

C EXPLAINING EPISODES OF DYNAMIC CREDIT GROWTH IN CENTRAL AND EASTERN EUROPE

Credit growth has accelerated in recent years in some central and (south-) eastern European countries (CEECs).¹ While low starting levels of financial intermediation help explain the speed of credit growth, its fast pace could raise concerns from a financial and macroeconomic stability perspective. This Special Feature suggests a methodology for analysing these episodes that explicitly accounts for both macroeconomic developments and the catching-up process associated with the transition from planned to market economies that countries in the region have been undergoing. However, even if both factors are taken into account evidence is still found in some countries of higher credit growth than the empirical model would suggest. In these cases the dynamics of credit growth are nevertheless not markedly different for foreign or domestic currency lending, or for lending to households and corporations. Given the limited available data, however, these results must be interpreted with caution, and further research is called for to address issues such as the mechanisms through which the exchange rate regime, the presence of foreign banks and the range of lending products on offer may impact credit developments in the region.

INTRODUCTION

Domestic bank credit to the private sector has increased significantly in many CEECs in recent years. However, the speed of credit growth across the region and over time has been far from homogeneous. From 1996 to 2000 credit grew at a relatively moderate pace, with annual rates generally at below 20%. However, after the beginning of the current decade credit growth accelerated beyond 20% per annum in a number of CEECs, while a few other countries experienced average annual real growth rates above 10%. In contrast, after 2000 credit growth was low in Poland, the Czech Republic and Slovakia.

While real GDP growth has also been particularly rapid among the countries that have experienced very fast expansions in credit, there has nevertheless been a notable increase in the GDP ratio of credit to the private sector in most CEECs.²

To what extent can these episodes of dynamic credit expansion be explained by the rapid transition from centrally planned to market-based economies in just over a decade? To answer this question, it is important to recall the path that these countries followed after the beginning of the transition period. In the early years of the transition, most countries experienced a significant slump in GDP followed by a period of rapid economic growth. In some cases, rapid privatisation of the banking sector and expansion of underdeveloped financial markets resulted in lending booms followed by credit crunches, bank runs, and crises that spilled over to the entire economy. Financial liberalisation during the first phase of transition thus may have in some cases undermined real sector development.³

This turbulent recent history, together with low levels of financial intermediation at the beginning of the transition process, helps to explain why the CEECs still exhibit significantly lower levels of lending in terms of GDP compared not only to developed countries, but also to countries at a similar stage of economic development. Controlling for the level of GDP per capita, private credit to GDP in all CEECs

1 The CEEC region is defined here as including Bulgaria, Croatia, the Czech Republic, Estonia, Hungary, Latvia, Lithuania, Poland, Romania, Slovakia and Slovenia. The data sample covers the period 1996-2004 so as to exclude the early years of transition in which data, when available, are particularly difficult to interpret. While data are provided for all these countries, this Special Feature focuses on those CEECs that have experienced episodes of rapid domestic credit growth since the beginning of the decade.

2 See P. Backé and T. Zumer (2005), "Developments in Credit to the Private Sector in Central and Eastern European EU Member States: Emerging from Financial Repression – A Comparative Overview", *Focus on European Economic Integration*, 2/05, Oesterreichische Nationalbank, October.

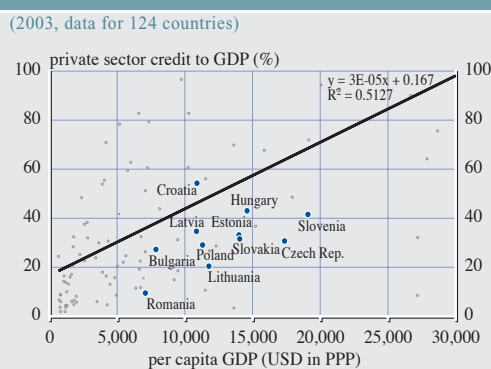
3 See E. Berglöf and P. Bolton (2002), "The Great Divide and Beyond: Financial Architecture in Transition", *Journal of Economic Perspectives*, 16 (1), Winter, pp. 77-100.

