Credit Growth in Central and Eastern Europe: New (Over)Shooting Stars?

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This paper analyzes the equilibrium level of private credit to GDP in 11 Central and Eastern European countries on the basis of a number of dynamic panels containing quarterly data on Central and Eastern European economies, emerging markets and developed OECD countries. In doing so, we propose a unifying framework which includes factors driving both the demand for and the supply of private credit. We emphasize that relying on in-sample panel (i.e. including only transition countries) estimates for transition economies is problematic not only because of the upward bias of the estimated constant and slope coefficients due to the initial undershooting and the ensuing steady adjustment toward equilibrium, but also because of the instability of the equations estimated for transition economies. The use of out-of-sample (i.e. excluding transition economies) panels suggests that some of the transition economies might have already come close to equilibrium by 2004, whereas others have private credit-to-GDP ratios which are well below the level the fundamentals would justify.

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.[5] Credit growth has been promoted by macroeconomic stabilization, by comprehensive reforms and privatization in the financial sector, by the introduction of market institutions and by legal reforms. Nevertheless, the recent boom in bank lending in Central and Eastern Europe (CEE) 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 of domestic credit to the private sector as a percentage of GDP in 11 CEE countries as well as its equilibrium level.[6] The empirical model we have used for this purpose can be viewed as a unifying framework which includes both demand-side and supply-side variables. We have tested our empirical specifi-

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[5] *See e.g. Cottarelli, Dell'Ariccia and Vladkova-Hollar (2003), Backé and Zumer (2005) and Duenwald, Gueorguiev and Schaechter (2005).*
[6] *Bulgaria, Croatia, the Czech Republic, Estonia, Hungary, Latvia, Lithuania, Poland, Romania, Slovakia and Slovenia.*

cation for a variety of panels composed of (1) developed small and large OECD countries, (2) emerging market economies from Asia and the Americas, and (3) a number of in-sample panels[7] 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 CEE. However, as financial depth in most transition economies remains comparatively low, it might well be that private credit to GDP has still remained 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 toward their equilibrium levels.[8] The use of the OECD and emerging markets 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 stylized facts regarding credit growth in the transition economies. Section 3 deals with initial under- and overshooting of the credit-to-GDP ratio and with its 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 contains some concluding remarks.

2 Some Stylized 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 CEE 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 health of banking sectors have advanced substantially, as standard prudential indicators on capitalization, asset quality, profitability and liquidity show.[9]

Chart 2 gives an overview of the development of credit to the private sector in percent of GDP from the early 1990s to 2004. Several observations can be made on the basis of chart 1. Some countries, namely Estonia, Latvia,

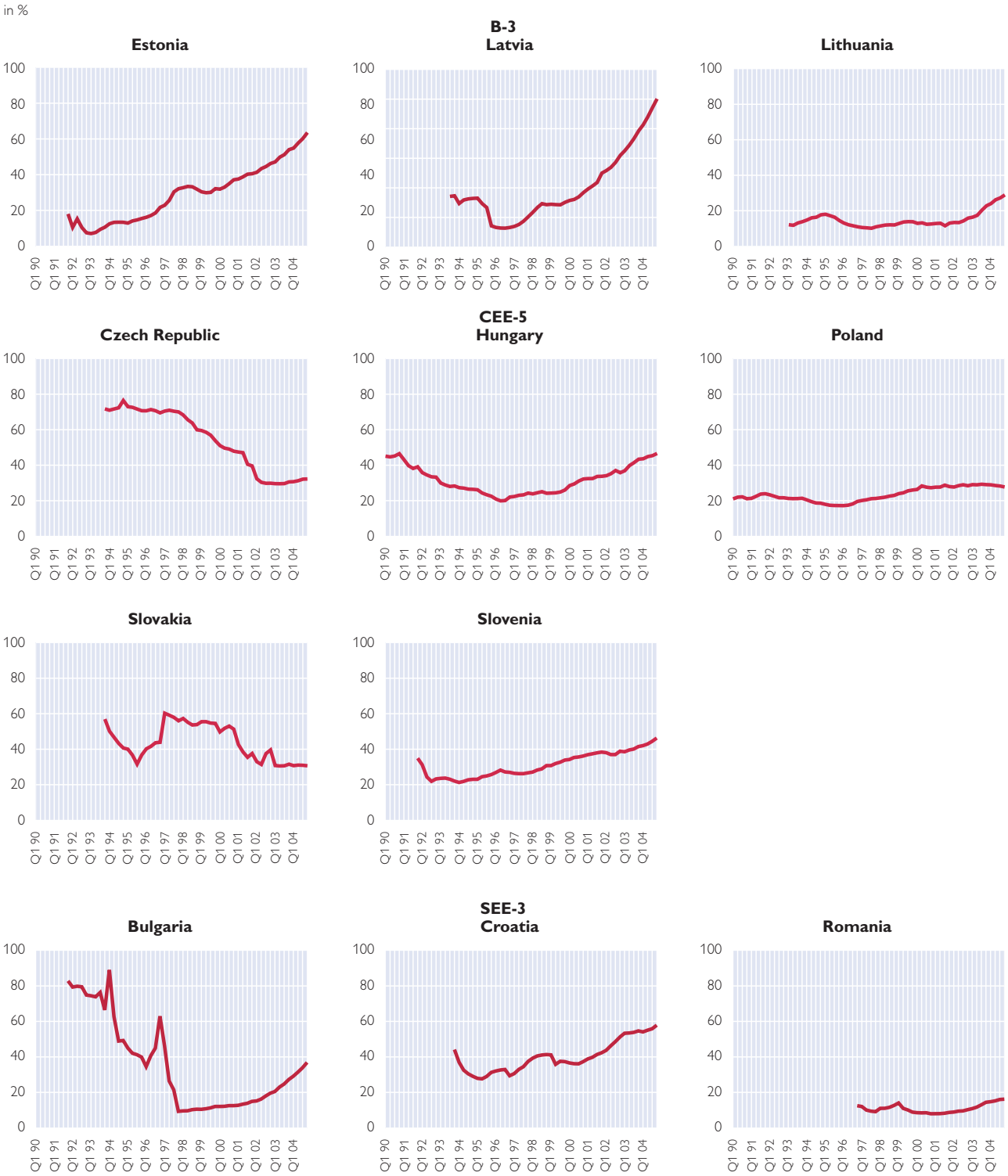
[7] *We use the terms "in-sample" and "out-of-sample" to denote country coverage. In-sample panels include the countries to which the estimation results are applied while out-of-sample panels exclude them.*

