they shall not restrict the scope of the monetary financing prohibition, nor shall they extend the exemptions provided under EU law. The EU regulations on the prohibition on monetary financing are reflected in Hungarian law in the Act on Magyar Nemzeti Bank.

MONITORING COMPLIANCE WITH THE PROHIBITION ON MONETARY FINANCING

According to the TFEU, the Governing Council of the ECB has competence to monitor the fulfilment of the obligations of national central banks arising from the TFEU and from the ESCB-ECB Statutes. Steps of the procedure followed when auditing the compliance with the prohibition on monetary financing:

- If the Governing Council of the ECB considers that a national central bank has failed to fulfil an obligation under the TFEU, it shall deliver a reasoned opinion on the matter after having provided the respective central bank with the opportunity to submit its comments;

- if the central bank concerned does not comply with the provisions of the opinion within the period specified by the Governing Council of the ECB, the latter may bring the matter before the European Court of Justice;

- if the European Court of Justice establishes that the central bank has failed to fulfil an obligation under the TFEU, the central bank must take necessary measures for fulfilling the judgement of the European Court of Justice; failure to do so could result in the imposition of a lump sum or penalty payment.

The ECB annually reviews and formulates its findings on whether national central banks comply with the prohibition on monetary financing.[3] National central banks, including the MNB, must complete a questionnaire at the beginning of every year on their activities related to the prohibition on monetary financing performed during the previous year. The ECB may ask additional questions and request explanations on the information supplied. The annual evaluation is performed in the context of dialogue between the ECB and the national central banks. The ECB also presents in its public annual report those cases that it deems alarming or worth mentioning in terms of the prohibition on monetary financing. The position of the ECB concerning the assessment of certain cases is also influenced by those consultation procedures, in the course of which the ECB expresses its opinion on certain national draft legislative provisions also assessing compliance with the prohibition on monetary financing. The ECB opinions formulated and published during the consultation procedures serve as important points of reference for the national authorities, as well as for the central banks in the area of legislation and application of the law.

The ECB – fulfilling its obligation prescribed in Article 140 of the TFEU – reports to the Council of the European Union at least every two year, and upon the request of any impacted member state, on the progress made by the member states with a derogation, i.e. those that have not yet introduced the euro, in the area of fulfilling their obligations concerning the implementation of the Economic and Monetary Union. The report discusses whether these member states have implemented a high degree of sustainable convergence, whether the national laws are compatible with the TFEU and whether the national central banks meet the legislative requirements of the integration in the Euro-system. In this so-called convergence report, the ECB also inspects whether the laws of the member state, being outside the Euro-system, comply with the prohibition on monetary financing prescribed in EU law.

In view of the fact that the audit performed by the ECB may be also divided into three larger areas, in the further parts

[2] According to Article 139 (1) of the TFEU, Hungary – in view of the fact that it has not yet introduced the euro – is a "Member State with a derogation". Article 139 (2) of the TFEU lists, item by item, those provisions of the TFEU that do not apply to "Member States with a derogation". However, these do not include Article 123 concerning the prohibition of monetary financing; consequently Hungary must comply with it.
The ESCB-ECB Statutes – following a similar logic – also order the prohibition of monetary financing, with the proviso that in Article 42.1 it does not specify Article 21 of the ESCB-ECB Statutes, prescribing the prohibition of monetary financing, as one not applicable to "Member States with a derogation". This also means an obligation for Hungary and the MNB must observe the prohibition.

[3] For the sake of completeness, it should be noted that upon the annual evaluation of compliance with the prohibition of monetary financing, the ECB also audits the national laws pertaining to the compliance with the prohibition of privileged access, regulated in Article 124 of the TFEU and in EC Regulation 3604/93/EC – however, this topic falls outside the subject matter of this paper.

of this document we describe these in the context of the prohibition on monetary financing:

- central bank lending practice,
- the debt instruments available for purchase by the central banks, and
- the central banks' fiscal agent functions.

CENTRAL BANK LENDING

Prohibition of lending to the public sector

The public sector include the EU institutions, bodies, offices or agencies, as well as the central governments, regional, local or other public authorities, other bodies governed by public law, or public undertakings of the member states.[4]

The ECB and the national central banks are not part of the public sector; accordingly, for example, if a central bank places a deposit with another central bank or with the ECB, it does not qualify as prohibited financing.

For the purpose of the prohibition on monetary financing, lending shall mean the granting of an overdraft facility or any other type of credit facility.

An overdraft facility is the provision of funds to the public sector resulting or likely to result in a debit balance.

The notion of "other type of credit facility" beyond the overdraft facility includes transactions concluded with the public sector resulting or likely to result in a claim against the public sector. Similarly, the central bank financing of the public sector's liabilities to third parties is also prohibited, as it falls under the category of "other type of credit facility".[5]

EU law does not list the transactions classified as "other type of credit facility" one by one, but as an example it may be emphasised that within the investment activity of central banks – i.e. besides cases of central bank money supply – the following transactions are subject to the prohibition on monetary financing: placement of central bank deposits with public sector credit institutions (including the holding of accounts with them) or repo transactions with public sector credit institutions where in the first leg of the transaction the central bank provides the repo partner with cash when purchasing the securities. This is because in all these cases, the central bank accrues receivables from the public sector institution as a result of the transaction.

A central bank may not finance the activity of public sector bodies or the public sector's liabilities towards third parties. The central bank is also prohibited from granting advances for public sector payments.

On the other hand, according to the provision of EU law specifying the exceptions, the financing of the obligations towards the International Monetary Fund (IMF) or those arising from the implementation of medium-term financial assistance scheme, shall not qualify as a form of lending, if it generates such foreign receivables that bear all features of the reserve assets.

Intra-day credits granted by the central banks to the public sector – facilitating the smooth operation of the payment and settlement systems – shall not be deemed as ones conflicting with the prohibition, provided that they are limited to the respective day and cannot be extended to the next day. The central bank financing of the public sector is prohibited not only for traditional credit and loan contracts, but also for all other combined or atypical agreements.

It is prohibited to provide central bank financing to publicly-owned credit institutions, other than through means of central bank money supply. Irrespective of the form – whether atypical or a special scheme – of prohibited financing of publicly-owned credit institutions, the central bank only has leeway to proceed lawfully in the case of central bank money supply instruments. Monetary policy instruments are characterised by the fact that central banks announce them, subject to equal terms, to a specific range of the central bank's partners and any of the entities

[4] A public undertaking is an undertaking (economic organisation) in which the state or other authority has direct or indirect controlling interest on ownership basis, either based on financial share in the undertaking or pursuant to rules applicable to the undertaking. The controlling interest of the state authorities shall be presumed, if in respect of an undertaking it holds directly or indirectly: a) the larger part of the undertaking's subscribed capital; b) it controls the majority of the voting rights connected to the shares issued by the undertaking; or c) it may appoint more than half of the members in the undertaking's management, controlling or supervisory bodies. An undertaking may also qualify as public undertaking if none of the above-listed conditions – underlying the presumption – prevail, but the public sector exerts controlling influence on the given undertaking in any other way, based on the rules applicable to the undertaking.