(with the exception of Croatia) was in 2003 below the average across all countries in the world for which data were available (see Chart C.1).

This evidence suggests that there may be sound reasons to expect credit growth in CEECs to be faster than in both developed countries and other emerging regions of the world. While in the early and mid-1990s banks were at times engaged in connected lending to a rather restricted number of corporate borrowers, or lending into arrears to state-owned enterprises that faced soft budget constraints, such practices have since mostly disappeared owing to progress made in the transition process.⁴

Assuming that incomes continue to catch up, and that this will be accompanied by financial deepening, as suggested by the simple correlation shown above, credit will necessarily have to grow faster than GDP in the CEECs. In addition, there may be a number of other related factors that could help explain the recent acceleration of credit growth in the region, including macroeconomic stabilisation, the entry of foreign banks (which may have brought both improved risk management techniques as well as increased access to funding from parent banks), a more competitive banking sector environment (which may have contributed to declining interest rates), improvements in the institutional environment, increased creditworthiness of borrowers on the back of improved economic prospects, as well as increasing property prices (which may have led to higher financing needs). Banking sector reform also represents a key development in these transition countries. Privatisation may have led to faster financial deepening through the entry of foreign banks, but this is not the only channel through which banking sector reform may affect the pace of financial deepening. Banking sector reform has also led to the emergence of new market segments and brought about increased competition, thus increasing the range of products available to potential borrowers, and at the same time reducing costs. However, while credit growth

Chart C.1 Private sector credit to GDP ratio and per capita GDP



Source: IMF.

can be seen as a natural adjustment owing to recent banking system reforms, improved bank efficiency and capital inflows from western European countries, some concerns have been raised with regard to the speed of these adjustments. As Borio and Lowe (2002) put it, “one of the relatively few robust findings to emerge from the literature on leading indicators of banking crisis is that rapid domestic credit growth increases the likelihood of a problem”.⁵

This Special Feature seeks to explore how much of the recent credit growth may be explained by this catching up both in real incomes and in financial deepening, which as we have seen is a key characteristic among CEECs. In doing so, it builds upon the limited existing literature on lending booms, which is discussed briefly below. Two methods are proposed to address the question and then cross-check the results obtained from these methods, explore a number of themes highlighted by the results, and finally provide some concluding remarks.

- 4 See A. Mehl, C. Vespro and A. Winkler (2006), “Financial Sector Development in South-Eastern Europe: Quality Matters”, in: K. Liebscher, J. Christl, P. Mooslechner and D. Ritzberger-Grünwald (eds), *Financial Development, Integration and Stability – Evidence from Central, Eastern and South-Eastern Europe*, Cheltenham: Edward Elgar, pp. 186-203.
- 5 See C. Borio and P. Lowe (2002), “Asset Prices, Financial and Monetary Stability: Exploring the Nexus”, *BIS Working Paper*, No 114, July.

OVERVIEW OF THE EMPIRICAL LITERATURE ON LENDING BOOMS

The empirical literature on lending booms faces the enormous challenge of providing a working definition of what precisely should be considered to be a problematic rate of credit growth. In theory, an episode of credit growth can be thought of as problematic if it either (i) endangers financial stability by financing undeserving projects that will eventually turn into bad loans; or (ii) leads to unsustainable macroeconomic developments, such as a deteriorating external position resulting in an unsustainable build-up of external debt. Neither of these two effects can easily be measured or forecast.

