Credit Growth in Central and Eastern Europe: Emerging from Financial Repression to New (Over)Shooting Stars?

Peter Backé* Balázs Égert † Tina Zumer ‡ §

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Abstract

This paper analyses the equilibrium level of private credit to GDP in 11 Central and Eastern European (CEE) countries on the basis of a number of dynamic panels containing quarterly data on CEE economies, emerging markets and developed OECD countries. In doing so, we propose a unifying framework which includes both factors driving the demand for and the supply of private credit. We emphasise that relying on in-sample panel estimates for transition economies is problematic not only because of the possible upward bias, which shows up in the estimated constant and slope coefficients due to the initial undershooting and the ensuing steady adjustment towards equilibrium, but also because the equations estimated for transition economies are not sufficiently stable. The use of out-of-samples suggests that some of the transition economies might have already come close to equilibrium by 2003, whereas others have private credit to GDP ratios, which are well below the level what the fundamentals would justify.

JEL classification: C31, C33, E44, G21

Keywords: credit to the private sector, credit growth, equilibrium level of credit, initial undershooting, transition economies

*Oesterreichische Nationalbank, peter.backe@oenb.at

†Corresponding author, Oesterreichische Nationalbank; EconomiX - University of Paris X-Nanterre and William Davidson Institute. balazs.egert@oenb.at and begert@u-paris10.fr

‡European Central Bank, tina.zumer@ecb.int

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1 Introduction

The emerging literature on credit growth in transition economies has documented that lending to the private sector has recently grown dynamically in a number of transition economies[1]. Credit growth has been promoted by macroeconomic stabilization, comprehensive reforms and privatization in the financial sector, by the introduction of market institutions and legal reforms. Nevertheless, the recent boom in bank lending in Central and Eastern Europe has prompted the question of whether the growth rates recorded in these countries can be viewed as sustainable in the medium to long run.

In this paper, we investigate the macro- and microeconomic determinants and the equilibrium level of domestic credit to the private sector as percentage of GDP in 11 CEE countries[2]. Our empirical model used for this purpose can be viewed as a unifying framework, which includes both demand-side and supply-side variables. Our empirical specification is tested for a variety of panels composed of (i) developed small and large OECD countries; (ii) emerging market economies from Asia and the Americas; and (iii) a number of in-sample panels for transition economies.

The use of these panels provides some interesting perspectives. First of all, in-sample panels might give useful insights regarding the major determinants of credit-to-GDP levels in Central and Eastern Europe. However, as financial depth in most transition economies continues to be comparatively low, it might well be that private credit to GDP is still below its equilibrium level for most of the last decade. If this were so, it would give rise to a bias in the econometric estimates, as credit-to-GDP ratios tend to converge towards their equilibrium levels[3]. The use of the OECD and emerging market panels may help to tackle this problem. Results derived from the emerging markets panel may be a good benchmark for equilibrium levels at a medium term horizon, while estimates based on the panel of small open OECD countries may show equilibrium levels at a longer horizon at which the CEE countries will have caught up in terms of overall economic development.

The paper is structured as follows. Section 2 reviews some stylised facts regarding credit growth in the transition economies. Section 3 deals with initial under- and overshooting of the credit-to-GDP ratio and with their consequences for econometric testing. Section 4 presents the economic specification used for the estimations and describes the dataset and the estimation techniques. Section 5 then presents and discusses the estimation results. Finally, Section 6 draws some concluding remarks.

[1] See e.g. Cottarelli, Dell'Ariccia and Vladkova-Hollar (2003) and Backé and Zumer (2005).

[2] Bulgaria, Croatia, Czech Republic, Estonia, Hungary, Latvia, Lithuania, Poland, Romania, Slovakia and Slovenia.

[3] An analogous line of reasoning is applied in the literature to equilibrium exchange rates of Central and Eastern European countries (Maeso-Fernandez, Osbath and Schnatz, 2005).

2 Some Stylised Facts

To place credit developments in transition economies into context, it is useful to recall that financial systems in these countries are bank-based – about 85% of financial sector assets are bank assets – and that capital markets (in particular corporate bond and stock market segments) are generally not very developed. This implies that bank credit is the main source of external financing in these countries, although also foreign direct investment (FDI) has been important in some countries. Banking sectors in transition economies in Central and Eastern Europe have undergone a comprehensive transformation in the past one-and-a-half decades, including a complete overhaul of the regulatory framework, bank consolidation schemes and – in almost all countries – sweeping privatization, mainly to foreign strategic owners (mostly financial institutions based in "old" EU Member States). Consequently, the governance of banks has greatly improved, and the performance and the health of banking sectors have advanced substantially, as standard prudential indicators on capitalization, asset quality, profitability and liquidity show[4].

Figure 1 gives an overview on the development of the credit to the private sector in percentage of GDP from the early 1990s to 2004. Several observations can be made on the basis of Figure 2. First, some countries, namely Estonia, Latvia, Lithuania, Poland, Romania and Slovenia started transition with low credit-to-GDP ratios of around 20%. Estonia and Latvia then recorded a marked increase in the ratio and the credit to GDP ratio was also rising steadily in Slovenia from the early 1990s to 2004 although the overall increase was less pronounced than in the two aforementioned Baltic countries. Credit growth has only picked up recently in Lithuania and Romania and, for Poland, only a moderate increase can be observed for Poland during the second half of the period studied.

By contrast, the second group of countries, notably Croatia and Hungary, started transition with higher credit-to-GDP ratios higher than in the Baltic countries. After a considerable drop to close to 20%, the ratio started to increase reaching pre-transition levels in Hungary and well exceeding 40% in Croatia by 2004.

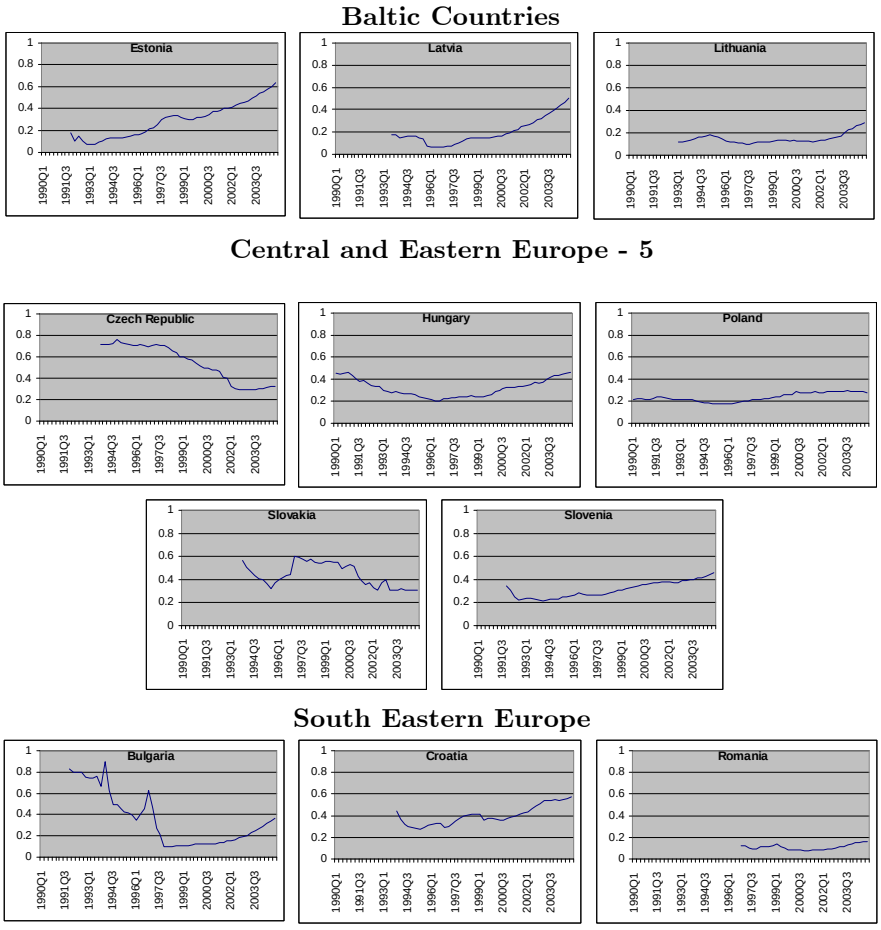
The third group of countries, comprising Bulgaria, the Czech Republic and Slovakia had the highest credit-to-GDP ratio at the beginning of the period (between 60% and 80%). For Bulgaria, this ratio came down to 10% in 1997, while expanding to close to 40% by 2004. The Czech Republic and Slovakia also recorded a substantial contraction (to nearly 30% for both countries), while the ratios seem to have stabilised during the last couple of years.