[5] It should be noted that according to the EU regulation the receivables from the public sector as at 1 January 1994 also qualify as "other credit", except for the fixed-term receivables acquired by the central banks prior to this date. Thus such receivables may still exist, but they must show a decreasing, phasing out tendency.

belonging to the range of partners may avail itself thereof subject to the conditions announced in advance. Credit granted for the smooth operation of the payment and settlement systems may be also used by the participating credit institutions subject to pre-defined conditions and in an identical manner. The extraordinary assistance within central bank money supply, not announced in advance and in general, is always based on special consideration and it is the central bank's own decisions concerning the temporary financing of a credit institution still qualifying as solvent – regardless of whether these decisions concern cooperation in the reorganisation of the bank, the granting of emergency liquidity assistance or the assumption of any other central bank role serving the stability of the financial intermediary system.

Possibility of granting emergency liquidity assistance

The Emergency Liquidity Assistance (ELA) granted to credit institutions qualifies as another function under the ESCB and ECB Statute which the national central bank may legitimately perform. The rules pertaining to the emergency liquidity assistance are included in the national laws. These national laws must also comply with the provisions pertaining to the prohibition on monetary financing. In Hungarian law, the emergency liquidity assistance which may be provided to credit institutions is regulated by the Act on the MNB.

If there is any circumstance due to which the operation of the credit institution jeopardises the stability of the financial system, MNB may grant emergency liquidity assistance to the credit institution. The decision on granting emergency liquidity assistance falls under the central bank's discretionary powers. As opposed to monetary policy instruments, the central bank never makes a general announcement of the emergency liquidity assistance; it always grants such after consideration the specific case, based on an individual decision.

The most important goal of emergency liquidity assistance is to prevent or mitigate the risk of potential contagion at the banking system and money market level. In a situation of temporary liquidity emergency faced by a credit institution, if warranted for the protection of financial system stability, the central bank may provide the liquidity necessary for the credit institution's daily operation in the form of emergency liquidity assistance. Use of emergency liquidity assistance typically arises when the credit institution's access to the announced monetary policy instruments is no longer sufficient or adequate. In such a situation, the central bank assesses the option of providing emergency liquidity assistance to the credit institution based on individual judgement.

In view of the national regulatory background, the MNB provides emergency liquidity assistance only if all of the following conditions below apply:

- the emergency liquidity assistance is requested by a credit institution,
- the functioning of the credit institution jeopardises the stability of the financial system,
- the prohibition on monetary financing must be observed.

It results from compliance with the prohibition on monetary financing that emergency liquidity assistance may only be granted to credit institutions struggling with temporary liquidity problems, but not to insolvent ones. The funding of insolvent credit institutions is beyond the scope of emergency liquidity assistance. If insolvency of the credit institution occurs after credit has been granted and was not foreseeable prior to the emergency liquidity assistance, despite the due diligence review performed by the central bank, it is not regarded as a violation of the monetary financing prohibition. However, if the insolvency is foreseeable and can clearly not be prevented even with emergency liquidity assistance, no such assistance may be provided to the credit institution. This requires that the central banks perform a highly thorough assessment to fully gauge the condition of the credit institution. The position of the central bank is made much easier if it also has micro-prudential supervisory powers, giving it direct access to the information. Otherwise, supervisory authorities and central banks cooperate closely when a credit institution faces troubles.

Emergency liquidity assistance – its primary purpose being the management of temporary liquidity shocks – is typically a short-term credit, but it bears a penalty-type interest that is higher than the usual refinancing interest rate.

Financial support for insurance deposit and investor compensation schemes

The financing costs of deposit insurance and investor compensation schemes are borne by credit institutions and investment companies.[6] Accordingly, the national laws that

[6] This is in harmony with recital (23) of Directive 94/19/EC of the European Parliament and of the Council of 30 May 1994 on deposit-guarantee schemes and recital (23) of Directive 97/9/EC of the European Parliament and of the Council of 3 March 1997 on investor compensation schemes.

are compatible with the prohibition on monetary financing are ones that permit the financing of the public sector's national credit institution deposit guarantee scheme or investment companies' national investor compensation scheme by the central bank only if (i) the financing is short term, (ii) it addresses an emergency situation, (iii) the stability of the financial system is at stake, and (iv) the financing decisions are made by the central bank.

The Act on the MNB reflects these conditions. The MNB may grant urgent, extraordinary credit for a term no longer than three months to the National Deposit Insurance Fund – at its request, after giving individual consideration to the request and in cases that jeopardise the stability of the financial system as a whole and the smooth operation of payments – in line with the prohibition on monetary financing.

The fact that the term of the given credit may not exceed three months is geared towards ensuring the avoidance of regular prefinancing by the central bank. This maturity may not be prolonged. New central bank credit may only be applied for if there is once again an emergency situation jeopardising the stability of the financial system and the smooth operation of the payments. If a compensation scheme is constantly in an emergency situation, the credit granted by the central bank is not a solution anyway, because central bank credit only functions as a temporary assistance and the central bank does not assume the permanent financing of the compensation scheme.

Should a compensation scheme be linked to the central bank based on the management, organisation or any other connection point, then the regulation must ensure that the operation of this organisation, including the fund meant to pay the compensations, is not financed by the central bank regularly.

Similarly to the emergency financial assistance, the temporary credit granted to compensation schemes must not jeopardise the performance of the central bank's monetary policy functions or the functions arising from its ESCB membership.

PURCHASE OF DEBT INSTRUMENTS

Possibility of acquiring debt instruments on the primary market

According to the general rule set out in the provisions of EU law, central banks may not acquire debt instruments (debt securities, commercial papers, certificates of deposit) on the primary market (upon issue).

However, the following purchases – with the sole objective of managing foreign exchange reserves – shall not qualify as violation of the prohibition on monetary financing:

- the purchase of marketable debt instruments from the public sector of another member state in the primary market by the central bank of a non-euro area member state; and

- the purchase of marketable debt instruments from the public sector of a non-euro area member state in the primary market by the ECB or the central bank of a euro-area member state.

Accordingly, the MNB – as a non-euro area central bank – may purchase marketable debt instruments on the primary market from the public sector of another member state for the sole purpose of managing foreign exchange reserves. However, the foreign exchange reserve management purpose also means that the debt instruments of another member state denominated in forint may not be purchased in the primary market. Furthermore, the MNB may not purchase debt instruments issued by an EU institution, body, office or agency (e.g. European Investment Bank) in the primary market, even for the purpose of managing foreign exchange reserves, as EU law specifying the exception permits only the acquisition of member state issues in the primary market.

Possibility of acquiring debt instruments on the secondary market

The purchase of debt instruments issued by the public sector in the secondary market does not violate the prohibition on monetary financing, but such purchases shall not be used by the central banks to circumvent the prohibition on monetary financing. Thus, purchase on the secondary market is permitted; however this opportunity should only be used bearing in mind the purpose of the prohibition on monetary financing. The sole purpose of managing foreign exchange reserve is compatible with the prohibition on monetary financing. If the purchase of securities takes place expressly for the purpose of restoring monetary transmission or attaining the primary objectives of the central bank and not for financing the budget or reducing its burdens, it does not qualify as circumvention of the prohibition either.