Despite this intrinsic difficulty, policymakers and market participants alike need to assess credit growth developments. From an operational point of view, an episode of rapid credit growth is typically a cause for concern when the observed growth rates exceed a given threshold. This threshold is often estimated on the basis of the country's trend credit growth, using, for instance, a Hodrick-Prescott filter. For example, IMF (2004) labels a credit expansion a "credit boom" if it exceeds 1.75 times the standard deviation of the country's average credit fluctuation around the trend.⁶ The threshold value in this case is selected because, assuming the observations of credit growth were drawn from a normal distribution, there is only a 5% probability that they would lie more than 1.75 times outside the standard deviation. While the specific thresholds may differ, it is common in this literature to focus on deviations from an estimated trend.⁷ However, in the context of transition countries this may be inappropriate because of the short time series and the likely structural breaks in the series.⁸

There is a growing literature on credit developments in European transition economies. However, most of these papers remain descriptive, and do not provide an econometric analysis of the growth of the credit-to-GDP ratio.⁹ Cottarelli et al. (2005), for example,

explicitly refrain from exploring this question and instead model the expected credit-to-GDP ratio on the basis of economic fundamentals. They conclude that many countries in the region exhibited credit-to-GDP ratios below the level that their economic fundamentals warrant, which only serves to underscore the importance of studying the different paths followed by these countries towards their credit-to-GDP equilibrium levels.

Schadler et al. (2004) provide a useful approach to the question of the path of credit growth.¹⁰ Acknowledging the challenges posed by the transition process, their approach draws on the experience of existing euro area countries to infer likely trends in the new Member States, which they justify on the grounds that "historical data from the CECs would not be relevant to predicting future credit developments" (p. 4). Their paper estimates a vector error correction model (VECM) on quarterly euro area data for the period 1991-2002. The VECM of the demand for credit includes three variables: (i) the credit-to-GDP ratio; (ii) a proxy for the cost of credit (the long-run real interest rate on government bonds); and (iii) per capita income. A cointegrating relationship between these variables is then found which can be used to draw some inferences about likely future developments in the CEECs. For example, a 10% increase in per capita income raises the credit-to-GDP ratio by around 3 percentage points in the long run. Building on this contribution, use is made here of an error

6 See IMF (2004), *World Economic Outlook*, April.

7 See, for example, P. Gourinchas, O. Landerretche and R. Valdes (2001), "Lending Booms, Latin America and the World", *NBER Working Paper*, No 8249.

8 See C. Duenwald, N. Gueorguiev and A. Schaechter (2005), "Too Much of a Good Thing? Credit Booms in Transition Economies: The Cases of Bulgaria, Romania and Ukraine", *IMF Working Paper*, No 05/128.

9 See C. Cottarelli, G. Dell'Ariccia and I. Vladkova-Hollar (2005), "Early Birds, Late Risers, and Sleeping Beauties: Bank Credit Growth to the Private Sector in Central and Eastern Europe and in the Balkans", *Journal of Banking & Finance*, 29 (1), pp. 83-104.

10 See S. Schadler, Z. Murgasova and R. van Elkan (2004), "Credit Booms, Demand Booms, and Euro Adoption", paper for the Conference on Challenges for Central Banks in an Enlarged EMU, Oesterreichische Nationalbank, February.

correction framework to explain episodes of rapid credit growth among the CEECs.

EXPLAINING CREDIT GROWTH DYNAMICS

The focus of analysis here is on the question of how much credit growth can be explained by macroeconomic fundamentals, as well as on the gap between the actual credit-to-GDP ratio and its equilibrium level. The latter is important for the analysis as countries in the region have been experiencing major structural changes related to the transition process. Credit growth is modelled as a simple function of its main macroeconomic determinants, namely GDP growth and the interest rate, as well as the gap between the observed credit-to-GDP ratio and its equilibrium level. This allows the elasticity of credit with regard to those variables to be estimated and estimates of expected credit growth for the countries in the region can be derived. The comparison between observed and expected credit growth provides a measure of so-called unexplained credit growth. While omitted variables may explain part of that difference, the analysis is kept as parsimonious as possible given the limited time series, and to focus on the extent to which the dynamics of credit growth can be explained in simple catching-up terms. Two key steps in this simple approach are the determination of the equilibrium credit-to-GDP ratio, and the estimation of credit elasticities.