[8] *An analogous line of reasoning is applied in the literature on equilibrium exchange rates of CEE countries (Maeso-Fernandez, Osbath and Schnatz, 2005).*

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

Chart 1

Bank Credit to the Private Sector as a Percentage of GDP, 1990 to 2004



Source: Authors' calculations based on data drawn from the IMF's International Financial Statistics. For exact data definitions, see section 4.2.
Note: B-3 covers Estonia, Latvia and Lithuania; CEE-5 covers the Czech Republic, Hungary, Poland, Slovakia and Slovenia; SEE-3 covers Bulgaria, Croatia and Romania.

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 also rose 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 picked up only recently in Lithuania and Romania, and for Poland, only a moderate increase can be observed 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 than the Baltic countries. After dropping considerably to close to 20%, the ratio started to increase, reaching pretransition levels in Hungary and growing to levels 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.[10] The Czech Republic and Slovakia also recorded a substantial contraction (to nearly 30% for both countries), while the ratios seem to have stabilized during the last couple of years.

The differences in initial credit-to-GDP levels can be traced largely 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 mainly been due to banking consolidation measures, by which nonperforming assets were removed from banks' balance sheets. In a few cases, high inflation episodes combined with strongly negative real interest rates also contributed to reducing financial depth temporarily during the transition process (e.g. in Bulgaria from 1996 to 1997).

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 in chart 2 when moving from point A through B to C. 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.[11]

[10] *Note that the peculiar and rather fuzzy pattern of the credit-to-GDP ratio in Bulgaria shown in chart 1 is not due to data problems but, to a considerable extent, is driven by exchange rate movements. The ratio rose sharply in 1994, 1996 and 1997 because of the depreciation of the domestic currency vis-à-vis the U.S. dollar, considering that a significant share of credit was denominated in foreign currency (mainly U.S. dollars). Correction of the credit ratio occurred in the post-crisis period because of the appreciation of the domestic currency and because of the write-off of nonperforming loans.*

[11] *In other words, this approach corresponds to the absolute convergence hypothesis one can find in the growth literature.*

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 justified by the level of economic development (initial overshooting). By contrast, point A'' shows a credit-to-GDP ratio which is lower than predicted by the level of economic development of the given country (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 the credit-to-GDP ratio.[12]

Initial undershooting may be important for transition economies, most of which started economic transformation with lower levels of credit to GDP 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 partly reflect the correction from this initial undershooting to the equilibrium level of the credit-to-GDP ratio. This is shown in chart 2, where the move from A'' to B can be decomposed into (1) equilibrium credit growth, given by A'' to B'', and 2) 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 justified by the equilibrium change and the correction from initial undershooting. The move from A'' to B' on chart 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 toward 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 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.