Since EU law does not define in an objectively measurable way when a secondary market purchase qualifies as circumvention of the prohibition, the ECB monitors whether certain central banks abuse the opportunity on the basis of

the – typically GDP-proportionate – valuation threshold defined by it. Breach of the threshold values does not necessarily represent a violation of the prohibition, but in this case the ECB makes an enquiry at the given central bank as to the circumstances of the purchase on the secondary market, i.e. it asks for explanation and proper justification, and based on that it assesses whether or not there is an issue of circumventing the prohibition.

It is not typical of national central banks to purchase above the threshold values. If the ECB establishes a breach of the threshold value by a central bank after having made proper comments and potential adjustments, the ECB may implement increased oversight. If the respective central bank fails to meet the criteria in the following year as well, the ECB may increase the frequency of the reporting obligation to quarterly or monthly and ask for detailed information concerning the relevant transactions.

FISCAL AGENT FUNCTIONS

Pursuant to Article 21.2 of the ESCB-ECB Statutes, the ECB and the national central banks may act as fiscal agents for public sector institutions.

Traditionally – almost since the establishment of the first central banks – the role of "national central bank" and "bank of the state" has been inseparable from the operation of the central banks; therefore it would be unjustified if due to the prohibition on monetary financing this traditional central bank role ceased to exist and the state had to rely solely on market players. On the one hand, central banks have a special public law status; therefore, despite the business activities they perform they cannot be considered as market players in the ordinary sense; however, on the other hand, in view of the prohibition on monetary financing, market conditions must be reflected in their relations with the public sector as well.

Regulation 3603/93/EC also emphasises in the recital concerning the possibility of performing fiscal agent functions, that "the function of fiscal agents exercised by the central banks should not be impeded". Accordingly, the fiscal agent functions may be performed lawfully, but within a framework that guarantees compliance with the prohibition on monetary financing.

The holding of the coin stock, issued by and credited to the public sector, by the ECB or the national central banks shall not be treated as a prohibited form of lending, if the amount of the assets thus accumulated remains at less than 10 per cent of the coins in circulation. This rule is not relevant in Hungary, as the legal tender – including coins – is issued by the MNB.

If a central bank receives a cheque for collection from the public sector issued by a third party and the central bank credits the cheque's amount to the public sector's account before it receives the cheque amount, the prohibition on monetary financing is not violated if the usual deadline specified by the respective central bank for the collection of cheques has already expired since the receipt of the cheque, but the time difference is negligible, the cheque is for a small amount and the central bank receives it shortly afterwards.

The Act on MNB specifies several functions that the MNB may perform subject to complying with the prohibition on monetary financing.

The MNB may hold accounts for the public sector organisations specified in legislation, may accept deposits from them or provide other banking services to them.

Based on the instruction of the state, or in respect of the securities owned by the state – not including shares – the MNB may act on the securities market as an agent for the state.

Based on the instruction of the state, the MNB may participate in the state's foreign exchange borrowing transactions and securities issues abroad, as well as in functions related to the management of the state's foreign receivables.

The MNB may conclude forward and hedging transactions with the state or as its agent under market conditions.

The transactions listed above must not be geared towards shielding the state from market conditions; therefore precautions must be taken to ensure that each transaction is concluded under actual market conditions.

Kristóf Lehmann, Róbert Mátrai and György Pulai: Measures taken by the Federal Reserve System and the European Central Bank during the crisis

The instruments applied by the ECB and the Fed[1] during the crisis were based on similar principles, but as the ECB and the Fed function in different financial intermediary systems, they relied on different tools to respond to different types of challenges. Both institutions increased liquidity substantially and deployed instruments with the aim of alleviating tensions in certain market segments. The ECB faced a somewhat more complex problem, due to the combination of banking system difficulties and uncertainties surrounding fiscal sustainability. The central bank(s) of the euro area attempted to ensure the funding of banks by providing longer-term loans unrestrictedly; securities purchases had smaller limit amounts and were, for the most part, intended to mitigate disturbances in certain market segments and lower excessive yields. The Fed tried to address the root problem of the crisis, the mortgage market. With its asset purchases, it attempted to lower long-term yields and mitigate the disturbances in the market of mortgage-backed securities; in addition, it introduced several targeted loan instruments. According to empirical analyses, the unconventional instruments the two central banks deployed successfully mitigated market tensions, expanded market liquidity and lowered yields. Typically, the studies concluded that the programmes improved the situation of the real economy and that the recession would have been deeper and unemployment higher without them.

INTRODUCTION

In the financial crisis which started in 2007, the central banks of developed countries were unable to use traditional monetary policy instruments to efficiently address the substantial downturn in the performance of the real economy and the strains in the functioning of the financial intermediary system and money markets, and consequently they supplemented their instruments by using unconventional measures.

Unconventional instruments were primarily applied in two cases and for two purposes. First, when the central bank base rate dropped to zero or close to zero, but monetary policy decision-makers wished to ease monetary conditions further. With the use of unconventional policies, long-term yields can be reduced further via non-traditional communications (a persistent verbal commitment to low base rate levels) and the purchase of longer-term financial market instruments. The use of unconventional instruments may be also warranted when a certain market segment becomes dysfunctional (for instance, the swap market freezes up), due to an acute money market disturbance or panicky atmosphere, or when the central bank considers the risk premium emerging – or persistently prevailing – in the given market segment to be excessively high. Central bank intervention, in this particular case, is aimed at alleviating tensions, tempering excessive risk avoidance and reducing yields and premia in the specific market to a reasonable level. In turbulent cases, the mere announcement of the measure went a long way towards easing the tensions. During the crisis, nearly all central banks carried out general liquidity-providing operations in an attempt to mitigate the disturbances in the financial intermediary system through banking system liquidity and hence, facilitate banks' lending activity and asset purchases. In this context, against collateral, central banks provided loans to banks in large volumes and not necessarily for the usual maturities. To address money market disturbances, some central banks in developed countries purchased higher-risk money market instruments as well, whereby they incorporated unhedged (or partly hedged) instruments

[1] For the rest of our paper, the Federal Reserve System will be mentioned informally as the Fed, and the European Central Bank together with the Eurosystem – the latter comprising the ECB and the national central banks of the euro-area Member States – will be referred to as the ECB.

in their portfolio. The purchase of risky assets results in a deterioration of the central bank's portfolio as well, which could pose a significant risk from the perspective of the central bank profit and loss account. Central banks moderate the risk by purchasing risky assets typically in cases where, due to the market disturbance, the price of such assets are presumed to be lower than would be justified by the economic fundamentals, or when they sign an advance guarantee agreement with the state securing the payment of losses from the budget.

Based on Krekó et al. (2012),[2] using the quantitative easing programmes of the Fed and the liquidity providing operations of the ECB, we present in this paper the most important unconventional instruments applied by the central banks of developed countries, and the impact of such measures on economic growth, inflation, lending activity and the liquidity of various money and capital markets. The financial intermediary system of the euro area and that of the USA are very different;[3] moreover, in contrast to the federal budget of the USA, fiscal policy is a national competence in the euro area. Consequently, the crisis generated different problems, to which the central banks responded with different monetary policy measures.

