Brunel
UNIVERSITY
WEST LONDON

Department of
Economics and Finance

Economics and Finance Working Paper Series

Ray Barrell, E Philip Davis, Tatiana Fic
and Ali Orazgani

Household Debt and Foreign Currency Borrowing in New Member States of the EU

June 2009

http://www.brunel.ac.uk/about/acad/sss/depts/economics

HOUSEHOLD DEBT AND FOREIGN CURRENCY BORROWING
IN NEW MEMBER STATES OF THE EU

Ray Barrell [1], **E Philip Davis** [1,2], **Tatiana Fic** [1,3] **and Ali Orazgani** [1]
NIESR and Brunel University
London

Abstract: In the light of rapidly rising household debt, we undertake panel estimation of determinants of debt-income ratios in new EU member states of Central and Eastern Europe and interpret the results in the light of indicators of housing bubbles, estimates of equilibrium debt ratios from Western Europe and information on foreign currency borrowing in the CEE. We conclude that there are potential risks from overindebtedness in some of these countries, while in others where debt-income ratios appear sustainable, there remain risks related to high levels of foreign currency debt, notably where there is a floating exchange rate. Important issues are raised for future economic performance as well as the structure of banking regulation.

Keywords: Transition economies, household debt, house price bubbles, foreign currency debt
JEL: D14, F34

---

1   Introduction

Over recent years, many new members of the EU have been experiencing rapid growth of debt in the household sector. Strong credit growth is an essential element of the catching-up process, as it implies financial deepening in the household sector. However, it may also constitute a risk factor for these countries' financial and macroeconomic performance, as excessive household indebtedness, especially if it is in foreign currency, may increase their susceptibility to financial crises as well as prolonged periods of slow economic growth as balance sheets are corrected.

This paper looks at indebtedness of households and its determinants in ten of the new members of the EU: Bulgaria, Czech Republic, Estonia, Hungary, Lithuania, Latvia, Poland, Romania, Slovenia and Slovakia. We apply a panel model to assess the long run sustainability of the level of debt in countries of Central and Eastern Europe. Then, we discuss risks related to the fact that much of the increased borrowing is in foreign currency.

The paper is organised as follows. Section 2 provides some stylised facts on indebtedness in new member states of the EU and selected old members as comparator countries. Section 3 looks at recent literature on this area, while Section 4 presents results of estimation of a panel model of debt in selected new and old member states. We attempt to assess the sustainability of new member states' debt, referring to individual countries' fundamentals: GDP per capita, interest rates, and house prices. Section 5 discusses risks associated with the possibility of occurrence of bubbles in house prices and cycles in GDP per capita and interest rates that may affect the computation of the sustainable level of debt to income. Short-, medium- and long-term risks of excessive indebtedness identified on the basis of the estimated model are shown in section 6. Section 7 focuses on non-model risks for households (risks exogenous to the estimated model) resulting from foreign currency borrowing. Last section concludes.

2   **Stylized facts**

Over recent years household indebtedness has been growing rapidly in a number of Central and Eastern European countries. The expansion of household debt observed in the new members of the EU may result from two factors: the convergence process - in which case the expanding indebtedness constitutes a necessary element of the long term macroeconomic equilibrium - and short term borrowing trends driven by the business cycle or by autonomous factors such as financial liberalisation driven by international competition or foreign ownership of the banking system. These may result in credit and asset price booms, posing risks of overheating to the economy and of financial instability in the downturn.

Figure 1 shows the ratio of personal sector debt to personal income in ten new member states: Bulgaria, Czech Republic, Estonia, Hungary, Latvia, Lithuania, Poland, Romania, Slovenia, Slovakia, and four economies of the Euro Area: Belgium, France, Germany and Italy. These ratios vary significantly between the four old member states, but over time these countries have been converging, with Germany and France ending the data period with ratios just below one. They have also generally been rising, except perhaps in the case of Germany, and this may suggest either convergence or an income elasticity of demand in excess of one. All the new member states exhibit per capita income levels below that in Italy in 1995, and hence strong differences in institutional finance factors would be need to explain the sped at which these economies have moved to or even surpassed Italian levels of borrowing in 1995

Figure 1. Personal sector debt to personal income ratios
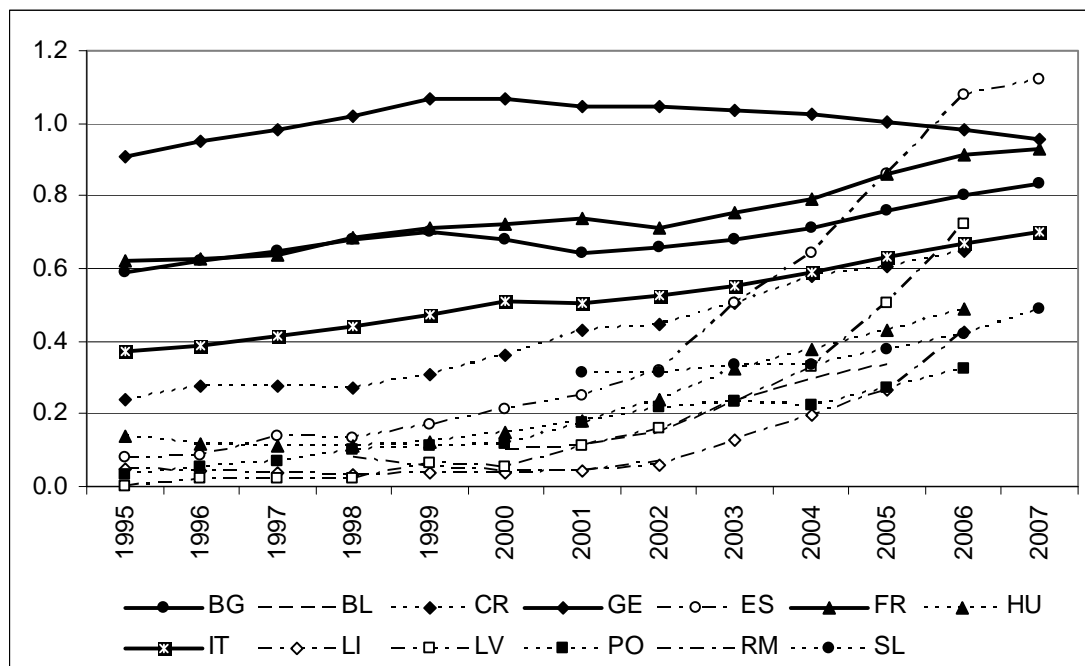
Note: BG=Belgium, BL=Bulgaria, CR=Czech Republic, GE=Germany, ES=Estonia, FR=France, HU=Hungary, IT=Italy, LI=Lithuania, LV=Latvia, PO=Poland, RM=Romania, SL=Slovenia

Source: EUROSTAT

The figure illustrates that new member states' debt levels have been catching up relatively rapidly with levels observed in the old members of the EU (the solid lines illustrate the debt to personal income paths for the four countries of Western Europe, the thin lines correspond to the debt to income trajectories for the new member states). The fastest pace of debt growth has been recorded in the Baltic states. The levels of debt in Estonia and Latvia have reached Western European levels. It is difficult to disentangle how much of the change is due to a sustainable process of convergence and how much might be driven by financial deregulation and the excessive accumulation of debt. However, it is clear that the rapid debt growth has contributed to the overheating of the Baltic economies, and consequently to the "hard landing" the Baltic countries have been experiencing. The debt to income ratios in Poland, Hungary and the Czech Republic have been increasing relatively moderately. The levels of household debt in countries of Southern Europe, Romania and Bulgaria, although increasing, have remained at low levels, which may be due to a relatively lower level of financial development in these countries.