The differences in initial credit-to-GDP levels can be largely traced to different approaches with respect to the financing of (credit to) enterprises under central planning across countries as well as strongly negative real interest rates right before or at the start of transition in some cases. In turn, major temporary contractions in credit-to-GDP ratios during the transition process have

[4] See e.g. Barisitz (2005), Cottarelli et al. (2003), ECB (2005) and EBRD (2005).

mainly been due to banking consolidation measures, by which non-performing assets were removed from the banks' balance sheets. In a few cases, high inflation episodes combined with strongly negative real interest rates have also contributed to lowering financial depth temporarily during the transition process (e.g. Bulgaria 1996/97).

Figure 1. Bank credit to the private sector as percentage of GDP, 1990-2004



Source: Authors' calculations based on data drawn from the IFS/IMF. For precise data definitions, see Section 4.2.

3 Equilibrium Credit Growth

3.1 Initial Under- and Overshooting...

The question of whether or not credit growth in transition economies is excessive is closely related to the issue of what the equilibrium level of the stock of bank credit to the private sector as a share of GDP in those countries is. It is a widely

observed fact that economic development goes hand in hand with an increase in the credit to GDP ratio. This is demonstrated on Figure 2 when moving from point A to C through B. The depicted trajectory of the increase in the credit to GDP ratio (credit growth) can be thought of as an equilibrium phenomenon insofar as it is in line with economic fundamentals, in particular with GDP per capita figures.

Nevertheless, we may also think of a situation when the observed credit to GDP ratio is out of tune with economic fundamentals. Point A' depicts the situation when the initial credit to GDP ratio is higher than what the level of economic development would justify (initial overshooting). By contrast, point A" shows a credit to GDP ratio, which is lower than what the level of economic development of the given country would predict (initial undershooting). In those cases, credit growth should differ from the equilibrium rate of growth, and this would secure the return to the equilibrium level of credit to GDP ratio[5].

Initial undershooting may be important for transition economies most of which started economic transformation with levels of credit to GDP lower than other countries at the same level of development would have in other parts of the world. This is a heritage of central planning because of the underdevelopment of the financial sector under the communist regime. Hence, once economic transformation from central planning to market is completed, higher credit growth in the transition economies may reflect partly the correction from this initial undershooting to the equilibrium level of the credit to GDP ratio. This is shown on Figure 2, where the move from A" to B can be decomposed in (a) the equilibrium credit growth, given by A" to B" and (b) the adjustment from initial undershooting to equilibrium (from B" to B).

However, the issue is whether the observed change in the credit to GDP ratio corresponds to the move from A" to B. In cases of high credit growth rates, one might suspect that the increase in credit-to-GDP may be even higher than the equilibrium change and the correction from initial undershooting would justify. The move from A" to B' on Figure 2 indicates such an overshooting where the excessive increase in credit-to-GDP is given by the distance between B and B'.

3.2 ... and the Consequences

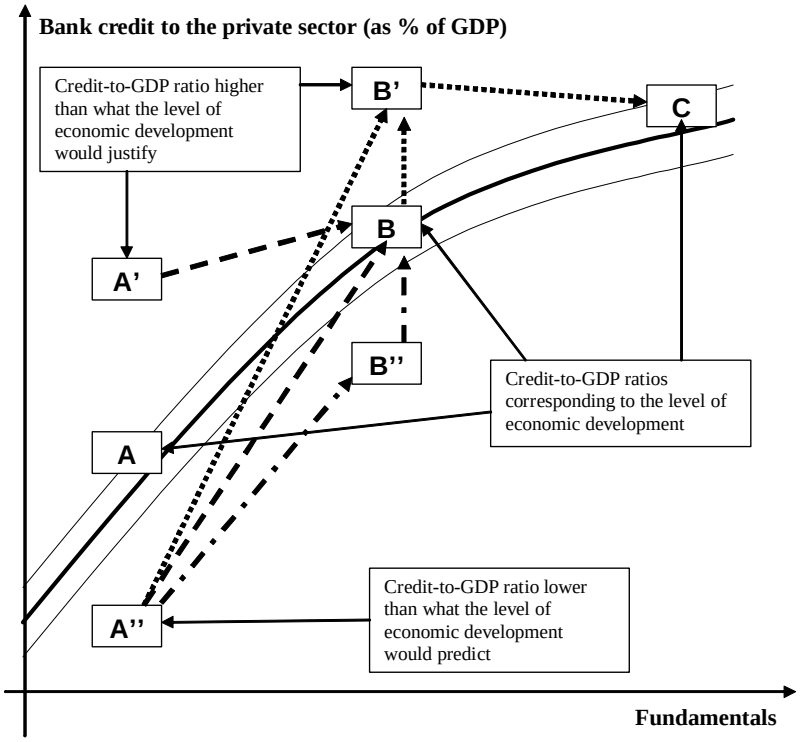
If there is initial under- or overshooting at the beginning of the transition process and if the adjustment towards equilibrium occurs gradually implying persistent initial under- or overshooting, the use of panels including only transition economies may lead to severely biased constant terms and coefficient estimates, as put forward in the context of equilibrium exchange rates by Maeso-Fernandez, Osbath and Schnatz (2005). When regressing the observed credit-to-GDP ratio moving from A" to B (instead of the equilibrium change from A to B) on a

[5] In both cases, credit growth is expressed in terms of GDP. For example, credit growth ([C(t)-C(t-1)]/C(t-1) is higher for countries with lower credit-to-GDP levels than for countries with higher credit-to-GDP levels if both countries have similar credit-to-GDP flows. Hence, it is more appropriate, as we do it in this study, to relate changes in credit to the GDP to avoid this distortion (Arpa, Reininger and Walko, 2005).

set of fundamentals, the slope coefficient would suffer from an obvious upward bias. By the same token, the constant term will be lower than it would be in the absence of an initial undershooting.

This is the reason why one would be well advised to use panels including countries, which do not exhibit an initial under- or overshooting in the credit-to-GDP ratio, or to use out-of-sample panels for the analysis of the equilibrium level of the credit-to-GDP ratio of transition economies.

Figure 2. The evolution of the credit to GDP ratio over time



4 Economic and Econometric Specifications

4.1 The Empirical Model

Most studies investigating credit growth employ a simple set of explanatory variables (see Table 1), which usually includes GDP per capita or real GDP, some kind of (real or nominal) interest rate and the inflation rate (Calza et al, 2001, 2003 and Brzoza-Brzezina, 2005). Hofmann (2001) extends this list by the inclusion of housing prices. This is very important because a rise in housing prices is usually accompanied by an increase in credit to the private sector.

Cottarelli et al. (2005) use indicators capturing factors driving the demand for credit but they also consider a number of variables characterising the supply of credit. These variables describe the degree of financial liberalisation, the quality and implementation of accounting standards, entry restrictions to the banking sector and the origin of the legal system. Finally, they use a measure of public debt aimed at analysing possible crowding-out (or crwoding-in) effects.

Table 1. Overview of papers analysing the determinants of credit growth

Paper	Dependent variable	Explanatory variables
Calza et al. (2001)	Real loans	CAPITA, short- and long-term real interest rates
Calza et al. (2003)	Real loans	Real GDP growth, nominal lending rate, inflation rate
Brzoza-Brzezina (2005)	Real loans	Real GDP growth, real interest rate
Hofmann (2001)	Real loans	Real GDP, real interest rate, housing prices
Cottarelli et al. (2005)	Credit to the private sector (%GDP)	CAPITA, inflation rate, financial liberalisation index, accounting standards, entry restrictions to the banking sector, German origin of the legal system, public debt

Note: CAPITA refers to GDP per capita in PPS.

The economic specification which we estimate not only provides a unifying framework for the variables used in previous studies but also extends on them. We consider the following variables influencing the demand for credit from the private sector:

1.) GDP per capita in terms of PPS ($CAPITA$). An increase in per capita GDP is expected to result in an increase in credit to the private sector. Alternatively, we also use real GDP ($gdpr$) and industrial production (ip) to check for the robustness of the GDP per capita variable and to see to what extent these variables which are used interchangeably in the literature are substitutes.

2.) Bank credit to the government sector in percentage of GDP (C^G). As this variable captures possible crowding-out effects, any increase (decrease) in bank credit to the government sector is thought to give rise to a decrease (increase) in bank credit to the private sector. It should be noted that bank credit to the government measures better crowding out as compared to public debt employed in Cottarelli et al. (2005) because public debt also includes loans taken from abroad and because public entities might well finance themselves on securitiy markets. Moreover, public debt is subject to valuation and stock-flow adjustments.