EUROPEAN CENTRAL BANK

Changing the standard instruments

With the deepening of the crisis following the collapse of Lehman Brothers in September 2008, lack of trust among banks increased and the ECB was confronted with the drying-up of interbank markets and a rise in interbank yields. In this environment, demand for central bank liquidity increased significantly. The ECB adapted to this situation by fine-tuning its instruments.

As a first step, on 8 October 2008 the Governing Council decided on the unlimited availability of the one-week MRO tenders[4] at the key interest rate. These measures made the necessary liquidity available for credit institutions, thereby contributing to stabilisation of the banking system. In parallel with this, the width of the interest rate corridor was reduced from 200 basis points to 100 basis points, with the intention of preventing market O/N rates from departing from the policy rate.

As a result of the measures, in the initial period recourse to the MRO tenders and the size of the deposit facility increased by around EUR 150 billion and more than EUR 200 billion, respectively. At the same time, the average turnover of the overnight unsecured interbank market declined by nearly 40 per cent, and the EONIA (euro overnight index average) approached the bottom of the interest rate corridor. Perceiving this, the ECB widened the interest rate corridor to 200 basis points again in January 2009 which, however, did not result in a significant increase in overnight interbank turnover, and the EONIA also remained at the bottom of the widened interest rate corridor.

On 15 October 2008, the ECB widened the range of acceptable securities (collateral) and reduced the credit rating threshold from 'A minus' to 'BBB minus' (with the exception of ABSs[5]). At the same time, the decision was also taken on the full allotment – at fixed interest rates – of the three-month loan tenders (LTROs),[6] which had already been applied prior to the crisis as well, with the six-month operations introduced in April 2008 and one-month ones applied from September 2008. The ECB announced on 7 May 2009 that it would hold one-year LTRO tenders on three occasions between June 2009 and December 2009. The first two tenders were allocated at the MRO rate, thus fixing the one-year point of the yield curve, whereas the last one was allocated at the average MRO rate of the period. On 6 October 2011, the ECB announced that it would hold one-year LTRO tenders on 26 October and 21 December, again with full allotment. In December, in parallel with the announcement of several liquidity providing instruments, the maturity of the LTRO tender of 21 December was adjusted to 3 years and another 3-year LTRO tender was announced on 29 February 2012.

The ECB's primary goal with these 3-year LTROs was to alleviate the negative impact of sovereign risks on the banking system and to avoid a collapse in lending. According to the ECB's preliminary survey, banks were to use one third of the total liquidity provided during the first LTRO for

[2] The study, which was written in April 2012, has since been supplemented in this tender documentation by the description of more recent measures and the use of newer impact studies.

[3] It is an important difference that capital markets have a larger weight in the financial system of the USA from the standpoint of corporate financing, while the banking system plays a more significant role in financing in the European financial system. Consequently, in the capital position of banks the share price of large US listed companies plays a crucial role.

[4] MRO (Main Refinancing Operation): the ECB's main refinancing operation, in which the ECB provides liquidity in the form of a repo transaction to credit institutions of the euro area with a weekly frequency, usually with a one-week maturity.

[5] ABS: asset-backed securities.

[6] LTRO: longer-term refinancing operation, based on the pattern of the ECB's MRO instrument.

lending (with the remaining amount to be spent on refinancing and asset purchases). Instead, banks spent the entire EUR 500 billion facility on refinancing (swapping their funds originating from the interbank market) and government bond purchases.[7] Meanwhile, the LTRO tender successfully alleviated the turmoil in the interbank market, but it was only possible to temporarily reduce the government bond yields of periphery countries.

Complemented with the covered bond purchase programme described in the next chapter and the FX swap tenders, the ECB called the above measures 'enhanced credit support'. The ECB's balance sheet increased considerably as a result of the programme, and the amount of liquidity available for euro-area credit institutions grew during this period, when the drying-up of interbank markets jeopardised the stability of the banking system.

The liquidity providing instruments of the ECB addressed the financial disturbances efficiently and improved the situation of the real economy. Lenza et al. (2010) and Fahr et al. (2010) evaluated the liquidity providing instruments of the ECB in a such way that, based on various assumptions, they set up an alternative scenario without unconventional instruments. In their simulation, Lenza et al. (2010) first tried to determine the decline caused in the spread of the interbank rate at various maturities.[8] Subsequently, they captured the impact of the decline in premium caused by the measures using simulations conducted with a B-VAR model estimated for the pre-crisis period. It was found that the instruments of the ECB played a significant role in the stabilisation of the economy in the period after the Lehman Brothers' bankruptcy: as a result of the programme, private sector credit growth was around 1.5 percentage points higher and unemployment was 0.5 percentage points lower than in the scenario without the measures. Fahr et al. (2010) determined the alternative scenario using a DSGE model that contained the banking system as well. They found that without the instruments the euro area would have been characterised by GDP growth more than one percentage point lower and deflation until 2010 H1.

Covered bond purchase programme

At its meeting on 7 May 2009, the Governing Council of the ECB decreased the key policy rate to 1 per cent. At the same meeting, it decided to launch the covered bond purchase programme (CBPP). The CBPP focused on an identifiable market, the market of covered bonds,[9] which – in the opinion of the Governing Council – was more seriously affected by the crisis than other segments of the securities market (Trichet, 2009). The objectives of the programme were to mitigate strains in the covered bond market, reduce risk premia, increase liquidity and hence, encourage primary issuances. In a targeted manner, the ECB wished to support a revival in market transactions and the improvement of the liquidity of the CB market by purchases in the primary and secondary markets. In addition, the ECB intended to ease the financing conditions of credit institutions and corporations, and wanted to encourage credit institutions to maintain – and possibly expand – their lending activity, while also reducing money market yields.

Between July 2009 and June 2010, the ECB purchased covered bonds (CB) under the CBPP with a total value of EUR 60 billion; since it did not sterilise the bonds, the instrument increased the euro liquidity of the banking system directly as well. In this programme, the ECB primarily focused on the longer end of the yield curve. The maturities of the securities purchased mainly varied between 3 and 7 years, with an average of 4.12 years. Covered bond purchases under the CBPP did not result in any major distortion in the market structure; the ECB obtained a mere 5 per cent share of total holdings and a 10 per cent share of jumbo issues.

CB spreads started to tighten immediately as a result of the announcement of the programme, issuing activity increased, and the liquidity of the market approached pre-crisis levels. By the end of 2011, however, spreads had returned to the levels observed before the announcement of the programme for the most part, although issuing activity continued to be strong. The instrument was largely ineffective in addressing the tensions emerging in the covered bond market because the turmoil was fuelled by banks' exposure to periphery government bonds.