3 Recent literature

The literature on credit growth in new member states has analysed risks of excessive indebtedness of households and enterprises from different perspectives. Egert et al. (2006) focus on equilibrium levels of private credit to GDP in 11 countries of Central and Eastern Europe. The authors use a panel of small open OECD economies (estimated with various techniques – fixed effects OLS, panel dynamic OLS and the MGE) to derive the equilibrium credit level for transition countries on the basis of a set of fundamentals encompassing GDP per capita, bank credit to the public sector, nominal lending rates, inflation rates, the spread,

and house prices. Their results suggest a number of Central and Eastern European countries are very close or above the equilibrium levels, whereas others are still below the equilibrium. Kiss and Vonnak (2006) also use panel techniques to identify the equilibrium level of credit to GDP, disentangling between trend, cycle and boom. The authors show that although in most countries a large part of the credit growth can be explained by fundamentals, risks to stability of the financial system may be observed in Estonia and Lithuania.

Foreign currency lending, its determinants, as well as risks which it may pose to the stability of the financial system have been analysed by several authors. Rosenberg and Tripak (2008) investigate the determinants of foreign currency lending in new members of the EU. They find that loan to deposit ratios, openness and interest rate differential are key variables in explaining foreign currency lending across countries. Brzoza-Brzezina et al. (2007) focus on substitution effects between domestic currency and foreign currency loans, suggesting that restrictive monetary policy leads to a decrease in domestic currency lending and an increase in foreign currency lending making the central bank's job of providing both monetary and financial stability harder.

The direct link between credit booms and episodes of banking system distress is studied by Barajas et al. (2007). Using a logit model for 100 countries the authors find that larger and more prolonged credit booms, and also those coinciding with high inflation and/or low economic growth, are more likely to result in a crisis. Davis and Karim (2008) also found a significant impact of credit growth on banking crises, especially if it was interacted with deposit insurance provision. Other significant variables included credit/GDP, M2/reseves, fiscal balance./GDP, inflation, real interest rates and economic growth.

4   The model of debt to income ratio

To assess the scale of the excessive indebtedness of households in the new member states we estimate the equilibrium level of personal sector debt to income, which we define as the level that would correspond to economic fundamentals. Using a panel model we estimate the long term relationship between household debt and determinants of its sustainable growth: GDP per capita, long term interest rates, and house prices. An increase in GDP per capita is expected to result in an increase in household debt ratios as part of the convergence process. Lower interest rates should promote credit to the private sector, implying a negative relationship between the interest rate and debt. A rise in house prices usually leads to increases in households' indebtedness (a significant proportion of recent increases in debt has resulted from housing debt).

The model encompasses new member states (Poland, Hungary, Czech Republic, Estonia, Latvia and Lithuania)[1] and major economies of the Euro Area (Germany, France, Italy, Belgium) as comparator countries. The sample includes annual data for the period 1996 -2007.

Results of the estimation for the long run are the following (t-Statistics in parentheses):

$$DEBT_t = -\underset{(-8.1)}{5.91} + \underset{(7.9)}{0.64}\ln(GDP_t) - \underset{(-2.2)}{0.006}\,LR_t + \underset{(9.2)}{0.21}\ln(PH_t) \qquad\qquad (1)$$

$R^2 = 0.98$, DW=0.61

where *DEBT* denotes the debt to personal income ratio, *GDP* is GDP per capita, *LR* is the long term interest rate and *PH* is house prices. There is some evidence here that debt is a

---

[1] The selection of countries is dictated by data availability

'superior' good in that the desired debt to income ratio rises with GDP per capita. It also rises with real house prices and declines with real interest rate increases. The last decade or so has seen rapid income growth in the new members, along with declining real interest rates, and hence it is not surprising that debt to income ratios have been rising rapidly. Fixed effects were included in the estimation; they may, to some extent, reflect differences in the financial structure of the countries in the sample (we tried to extend the estimated model including a measure of the banking sector reform (index produced by the EBRD), however, this variable proved to be insignificant). Group unit root tests suggest that the residual series are stationary – we test both for a common unit root test, as well as individual unit root processes (see table 1).

Table 1. Unit root tests

Method	Statistic	Prob.**	Cross-sections	Obs
Null: Unit root (assumes common unit root process)				
Levin, Lin & Chu t*	-4.1789	0.0000	10	85
Breitung t-stat	-1.708	0.0438	10	75
Null: Unit root (assumes individual unit root process)				
ADF - Fisher Chi-square	45.7	0.0009	10	85
PP - Fisher Chi-square	39.8	0.0053	10	91
** Probabilities for Fisher tests are computed using an asympotic Chi -square distribution. All other tests assume asymptotic normality.				

The short run dynamics are described by the following equation:

$$DEBT_t = DEBT_{t-1} - \underset{(-3.4)}{0.24}\,ECT_{t-1} + \underset{(7.7)}{0.77}\,\Delta\ln(GDP_t) - \underset{(-1.8)}{0.005}\,\Delta LR_t + \underset{(5.2)}{0.15}\,\Delta\ln(PH_t) \quad (2)$$

$R^2 = 0.98$, DW = 1.19

and the speed of the adjustment term *ECT* implies that about 25 per cent of a shock is corrected each year, although the additional dynamic terms in equation (2) speed up the process of adjustment and point to some initial overshooting.

Results of examination of residuals for the above estimation show that the personal sector debt to income ratio in the new member states has largely evolved in line with its fundamentals - that is GDP per capita, the real interest rate and house prices. There is, however, some evidence of excessive debt growth in Estonia, and possibly the other Baltic economies and Hungary – figure 2 shows residuals of the long term relationship for two selected new member states Estonia and Hungary; compare also figure 7 where we plot the actual paths of the debt to income (thick solid lines) and paths predicted by the model (thin, dotted lines).