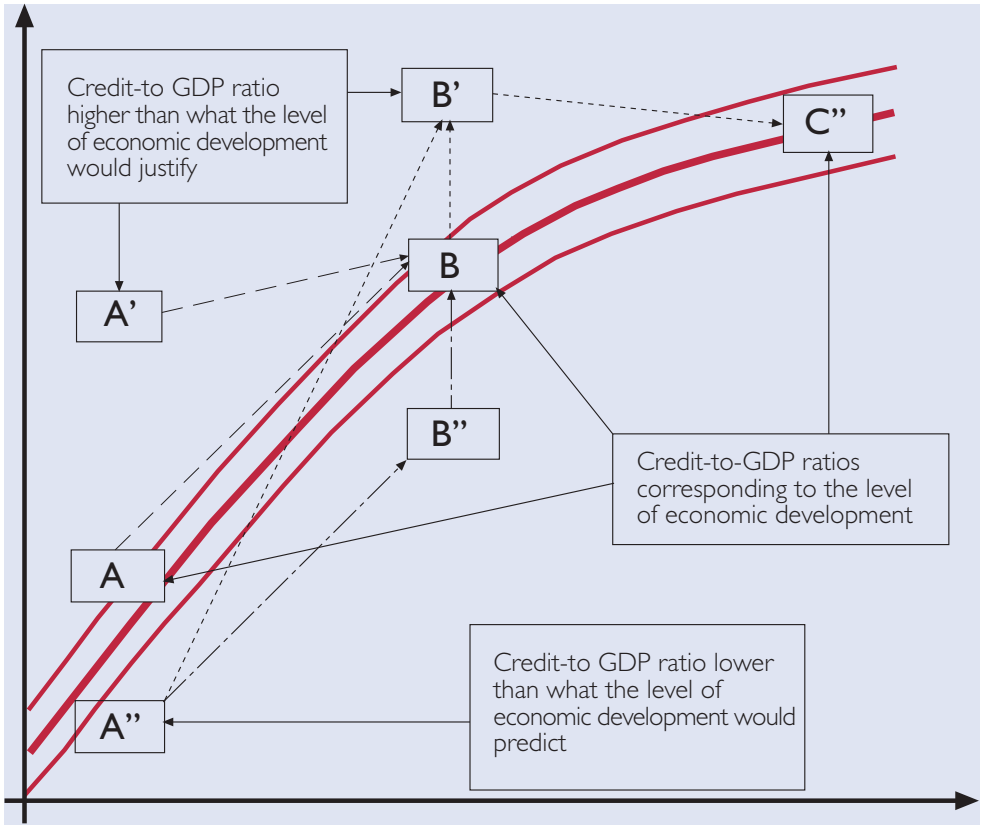
This is the reason why one would be well advised to use panels including countries which do not exhibit an initial under- or overshooting in the credit-to-GDP ratio or to use out-of-sample panels for the analysis of the equilibrium level of the credit-to-GDP ratio of transition economies.

[12] *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 to relate changes in credit to the GDP to avoid this distortion (Arpa, Reininger and Walko, 2005), like we do in this study.*

Chart 2

The Evolution of the Credit-to-GDP Ratio

Bank credit to the private sector (% of GDP)



Fundamentals (GDP per capita etc.)

Source: Authors.

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; Brzoza-Brzezina, 2005). Hofmann (2001) extends this list by housing prices, a very important variable, 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 which drive the demand for credit, but they also consider a number of variables which characterize the supply of credit. These variables describe the degree of financial liberalization, 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 analyzing possible crowding-out (or crowding-in) effects.

Table 1

Overview of Papers Analyzing the Determinants of Credit Growth

Paper	Dependent variable	Explanatory variables
Calza et al. (2001)	Real loans	GDP per capita in PPS, 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)	GDP per capita in PPS, inflation rate, financial liberalization index, accounting standards, entry restrictions to the banking sector, German origin of the legal system, public debt

Source: Authors' calculations.

The economic specification which we estimate for the private credit-to-GDP ratio not only provides a unifying framework for the variables used in previous studies but also extends on them. We consider the following variables capturing both the demand for and the supply of credit from and to the private sector:

– GDP per capita in terms of purchasing power standards (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.
– Bank credit to the government sector in percent 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 crowding out better than public debt as employed in Cottarelli et al. (2005) because public debt also includes loans taken out abroad and because public entities may well finance themselves on security markets. Moreover, public debt is subject to valuation and stock-flow adjustments.
– 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 whether short-term or long-term interest rates play a more important role depends on the respective share of loans with fixed interest rates and variable interest rates. Because the nominal lending interest rates used in the paper show a high correlation with short-term interest rates (three-month treasury bills and money market rates), short-term interest rates are used as a robustness check rather than as an additional variable.
– 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 the producer price index (PPI) and the consumer price index (CPI).
– Housing prices ($p^{housing}$). Increases in housing prices result in a rise in the total amount which has to be spent to purchase a given residential or commercial property. This is subsequently reflected in an increase in demand for credit through which the higher 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 price increases in the real estate market are driven by fundamental factors or whether they 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.

– The degree of liberalization of the financial sector, in particular that of the banking sector. A higher degree of financial liberalization makes it easier for banks to fund credit supply. Because the financial liberalization indices *(finlib)* used in Abiad and Mody (2003) and Cottarelli et al. (2005) only partially match 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 $spread2=i^{lending}-i^{deposit}$) to capture financial liberalization.[13] A decrease in the spread indicates financial liberalization and can also reflect more intensive competition among banks and also between banks and other financial intermediaries. It should be noted that the spread variables could also capture other factors than financial liberalization.[14]
– Public and private credit registries (*reg*). The existence of credit registries diminishes problems related to asymmetric information and the probability of credit fraud. This in turn leads to an increase in the supply of bank credit, all things being equal.[15,16]

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

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

where C^P is bank credit to the private sector expressed as a share of GDP. In addition, it is worthwhile checking whether the robustness of the variables included in equation (1) is affected by the use of alternative measures often used in the literature (e.g. replacing GDP per capita by real GDP growth and real industrial production, or long-term lending rates by short-term lending rates, and the PPI by the CPI). These alternative variables are subsequently