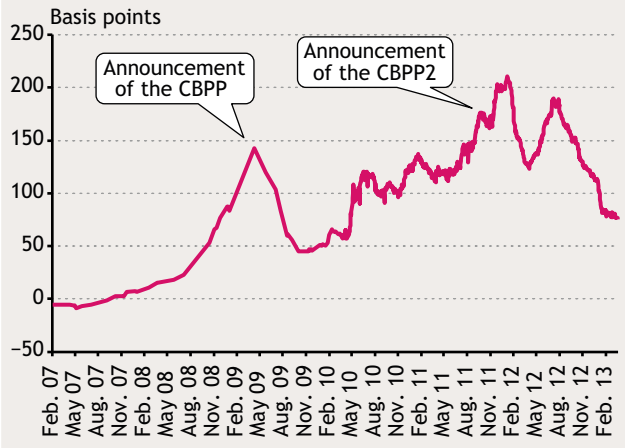
Based on research by Beirne et al. (2011), the ECB's first covered bond purchase programme can be considered successful. The yield spread of covered bonds declined, money market yields dropped, and there was an upturn in bond markets across all maturity horizons. The average decline in yields in the covered bond market was around 12 basis points. The programme successfully stimulated the issuance of covered bonds in the primary market, thereby

[7] Moutot (2012).

[8] For instance, without the intervention the EURIBOR-OIS spread would have stayed at the October 2008 level for a protracted period of time.

[9] One great advantage of covered bonds is that in the case of non-performance the cover is behind the bond, therefore, they are far less risky than packaged or repackaged US debt securities. Therefore, during the crisis it was an important objective to enable this market to expand in Europe.

Chart 1
Premia on 3-5-year euro covered bonds compared to government security yields



Source: UBS Delta.

improving banks' financing conditions and boosting bank lending. The main deficiency of the covered bond purchase is that no feed-through effect evolved, i.e. it did not have a perceptible effect in the market of normal bonds. Another important experience was that in euro-area countries struggling with the sustainability of government debt, the programme failed to improve yields in the covered bond market and was thus completely ineffective.

On 6 October 2011, the ECB announced the launch of CBPP2, within the framework of which the ECB planned to purchase covered bonds at a value of EUR 40 billion between November 2011 and October 2012, with objectives[10] and conditions similar to those of the first programme. The direct impact of the programme on the bond markets is difficult to estimate. In contrast to the first programme in 2009–2010, at this time there was no immediate and lasting decline in the premium following announcement of the programme. The premium on covered bonds only began to decline more significantly at the end of 2011 and the beginning of 2012, which may have already reflected the effect of the three-year LTRO tenders. Nonetheless, the decline in the premium proved to be temporary, and by June 2012 spreads had returned to the levels prevailing before the announcement of the programme. Owing to increased market demand and a weaker-than-expected willingness to issue, the ECB's covered bond purchases during the programme amounted to only EUR 16 billion, i.e. 40 per cent of the anticipated amount.

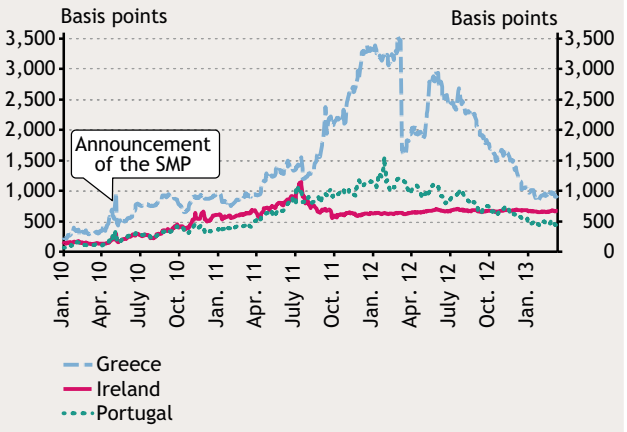
Securities Markets Programme (SMP)

On 10 May 2010, the ECB announced its Securities Markets Programme (SMP), following a significant increase (around one and a half times at the ten-year maturity) in the premia of longer-term government bonds in euro-area periphery countries during the first week of May 2010. Officially, the programme was aimed at addressing the inadequate functioning of securities markets and restoring the monetary transmission mechanism without changing the elements of the standard instruments. The ECB offset the liquidity providing impact of the SMP with one-week deposit tenders.

Right after the announcement on 10 May 2010, spreads declined considerably. On the very next day, however, they already started to increase again, and in a matter of a few months they exceeded the level observed before the May announcement. Until closure of the programme in September 2012, the ECB purchased more than EUR 200 billion worth of securities, primarily consisting of the government papers and other bonds of periphery countries. Over the short term, the programme had a significant positive impact on the government bond yields of periphery countries, but it failed to effectively reduce their long-term yields.

Comprehensive evaluations of the Securities Markets Programme of the ECB are few and far between. According to Fahr et al. (2010), the programme was temporarily

Chart 2
Yield spreads of 10-year Greek, Irish and Portuguese government bonds compared to their German counterparts



Source: Bloomberg.

[10] The primary objectives of the CBPP2 programme were to improve the financing position of credit institutions and corporations and to boost lending.

successful in mitigating risks and contagion. However, the recent developments and fluctuations in the yields of the government bond markets of periphery countries suggest that, in the case of periphery countries, the securities purchase programmes were only suitable 'to buy time'. In order to restore market confidence, all governments concerned had to produce a programme that was considered sustainable over the longer term. Although government bond purchases by the central bank led to some improvement, on their own, they were unable to restore market confidence in the periphery countries of the euro area.

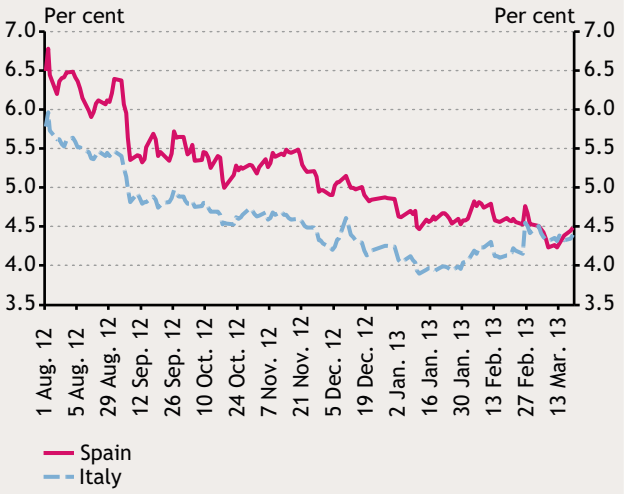
Outright Monetary Transactions (OMT)

In 2012 handling the debt crisis remained the main priority for the ECB. As regards the euro area, certain countries saw the emergence of record low sovereign premia, while other countries – particularly in South Europe –recorded unprecedented high levels. The ECB is working to correct the unreasonably high periphery yields and restore the impaired monetary transmission channel with the OMT instrument announced on 2 August 2012 and launched in September 2012, concurrently with the termination of the SMP. Under the OMT scheme, the ECB may contribute to alleviating tensions in the government securities market and easing transmission difficulties by purchasing shorter-term (less than 3-year) government papers.

For the time being, outright monetary transactions should be considered as a verbal intervention only, as none of the countries with high yields can currently meet the conditions required for the use of the instrument. From the perspective of the ECB, this situation is particularly hard to resolve as the ECB is not authorised to prescribe the improvement of fiscal conditions. The ECB attempted to circumvent this problem by setting forth the requirement of participating in the EFSF/ESM programme[11] for the use of the OMT instrument, which also includes fiscal consolidation. Another condition is the country's presence on the primary bond market (government bond issuance). Amid some fluctuations, short-term and medium-term government bond yields and sovereign CDS spreads of periphery countries decreased significantly after the announcement in August. Besides easing the financing position of the countries concerned, this improves banks' balance sheets and capital adequacy as well, which, in turn, may contribute indirectly to the recovery of corporate lending; however, lending data reported so far do not support this assumption.