3.) Short- and long-term nominal lending interest rates (i). Lower interest rates should promote credit to the private sector implying a negative sign for this variable. Calza et al. (2001) use both short-term and long-term interest rates arguing that it depends on the share of loans with fixed interest rates and variable interest rates whether short-term or long-term interest rates play a more important role. Because the nominal lending interest rates used in the paper show a high correlation with short-term interest rate (three-month T-bill and money market rates), short-term interest rates are used as a robustness check rather than as an additional variable.

4.) Inflation (p): high inflation is thought to be associated with a drop in bank credit to the private sector. Inflation is measured both in terms of PPI and CPI.

5.) Housing prices ($p^{housing}$): increases in housing prices result in a rise in the total amount which has to be spent on the purchases of a given residential or commercial property. This is subsequently reflected in an increase in demand for credit through which the increased purchasing price can be fully or partly financed. This means that an increase in housing prices may generate more credit to the private sector. However, a fundamental problem arising here is whether or not price increases in the real estate market are driven by fundamental factors or reflect a bubble. If price developments in the real estate market mirror changes in fundamentals such as the quality of housing or an adjustment to the underlying fundamentals, the ensuing rise in the stock of credit can be viewed as an equilibrium phenomenon. In contrast, in the event that high credit growth is due to the development of a housing price bubble, the accompanying credit growth is a disequilibrium phenomenon from the point of view of long-term credit stock.

Regarding the supply of credit, the following variables are considered in our study:

1.) The degree of liberalisation of the financial sector, and in particular that of the banking sector. A higher degree of financial liberalisation makes it easier for banks to fund credit supply. Because the financial liberalisation indexes ($finlib$) used in Abiad and Mody (2003) and Cottarelli et al. (2005) match only partially with our country and time coverage, we use in addition two variants of the spread between lending and deposit rates ($spread = i^{lending}/i^{deposit}$ and $spread2 = i^{lending} - i^{deposit}$) capturing financial liberalisation. A decrease in the spread indicates financial liberalisation and can also reflect more intensive competition among banks and also between banks and other financial intermediaries.

2.) Public and private credit registries (reg). The existence of credit registries diminishes problems related to asymmetric information and the probability of credit frauds. This in turn leads to an increase in the supply of bank credit, all thing being equal.

Our baseline specification includes per capita GDP, bank credit to the public sector, nominal lending rates, inflation rates and financial liberalisation based on the spread:

$$C^P = f(\overset{+}{CAPITA}, \overset{-}{C^G}, \overset{-}{i^{lending}}, \overset{-}{p^{PPI}}, \overset{-}{spread}) \tag{1}$$

where C^P is bank credit to the private sector expressed as a share of GDP. The alternative variables are subsequently introduced one by one in the baseline specification, which yields 6 additional equations.

$$C^P = f(\overset{+}{ip}, \overset{-}{C^G}, \overset{-}{i^{lending}}, \overset{-}{p^{PPI}}, \overset{-}{spread}) \tag{2}$$

$$C^P = f(\overset{+}{gdpr}, \overset{-}{C^G}, \overset{-}{i^{lending}}, \overset{-}{p^{PPI}}, \overset{-}{spread}) \tag{3}$$

$$C^P = f(\overset{+}{CAPITA}, \overset{-}{C^G}, \overset{-}{i^{short-term}}, \overset{-}{p^{PPI}}, \overset{-}{spread}) \tag{4}$$

$$C^P = f(\overset{+}{CAPITA}, \overset{-}{C^G}, \overset{-}{i^{lending}}, \overset{-}{p^{CPI}}, \overset{-}{spread}) \tag{5}$$

$$C^P = f(\overset{+}{CAPITA}, \overset{-}{C^G}, \overset{-}{i^{lending}}, \overset{-}{p^{PPI}}, \overset{-}{spread2}) \tag{6}$$

$$C^P = f(\overset{+}{CAPITA}, \overset{-}{C^G}, \overset{-}{i^{lending}}, \overset{-}{p^{PPI}}, \overset{+}{finlib}) \tag{7}$$

The sensitivity check to alternative specification is then followed by the use of the registry variable and by the inclusion of housing prices:

$$C^P = f(\overset{+}{CAPITA}, \overset{-}{C^G}, \overset{-}{i^{lending}}, \overset{-}{p^{PPI}}, \overset{-}{spread}, \overset{+}{reg}) \tag{8}$$

$$C^P = f(\overset{+}{CAPITA}, \overset{-}{C^G}, \overset{-}{i^{lending}}, \overset{-}{p^{PPI}}, \overset{-}{spread}, \overset{+}{p^{housing}}) \tag{9}$$

4.2 Data Sources

Our quarterly dataset covers 43 countries, which are grouped in three panels: (a) developed OECD countries, (b) emerging markets from Asia and the Americas[6], and (c) transition economies from Central and Eastern Europe. The OECD panel is further split into two sub-panels: (i) small OECD countries (excluding transition economies that have joined the OECD)[7] and (ii) large OECD countries[8]. The panel including 11 transition economies is also divided into three presumably more homogeneous groups: (i) CEE-5: the Czech Republic, Hungary, Poland, Slovakia and Slovenia; (ii) Baltic 3 (B-3): Estonia, Latvia and Lithuania and (iii) South Eastern Europe 3 (SEE-3): Bulgaria, Croatia and Romania.

The sample runs from 1975 till 2003 for the OECD countries, it begins around 1980 for the emerging market economies and starts in 1993 for the transition economies. The dataset is unbalanced as the length of the individual data series depends largely on data availability.

[6] Argentina, Brazil, Chile, India, Indonesia, Israel, Mexico, Peru, Philippines, South Africa, South Korea, Thailand. Although South Korea and Mexico are OECD countries, they can be viewed as a catching-up emerging market economies for most of the period investigated in this paper.

[7] Austria, Australia, Belgium, Denmark, Netherlands, Sweden, Canada, Finland, Greece, Ireland, Norway, Portugal, Spain, New Zealand.

[8] Germany, France, Italy, Japan, United Kingdom and USA.

Data for bank credit to the private sector, credit to the government sector, short-term and long-term interest rate series, the consumer and producer prices indices (CPI, and PPI), real and nominal GDP, industrial production are obtained from the International Financial Statistics of the IMF[9]. If not available from this source, the data are obtained either from the OECD's Main Economic Indicators (MEI) or the WIIW's monthly database. Inflation is computed as a year-on-year rate (P_t/P_{t-4}). Lending rates are based on bank lending rates, and if not available, long-term government bond yields are used instead. 3-month treasury bill rates, and if not available, money market rates are employed for short-term interest rates. The spread is calculated using lending (or, if not available, long-term government bond yields) and deposit rates.

GDP per capita expressed in Purchasing Power Standards (PPS) against the euro and US dollar are drawn from the AMECO database of the European Comission and the World Economic Indicators of the World Bank, respectively. The financial liberalisation index (going from 0 to 20) reported in Abiad and Mody (2003) and used in Cottarelli et al. (2005)) is used for OECD and emerging market economies. They cover the period from 1975 to 1996 and are available for emerging countries and for 9 OECD economies, namely the large OECD countries plus Canada, Australia and New Zealand. For the transition economies, the average of the liberalisation index of the banking sector and that of the financial sector provided by the EBRD are used (rescaled from 1 to 4+ to 1 to 20, which corresponds to the scaling used in Abiad and Mody, 2003). Data for the existence of public and private credit registries are taken from Djankov et al. (2005). They provide data for 1999 and 2003. The series we use can take three values: 0 in the absence of both public and private registry; 1 if either public or private credit registry operates and 2 if both exist. This variable captures basically whether a change between 1999 and 2003 alters the supply of credit during this period. GDP per capita, financial liberalisation index and the registry variable are transformed to quarterly frequency by means of linear interpolation.

Housing prices are not available for emerging countries and for Italy. For transition economies, data could be obtained for the Czech Republic, Estonia, Hungary and Lithuania. The data are mostly obtained from the Macroeconomic Database of the Bank for International Settlements and Datastream. The source of the data are the respective central banks for the Czech Republic, France, Hungary and Lithuania and the national statistical office for Estonia. All data are transformed into logs, except for spread2.