[13] *We use the two additional variants to see whether the results are robust to the alternative definitions of the spread, given that the two spread series sometimes display different profiles for the same country.*
[14] *Note e.g. that the recent decline in the absolute level of spreads may be partly due to record low global interest rates.*
[15] *In contrast to Cottarelli et al. (2005), for econometric reasons, we do not include a variable that captures the tradition of legal systems of countries, which can affect financial development. The mean group estimator (MGE) estimation methods in section 5 do not allow the use of dummy variables that take a value of zero throughout the entire period.*
[16] *We are aware of the fact that the registry variable may not capture how credit contracts are enforced in courts. However, even though an easier seizure of collateral by banks may spark credit to households and small firms, such growth will probably be reflected in a one-off spike in growth rates.*

introduced one by one in the baseline specification, which yields six additional equations.

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

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

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

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

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

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

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

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

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

4.2 Data Sources

Our quarterly dataset covers 43 countries, which are grouped in 3 panels: (1) developed OECD countries, (2) emerging markets from Asia and the Americas,[17] and (3) transition economies from CEE. The OECD panel is further split into 2 subpanels: (1) small OECD countries (excluding transition economies that have joined the OECD),[18] and (2) large OECD countries[19]. The panel of 11 transition economies is also subdivided into 3 presumably more homogeneous groups: (1) the Baltic 3 (B-3): Estonia (EE), Latvia (LV) and Lithuania (LT), (2) the CEE-5: the Czech Republic (CZ), Hungary (HU), Poland (PL), Slovakia (SK) and Slovenia (SI), and (3) the Southeastern European 3 (SEE-3): Bulgaria (BG), Croatia (HR) and Romania (RO).

The sample begins between 1975 and 1980 for the OECD countries, between 1980 and 1993 for the emerging market economies, and between 1990 and 1996 for the transition economies; it ends in 2004.[20] The dataset is

[17] *Argentina (AR), Brazil (BR), Chile (CL), India (IN), Indonesia (ID), Israel (IL), Mexico (MX), Peru (PE), Philippines (PH), South Africa (ZA), South Korea (KR) and Thailand (TH). Although South Korea and Mexico are OECD countries, they can be viewed as catching-up emerging market economies for most of the period investigated in this paper.*

[18] *Austria (AT), Australia (AU), Belgium (BE), Canada (CA), Denmark (DK), Finland (FI), Greece (GR), Ireland (IE), the Netherlands (NL), New Zealand (NZ), Norway (NO), Portugal (PT), Spain (ES) and Sweden (SE).*

[19] *Germany (DE), France (FR), Italy (IT), Japan (JP), United Kingdom (UK) and the United States (US).*

[20] *See appendix A for a detailed description of the time span for variables.*

unbalanced, as the length of the individual data series depends largely on data availability. All data are transformed into logs, except for spread2.

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 price indices (CPI and PPI), real and nominal GDP, and industrial production are obtained from the International Financial Statistics of the IMF accessed via the database of the Austrian Institute for Economic Research (WIFO).[21] For some emerging markets, industrial production data are not available from this source, and hence are obtained from national data sources. Inflation is computed as a year-on-year rate (p_t/p_{t-4}). Lending rates are based on bank lending rates, and wherever not available, long-term government bond yields are used instead. Three-month treasury bill rates, and, wherever not available, money market rates are employed for short-term interest rates. The spread is calculated using lending (or, wherever not available, long-term government bond yields) and deposit rates.

GDP per capita expressed in PPS against the euro and the U.S. dollar is drawn from the AMECO database of the European Commission and the World Economic Indicators of the World Bank, respectively. The data start in 1975 for OECD countries and the emerging markets and in the 1990s for transition economies. The financial liberalization index (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. The data cover the period from 1975 to 1996 and are available for all emerging countries and for nine OECD economies, namely the large OECD countries plus Canada, Australia and New Zealand. For the transition economies, the average of the liberalization index of the banking sector and that of the financial sector provided by the EBRD from 1990 to 2004 are used (rescaled from the range 1 to 4+ to the range 0 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), who provide data for 1999 and 2003. The series we use can take three values: 0 in the absence of both public and private registries, 1 if either public or private credit registries are in operation and 2 if both exist. This variable basically captures whether a change between 1999 and 2003 alters the supply of credit during this period. GDP per capita, the financial liberalization index and the registry variable are transformed to a 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 only for the Czech Republic, Estonia, Hungary and Lithuania. The data for the OECD economies are obtained from the Macroeconomic Database of the Bank for International Settlements (BIS) and Datastream. The source of the data is the respective central bank for the Czech Republic, France, Hungary and Lithuania and the national statistical office for Estonia.

[21] *IFS codes: Bank credit to the private sector: lines 22d and 22g; credit to the government: lines 22a, 22b and 22c; interest rates: lines 60b, 60c, 60l, 60p 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).*

4.3 Estimation Methods

As an introductory step, we undertake a simple cross-sectional analysis based on ordinary least squares (OLS). This is followed by the panel data analysis. We proceed by first checking the order of integration of the series. As the series are found to be mostly nonstationary 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 autoregressive distributed lag (ARDL) process (mean group estimator, MGE) proposed by Pesaran et al. (1999). The dynamic OLS can be written for each member of the panel as follows:

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

with k_1 and k_2 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:

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

where l_1 and l_2 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. In all cases, the lag length is obtained using the Schwarz information criterion.