Chart 3
Changes in Spanish and Italian government bond yields

(iBoxx indices)



Source: UBS Delta.

Comprehensive evaluation of the ECB programmes

The estimates regarding the effectiveness of the ECB's unconventional instruments *(enhanced credit support),* most of which were prepared by the ECB, basically came to the conclusion that the unconventional instruments influenced the functioning of financial markets and the performance of the economy considerably and positively: although they were unable to prevent the steep downturn, without the programme GDP decline would have been much greater and unemployment much higher.

Giannone et al. (2011) evaluated the effectiveness of all unconventional instruments. The essence of their method is that they used a VAR model estimated for the pre-crisis period to run simulations regarding the crisis period to examine whether any material change can be perceived in the transmission of monetary policy. There was no significant difference between the developments in actual macro variables and the simulated ones that presume pre-crisis transmission. In the authors' assessment, this proves that the programme of the ECB was efficient in the maintenance of transmission, thus unconventional instruments contributed to the fact that a collapse similar to the Great Depression could be avoided.

[11] The EFSF (European Financial Stability Facility) and the ESM (European Stability Mechanism) are crisis funds designed to resolve payment and refinancing difficulties and preserve financial stability in Europe.

FEDERAL RESERVE

Programmes during the crisis

Owing to housing market disturbances, the crisis began in the United States as early as 2007. In the first phase of the crisis, it was the market of financial instruments linked to mortgage loans that was primarily impaired. Through the banking system, this market segment spread to the entire financial system in 2008 and developed into a full-fledged global crisis.

In its management of the financial crisis, the Fed strived to mitigate the severe turmoil in the financial system and the economic downturn partly attributable to it not only with conventional monetary policy instruments,[12] but also with the use of several unconventional tools.

The unconventional instruments applied by the Fed had two fundamental goals: first, they were intended to provide short-term liquidity/loans in order to reduce systemic risks and facilitate lending; second, to ease monetary policy conditions further with a key policy rate close to zero *(zero lower bound, ZLB)*.

Looking at the chronology, between August (after the subprime mortgage crisis) and November 2007, basically it was only already existing instruments that were transformed. Between December 2007 and August 2008, the set of liquidity providing instruments were expanded, but still taking account of the central bank's balance sheet with restrictions and sterilising operations. From September 2008, loan instruments were used more flexibly and asset purchase programmes were introduced, supplemented by a longer-term commitment to a low policy rate after reaching the zero interest rate level (December 2008). (The latter contributes to subduing medium-term yields through the expectations channel without open market intervention). Of the instruments applied, below we present only those of greater significance.

TAF (Term Auction Facility) was a programme temporarily applied by the Fed and introduced even before the Lehman Brothers' bankruptcy with the intention to maintain short-term financing and liquidity. In the case of the TAF programme, 28- and 84-day loans were disbursed (against collateral) to depository institutions, provided that they had adequate financial conditions. The Fed launched the TAF programme in December 2007 to handle mortgage market turbulences, and the last auction was organised in March 2010. From March 2008 when Bear Stearns, an investment bank, was struggling with serious financing difficulties and was bought up by JP Morgan, the Fed introduced a permanent lending facility for the most important financial institutions as a supplement to the TAF programme. They also strived to improve the same participants' liquidity by allowing them to exchange their asset-backed securities included in their respective balance sheets as collateral for more liquid government securities with the Fed.

The Fed announced the ***TALF (Term Asset-Backed Securities Loan Facility)*** programme on 25 November 2008, to support the further the issuance of asset-backed securities. Originally, the New York Fed announced the programme with a volume of USD 200 billion.[13] The point in the functional mechanism is that the TALF financed, without right of recourse, investors who purchased AAA, i.e. the highest-rated, covered securities. The Fed provided three arguments to justify the necessity of the programme:

- Following the Lehman bankruptcy, the issuance of asset-backed securities (ABSs) (created by securitisation) fell sharply, before stopping altogether from October.
- Premia of AAA-rated asset-backed securities already on the market reached heights that were even more extreme than historical fluctuations.
- The ABS market plays a prominent role in the financing of small and medium-sized enterprises, as well as consumer loans; therefore, the functional disorder of the market affected the overall economic activity of the USA.

The amount was not directly received by consumers or the SME sector, but by the issuers of ABS bonds. The Fed did not purchase the ABSs, only accepted them as collateral for the sake of further lending. All in all, the Fed lent a mere USD 48 billion to banks and various investment funds through the TALF as the state of the targeted markets improved significantly as a result of the announcement.[14]

[12] In the case of the conventional policies an attempt is made to improve financing conditions by extending the maturity of the policy rate and of traditional short-term financing (Lenza et al., 2010).

[13] The US Treasury supported the TALF with funds amounting to USD 20 billion, of which a total of USD 200 billion could have been disbursed through the leverage.

[14] It should be noted that the programme was reinforced by the measures announced by the US Treasury as well. One such treasury programme was the PPIP (Public-Private Investment Programme), which bought up the problematic assets of distressed companies dealing with mortgage market financing. A similar one is the TARP (Troubled Asset Relief Programme) introduced after the Lehman bankruptcy in October 2008; its objective was to buy up bad assets of the financial sector (by the Treasury).

The third relevant instrument applied by the Fed was the ***CPFF programme (Commercial Paper Funding Facility)*** aimed at the purchase of short-term corporate debt securities. For this purpose, the Bank set up a fund, which was announced on 7 October 2008 and started its operation as early as 27 October. While the Fed purchased three-month corporate paper directly from issuers under the programme, its primary objective was to stimulate issuances and purchases in the market of longer-term corporate paper. The idea was that the *backstop* created by the instrument would ease anxieties about issuers' inability to obtain the funds necessary to repay their maturing securities through the issuance of further CPs, and thus demand for longer-term securities as well as issuances could pick up again. The programme was necessitated by the fact that following the Lehman bankruptcy, investors invested in funds containing government securities, instead of funds where the weight of the private sector was higher. All of this resulted in such serious turbulence in the market that only overnight financing functioned, and the issuance of longer-term corporate securities stopped due to a lack of demand. Accordingly, the objective of the Fed was to restore confidence and functioning in the CP market with a maturity of up to one year. Up to end-2008, issuers used the financing facilities of the fund at a value of USD 333 billion. The CPFF functioned until 1 February 2010.

The Fed launched its ***AMLF (Asset Backed Commercial Paper Money Market Mutual Fund Liquidity Facility)*** on 22 September 2008. Under the programme, all financial institutions that were handling deposits could take out a loan. They were allowed to spend the loan to purchase good-quality, short-term asset-backed commercial papers (ABCP). On the one hand, the programme was aimed at stabilising the corporate bond market; on the other hand, it strived to restore the demand of institutions dealing in asset-backed securities, in order to prevent the market from collapsing.