THE EQUILIBRIUM CREDIT-TO-GDP RATIO

The equilibrium credit-to-GDP ratio of the CEECs is difficult to measure because it has to account for the effects of the transition from a centrally planned to a market-based economy. Credit not only depends on its traditional macroeconomic determinants, but also on the new circumstances arising from financial liberalisation during the transition process. These new circumstances may affect the banking sector and credit supply in various ways. For example, a variety of factors have contributed to increasing the credit supply and to lowering lending rates, such as free entry into the banking sector, the possibility for foreign banks to

purchase local banks or create local branches, and the gradual expansion of these banks into the retail credit markets.¹¹

The formal definition of the equilibrium level of credit builds on the basic credit demand/supply nexus, which links the actual volume of credit to real GDP, the real interbank interest rate, and other factors which capture the effects of financial liberalisation on credit supply. The equilibrium credit-to-GDP ratio is defined as the ratio that would be observed in the absence of short-term shocks, given the interbank interest rate and the position of the economy towards becoming market-based. This path is modelled as a deterministic and non-linear time trend, so that the gap between the actual credit-to-GDP ratio and its equilibrium level is mean stationary, allowing use to be made of an error correction model.

ESTIMATION OF CREDIT ELASTICITIES

Elasticities are estimated on the basis of a standard dynamic error correction model of credit growth, in which the error correction term is the gap between the actual credit-to-GDP ratio and its equilibrium level as defined above.

The estimated short-run dynamic equation includes as a dependent variable the growth rate of real credit and, as independent variables, the lagged real growth rates of credit and GDP, the lagged variation of the real interbank interest rate, and the lagged error correction term. In addition, a dummy variable equal to one over the period 2001-2004, and to zero otherwise is included. A positive coefficient on the dummy reveals credit growth that cannot be explained by the catching-up process as defined here. The period 2001-2004 was chosen because, as seen above, credit growth accelerated during this period in a number of CEECs.

¹¹ See R. De Haas and I. Naaborg (2005), "Foreign Banks in Transition Economies: Small Business Lending and Internal Capital Markets", *International Finance Working Paper*, 0504004, Economics Working Paper Archive at WUSTL.

However, the limited availability of data poses a challenge when seeking to estimate these elasticities for each of the countries in the region. To circumvent this issue, and to ensure that the results are not driven exclusively by the choice of methodology, two sets of elasticities are estimated.

First, credit elasticities are estimated for a number of benchmark countries where the credit-to-GDP ratio had been relatively stable over a long period of time, and where long time series are available. As countries with stable credit-to-GDP ratios are used in the analysis lower elasticities are likely to be obtained than might be expected for catching-up countries. Since these elasticities are used to derive the expected credit growth in the CEECs, the results are likely to be biased towards making the detection of credit growth that cannot be explained by the catching-up process more likely. This gives an upper bound for the measure of “unexplained” credit growth adopted here. The use of benchmark countries outside the region also implies that the results will be independent of the composition of the panel of countries and, in particular, irrespective of whether or not large countries such as Poland are included in the analysis.

Second, the credit elasticities are estimated using data for those CEEC countries that have experienced episodes of dynamic credit growth. In contrast with the benchmark countries, most of the countries in the panel have experienced rising credit-to-GDP ratios. Therefore, higher elasticities are likely to be obtained than with the benchmark countries. This will give a lower bound for the measure of unexplained credit growth used here, with the true value lying in-between.

TEST STRATEGY

The test for unexplained credit growth during the period of recent credit growth acceleration (2001-2004) focuses on the coefficient of the dummy variable in the error correction model, which is the only country-specific parameter in the regression. As mentioned above, a strictly

positive coefficient means that credit grew faster during the period 2001-2004 than what its standard determinants would have implied.