5. Results

5.1 A Preliminary Look at Cross-Sectional Data

It seems a worthwhile endeavor to see whether the currently prevailing credit-to-GDP levels in the transition economies analyzed in this paper are in line with observed GDP per capita figures. This gives us a first rough 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[22] using three sets of cross-sectional data. We first use the dataset of Djankov et al. (2005), which contains data on bank credit to the private sector in percent of GDP (average for 1999 to 2003) and GDP per capita expressed in current U.S. dollars for 2003 for 127 countries. We then use our own dataset, which includes GDP per capita in U.S. dollar PPS for 44 countries and GDP

[22] *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 the OECD members Mexico and South Korea).*

per capita in euro PPS for 35 countries, using averages for the period 2002 to 2004.

For the large dataset covering 127 countries, several groups of countries which exclude all or some of the transition economies are built. Also, nontransition 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. In our dataset, we use groups similar to those used for the panel data analysis: 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 nontransitional low-income countries and for 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 CEE, than for the rest of the countries.

Table 2

Cross-Sectional Bivariate Regressions

$C^P = f(CAPITA^+)$

	CONS-TANT	CAPITA	R2	SIC	AIC	OBS
	GDP per capita in U.S. dollars (Djankov et al. (2005) dataset)					
All	−0.069	0.505***	0.59	2.17	2.12	127
All (excl. transition economies)	0.037	0.504***	0.62	2.14	2.09	105
All (excl. CEE)	−0.001	0.516***	0.6	2.19	2.14	117
Poor (< USD 1,000)	0.431	0.599***	0.16	2.41	2.33	46
Middle (USD 1,000 < X < USD 10.000)	−0.491	0.27	0	2.53	2.43	33
Rich (>USD 10.000)	0.024	0.183	0.01	0.52	0.42	26
Transition economies 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 is U.S. dollars. PPS (dataset of this paper)					
All	−0.419*	0.572**	0.09	3.22	3.13	44
OECD + emerging economies	−0.371	0.504	0.05	3.5	3.41	33
Emerging economies	−0.945	0.182	−0.09	2.26	2.19	11
OECD	−0.349	−0.451	−0.05	3.87	3.77	22
CEE-11	−0.435	0.839**	0.29	1	0.93	11
	GDP per capita in euro. PPS (dataset of this paper)					
All	−0.387	0.917**	0.1	3.39	3.3	35
OECD + emerging economies	−0.378	0.898	0.01	3.81	3.71	24
OECD	−0.3	−0.274	−0.05	3.88	3.78	22
CEE-11	−0.521	0.781*	0.24	1.07	1	11

Source: Authors' calculations.

*Note: Middle-income countries exclude transition economies. R2 is the adjusted R-squared, SIC and AIC stand for the Schwarz and Akaike information criterion, and OBS shows the number of observations used for the respective regression. *,** and *** indicate statistical significance at the 10%, 5% and 1% significance levels, respectively. The CEE-11 cover Bulgaria, Croatia, the Czech Republic, Estonia, Hungary, Latvia, Lithuania, Poland, Romania, Slovakia and Slovenia.*

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)[23] 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 chart 3, the private credit-to-GDP ratio had 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 has started to adjust from an initial position below equilibrium toward equilibrium, even though it has not reached equilibrium 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. Of 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.