4.3 Estimation Methods

As an introductory step, we undertake a simple cross-sectional analysis based on OLS. This is followed by the panel data analysis. We proceed by first checking

[9] Bank credit to the private sector: lines 22d and 22g; credit to the government: lines 22a, 22b and 22c; interest rates: lines 60b,c,l,p and 61; CPI and PPI: lines 64 and 63; nominal GDP: lines 99b and 99b.c; real GDP: lines 99bvp and 99bvr; industrial production in industry : lines 66, 66..c and 66ey (in manufacturing).

the order of integration of the series. As the series are found to be mostly non-stationary in levels and stationary in first differences, panel cointegration is employed. Besides pooled and fixed effect OLS (OLS and FE_OLS), the coefficients of the long-term relationships are derived on the basis of the mean group of individual dynamic OLS estimates (DOLS) and by relying on the mean group of individual estimates based on the error-correction specification of the ARDL process (MGE) proposed by Pesaran et al. (1999). The dynamic OLS can be written for each member of the panel as follows:

$$Y_{i.t} = \beta_0 + \sum_{i=1}^{n} \beta_n \cdot X_{i,t} + \sum_{i=1}^{n} \sum_{j=-k_1}^{k_2} \gamma_{i,j} \cdot \Delta X_{i,t-j} + \varepsilon_t \tag{10}$$

with k1 and k2 denoting respectively leads and lags for panel member i. The error correction form of the ARDL model is given for panel member i as shown in equation (11) where the dependent variable in first differences is regressed on the lagged values of the dependent and independent variables in levels and first differences:

$$\Delta Y_{i,t} = \beta_0 + \rho(Y_{i,t-1} + \sum_{i=1}^{n} \beta_n X_{i,t-1}) + \sum_{j=1}^{l_1} \eta_j \Delta Y_{i,t-j} + \sum_{i=1}^{n} \sum_{j=0}^{l_2} \gamma_{i,j} \cdot \Delta X_{i,t-j} + \varepsilon_t \tag{11}$$

where l1 and l2 are the maximum lags. The error correction terms obtained from the mean group estimators proposed by Pesaran et al. (1999) are used as tests for cointegration. A negative and statistically significant error correction term is taken as evidence for the presence of cointegration.

5 Results

5.1 A Preliminary Look at Cross-Sectional Data

It seems a worthwhile endeavour to see whether the currently prevailing credit-to-GDP levels in the transition economies analysed in this paper are in line with observed GDP per capita figures. This gives us a first idea on the presence of initial under- or overshooting in the transition economies.

For this purpose, the credit-to-GDP ratio is regressed on relative GDP per capita using three sets of cross-sectional data[10]. We first use the dataset of Djankov et al. (2005), which contains data on bank credit to the private sector in percentage of GDP (average for 1999 to 2003) and GDP per capita expressed in current USD for 2003 for 127 countries. We then use our own dataset which includes GDP per capita in PPS USD for 44 countries and GDP per capita in PPS euro for 35 countries, using averages for the period 2002 to 2004.

[10] GDP per capita is expressed relative to German GDP per capita, and both GDP per capita and credit-to-GDP ratios are expressed in logarithmic terms. The number of countries is lower when GDP per capita in euro is used because those figures are mostly not available for emerging markets (only for OECD Members: Mexico and South Korea).

For the large dataset covering 127 countries, several groups of countries are built which exclude all or some of the transition economies. Also, non-transition economies are grouped into low-, middle- and high-income countries. Finally, cross-sectional regressions are run for all transition economies and then separately for the CIS and for the CEE countries. Regarding our own dataset, groups similar to those used for the panel data analysis are used: developed OECD countries, emerging countries and transition countries.

The results displayed in Table 2 have several interesting features, which turn out to be fairly robust across the three datasets. First, no significant cross-sectional relationship seems to emerge for developed OECD countries and middle-income emerging market economies, irrespective of the dataset used. Second, the relationship between the credit-to-GDP ratio and GDP per capita is found to be very significant both for non-transitional low-income countries and transitional economies. The relationship is also statistically significant when all countries are pooled together. Finally, the coefficient on GDP per capita is higher for transition economies, in particular for countries of Central and Eastern Europe, as compared to the rest of the countries.

Table 2. Cross-sectional bivariate regressions ($C^P = f(CAPITA)$)

	CONSTANT	CAPITA	R2	SIC	AIC	OBS
GDP PER CAPITA IN USD (Djankov et al. (2005) dataset)						
ALL	-0.069	**0.505*** **	0.59	2.17	2.12	127
ALL (no-transition)	0.037	**0.504*** **	0.62	2.14	2.09	105
ALL (no CEE country)	-0.001	**0.516*** **	0.60	2.19	2.14	117
POOR (<1000 USD))	0.431	**0.599*** **	0.16	2.41	2.33	46
MIDDLE (1000USD<X<10000USD)	-0.491	0.270	0.00	2.53	2.43	33
RICH (>10000 USD)	0.024	0.183	0.01	0.52	0.42	26
TRANISITION ALL	-0.291	**0.629*** **	0.57	1.58	1.48	22
CIS	-0.402	**0.586***	0.21	1.95	1.87	12
CEE	0.092	**0.876*** **	0.52	1.24	1.18	10
GDP PER CAPITA IN USD, PPS (dataset of this paper)						
ALL	-0.419*	**0.572** **	0.09	3.22	3.13	44
OECD+EMERGING	-0.371	0.504	0.05	3.50	3.41	33
EMERGING	-0.945	0.182	-0.09	2.26	2.19	11
OECD	-0.349	-0.451	-0.05	3.87	3.77	22
CEE11	-0.435	**0.839** **	0.29	1.00	0.93	11
GDP PER CAPITA IN EUR, PPS (dataset of this paper)						
ALL	-0.387	**0.917** **	0.10	3.39	3.30	35
OECD+EMERGING	-0.378	0.898	0.01	3.81	3.71	24
OECD	-0.300	-0.274	-0.05	3.88	3.78	22
CEE11	-0.521	**0.781***	0.24	1.07	1.00	11

Note: Middle income countries exclude transition economies. R2 is the adjusted R-squared, SIC and AIC stand for the Schwarz and Akaike information criteriaand OBS shows the number of observations used for the respectiveregression. .*,** and *** indicate statistical significance at the 10%, 5% and 1% significance levels, respectively.

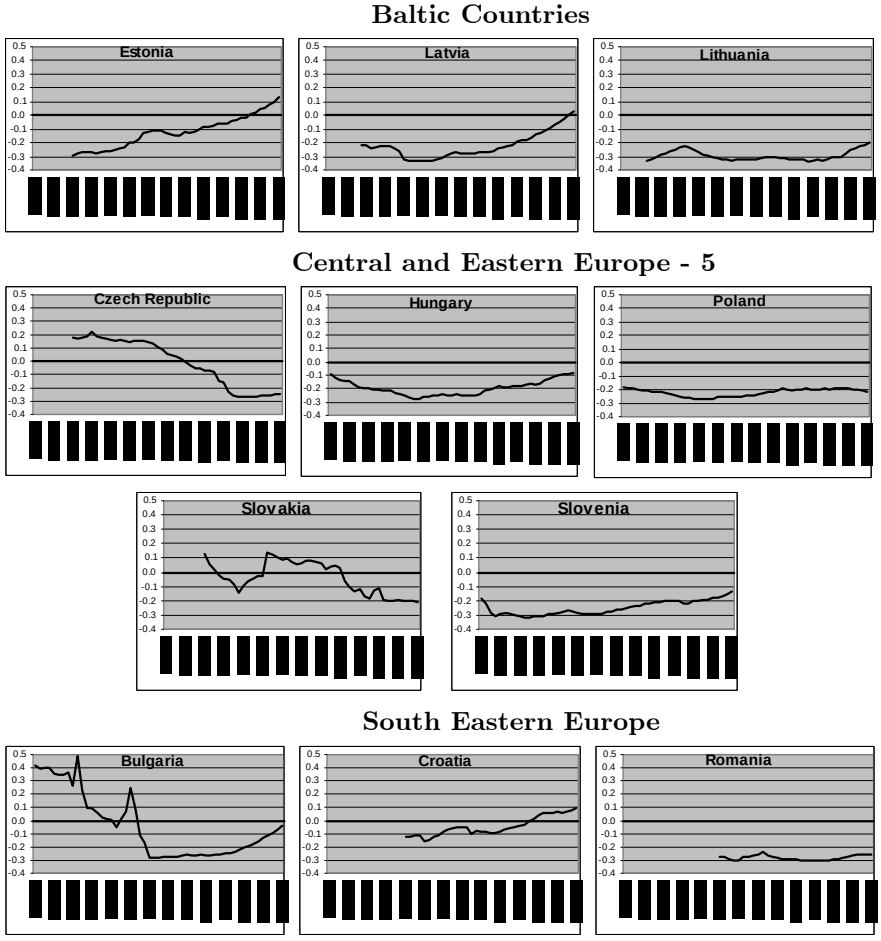
It is rather convenient to use the estimation results reported in Table 2 to derive the deviation of private credit-to-GDP ratios from their equilibrium levels for the period from 1990 to 2004. In order to avoid the bias induced by the process of transition, the results obtained for the large sample excluding all

transition economies (both CEE and CIS countries) are applied to compare the observed and fitted values of the private credit to GDP ratio for the transition economies under study. As plotted in Figure 3, the private credit to GDP ratio reached and even surpassed its equilibrium level in Estonia, Latvia and also in Croatia by 2004, at least according to these cross-sectional estimations. In Hungary, Slovenia and Lithuania, it started to adjust from an initial position below equilibrium towards equilibrium even though equilibrium has not been reached yet.