Figure 2. Estonian and Hungarian residuals (the long term relationship)

Estonian residuals

Hungarian residuals
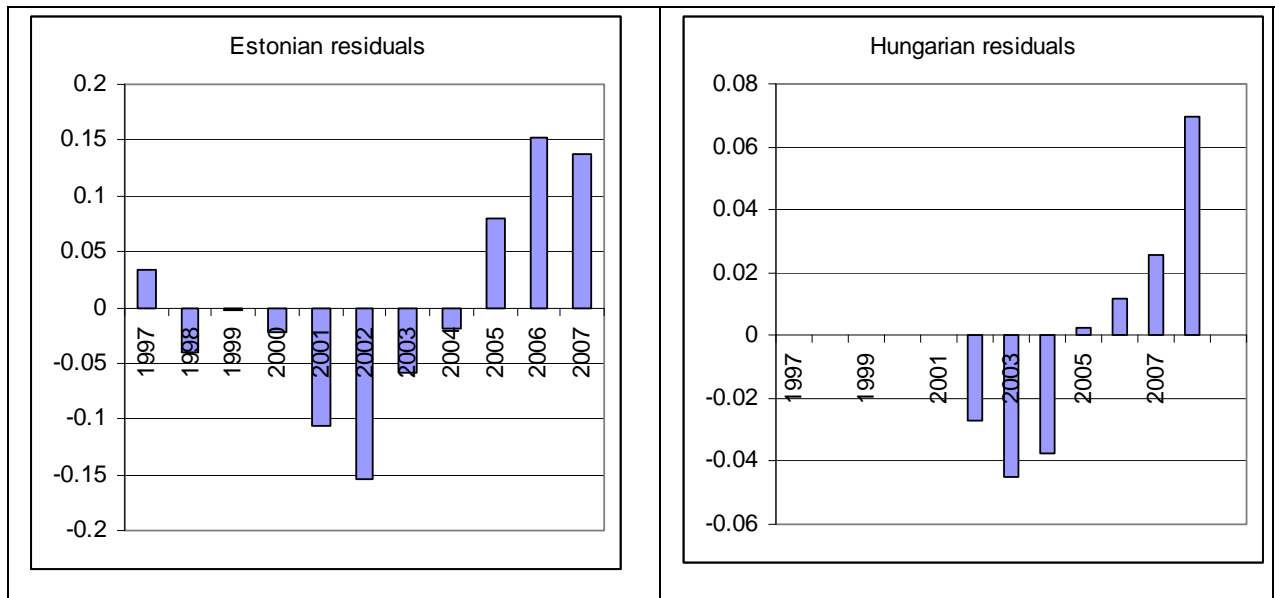
5 Cycles, bubbles and associated risks

The evolution of the debt to income ratio in line with its determinants - GDP per capita, interest rates and house prices does not necessarily guarantee the sustainability of the debt growth. Both GDP per capita and interest rates, as well as house prices are subject to cycles and/or bubbles. If cycles are reversed, and/or bubbles burst, the debtors are still left with high amounts of debt to repay, so as to reduce the level of the debt to income ratio to a new equilibrium. This in turn may entail widespread defaults, or at least sluggish consumption as balance sheets adjust. This section looks at the cyclicality of GDP and interest rates and the scale of possible house price bubble that may affect assessment of the sustainability of the debt to income ratio in individual countries.

We start by investigating recent house price developments (where we view bubbles as indicated by a greater deviation from equilibrium than is warranted by the cycle). A significant proportion of the rise in personal sector debt has been secured on housing assets. There fact that house price bubbles may have developed in some of the new member states, may put household borrowers at serious risk. Once the bubble bursts, the level of debt cannot adjust immediately, but may generate significant defaulting on loans.

Figure 3 shows the growth rate of house prices in new members of the EU and major economies of the Euro Area.

Figure 3. House price growth in the new member states and the major economies of the Euro Area
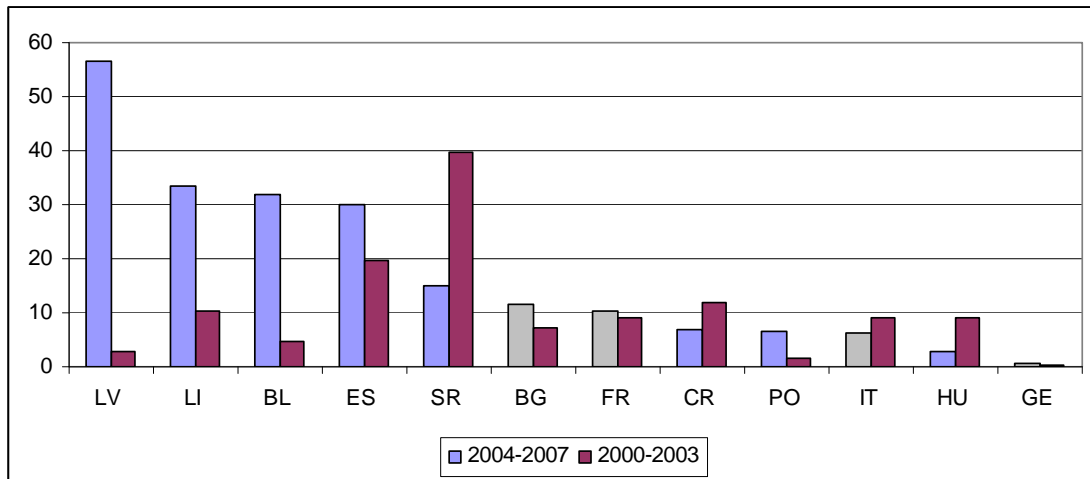

Note: BG=Belgium, BL=Bulgaria, CR=Czech Republic, GE=Germany, ES=Estonia, FR=France, HU=Hungary, IT=Italy, LI=Lithuania, LV=Latvia, PO=Poland, SR=Slovak Republic

Source: the data were obtained from the ECB (which is gratefully acknowledged)

Countries reporting the highest growth of house prices have been the Baltics and Bulgaria. Over the period 2000-2007 the average growth rate of house prices in the new member states significantly exceeded the average growth rate of house prices in the selected old members of the EU. The volatility of NMS house price growth also remained higher than that of the old members of the EU; 21.2 per cent in the new versus 3.5 per cent in the old members (we compute the volatility of house prices growth over the period 2000-2007 and take the average across the new and the old member states).

The character of housing developments in new member states is also somewhat different from the behaviour of prices of houses in Western European countries. House price developments in new member states tend to lag behind house price developments in the old members of the EU – see figure 4. This may suggest that the new member states are in an earlier phase of the cycle.