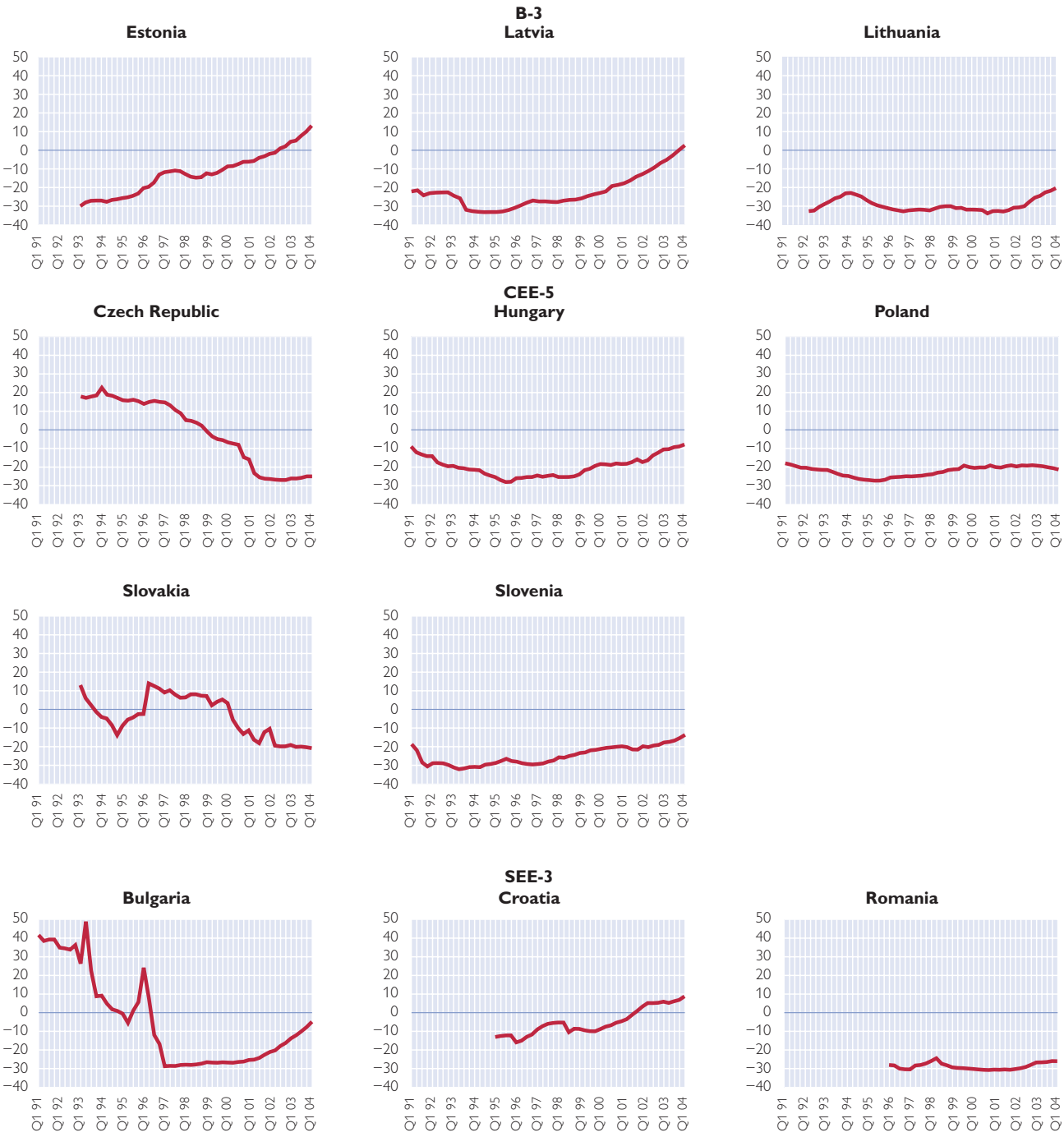
As already noted earlier, an initial under- or overshooting has severe consequences for econometric estimations, if a steady but still longer-lasting adjustment process takes place. This definitely seems to be the case in Estonia, Latvia and Croatia, and also perhaps in Hungary and Slovenia. On the other 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 subpanels (CEE-5, B-3 and SEE-3) contain countries displaying a possibly protracted period of undershooting, results obtained from in-sample panels should be interpreted with a high degree of caution.

[23] *Second equation from above in table 2 (ALL(no-transition)).*

Chart 3

Deviations from Long-Run Equilibrium Credit-to-GDP Ratios Based on Cross-Sectional Estimates, 1990 to 2004

in %



Source: *Authors' calculations.*

Note: B-3 covers Estonia, Latvia and Lithuania; CEE-5 covers the Czech Republic, Hungary, Poland, Slovakia and Slovenia; SEE-3 covers Bulgaria, Croatia and Romania. 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 analyzing 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 make sure 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 fulfill 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 Southeastern Europe, no cointegration could be established for equation 6.

Table 3

Cointegration – Error Correction Terms, Equation 1 to Equation 8

	Large OECD	Small OECD	Emerging economies	CEE-11	CEE-5	B-3	SEE-3
Equation 1	−0.094***	−0.063***	−0.132***	−0.281***	−0.225***	−0.103	−0.551***
Equation 2	−0.088***	−0.052***	−0.135***	−0.174***	−0.188***	−0.052	−0.273***
Equation 3	−0.092***	−0.055***	−0.202***	−0.188***	−0.183***	-0.135**	−0.248***
Equation 4	−0.097***	−0.069***	−0.189***	−0.226***	−0.136***	−0.049	−0.553***
Equation 5	−0.097***	−0.057***	−0.215***	−0.198***	−0.207***	−0.066	−0.315***
Equation 6	−0.106***	−0.060***	−0.098***	−0.128***	−0.268***	−0.036	−0.013
Equation 7	−0.160***	−0.049**	−0.211***	−0.233***	−0.269***	−0.12	−0.285**
Equation 8	−0.98***	−0.003**	−0.134***	−0.227***	−0.231***	−0.033	−0.414**

Source: Authors' calculations.

*Note: *, ** and *** indicate statistical significance at the 10%, 5% and 1% significance levels, respectively. The CEE-11 cover Bulgaria, Croatia, the Czech Republic, Estonia, Hungary, Latvia, Lithuania, Poland, Romania, Slovakia and Slovenia, the CEE-5 the Czech Republic, Hungary Poland, Slovakia and Slovenia, the SEE-3 Bulgaria, Croatia and Romania.*

We can now turn to the coefficient estimates, which are 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 usually lying somewhere between 0.4 and 1.0 for most of the alternative specifications. However, less robustness is found 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 toward 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 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/crowding-in hypothesis in

these countries. Some empirical support for this hypothesis 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 as well as 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 by the use of lending rates or short-term interest rates.