DATA

Throughout the sample period (1996-2004) the CEECs had significantly lower credit-to-GDP levels than the EU average. In 1996 most of the countries considered in the study had total outstanding loans-to-yearly GDP ratios below 40%. Despite the high speed of credit growth, this ratio was still below the EU average at the end of the sample period. In terms of composition, less than half of total private loans were loans to households or short term loans in 2004 (see Table C.1).

TEST USING BENCHMARKS FROM OUTSIDE THE REGION

The first test suggests that total private credit has grown below what our model would suggest in three countries (Poland, the Czech Republic and Slovakia); has grown in line with its main determinants in two (Slovenia and Romania), and was on average higher in the remaining six countries (Bulgaria, Croatia, Estonia, Hungary, Latvia and Lithuania) than what would be

Table C.1 Lending to the private non-financial sector and its currency, maturity and sectoral structure

(2004)

	Loans to private sector (% of GDP)	Domestic currency loans (as a % of total loans)	Long-term loans (as a % of total loans)	Loans to households (as a % of total loans)
Bulgaria	36.7	53.5	86.5	32.1
Croatia	57.5	88.0	–	54.5
Czech Rep.	32.2	87.2	75.0	29.6
Estonia	43.3	20.0	91.4	47.0
Hungary	46.0	56.0	62.3	44.6
Latvia	45.4	40.8	85.3	35.4
Lithuania	25.6	36.5	–	–
Poland	27.7	75.7	67.2	48.6
Romania	10.0	39.1	49.9	46.2
Slovakia	30.6	78.5	67.9	22.4
Slovenia	46.3	69.3	69.1	28.9

Sources: Hilbers et al. (2005) and ECB calculations.
Note: Data are non-harmonised.

implied by the evolution of GDP, interest rates and financial liberalisation using benchmark elasticities from outside the region. Hence in the following the focus is on the latter six countries where the first test using benchmark elasticities cannot rule out that credit may have grown faster than what can be explained by the model specification used.¹²

TEST USING CEEC DATA

For these six countries we now turn to our second test on the basis of data from the countries themselves, and not from benchmarks outside the region. A panel of quarterly observations for the countries in the region starting in 1998 is used, rather than 1996, owing to data availability. Further refinement of the analysis is made by considering various credit aggregates, in particular total lending (the outstanding stock of total loans of MFIs to non-MFIs), loans broken down by currency denomination (domestic and foreign), maturity (short-term and long-term) and by type (to households or corporations). Table C.2 below summarises the results.

Overall, unexplained credit growth is found to amount to around 2-6% per quarter. Moving on to the disaggregated analysis, lending in foreign currency has been particularly strong in only three countries, whereas lending in domestic currency has been driving credit growth in all countries except Hungary. With regard to the maturity breakdown, there is some evidence that long-term lending has grown at lower rates than short-term lending in a number of countries. Similarly, lending to corporations appears to have grown more slowly than credit to households.

These developments have driven most countries to take policy measures to contain credit growth, including a tightening of supervisory and prudential policies, moral suasion, administrative measures and binding limits on credit growth.¹³ Obviously, the sample studied here is too short to take into account the success that such recent measures have had in bringing down credit growth.

Table C.2 Average quarterly credit growth that cannot be explained by the model

	Average unexplained credit growth						
	Total	Foreign currency	Domestic currency	Short term	Long term	Households	Corporates
Bulgaria	5.6***	6.4***	5.6***	3.4**	2.1*	4.8***	5.5***
Croatia	2.2***	0.9	3.3***	-	-	0.9	1.0
Estonia	2.9***	2.5**	3.8***	2.1	-3.1	2.5**	1.6
Hungary	2.0***	0.1	0.6	0.3	0.4	3.1**	0.0
Latvia	5.4***	5.2***	5.1***	4.8***	0.5	4.5***	5.0***
Lithuania	4.0***	2.0	6.0***	-	-	-	4.9***

Source: ECB calculations.