Figure 4. Average house prices growth (%) – in the new member states (NMS) and the major old members of the Euro Area (OMS)
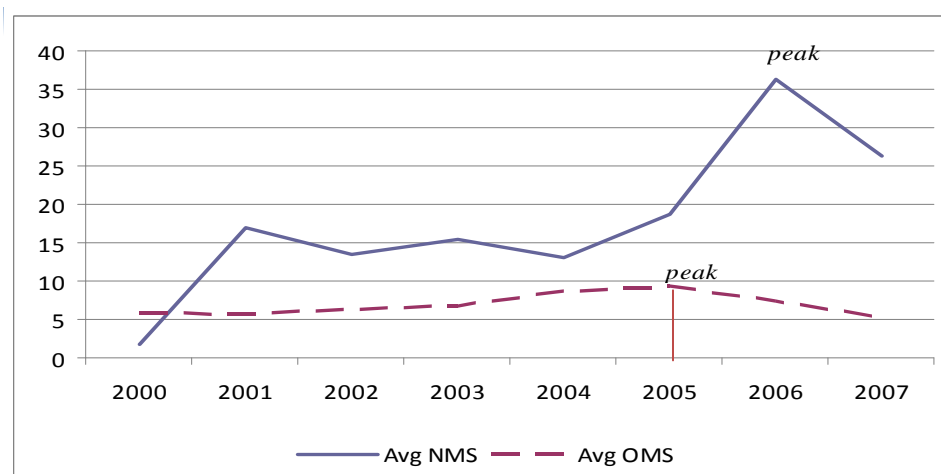
The higher house prices growth in the new member states can be partially explained by fundamental factors - an acceleration in income growth, the relatively low interest rates

and higher demand for housing generated by cohorts of small baby booms of the 1970s entering their prime earning age (Egert and Mihaljek, 2007). There are also transition-related factors: development of housing markets and housing finance, and greater provision of long term housing loans by banks. In addition, while it is difficult to obtain data on the level of house prices, the available evidence suggests that house prices started at a relatively low level, given the standard determinants of equilibrium house prices such as income and real interest rates. There exist, however, strong demand pressures on new member states housing markets, suggesting that house prices may exhibit bubble properties. This in turn may have been supported by the scale of foreign ownership of banks and the degree of foreign currency borrowing by the personal sector. Figure 5 illustrates the relationship between the house prices growth and the scale of foreign ownership of banks and the degree of foreign currency borrowing of the household sector.

Figure 5. Demand pressures on new member states housing markets
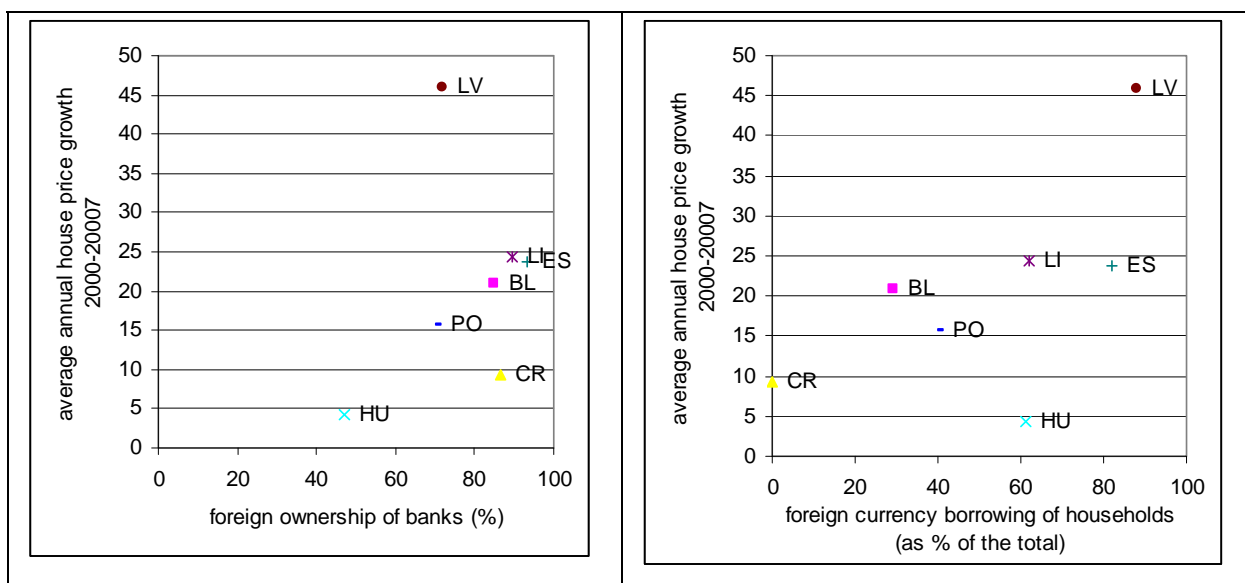
An assessment of the scale of the bubble is difficult. As a first approximation we compute the difference between actual house prices and their HP smoothed values[2] and compare it with other available information. Goodhart and Hoffmann (2002) undertake a similar procedure. As an alternative measure, we look at the construction cost of new dwellings relative to house prices. Figure 6 shows these two measures of house price bubbles for Estonia (where figure 6a shows the difference between the growth rate of actual (ESHP) and smoothed (ESHP_hp) series of house prices and the difference between the growth rate of actual house prices (ESHP) and the growth rate of the cost of construction of new dwellings (ESCD); (where the difference between these two growth rates reflects largely the growth rate of land prices). Figure 6b shows the growth rates of the three series with shaded areas indicating possible bubble periods) for Estonia (the country with the highest growth of house prices materialising over the recent years).

---

[2] To minimise the inaccuracy of the HP filter at ends of the sample we extend the sample period (including forecasts for 2009 and 2010). The HP smoothed values of the house price level remain, however, surrounded by considerable uncertainty (and the size of the bubble may still be underestimated).

Figure 6. House price bubble indicators for Estonia

Estonia

2 measures of bubble

(growth rate of house prices)