Bulgaria, the Czech Republic and Slovakia appear to have entered transition with private credit to GDP ratios above equilibrium, but these countries also experienced a rapid undershooting during the mid-1990s. From these three economies, only Bulgaria has recently come close to equilibrium, while the Czech Republic and Slovakia remain fundamentally below equilibrium, at least according to the cross-sectional estimations.

As already noted earlier, an initial under- or overshooting has severe consequences for econometric estimations, if a steady but still longer-lasting adjustment process takes place. This definitely seems to be the case in Estonia, Latvia and Croatia and also perhaps in Hungary and Slovenia. On the other hand, initial undershooting might not be a serious problem for Lithuania, Poland and Romania because the deviation from equilibrium remained pretty stable over the time horizon considered. For Bulgaria, the Czech Republic and Slovakia, the bias may be also less of a concern given that periods of over- and undershooting roughly average each other out and thus no permanent over- or undershooting can be observed. This notwithstanding, given that all sub-panels (CEE-5, B-3 and SEE-3) contain countries displaying a possibly protracted period of undershooting, the in-sample results should be interpreted with a high degree of caution.

Figure 3. Deviations from equilibrium, cross-sectional estimates, 1990-2004



Note: negative values indicate that the observed private credit to GDP ratio is lower than what a particular country's GDP per capita would predict ("undershooting"). Conversely, positive figures show an "overshooting" of the private credit to GDP ratio. Figures refer to differences in percentage points (e.g. 0.5=50%)

5.2 Panel Data Analysis

When it comes to analysing possible long-term relationships between the private credit to GDP ratio on the one hand and the explanatory variables on the other, one first has to ascertain that the variables are cointegrated. As explained earlier, the error correction terms issued from the estimated error correction form of the MGE are used for this purpose. The variables are connected via a cointegrating vector in the event that the error correction term is statistically significant and has a negative sign. According to results shown in Table 3

below, most of the error correction terms fulfil this double criterion. A notable exception is the panel composed of the three Baltic states as there seems to be only one cointegration relationship out of the eight tested equations. For the panel comprising countries from South Eastern Europe, no cointegration could be established for Equation 6.

Table 3 Cointegration – Error Correction Terms, Eq1 to Eq8

	Large OECD	Small OECD	Emerging	CEE11	CEE5	B3	SEE3
Eq1	-0.094***	-0.063***	-0.132***	-0.281***	-0.225***	-0.103	-0.551***
Eq2	-0.088***	-0.052***	-0.135***	-0.174***	-0.188***	-0.052	-0.273***
Eq3	-0.092***	-0.055***	-0.202***	-0.188***	-0.183***	-0.135**	-0.248***
Eq4	-0.097***	-0.069***	-0.189***	-0.226***	-0.136***	-0.049	-0.553***
Eq5	-0.097***	-0.057***	-0.215***	-0.198***	-0.207***	-0.066	-0.315***
Eq6	-0.106***	-0.060***	-0.098***	-0.128***	-0.268***	-0.036	-0.013
Eq7	-0.160***	-0.049**	-0.211***	-0.233***	-0.269***	-0.120	-0.285**
Eq8	NA	-0.003**	NA	-0.227***	-0.231***	-0.033	-0.414**

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

We can now turn to the coefficient estimates, displayed in Table 4 and in the Appendix. GDP per capita enters the long-run relationship with the expected positive sign for the OECD and the emerging markets panels. This result is particularly robust for small OECD and emerging market economies with the size of the coefficient lying usually somewhere between 0.4 and 1.0 for most of the alternative specifications. However, less robustness can be revealed for the transition countries. This holds especially true for the CEE-5, for which GDP per capita turns out to be insignificant both in the baseline and in alternative specifications. Although cointegration could not be firmly established for the Baltic countries, it is worth mentioning that GDP per capita is usually statistically significant for this group as well as for the SEE-3. The fact that the coefficients' size largely exceeds unity reflects the upward bias due to quick adjustment towards equilibrium. The results furthermore indicate that the bias is substantially larger for the Baltic countries than for the SEE-3.

With regard to credit to the public sector, the estimations provide us with some interesting insights as an increase (decrease) in the credit to the public sector is found to cause a decline (rise) in private credit. This result is very robust for emerging market economies and for the CEE-5 as the coefficient estimates are almost always negative and statistically significant across different specifications. This lends support to the crowding-out/-in hypothesis in these countries. Some empirical support for this can be also established for the advanced OECD and for emerging market economies. By contrast, the estimated coefficients are either not significant or have a positive sign for the Baltic countries and for the SEE-3. This finding might mirror in particular the very low public indebtedness of the three Baltic countries.

Let us now take a closer look at the nominal interest rate and at the inflation rate. In accordance with the results shown in Table 4 and in the Appendix, there is reasonably robust empirical support for nominal lending rates being negatively linked to private credit in the CEE-5, and also in emerging markets and small OECD countries. In contrast, the finding for the Baltic states and the SEE-3 is that interest rates mostly have a positive sign, if they turn out to be statistically significant. Note that these results are not really affected whether or not lending rates or short-term interest rates are employed.

For emerging economies from Asia and the Americas, particularly strong negative relationships are detected between the rate of inflation and private credit. Although less stable across different specifications and estimation methods, this negative relationship between inflation and credit is also supported by the data for the CEE-5 and for small OECD economies. By contrast, no systematic pattern could be revealed for the Baltic and South Eastern European countries.

An increase in financial liberalisation, measured by (a decline in) spread and spread2, have the expected positive impact on private credit in small OECD economies and in the CEE-5 and also to some extent in the other transition economies. Although the financial liberalisation index is positively associated with private credit in OECD and emerging economies, it has an unexpected negative sign for all transition economies. An explanation for this may be due to the delay with which financial liberalisation measured by this index is transmitted to private credit, whereas the spread variable captures the effective result of financial liberalisation. The same mismatch between OECD and transition economies can be seen for private and public credit registries. While changes in credit registries produce the expected effect on private credit in OECD countries, the estimation results show the opposite happening in the transition economies.

Table 4. Estimation Results – Baseline Specification

$$C^P = f(\overset{+}{CAPITA}, \overset{-}{C^G}, \overset{-}{i^{lending}}, \overset{-}{p^{PPI}}, \overset{-}{spread})$$

	$CAPITA$	C^G	$i^{lending}$	p^{PPI}	$spread$
Large OECD					
OLS	2.602***	-0.290***	2.986***	5.637***	-0.672***
FE_OLS	0.422***	-0.198***	-0.028	-0.394*	-0.050***
DOLS	0.391***	-0.034***	0.120***	0.241	0.171***
MGE	0.040	0.118	-0.016	-2.611**	0.207*
Small OECD					
OLS	0.256***	-0.007	-0.173***	-2.160***	-0.102***
FE_OLS	0.480***	-0.170***	-0.068***	-0.178	-0.037***
DOLS	0.540***	-0.065***	-0.082	0.678***	-0.143***
MGE	0.643***	0.057	-0.171	-1.272	0.281
Emerging					
OLS	0.362***	-0.212***	0.086***	-0.212**	0.163***
FE_OLS	0.492***	-0.120***	0.136***	-0.263***	0.069**
DOLS	0.715***	-0.064***	0.187***	-0.436***	-0.001
MGE	0.583***	-0.386***	0.454	-0.492***	-1.172
CEE11					
OLS	0.906***	0.222***	-0.019	0.120	0.002
FE_OLS	1.648***	0.053**	0.297***	-0.046	-0.640***
DOLS	0.981***	-0.169***	0.125	-0.105	-0.382***
MGE	2.043	-0.114	-0.027***	-0.263	-0.907**
CEE5					
OLS	0.052	-0.346***	-0.225***	-1.235***	-0.028
FE_OLS	0.169	-0.276***	-0.031	-1.179***	-0.407***
DOLS	0.375***	-0.308***	-0.046	1.062***	-0.109*
MGE	-1.076	-0.222***	-0.057***	1.501	-0.985**
B3					
OLS	1.926***	-0.055	0.136	0.507	-0.505***
FE_OLS	2.554***	0.024	0.369***	0.396*	-0.458***
DOLS	2.227***	-0.121	0.083**	-1.676***	-0.481***
MGE	4.045	0.313	-0.124***	-2.852	-1.466
SEE					
OLS	1.356***	0.775***	-0.002	-0.057	0.076
FE_OLS	2.049***	0.455***	0.218***	-0.102**	-0.366***
DOLS	0.745***	0.013	-0.298	-0.479	-0.737***
MGE	1.654***	0.264	0.120	-0.616**	0.217

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

Because data on housing prices are available only for developed OECD countries and for four transition economies (Czech Republic, Estonia, Hungary and Lithuania), the estimations are performed only for large and small OECD and transition economies. In addition, we constructed a panel including those countries exhibiting large and persistent increases in housing prices over the late 1990s possibly indicating the build-up of a real estate bubble (Canada, Spain, France, United Kingdom and the US). The results are not particularly robust for the small and large OECD economies as the coefficient on housing prices changes sign across different estimation methods. For transition economies, even though the results are somewhat more encouraging as the coefficient is always positively signed if it is found statistically significant, the estimated equations seem to be rather fragile in general.