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

AREAS FOR FURTHER RESEARCH

The analysis suggests a number of potential areas for further research, the most interesting of which concerns the relationship between exchange rate regimes and the pace of credit growth.

While this question lies beyond the scope of this Special Feature, some observations are worth noting. Bulgaria, Estonia and Lithuania all operate currency boards whereby their exchange rates are fixed to the euro.¹⁴ In addition to these countries with hard pegs, both Croatia and Slovenia have experienced limited real exchange rate fluctuations. One possible mechanism through which the exchange rate regime may lead to higher credit growth is by encouraging lending in foreign currency. However, no clear trend in the share of loans in foreign currency can be observed based on the available data.

12 Note that excluding the CEECs for which the model can explain credit growth may bias the results of the second test towards making it more likely that our model specification can explain credit growth.

13 For an overview of policy responses in selected CEECs, see I. Ötger, P. Hilbers, G. Johnsen and C. Pazarbasioglu (2005), "Assessing and Managing Rapid Credit Growth and the Role of Supervisory and Prudential Policies", *IMF Working Paper*, No 05/151, July.

14 The Lithuanian litas was pegged to the US dollar prior to 2002, and Latvia re-pegged its currency to the euro in January 2005.

A related area for further research is the role that foreign-owned banks may have played in contributing to the dynamism of credit growth among a number of CEECs. For example, foreign-owned banks differ from domestic ones in that they may have access to additional sources of finance, typically from their parent bank. They are also widely seen as bringing with them valuable know-how. Empirical studies have shown, for example, that bank privatisation leads to efficiency gains, especially in the case of privatisation to foreign strategic investors. A more efficient banking sector will increase financial intermediation. In fact, as shown in Chart C.2.a, there are some indications that foreign bank presence in these countries is associated with higher credit growth.

Chart C.2.b shows how, with the exception of Slovenia, the average share of banking assets owned by foreign bank subsidiaries or branches stands at above 50% for all countries in the region. It is also worth highlighting the relatively limited foreign bank penetration of the Slovenian banking system since, if it were to be confirmed that foreign bank entry is associated with a faster pace of financial deepening, this would help explain why of all the CEECs with relatively fixed exchange rate regimes, only

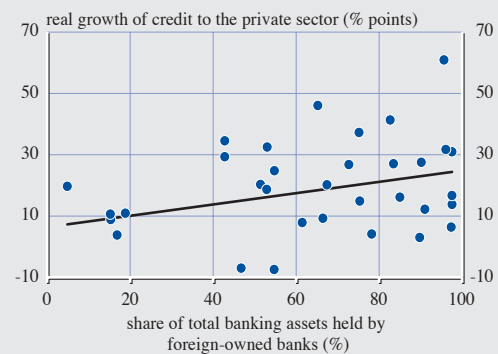
Slovenia stands out as having experienced very weak credit growth.¹⁵

The countries with the highest penetration rate of foreign banks are Croatia and Estonia. In the case of Croatia, the other CEEC with a relatively fixed exchange rate that has not witnessed such fast credit growth, it is worth noting that the Croatian National Bank (CNB) has already made use of binding credit ceilings to curb credit growth back in 2003. In particular, banks were made to hold CNB paper bearing low interest rates if their asset growth exceeded 4% in a given quarter. While these measures were repealed as from 2004, banks were then obliged to hold liquid foreign exchange assets equal to at least 35% of their total foreign exchange liabilities. Turning to Estonia, a wave of privatisation and consolidation in the mid-1990s meant that by 1998 there were only five private banks left in the country, down from 42 in 1992. Indeed, Estonia has the largest foreign bank presence of the CEECs, and has

15 An additional factor that could help explain the slow growth of credit in Slovenia is the base effects stemming from the fast rate of credit growth observed in the first half of 1999, when total loans to the non-banking sector expanded by 30% as domestic demand surged in anticipation of the introduction of VAT in July.