Bubble period

(growth rate of house prices)
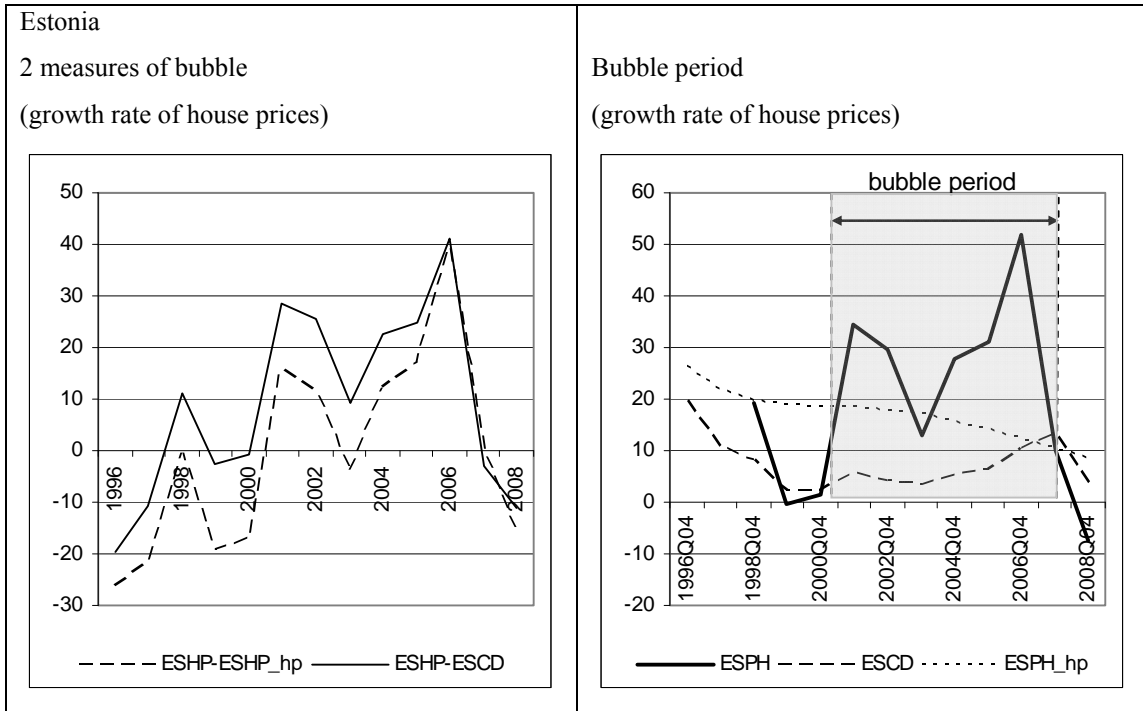
An analogous procedure of HP filtering is applied to GDP per capita and interest rate series and the smoothed series approximate the long run equilibrium level of GDP per capita and interest rates. To show GDP cycle-driven risks related to indebtedness of households in figure 7 we plot the relationship between the output gap (left axis) and the ratio of nonperforming loans (right axis) for a Central European country - Poland and a Baltic economy – Estonia. Table 2 details the level of the share of non-performing loans in each country, where an increasing level of such loans can reflect either unwise lending or a deteriorating macroeconomic situation which would imply that shares of bad loans in total loans increase.

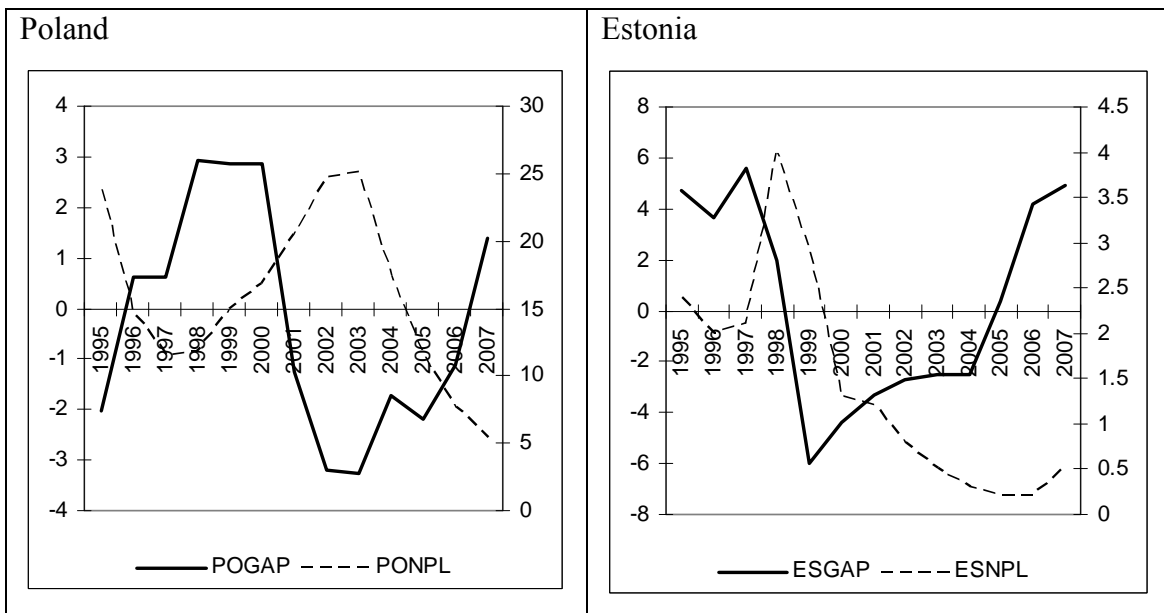**Figure 7. Output gap and nonperforming loans in Poland and Estonia**

Poland

Estonia

Table 2. Non-performing loans as a share of total loans

	Bulgaria	Czech Republic	Estonia	Hungary	Latvia	Lithuania	Poland	Romania	Slovakia	Slovenia
1995	12.5	31.5	2.4	na	18.9	17.3	23.9	37.9	41.3	9.3
1996	15.2	30.6	2	na	20.5	32.2	14.7	48	31.8	10.1
1997	13	30.2	2.1	6.6	10	28.3	11.5	56.5	33.4	10
1998	11.8	31.5	4	7.9	7	12.5	11.8	58.5	44.3	9.5
1999	17.5	37.8	2.9	4.4	6.2	11.9	14.9	35.4	32.9	9.3
2000	10.9	33.8	1.3	3.1	4.5	10.8	16.8	5.3	26.2	9.3
2001	7.9	14.5	1.2	3	2.8	7.4	20.5	3.5	24.3	10
2002	5.6	9.4	0.8	4.9	2	5.8	24.7	2.3	11.2	10
2003	4.4	5	0.5	3.8	1.4	2.6	25.1	1.5	9.1	9.4
2004	3.7	4.1	0.3	3.7	1.1	2.4	17.4	1.7	7.2	7.5
2005	3.8	4	0.2	3.1	0.7	0.7	11.6	1.7	5.5	6.4
2006	3.2	3.8	0.2	3	0.5	1	7.7	1.8	7.1	5.5
2007	2.5	2.8	0.5	2.8	0.4	1.1	5.4	3	2.6	3.9

Source: EBRD

6   The absolute equilibrium and individual NMS' sustainable convergence paths


In this section, we use the estimated model as a tool to determine the level of absolute equilibrium and individual countries' sustainable convergence paths (steady state growth paths). The concept initially derives from Kiss, Nagy and Vonnak (2007).

The key distinctive feature of our approach is that we assume that equilibrium levels of debt to income should correspond to equilibrium levels of its determinants, that is GDP per capita, interest rates and house prices – otherwise the equilibrium measure of the debt to income would be affected by (GDP and interest rate) cycles and (house price) bubbles.