Now, if we look at the group of countries with large increases in housing prices, it turns out that housing prices are positively correlated in a robust fashion with private credit, and that the other coefficient estimates are also in line with our earlier findings. However, the fact that the inclusion of housing

prices yields robust results only if large increases took place on the property markets might suggest that housing prices mostly matter for private credit in the event of possible housing market bubbles.

Table 5. Estimation Results – Equation 9; Housing prices

		ECT	*CAPITA*	C^G	$i^{lending}$	p^{PPI}	*spread*	$p^{hou\sin g}$
Small OECD	OLS		-0.123***	0.003	-0.323***	-0.655**	-0.143***	0.482***
	FE_OLS		0.611***	-0.166***	-0.098***	-0.125	-0.010	-0.062**
	DOLS		0.286***	-0.064	-0.043	0.086	-0.081	0.399***
	MGE	-0.207***	0.033	0.203***	-0.277**	-0.548	-0.080	0.587***
Large OECD	OLS		3.964***	-0.536***	3.612***	3.942*	-0.461**	-2.046***
	FE_OLS		0.078*	-0.209***	-0.022	-0.855***	0.007	0.290***
	DOLS		0.395***	-0.079***	-0.041*	-0.345	-0.040	-0.161**
	MGE	-0.181***	-0.360	-0.049	-0.097*	-2.397***	0.139	0.544**
OECD with high growth in housing prices	OLS		-0.842***	0.000	-0.113***	-2.081***	0.060	1.269***
	FE_OLS		0.111*	-0.160***	-0.066**	-0.787***	-0.025	0.336***
	DOLS		0.334***	-0.171***	-0.043**	-0.412	0.022	0.040*
	MGE	-0.176***	-0.838	-0.146***	-0.235**	-2.404**	0.432*	0.745**
CEE-4	OLS		2.064***	-0.374***	0.472***	-0.528	-0.223***	0.019
	FE_OLS		0.316	-0.429***	0.032	-0.603***	-0.096	0.541***
	DOLS		0.010***	-0.042***	0.050	-0.563**	0.002	-0.018
	MGE	-0.125***	-0.651	-0.136***	-0.599***	0.080	-0.359	0.561**

Note: ECT is the error correction term. *, ** and *** indicate statistical significance at the 10%, 5% and 1% significance levels, respectively.

5.3 How Close to Equilibrium?

We can now proceed with the calculation of the fitted values from the panel estimations for the transition economies. This exercise makes it possible to see how far the observed private credit to GDP ratio from the estimated long-term values is. We have shown earlier (Figure 3) that most of the transition economies had a large initial undershooting followed by a steady adjustment towards equilibrium. This preliminary finding cautions against the use of in-sample panel estimates as both the estimated long-run coefficients and the constant terms are possibly biased because of the steady adjustment towards equilibrium. But it is not only the upward bias, which prevents us from relying on the in-sample panel estimations. As can be seen in Tables 4 and 5 and in the Appendix, there is no single equation for transition economies with all coefficients being statistically significant and having the expected sign. Because the same applies to the emerging markets panel, we derive the estimated equilibrium private credit to GDP ratios from the OECD panels. In particular, the baseline specification estimated by means of fixed effect OLS appears to be best suited as all coefficients bear the right sign and all but one are statistically significant (marked in blue in Table 4).

When engaging in an out-of-sample exercise, the underlying assumption is that in the long run there is parameter homogeneity between the small developed OECD panel and the transition countries. One might reasonably assume that in the long run (after adjustment towards equilibrium is completed) transition

economies will behave similarly as small OECD countries behave presently. Even though this homogeneity is fulfilled between the two samples, the estimated long-run values of the private credit-to-GDP ratio and the underlying deviation from equilibrium should be interpreted from a long-run perspective.

Given that no country-specific constant terms are available for the transition economies, the next intricate issue is how constant terms should be applied for the derivation of the fitted values[11]. Our safest bet is to use the largest and the smallest constant terms (as well as the median constant term) obtained on the basis of the small OECD panel, which gives us the whole spectrum of possible estimated values for private credit[12].

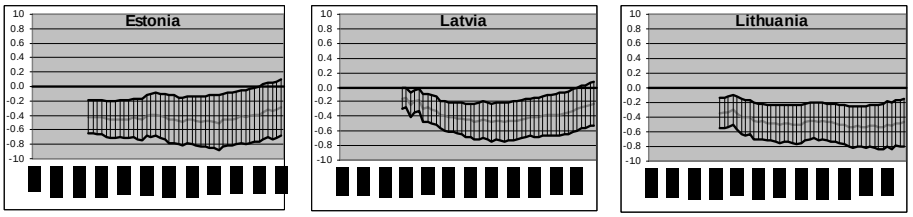
The derived range of deviation is plotted on Figure 3. The dynamics of the results is fairly similar to that obtained using cross-sectional estimates. However, the error margin is rather large. Consequently, if one considers mid-points, Croatia is now the only country which might have reached equilibrium by 2003. When looking at whole ranges, other countries, namely Bulgaria, Estonia, Hungary, Latvia and Slovenia, might have already reached equilibrium as well, while the mass of the estimated deviation is still located mostly on the undershooting side in 2003. At the same time, the upper edges of the estimated band come close to equilibrium for Hungary, Bulgaria, Poland and Slovenia. Moreover, it turns out that the initial overshooting might not have been that large for the Czech Republic and Slovakia, after all. Finally, it is interesting to see that the initial undershooting remains relatively stable for Lithuania and Romania throughout the period.

[11] Note that Cottarelli et al (2005), the only paper which derives the equilibrium level of private credit for transition economies does not address the issue of the constant terms.

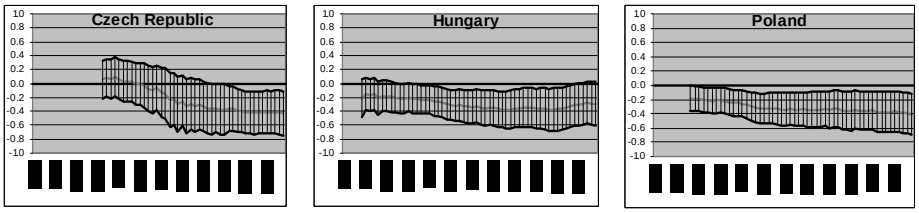
[12] Another reason for selecting the baseline specification is that the variables included are all expressed in levels, which secures that the constant terms derived on this basis have a cross-sectional meaning. For instance, the constants would not have any cross-sectional meaning when indices with a base year would be used (such as for industrial production or housing prices).

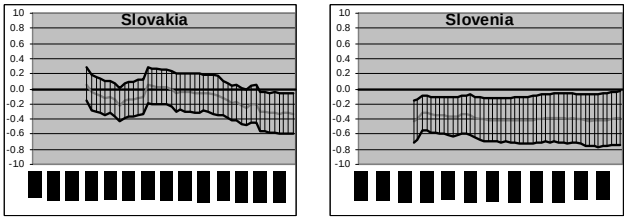
Figure 4. Deviations from equilibrium based on cross-sectional estimates, 1990-2004

Baltic Countries

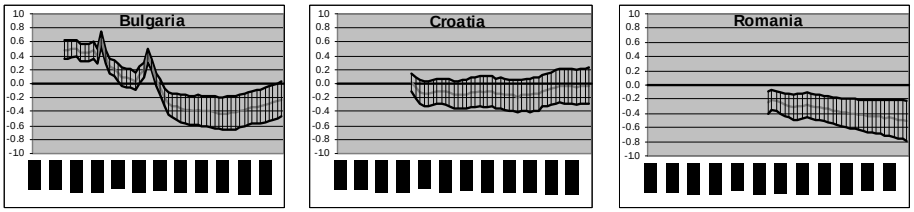


Central and Eastern Europe - 5





South Eastern Europe



Note: negative values indicate that the observed private credit to GDP ratio is lower than what a particular country's GDP per capita would predict ("undervaluation"). Conversely, positive figures show an "overvaluation" of the private credit to GDP ratio.