Finally, ***large-scale asset purchases (LSAP,*** often called as 'QE', standing for quantitative easing) represented the last and largest volume instruments introduced by the Fed to improve the credit markets in the first round; this instrument was first announced on 25 November 2008. Within the programme, between December 2008 and March 2010 the Fed purchased – mostly mortgage-backed – agency securities (issued by two large financial corporations refinancing mortgage loans) with a value of around USD 1,400 billion and government bonds amounting to USD 300 billion. Even after the launch of asset purchases carried out through balance sheet expansion, the Fed called its programme 'credit easing' to distinguish it from the quantitative easing aimed at accelerating monetary growth previously used in Japan, as the central bank wanted to put emphasis primarily on the composition of the instruments purchased by it. In other words, the purchases were intended to reduce the risk premia emerging in the market of the targeted segments and to tackle liquidity troubles, thereby improving the borrowing conditions of the private sector. While QE1 increased inflation expectations, it reduced the volatility of the expectations, and lowered the risk premium on long-term securities by around 100 basis points.[15] According to Bernanke (2009), the unconventional tools of the Fed were not only required because of the ZLB,[16] but also because of the dysfunctioning of certain credit markets.

Since the weaker-than-expected economic outlook justified further monetary easing, ***another round of large-scale asset purchases (LSAP)*** was carried out involving government papers for the most part, aimed at the reduction of long-term government paper yields. The second programme is called QE2 in the literature and by financial players alike. Under the QE2 programme, government securities worth USD 600 billion were purchased between November 2010 and June 2011, while the proceeds from previously purchased, maturing mortgage bonds were spent on purchasing long-term government papers as well, thereby maintaining the level of the central bank's balance sheet. QE2 reduced long-term government yields by 18 basis points.[17] During the simulations performed in relation to the impact assessment of the QE2 programme, Chen et al. (2012) found that the programme may increase GDP growth by 0.13 per cent, and influence GDP levels persistently. Based on their estimate, the inflationary effect of QE2 is almost negligible as the programme may increase inflation by 0.03 percentage points. Chung et al. (2011) attribute a stronger effect to the programme. According to their estimates, without the programme, the downturn in GDP would have been 1 percentage point greater, the unemployment rate 0.5 percentage point higher, and inflation 0.3 percentage point lower.

The next asset purchase programme of the Fed was the ***MEP (Maturity Extension Program,*** often mentioned as 'Operation Twist'). In essence, replacing its holdings of

[15] Krishnamurthy and Jorgensen (2011).

[16] Zero Lower Bound: the close-to-zero level of central bank base rate, a state where changes to the short-term interest rate do not allow further monetary easing due to the low level of the key interest rate.

[17] Krishnamurthy and Jorgensen (2011).

short-term papers (with a term of up to 3 years), the central bank purchases papers with long maturities (6–30 years), thus putting downward pressure on long-term yields similarly as it does with unsterilised asset purchases, but without an increase in the central bank's balance sheet. The Fed started to replace the papers in September 2011. Originally, it planned to swap bonds worth USD 400 billion in total until June 2012; however, the programme was subsequently extended. In relation to the MEP programme it should be noted that the nominal value of the short-term bonds sold and the long-term bonds purchased is practically identical (and thus the central bank balance sheet does not increase); however, the interest rate risk integrated into the balance sheet increases substantially. The result on the side of market players is the reverse: the average maturity of government papers held by the market was reduced by the programme as the volume of long-term papers available in the market decreased. This may have played a significant role in the decline in long-term yields.

The Fed announced its ***next large-scale asset purchase programme (LSAP, 'QE3')*** in September 2012. The asset purchase supplements the unconventional instruments already in use and extended until the end of the year (reinvestment of the principal repayments of the MEP and agency papers[18]). Under QE3 the value of the mortgage-backed securities (MBS) purchased reached USD 40 billion per month. Thus, with the new asset purchase programme, the holdings of longer-term bonds in the Fed's portfolio are expected to increase by USD 85 billion each month.[19] With the programme the Fed wishes to lower long-term yields and boost the mortgage bond market, which will eventually lead to the easing of credit conditions. Over the longer term, this may contribute to the recovery of the housing market and hence, support growth and reduce unemployment without allowing inflation to exceed the target. The instrument is open-ended, i.e. its application has no time limitation and since the amount is unrestricted as well, this tool can be adjusted flexibly in the future.

Evaluation of the programmes

In connection with the comprehensive evaluation of the programmes of the Fed, Gagnon et al. 2010) emphasised their success in the reduction in the term premium (by 30–100 basis points on average) and long-term interest rates. The study considered the mortgage market crisis management as the most effective one, as the targeted instruments here were able to prevent the complete collapse of the market. In addition, the analysis points out that the harmonised programmes triggered a notable positive effect in the market of both government bonds and corporate bonds.

It can be concluded in general that the asset purchase programmes of the Fed boosted market liquidity, reduced spreads and increased securities issues. In several cases the announcement mitigated market tensions and panic in and of their own right, and asset purchases resulted in a further decline in yields down the road. Communication was very important in terms of effectiveness, as the announcement effect influenced market expectations almost immediately. Further effects of the programmes depended on the nature of the specific market segments, risk aversion and the magnitude (or possible expansion) of the programme. Several studies attempted to provide quantitative estimates of the effects of the LSAP programmes. Overall, based on the findings of the studies, the programmes had a significant positive effect on financial markets. According to the evaluation of the programmes, strong consensus evolved in the literature about the first phase of the Fed's LSAP (Large Scale Asset Purchase) Programme, which reduced the yields on 10-year treasury bills and corporate bonds with a good credit rating by some 50 basis points.[20] Due to the short period of time elapsed, the effects of QE3 cannot be quantified; the announcement in itself did not generate a significant decrease either in government paper yields or mortgage market yields. The Fed, however, expects that the stimulating effect on the economy will emerge over a longer horizon, through a decline in mortgage loan interest rates.

As regards macroeconomic effects, the conclusions of the studies are very diverse. At the same time, the studies point out that without the programmes the fall in GDP would have been much more significant. Baumeister and Benati (2010) estimate 4 percentage point lower real GDP growth both in the USA and in the United Kingdom in the first quarter of 2009 if there were no asset purchase programmes. Analysing the programmes of the Fed, Chung et al. (2011) came to the conclusion that term premia declined by 50 basis points on average and by a further 20 basis points as a result of the QE1 and QE2 programmes, respectively. Regarding the impact on economic growth they came to the conclusion that without the QE1 programme the US GDP would be 2 percentage points lower until 2012, and it would have declined by a further 1 percentage point without the QE2 programme.

[18] During the reinvestment, the Fed spends the principal repayments of the securities concerned on the purchase of additional mortgage-backed securities (MBS).

[19] At its meeting on 20 March 2013, the Federal Open Market Committee (FOMC) decided to continue the programme.

[20] Adrian et al. (2010), Agarwal et al. (2010), Gagnon et al. (2010), and Joyce et al. (2011).

SUMMARY

In response to the housing market disturbances in the United States, the Fed began to change its monetary policy instruments as early as 2007, although between August and November 2007 it reacted to the unfavourable market developments by merely transforming its already existing instruments. Liquidity providing instruments were expanded from December 2007 and, after September 2008, besides a gradual lowering of the key policy rate – which practically dropped to zero by December 2008[21] – the Fed began to use credit instruments more flexibly and introduced its asset purchase programmes.