Chart C.2.a Credit growth and foreign ownership of the banking system – pooled data

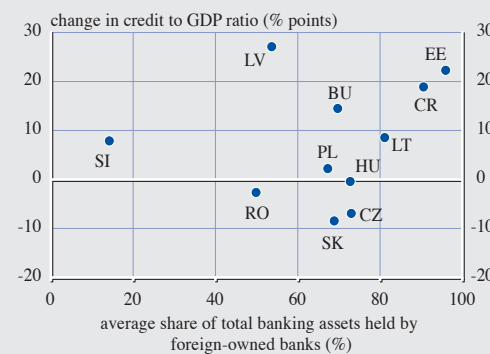
(1999 - 2003)



Sources: The European Bank for Reconstruction and Development (EBRD) and ECB calculations.

Chart C.2.b Credit growth and foreign ownership of the banking system – a cross-section

(1999 - 2003)



Sources: The European Bank for Reconstruction and Development (EBRD) and ECB calculations.

profited from one of the largest increases in financial deepening.

CREDIT COMPOSITION

A second area for further research is suggested by our disaggregated analysis of credit to households and credit to corporations. Our findings suggest that, for countries exhibiting high credit growth at the aggregate level, this result also typically applies to both credit to households and credit to corporations. This is the case for both Bulgaria and Latvia, for example. In Estonia, however, our model provides different results for credit to households and to corporations. While the latter can be explained by our simple model, lending to households has taken place at a much faster pace than our model suggests. However, this result could be influenced by the high and changing share of Estonian corporate borrowing directly from abroad, which has had an impact on the demand for domestic borrowing. Overall, the emergence of consumer credit and the introduction of new products such as mortgages deserve more detailed attention, in particular in connection with rapidly rising house prices.¹⁶

It would also be very interesting to explore the effect of including non-bank credit to the private sector in the analysis: this has grown very rapidly in some countries, but is much less important in others. Future research could notably consider a broader definition of “unexplained credit growth” based on both bank and non-bank lending. Looking at total lending rather than just bank lending would for example make it possible to control for the potential biases that may arise in the analysis owing to substitution effects between bank and non-bank loans or other structural changes in the composition of total lending.

CONCLUDING REMARKS

The experience of many emerging market economies (EMEs) suggests that episodes of rapid credit growth should be closely monitored from a financial stability perspective as in the

past they have been associated with the emergence of financial and currency crises. Given the high costs of such crises, policymakers in CEECs have been paying increasing attention to developments in credit to the private sector in the region. This increased attention has also resulted in a number of policy measures aimed at slowing down the pace of credit growth. It should be emphasised that the policy choices are by no means easy, as curbing credit growth is not without welfare costs, even though financial deepening is in principle associated with increased economic growth and efficiency.

This Special Feature suggests a relatively simple methodology for analysing episodes of dynamic credit growth in the region, one which can also account for the catching up in incomes associated with the transition process currently underway in the region.

A key result is that recent total credit growth can be fully explained by a simple empirical model that takes into account a few key macroeconomic developments (namely rising trends in the equilibrium credit-to-GDP ratio, GDP growth, and interest rates) for five of the 11 CEECs studied. However, our model was unable to explain fully the recent growth in total credit for the other countries. Tests on disaggregated data for these countries suggest that credit growth is generally driven by both foreign and domestic currency lending. We also find no detectable difference in lending to households and corporations.

Given the limited available data, these results must be interpreted with caution, and further research is needed to examine how issues such as the mechanisms through which the exchange rate regime, the presence of foreign banks and the range of lending products on offer may have

¹⁶ See L. Papademos (2005), “Financial Structures, Credit Growth and House Prices in the New EU Member States: Policy Challenges on the Road to the Euro”, speech at the conference held by Latvijas Banka in Riga, 19 September 2005, available at www.ecb.int.

an impact on credit developments in the region. While the results from this exercise necessarily depend on our narrow set of variables and model specification, they do provide a new perspective that can help explain episodes of dynamic credit growth in a number of countries in the region.