The absolute equilibrium is defined by the average equilibrium debt to income ratio in developed economies (Germany, France, Italy, Belgium). We create bands around the central value by taking minimum and maximum values of the equilibrium debt to income ratios observed in developed economies. The sustainable convergence path is defined as a debt to income ratio resulting from equilibrium levels of GDP per capita, interest rates and house prices (equilibrium values of GDP per capita, interest rates and house prices were computed using Hodrick Prescott filter).

Figure 8 shows debt to income developments in the Czech Republic, Hungary and Estonia against the background of their convergence paths and the absolute equilibrium. These can be compared to the residuals from their part of the dynamic equation estimated above which show the degree of divergence form some sort of equilibrium process.

Figure 8. Debt to income ratios, individual countries' sustainable convergence paths and the absolute equilibrium – Czech Republic, Hungary, Estonia
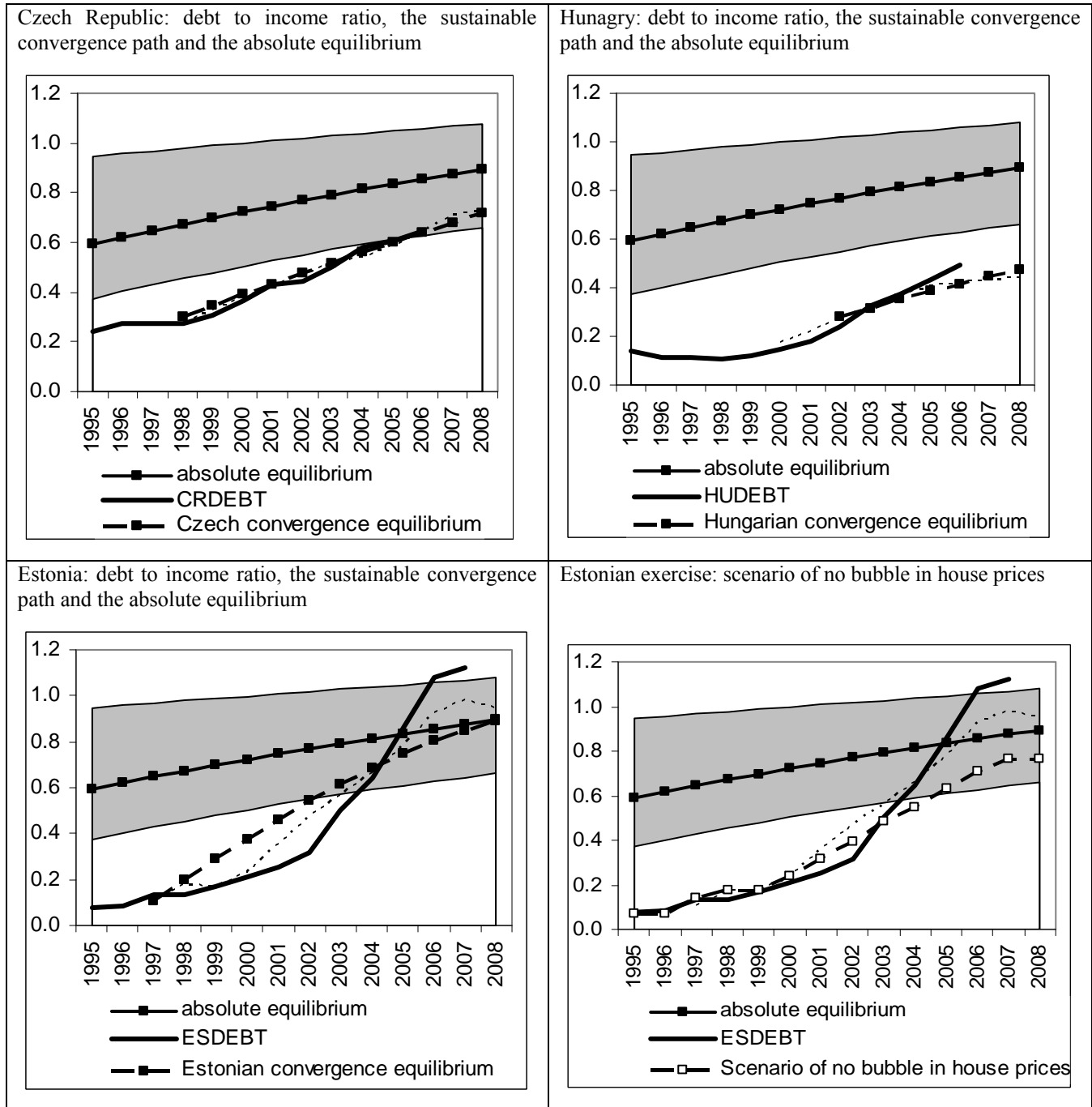
The indebtedness of households in Central European economies has remained relatively closer to their sustainable convergence paths. The medium term debt path in the Czech Republic may have reached the absolute equilibrium territory. In Hungary the debt to income ratio has exceeded its sustainable convergence growth path.

In recent years the indebtedness of households in Baltic countries has been growing faster than that observed in Central European economies. The debt growth in Estonia has exceeded not only its convergence equilibrium path, but also what the absolute equilibrium level would suggest. This may indicate that serious excessive indebtedness that has materialised in Estonia.

The identification of the absolute equilibrium level, individual economies' sustainable convergence paths and fundamentals-consistent paths (predicted by the model using

unsmoothed values of GDP per capita, interest rates and house prices (in figure 9 we plot results of a scenario in which allow GDP per capita and interest rates to follow their actual paths, while we modify the path of house prices (to eliminate the possible bubble)) allows us to determine three types of risks associated with the lack of long-, medium- and short-term sustainability of NMS household sector's debt. Table 3 summarises the three types of risks for the analysed NMS (the higher the deviation of the observed debt from the long-, medium- and short-term sustainable path the higher the risk).

Table 3. Risks of excessive indebtedness

Country	Long term risk Deviation from the absolute eq. path	Medium term risk Deviation from the convergence path	Short term risk Deviation from the model path
Estonia	high	high	high
Latvia	low	high	serious risks of a bubble in house prices
Lithuania	low	low	risks of a bubble in house prices
Hungary	low	high	high
Czech Republic	low	low	low
Poland	low	low	low

7 Issues arising from foreign currency borrowing

Borrowers in the new member states are also exposed to risks arising from a high level of unhedged foreign currency borrowing, which the model above does not take into account. A similar risk crystallised in Asian countries in 1997 (for the private sector)_and in 1982 in Latin America (for the public sector). It was also popular in some West European economies, such as Italy and the Nordic countries in the early 1990s (Drees et al., 1998 and Rosenberg, 2008), leading to losses following the ERM crisis of 1992-3. While foreign currency loans allow borrowers to take advantage of lower interest rates and less restricted credit from abroad, it introduces direct and indirect risks to both lenders and borrowers, and the magnitude of these risks depends on the borrower, the currency of denomination and the domestic currency regime.