The frictions, which primarily affected the housing markets in the United States, spilled over to Europe at a slow pace. Compared to the Fed, the ECB was slower to respond to the emerging crisis; it was only after the bankruptcy of Lehman Brothers in September 2008 that the ECB reacted, from October 2008, by gradually lowering the key policy rate prevailing in the euro area on the one hand, and by changing its monetary policy instruments on the other hand. Initially, the ECB's actions were also limited to 'fine-tuning' its standard instruments; i.e. it contributed to the stabilisation of the banking system by the provision of adequate liquidity through changing the conditions of the MRO tenders, easing the eligibility criteria of securities to be used as collateral, and applying more widely – and increasing the maturity of – the LTRO tenders that had already been used before the crisis.

In addition to general liquidity providing measures, both the Fed and the ECB applied asset purchase programmes during the crisis, the interim objective of which was the mitigation and elimination of the disturbances of key money markets. Ultimately, the programmes were intended to restore the liquidity of markets, reduce high risk premia and, through the restoration of the efficiency of interest rate transmission, facilitate the private sector's access to loans, boost the economy, reduce unemployment and lower the risk of deflation.

Again, the Fed was quicker to introduce asset purchase programmes than the ECB. Under the CPFF programme, it commenced the purchase of short-term CPs as early as 27 October 2008, and started to buy longer-term mortgage-backed agency papers and government securities in the framework of the LSAP programme (also known as 'QE') from December 2008. This was followed by the launch of QE2 in November 2010, which was aimed at lowering the yields on long-term government bonds by the purchase of longer-term government papers. In September 2011 the MEP programme (commonly called 'Operation Twist') was introduced, in the context of which the Fed reduced the level of the term premium prevailing in the market by replacing its short-term government papers with long-term ones. Finally, the Fed launched QE3 in September 2012, which is intended to boost the mortgage market of the United States by the purchase of MBSs.

By contrast, the ECB only launched its first asset purchase programme, the CBPP, in July 2009, the objective of which was to ease the financing conditions of credit institutions and businesses by intervention in the covered bond market. This was followed by the SMP programme in May 2010, aimed at the restoration of dysfunctional security markets primarily by the purchase of government papers and other bonds of periphery countries. The OMT programme, which was launched parallel to the conclusion of the SMP in September 2012, was intended to improve the efficiency of the transmission mechanism by promoting the purchase of shorter-term (up to 3-year) securities.

Table 1
Real economy impact of the liquidity providing measures of the Fed and the ECB

	GDP	Unemployment	Inflation	Study
Fed QE1	Output would have been 2 percentage points lower until 2012.	Without the programme, it would have been 1 percentage point higher until 2012.	It would have been 0.7 percentage point lower until 2011.	Chung et al. (2011)
Fed QE2	Without the programme the fall in GDP would have been 1 percentage point higher.	It reduced the unemployment rate by 0.5 percentage point.	It would have been 0.3 percentage point lower in 2011.	Chung et al. (2011)
Liquidity provision by the ECB	Output would have been 1 percentage point lower until H1 2010.	It reduced the unemployment rate by 0.5 percentage point.	Without the programme, deflation would have emerged.	Fahr et al. (2010) and Lenza et al. (2010).

Source: the authors.

[21] Lowering of the policy rate began as early as September 2007.

In addition to the specific measures, during the crisis both central banks placed special emphasis on central bank communication, i.e. the application of verbal intervention. One example is the long-term commitment to low policy rates after the reduction of the rate to a level close to zero. This can loosen monetary conditions through the reduction of longer-term yields. For the time being, the OMT programme launched by the ECB in September 2012 can only be considered a verbal intervention as well, since no Member State can meet the criteria for taking advantage of it. Meanwhile, it can efficiently communicate the ECB's commitment to assist the periphery countries.

In evaluating the programmes of the Fed and the ECB, we can conclude that the instruments applied had a positive impact on the functioning of financial markets and on economic performance, and furthermore they also proved efficient in maintaining the transmission mechanism. While the instruments applied were unable to prevent the downturn, without the programmes the decline in GDP would have been steeper and the unemployment rate would have been considerably higher.

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Publications of the Magyar Nemzeti Bank

All publications of the Magyar Nemzeti Bank on the economy and finance are available on its website at http://english.mnb.hu/Kiadvanyok. From 2009, the publications have been published only in electronic format.

Papers

MNB Bulletin / MNB-szemle
http://english.mnb.hu/Root/ENMNB/Kiadvanyok/mnben_mnbszemle
http://english.mnb.hu/Kiadvanyok/mnben_mnbszemle/mnben_szemle_cikkei
In Hungarian and English; published three or four times a year.
The aim of the short articles published in the Bulletin is to provide regular and readily comprehensible information to professionals and the public at large about underlying developments in the economy, topical issues and the results of research work at the Bank, which are of interest to the public. Private sector participants, university professors and students, analysts and other professionals working at central banks and international organisations may find the Bulletin an interesting read.

MNB Occasional Papers / MNB-tanulmányok
http://english.mnb.hu/Kiadvanyok/mnben_muhelytanulmanyok
In Hungarian and/or English; published irregularly.
Economic analyses related to monetary policy decision making at the Magyar Nemzeti Bank are published in the Occasional Paper series. The aim of the series is to enhance the transparency of monetary policy. Typically, the papers present the results of applied, practical research, review the technical details of projection work and discuss economic issues arising during the policy making process.

MNB Working Papers
http://english.mnb.hu/Kiadvanyok/mnben_mnbfuzetek
Only in English; published irregularly.
The series presents the results of analytical and research work carried out in the Bank. The papers published in the series may be of interest mainly to researchers in academic institutions, central banks and other research centres. Their aim is to encourage readers to make comments which the authors can use in their further research work.

Regular publications

Quarterly report on inflation / Jelentés az infláció alakulásáról
In Hungarian and English; published four times a year.

Report on financial stability / Jelentés a pénzügyi stabilitásról
In Hungarian and English; published twice a year.

Report on payment systems / Jelentés a fizetési rendszerről
In Hungarian and English; published once a year.

Annual report: Business report and financial statements of the Magyar Nemzeti Bank / Éves jelentés: A Magyar Nemzeti Bank adott évről szóló üzleti jelentése és beszámolója
In Hungarian and English; published once a year.

Féléves jelentés: Beszámoló az MNB adott félévi tevékenységéről (Semi-annual report: Report on the MNB's operations in a given half-year)
Only in Hungarian; published once a year.

Időközi jelentés: Beszámoló az MNB adott negyedévi tevékenységéről (Interim report: Report on the MNB's operations in a given quarter)
Only in Hungarian; published twice a year.

Analysis of the convergence process / Elemzés a konvergenciafolyamatokról
In Hungarian and English; published yearly or biennially.

Senior loan officer opinion survey on bank lending practices / Felmérés a hitelezési vezetők körében a bankok hitelezési gyakorlatának vizsgálatára
In Hungarian and English; published four times a year.

Public finance review / Elemzés az államháztartásról
In Hungarian and English; published three or four times a year.

In addition to those listed above, the Bank also occasionally publishes other materials.

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