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 Southeastern European countries.

An increase in financial liberalization, measured by (a decline in) spread and spread2, has 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. By contrast, the results for the financial liberalization index are less robust. Although the financial liberalization 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 the delay with which financial liberalization measured by this index is transmitted to private credit, whereas the spread variable captures the effective result of financial liberalization. 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	0.04	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 economies					
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
CEE-11					
OLS	0.906***	0.222***	−0.019	0.12	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**
CEE-5					
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**
B-3					
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-3					
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	0.12	−0.616**	0.217

Source: Authors' calculations.

*Note: *, ** and *** indicate statistical significance at the 10%, 5% and 1% significance levels, respectively. OLS stands for ordinary least squares, FE_OLS for fixed effect OLS, DOLS for dynamic OLS and MGE for mean group estimator. The CEE−11 cover Bulgaria, Croatia, the Czech Republic, Estonia, Hungary, Latvia, Lithuania, Poland, Romania, Slovakia and Slovenia, the CEE−5 the Czech Republic, Hungary, Poland, Slovakia and Slovenia, the SEE−3 Bulgaria, Croatia and Romania.*

Because data on housing prices are available only for developed OECD countries and for four transition economies (the 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 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, the U.K. and the U.S.A.). 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 to be 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 have taken 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	$p^{housing}$
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	−0.01	−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	−0.08	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	−0.04	−0.161**
	MGE	−0.181***	−0.36	−0.049	−0.097*	−2.397***	0.139	0.544**
OECD with high growth in housing prices	OLS		−0.842***	0	−0.113***	−2.081***	0.06	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***	0.05	−0.563**	0.002	−0.018
	MGE	−0.125***	−0.651	−0.136***	−0.599***	0.08	−0.359	0.561**

Source: Authors' calculations.

*Note: ECT is the error correction term. *, ** and *** indicate statistical significance at the 10%, 5% and 1% significance levels, respectively. OLS stands for ordinary least squares, FE_OLS for fixed effect OLS, DOLS for dynamic OLS and MGE for mean group estimator. CEE−4 includes the Czech Republic, Estonia, Hungary and Lithuania.*

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 away the observed private credit-to-GDP ratio is from the estimated long-term value. We showed earlier (chart 3) that most of the transition economies had a large initial undershooting followed by a steady adjustment toward 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 toward equilibrium. But not only the upward bias prevents us from relying on the in-sample panel estimations. As tables 4 and 5 and in the appendix show, there is no single equation for transition economies in which all coefficients are statistically significant and have 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. 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 toward equilibrium is completed) the behavior of transition economies will be similar to the present behavior of small OECD countries. 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 to derive the fitted values.[24] 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.[25]

The derived range of deviation is plotted on chart 4. 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 midpoints, Croatia is now the only country which might have reached equilibrium by 2004. 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 2004. 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, and also perhaps for Poland throughout the period.

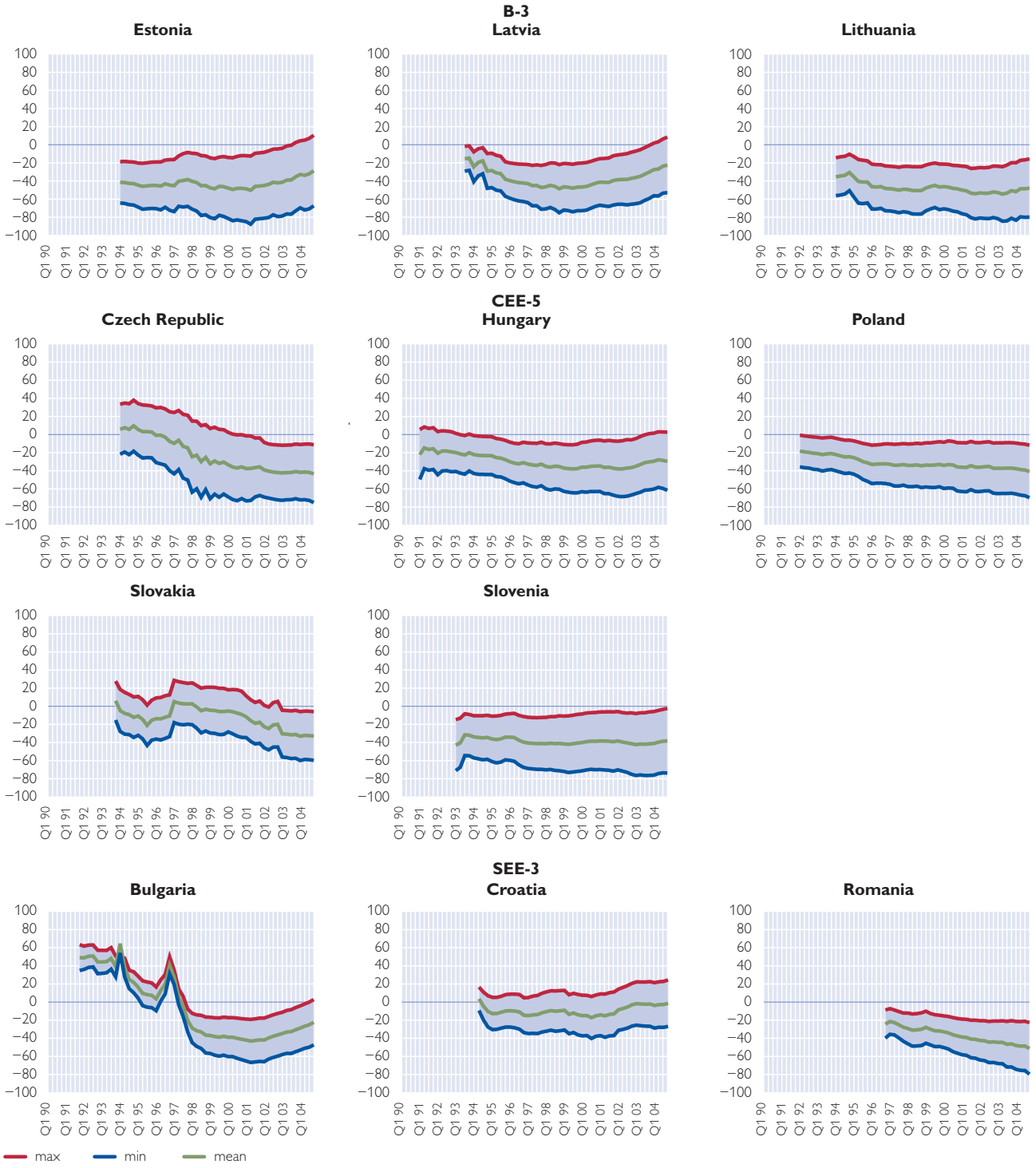
[24] *Note that Cottarelli et al. (2005), the only paper which derives the equilibrium level of private credit for transition economies, does not address the issue of the constant terms.*