The level of foreign currency borrowing has increased significantly in recent years in most of the NMS (exceptions are the Czech and Slovak Republics). While taking a loan in foreign currency may be attractive to households in the short run for a lower interest rate, in the longer term this will expose them to risks of a depreciation of the domestic currency and an increase in foreign interest rates. As access to foreign currency borrowing is relatively novel in these economies, a lack of risk awareness appears to exist among households in many countries and equally among lenders. Insufficient risk awareness has encouraged "herd behaviour" in foreign currency borrowing in some countries, as borrowers followed the borrowing behaviour of others rather than relying on their own risk information (ECB 2006). This type of behaviour can leave economies overexposed to risk.

Figure 9. The currency composition of the household debt
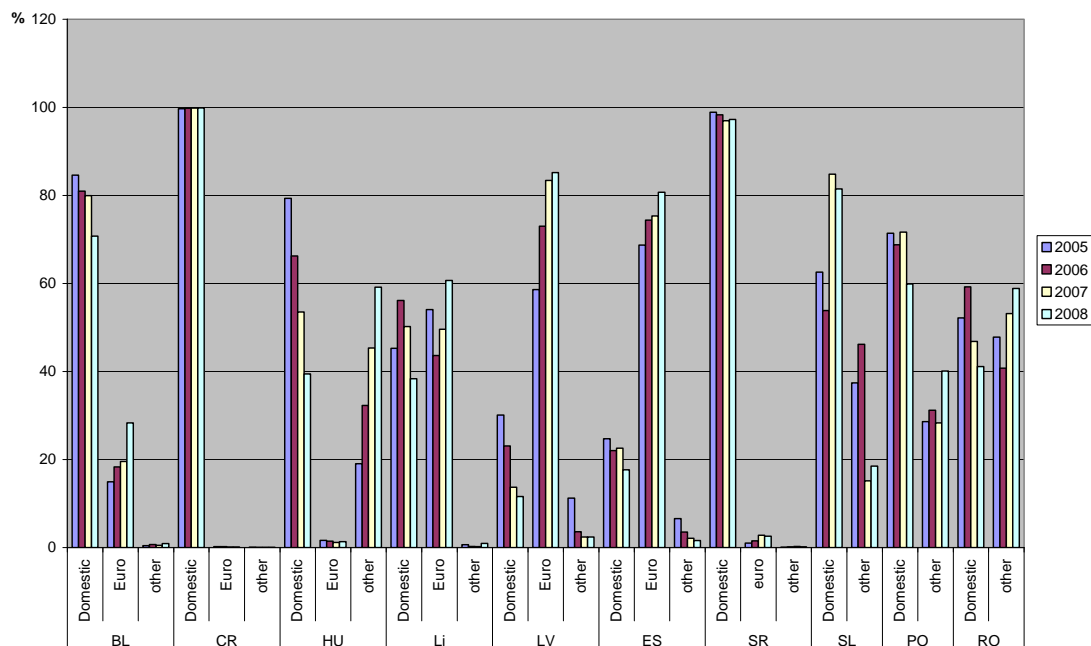
Note: BL=Bulgaria, CR=Czech Republic, ES=Estonia, HU=Hungary, LI=Lithuania, LV=Latvia, PO=Poland, RO=Romania, SL=Slovenia, SR=Slovakia

Source: national central banks

Table 4. Household sector's foreign currency borrowing as percent of GDP

	BL	CR	ES	HU	LI	LV	PO	RM	SL	SR
2004	0.01	0.00	0.13	0.01	0.03	0.10	0.03	0.00	0.03	0.00
2005	0.02	0.00	0.21	0.04	0.07	0.19	0.04	0.03	0.06	0.00
2006	0.03	0.00	0.31	0.07	0.08	0.30	0.06	0.05	0.08	0.00
2007	0.05	0.00	0.35	0.11	0.13	0.35	0.07	0.09	0.03	0.01
2008	0.08	0.00	0.40	0.17	0.17	0.35	0.10	0.11	0.04	0.01

Note: BL=Bulgaria, CR=Czech Republic, ES=Estonia, HU=Hungary, LI=Lithuania, LV=Latvia, PO=Poland, RO=Romania, SL=Slovenia, SR=Slovakia

Source: national central banks

Figure 9 shows the currency composition of household debt across countries using central bank data for each country, whilst table 4 gives total household foreign currency borrowing as a proportion of nominal GDP. The table gives an indication of risks faced by household when the domestic exchange rate changes against all other currencies, whilst the currency compositions can indicate specific risks if there is a large amount of borrowing in currencies other than in euros, as in Hungary. The highest level of borrowing in foreign currencies is found in Estonia, but its currency board supported exchange rate peg is probably the most credible in the region. Borrowing as a percentage of GDP is almost as high in Latvia, which also has a currency board, but is lower in the other Baltic state, currency board country, Lithuania. Household borrowing in foreign currency as a proportion of nominal GDP is as high in floating rate Hungary as it is in fixed rate Lithuania, and hence risks have to be seen as higher in Hungary. The growth of borrowing is also worrying in that country. Poland and Romania have less foreign currency borrowing and are less subject to bankruptcy risk in the household sector, and such risks seem to be absent in the Slovak and Czech Republics where foreign currency borrowing is almost completely absent.

As long as the Baltic states' currencies and Bulgarian lev are pegged to the euro, the borrowers' vulnerability to shifts in exchange rates is limited. Relatively large and unsecured borrowing in foreign currency (and mainly the Swiss franc) characterises the borrowing of the Hungarian household sector. Almost 60 per cent of household debt is denominated in foreign currencies and the recent substantial depreciation of the forint has increased the risk of insolvency of Hungarian borrowers. Households in Poland and Romania also have a relatively high exposure to exchange rate risk. The accession of Slovenia to the Eurozone has significantly reduced risks to households borrowing in foreign currency, as a large share of the debt was denominated in euro. Once Slovakia entered the Eurozone, the tiny share of euro denominated loans in Slovakia became loans denominated in domestic currency.

The share of borrowing in foreign currencies in new member states has tended to rise over time. This results from the rising integration of new member states' financial markets with their Western European counterparts, reflected also in the growing importance of foreign-owned banks. The greater demand for capital resulting from the convergence processes also plays a role. The shortage of capital in domestic markets means that investors tend to borrow in foreign markets, and lower foreign interest rates increase the attractiveness of loans denominated in foreign currency. The interest rate differential is one of the major factors taken into account by households, while they apparently disregarded currency risk. This activity is often described as the 'carry trade' and it exposes the household sector to significant but underestimated risks.