6 Conclusion

In this paper, we have analysed the equilibrium level of private credit to GDP in 11 transition economies from Central and Eastern Europe on the basis of a number of dynamic panels containing quarterly data for developed OECD economies, emerging markets and transition economies and relying on a unifying framework including both factors capturing the demand for and the supply of private credit.

We have emphasised that relying on in-sample panel estimates for transition

economies is problematic not only because of the possible bias, which shows up in the estimated constants and slope coefficients due to the initial undershooting and the ensuing steady adjustment towards equilibrium, but also because the equations estimated for transition economies are not sufficiently stable. Credit to the public sector (crowding out/in), nominal interest rates, the inflation rate and the spread between lending and deposit rates aimed at capturing financial liberalisation and competition in the banking sector turn out to be the major determinants of credit growth in the CEE-5, while GDP per capita is the only variable entering the estimated equations in a robust manner for the Baltic and South Eastern European countries. The estimated coefficients are much higher than those obtained for OECD and emerging market economies which testifies the bias caused by the initial undershooting of private credit to GDP (in most countries) and the subsequent adjustment towards equilibrium in those countries. Housing prices are found to lead to an increase in private credit only in countries with high housing price inflation. This finding disqualifies this variable from being included in the long-run equation to be used for the derivation of the equilibrium level of private credit.

Our intention to use the emerging markets panel is thwarted by the lack of robustness of the empirical results for emerging economies. This is why we primarily rely on the small OECD panel in the further analysis. The application of this out-of-sample panel to transition economies provides us with a wide corridor of deviations from equilibrium. Overall, while some countries such as Lithuania and Romania have private credit to GDP ratios, which are well below the level that would be justified by fundamentals, others have already come close to equilibrium by 2003. Although the estimated band is mostly on the undershooting side, the rapid adjustment that is observed in Croatia, Estonia, Latvia and possibly Bulgaria might surpass equilibrium and lead to the emergence of (over)shooting instances in the near future.

It has been argued that credit growth will very likely remain fast in Central and Eastern Europe or accelerate further in those countries where it is still comparatively moderate, given that the underlying factors which support private sector credit dynamics will remain at work for some time to come. As experience shows, the rapid pace of credit expansion and its persistence in a number of countries does by itself pose risks of a deterioration of asset quality. Moreover, it exposes lenders and borrowers to risks because of an increase in unhedged foreign currency lending. Furthermore, the rapid adjustment process toward equilibrium levels may trigger demand booms causing current account deficits moving above levels that can be sustained over a longer period of time. However, we leave it to future research to determine empirically the optimal speed of adjustment toward equilibrium that would not jeopardize macroeconomic and financial stability.

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Appendix

Table A1. Estimation Results – Eq2 to Eq5

	ip	C^G	$i^{lending}$	p^{PPI}	$spread$	$gdpr$	C^G	$i^{lending}$	p^{PPI}	$spread$	$capita$	C^G	$i^{short-term}$	p^{PPI}	$spread$	$capita$	C^G	$i^{lending}$	p^{CPI}	$spread$
Large OECD																				
OLS	4.799***	-0.609***	3.367***	-0.444	-0.229	0.089***	-0.733***	3.033***	-4.442**	0.026	2.910***	0.158	0.632***	12.095***	-1.300***	2.372***	-0.309***	3.172***	0.146	-0.661***
FE OLS	0.655***	-0.206***	-0.031	-1.643***	0.013	0.557***	-0.202***	-0.055*	-1.296***	-0.026	0.436***	-0.202***	0.027	-0.520**	0.005	0.362***	-0.201***	0.037	-1.687***	-0.024
DOLS	0.925***	0.018	0.143***	-0.635***	0.120***	0.700***	0.023	0.184***	-0.897***	0.158***	0.412***	-0.002***	0.071***	0.122	0.206**	0.361***	-0.025***	0.177***	-0.681**	0.155***
MGE	0.390	0.130	0.056	-3.480***	0.364**	0.067	0.119	-0.022	-2.406**	0.316*	0.007	0.147	0.097	-2.471**	0.288***	0.044	0.150	0.088	-2.788***	0.198**
Small OECD																				
OLS	0.405***	-0.033***	-0.210***	-2.423***	-0.067***	0.512***	0.037***	-0.107***	-1.111***	-0.051***	0.295***	-0.017*	-0.152***	-1.871***	-0.099***	0.386***	0.000	-0.273***	0.916***	-0.106***
FE OLS	0.767***	-0.115***	-0.089***	-0.888***	-0.134***	1.163***	-0.099***	0.029*	-0.334***	-0.108***	0.501***	-0.177***	-0.054***	-0.173	-0.045***	0.544***	-0.157***	-0.110***	1.181***	-0.039***
DOLS	1.113***	-0.011	0.029**	0.024	0.038**	1.272***	0.036**	0.038***	0.306***	-0.119	0.447***	-0.085***	-0.105***	0.741***	-0.112***	0.636***	-0.002***	-0.149***	1.645***	-0.165***
MGE	2.533***	0.254*	0.024	-2.903*	0.945**	2.111***	0.018	0.101	-1.169	0.458	0.686***	0.045	-0.060	-0.103	0.222	0.756***	0.573*	-0.165	-1.196	-0.592
Emerging economies																				
OLS	0.375***	-0.200***	-0.153***	-0.311**	-0.224***	0.172***	-0.208***	0.059	0.066	0.116**	0.358***	-0.244***	0.038*	0.020	0.217***	0.388***	-0.204***	0.111***	-0.409***	0.137***
FE OLS	0.483***	-0.097***	0.078***	-0.416***	-0.003	0.419***	-0.119***	0.097***	-0.150**	0.019	0.508***	-0.237***	0.004	0.115*	0.112***	0.485***	-0.082***	0.143***	-0.414***	0.065*
DOLS	0.589***	-0.006***	0.077***	-0.503***	-0.201***	0.729***	-0.030***	0.133***	-0.212*	-0.148***	0.621***	-0.049***	-0.089	0.319*	0.023	0.716***	-0.032***	0.041*	-0.327***	-0.018
MGE	0.502***	-0.253***	0.867	-0.333***	-0.555	0.109***	-0.089***	0.885**	-0.908**	-0.986	0.426***	-0.521***	-0.360	-0.852	-1.352	0.813***	-0.034***	0.239	-1.171***	-0.176
CEE11																				
OLS	-0.244**	0.317***	-0.462***	0.072	-0.263***	-0.263	0.209***	-0.535***	-0.512**	-0.221***	1.074***	0.180***	0.145***	0.028	0.213***	0.936***	0.224***	-0.038	0.209**	0.005
FE OLS	0.918***	0.079***	-0.044	0.040	-0.651***	1.972***	-0.200***	0.071	0.129	-0.331***	1.352***	0.090***	0.131***	0.002	-0.618***	1.731***	0.045*	0.295***	-0.033	-0.663***
DOLS	0.857***	-0.151***	0.062	-0.647***	-0.202***	1.957***	0.090	0.212***	-0.182*	-0.155***	0.653***	-0.175***	-0.078	-0.607***	-0.345***	0.976***	-0.067***	0.024	-0.190	-0.264***
MGE	0.228	-0.490	-1.018	-1.013**	-0.949	4.441***	0.320	-0.275	-1.563**	0.687	1.549	-0.065	-0.175***	-1.901***	-0.658**	-3.712	-0.254	-0.995***	-7.518	-1.341*
CEE5																				
OLS	-0.207	-0.338***	-0.266***	-1.694***	-0.059	-0.231	-0.316***	-0.275***	-1.793***	-0.112	0.006	-0.378***	-0.183***	-1.528***	-0.082	0.078	-0.348***	-0.212***	-1.023**	-0.021
FE OLS	-0.105	-0.293***	-0.181***	-1.202***	-0.379***	0.639***	-0.282***	-0.086	-1.018***	-0.472***	0.102	-0.288***	-0.085**	-1.154***	-0.476***	0.210	-0.272***	0.005	-1.095***	-0.412***
DOLS	0.158	-0.347***	-0.050	0.848***	-0.121**	0.980***	-0.109	0.089	1.012***	-0.198***	-0.260	-0.272***	0.040	0.211	-0.057	0.207**	-0.263***	-0.135	0.467**	-0.296***
MGE	-1.088*	-0.467***	-0.830**	1.030	-1.157	0.830	0.065	-0.067***	0.056	-0.587*	0.019	-0.216**	-0.105***	-0.729	-0.619	-5.367*	-0.401***	-0.776***	-12.111	-3.641**
B3																				
OLS	1.063***	-0.256***	-0.493***	1.273***	-0.486***	2.167***	-0.284***	-0.132	1.116***	-0.413***	1.711***	-0.081	0.057	0.382	-0.457***	1.995***	-0.064	0.266**	-0.351	-0.570***
FE OLS	1.589***	-0.004	-0.290***	0.621*	-0.463***	2.771***	0.006	0.128	0.411	-0.376***	2.148***	0.021	0.217***	0.581**	-0.192**	2.611***	0.005	0.479***	-0.385*	-0.523***
DOLS	1.905***	-0.087	0.371***	-3.927***	0.709***	3.169***	-0.076	0.423***	-1.885***	-0.184	2.183***	-0.179	0.002	-1.625***	-0.337	2.018***	0.121	0.160***	-1.375***	-0.011
MGE	1.198	2.772**	-2.259	-3.632***	0.827	12.374**	1.258*	-0.757	-4.716***	-1.985	4.174	0.313	-0.759	-5.160**	-1.178*	-3.755	0.285	-0.344	-7.268	-0.905
SEE																				
OLS	1.192***	0.777***	-0.079	-0.103	0.265***	0.954***	0.426***	-0.403***	-0.397***	0.249***	1.311***	0.794***	-0.051	-0.039	0.008	1.350***	0.781***	-0.011	-0.059	0.066
FE OLS	0.908***	0.096	-0.729	0.166	-1.349***	3.464***	0.129	0.308**	-1.920***	0.159	0.678***	0.009	-0.354	-0.953**	-1.024***	1.217***	0.073	-0.024	0.099	-0.463***
DOLS	0.973***	0.110	-0.682	0.140	-1.347***	3.464***	0.129	0.308**	-1.920***	0.159	0.678***	0.009	-0.354	-0.953**	-1.024***	1.217***	0.073	-0.024	0.099	-0.463***
MGE	2.174**	-0.197	0.091	-1.799	0.722	4.023***	-0.145	0.401	-2.743**	0.231	1.539***	0.264	0.058	-0.654**	-0.204	0.911**	0.548	-0.546	-0.112	0.245