While the growing borrowing in foreign currencies is, to some extent, a feature of the catching up process in Europe, the enhanced volatility of new member states currencies accompanying the recent global financial crisis poses a serious risk to borrowers' solvency. A depreciation of the domestic currency will hamper the repayment capability of households and consequently raise the risk of the default. The exchange rate risk can be exacerbated – or mitigated – by currency regimes within which countries operate. In the case of borrowing in euro, the accession to the Eurozone fully eliminates the exchange rate risk; pegging the domestic currency to the euro in ERM II may reduce the risk significantly. Table 5 shows the exchange rate regimes in the new member states.

**Table 5. Exchange rate regimes in the new member states**

Regime	Country			
EMU	Slovenia	Slovakia		
ERM II	*Estonia*	*Lithuania*	*Latvia*	
Floating exchange rate	Czech Republic	Poland	Hungary	Romania
Currency Board	*Bulgaria*			

(countries in italics fix the central exchange rate)

By joining the euro area, Slovakia practically eliminated the exposure of household debt to exchange rate risk, while Slovenian households retain some debt that may be denominated in currencies other than the euro. The exposure of households in Estonia, Latvia and Lithuania to exchange rate risk is limited, as most of the foreign currency borrowing is denominated in euro and the domestic currency is pegged to the euro. The currency board regime also shelters Bulgarian borrowers in foreign currency, although as the currency remains outside ERM II they face a greater risk of exchange rate realignment. In countries with floating exchange rates – Poland, Hungary, Czech Republic and Romania – exchange rate risk remains relatively substantial, although households in the Czech Republic face little risk due to domestic regulation. In effect, economies with a floating exchange rate and larger shares of borrowing in foreign currency (e.g. Hungary and Romania) may be exposed to

serious risks. Figure 10 shows the relationship between exchange rate volatility and the share of foreign currency borrowing, highlighting the exposure of Hungary, Romania and Poland.

Figure 10. Foreign currency borrowing and exchange rate volatility, 2005-2008
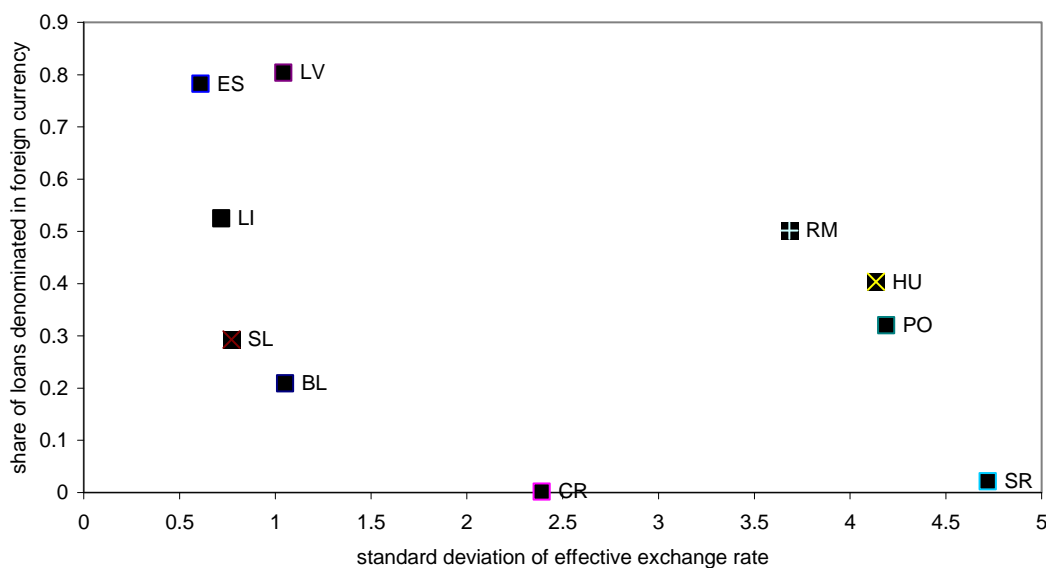
Note: BL=Bulgaria, CR=Czech Republic, ES=Estonia, HU=Hungary, LI=Lithuania, LV=Latvia, PO=Poland, RM=Romania, SL=Slovenia (2005-2006), SR=Slovakia

Source: national central banks, NIGEM

Conclusions

We have shown that debt-income ratios in new member states of Central and Eastern Europe have evolved broadly in line with fundamentals, given the convergence process underway in these economies. Nevertheless, there are potential risks from overindebtedness in some of these countries, notably Estonia, given trends in fundamentals and the risk of a house price bubble. Even in other countries whose debt-income ratios appear sustainable, there remain risks related to high levels of foreign currency debt. The degree of risk links also to the exchange rate regime, and suggests particular risks for borrowers in floating-rate Hungary

Even if banking crises do not result from household debt, there remains a risk across the New Member States that falling house prices will require balance sheet adjustments by households. This could stunt economic growth for some years to come. Furthermore, given the importance of foreign banks in CEE, these risks put a spotlight on the lack of control host country regulators have on banks from other member states. It is arguable that desirable measures of macroprudential regulation can only be attained by giving EU precedence to host regulators (and limitation of presence to subsidiaries) – or shifting overall banking regulation in the EU to a supranational institution.

REFERENCES

Barajas A., Dell'Ariccia G., Levchenko A. (2007), Credit Booms: the Good, the Bad, and the Ugly, IMF mimeo

Brzoza-Brzezina M., Chmielewski T., Niedźwiedzińska J. (2007), Substitution between Domestic and Foreign Currency Loans in Central Europe, NBP mimeo

Davis E P and Karim D (2008), Comparing early warning systems for banking crises, Journal of Financial Stability

Drees B., Pazarbaşioğlu C. (1998), The Nordic Banking Crises: Pitfalls in Financial Liberalization?, IMF Occasional Paper 161, IMF, April 1998.

Egert B., Backe P., Zumer T. (2006), Credit growth in Central and Eastern Europe. New overshooting stars?, ECB WP 687

Egert B., Mihaljek D., 2007, Determinants of house prices in Central and Eastern Europe, BIS WP 238

Egert B., Backe P., Zumer T. (2006), Credit growth in Central and Eastern Europe. New overshooting stars?, ECB WP 687

Goodhart C and Hoffmann B (2002), Asset prices and the conduct of monetary policy, Financial Markets Group, LSE

Kiss G., Nagy M., Vonnák B. (2006), Credit Growth in Central and Eastern Europe: Trend, Cycle or Boom?, MNB WP 2006/10

Rosenberg Ch., Tirpák M. (2008), Determinants of Foreign Currency Borrowing in the New Member States of the EU, IMF WP/08/173