Notes: *,** and *** indicate statistical significance at the 10%, 5% and 1% significance levels, respectively.

Table A2. Estimation Results – Eq6 to Eq9

	capita	C^G	$i^{lending}$	p^{FPI}	*spread 2*	*capita*	C^G	$i^{lending}$	p^{FPI}	*finlib*	*capita*	C^G	$i^{lending}$	p^{FPI}	*spread 2*	*reg*
Large OECD																
OLS	2.550***	-0.384***	3.958***	3.939*	-0.134***	-0.072	-0.680***	4.096***	1.069	2.540***	2.257***	-0.557***	1.774***	8.736***	-1.078***	1.830***
FE OLS	0.408***	-0.207***	0.026	-0.495**	-0.003	0.381***	-0.285***	0.015	0.022	0.111***	0.484***	-0.174***	-0.067***	-0.165	-0.036***	0.236***
DOLS	0.362***	-0.056***	-0.029***	0.391***	-0.004	0.435***	0.012	0.122***	-0.660***	-0.304***	0.180***	-0.006	0.091***	-0.120	0.025	0.042
MGE	0.047	-0.093	-0.097	-2.716***	0.030	0.405	0.041	0.160	-0.583***	0.084	-0.237	0.144	-0.089	-1.365	0.088	-0.064
Small OECD																
OLS	0.347***	0.022**	0.038	-1.959***	-0.061***	0.305***	0.037	0.057	0.212	0.187***	0.413***	-0.104***	-0.053**	-1.043***	-0.030*	0.404***
FE OLS	0.504***	-0.154***	0.004	-0.177	-0.022***	0.483***	-0.088***	-0.131***	0.192	0.223***	0.484***	-0.174***	-0.067***	-0.165	-0.036***	0.236***
DOLS	0.645***	-0.021***	0.052**	0.690***	-0.037***	2.337***	-2.619*	2.274	2.076	4.722	0.091***	0.006	0.024***	0.006	0.008	0.011
MGE	0.902***	0.054	0.017	-1.772	-0.039**	1.077	-0.283	-0.463	-0.638	0.307***	0.038	0.074	0.005	-0.209	0.024	-0.015
Emerging economies																
OLS	0.347***	-0.197***	0.053*	-0.459***	0.002***	0.227***	-0.079***	0.005	-0.114**	0.232***	0.539***	-0.284***	0.284***	-0.318***	0.167***	-0.433***
FE OLS	0.488***	-0.113***	0.114***	-0.319***	0.001**	0.269***	0.069***	-0.035**	0.137***	0.302***	0.733***	-0.177***	0.000***	0.000	0.000	
DOLS	0.386***	-0.071***	0.151***	-0.505***	-0.004	3.081***	-3.117***	2.640	-2.313***	5.679						
MGE	0.901***	-0.470***	-0.063	-0.085*	0.052**	1.084	-1.846	-0.152**	-0.379	0.141**						
CEE11																
OLS	0.951***	0.201***	-0.029	-0.020	0.013***	1.166***	0.199***	-0.172***	0.120	-1.218***	1.113***	0.348***	-0.026	0.037	-0.063	-0.351***
FE OLS	1.875***	0.043	0.614***	-0.011	-0.009***	2.362***	-0.013	0.323***	0.054	-1.529***	1.546***	0.066**	0.285***	-0.044	-0.603***	-0.068*
DOLS	1.321***	-0.123*	0.270***	-0.136	-0.029***	1.446***	-0.137***	0.046	-0.268	-1.446***	0.686*	0.062	0.023	-0.492	-0.296***	-0.043*
MGE	-7.493	4.527	-2.173*	-13.771***	0.474	10.417	-0.769*	-4.388***	-0.170	-1.874**	1.222	0.261	0.051	-1.749***	0.221	-0.286***
CEE5																
OLS	0.020	-0.344***	-0.249***	-1.148***	0.007	0.175**	-0.225***	-0.269***	-1.836***	-1.296***	0.053	-0.345***	-0.224***	-1.234***	-0.027	-0.002
FE OLS	0.232*	-0.335***	0.168***	-1.356***	-0.022***	0.663***	-0.298***	-0.008	-1.412***	-0.985***	0.220*	-0.257***	-0.011	-1.096***	-0.208*	-0.119**
DOLS	0.518***	-0.331***	0.124	1.081***	-0.029***	0.906***	-0.408***	-0.121	0.698	-1.304***	0.253**	-0.068	0.222***	0.104	-0.069	-0.146***
MGE	-1.045	-0.163**	-0.034	0.985	-0.180***	-19.708	-1.645**	-8.252***	2.034	-4.405	0.139	0.015	0.232**	-0.183	0.001**	-0.170***
B3																
OLS	1.865***	-0.309***	-0.060	0.403	0.044***	1.740***	-0.089*	0.340***	1.085***	1.088**	3.168***	0.146**	0.193	0.976***	-0.973***	-0.695***
FE OLS	2.738***	-0.002	0.589***	0.729***	-0.013	2.713***	-0.085*	0.485***	0.694**	-0.013	2.580***	0.012	0.412***	0.619**	-0.394***	0.157
DOLS	2.344***	0.085	0.311***	-1.563***	-0.020	2.002***	0.123	0.135*	-1.924***	-0.041	0.439	0.254**	0.152***	-1.739**	0.017	-0.005***
MGE	27.900	15.375**	-6.492	-47.236**	-1.891	2.828	0.353	-0.735***	-2.427	-0.312***	0.377	0.640*	0.500	-4.486	0.767	-0.565**
SEE																
OLS	1.296***	0.732***	-0.050	-0.170***	0.010***	2.335***	0.683***	-0.153***	0.074	-1.211***	1.298***	0.842***	0.048	-0.065	0.160*	0.325***
FE OLS	1.636***	0.187**	0.472***	-0.736	-0.038***	1.792***	0.053*	0.101	-0.221	-3.087***	1.919	0.182**	0.120***	0.334	-0.828***	-0.269***
DOLS	1.636***	0.187**	0.472***	-0.736	-0.038***	1.792***	0.053*	0.101	-0.221	-3.087***	1.919	0.182**	0.120***	0.334	-0.828***	-0.269***
MGE	1.317	0.952	-1.530	-1.615***	0.146***	2.523**	-0.432	1.600**	-1.588**	-0.160	4.965***	0.470***	1.015***	-0.907***	0.112	-0.577***

Notes: *,** and *** indicate statistical significance at the 10%, 5% and 1% significance levels, respectively.