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

Chart 4

Deviations from Long-Run Equilibrium Credit-to-GDP Ratios Based on Panel Estimates, 1990 to 2004

in %



Source: *Authors' calculations.*

Note: B-3 covers Estonia, Latvia and Lithuania; CEE-5 covers the Czech Republic, Hungary, Poland, Slovakia and Slovenia; SEE-3 covers Bulgaria, Croatia and Romania. 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 "overvaluation" of the private credit-to-GDP ratio.

6 Conclusion

In this paper, we have analyzed the equilibrium level of private credit to GDP in 11 transition economies from CEE 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 emphasized 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 toward equilibrium, but also because the equations estimated for transition economies are not sufficiently stable. Credit to the public sector (crowding out/crowding in), nominal interest rates, the inflation rate and the spread between lending and deposit rates aimed at capturing financial liberalization 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 Southeastern European countries. The estimated coefficients are much higher than those obtained for OECD and emerging market economies, which testifies to the bias caused by the initial undershooting of private credit to GDP (in most countries) and the subsequent adjustment toward 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 the housing price 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 the fundamentals would justify, others had already come close to equilibrium by 2004. 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 CEE 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 the risk 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 to move 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 does not jeopardize macroeconomic and financial stability.

7 References

Abiad, A. and A. Mody. 2003. Financial reform: What shakes it? What shapes it? IMF Working Paper 70.

Arpa, M., T. Reininger and Z. Walko. 2005. Can Banking Intermediation in the Central and Eastern European Countries ever Catch up with the Euro Area? In: Focus on European Economic Integration 2/05. Vienna: Oesterreichische Nationalbank. 110–133.

Backé, P. 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. In: Focus on European Economic Integration 2/05. Vienna: Oesterreichische Nationalbank. 83–109.

Barisitz, S. 2005. Banking in Central and Eastern Europe since the Turn of the Millennium – An Overview of Structural Modernization in Ten Countries. In: Focus on European Economic Integration 2/05. Vienna: Oesterreichische Nationalbank. 58–82.

Brzoza-Brzezina, M. 2005. Lending booms in Europe's periphery: South-Western lessons for Central-Eastern members. ECB Working Paper 543.

Calza, A., C. Gartner and J. Sousa. 2001. Modelling the demand for loans to the private sector in the euro area. ECB Working Paper 55.

Calza, A., M. Manrique and J. Sousa. 2003. Aggregate loans to the euro area private sector. ECB Working Paper 202.

Cottarelli, C., 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 and Finance 29. 83–104.

Djankov, S., C. McLiesh and A. Schleifer. 2005. Private credit in 129 countries. NBER Working Paper 11078.

Duenwald, C., 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 128.

European Central Bank. 2005. Banking structures in the new EU Member States. January. Frankfurt/Main.

European Bank for Reconstruction and Development. 2004. Transition Report. London.

Hofmann, B. 2001. The determinants of private sector credit in industrialised countries: Do property prices matter? BIS Working Paper 108.

Kiss, G. and G. Vadas. 2005. The role of the housing market in monetary transmission. National Bank of Hungary Background Study 3.

Maeso-Fernandez, F., C. Osbat and B. Schnatz. 2005. Pitfalls in estimating equilibrium exchange rates for transition economies. Economic Systems. 29(2). 130–143.

Pesaran, M. H., Shin, Y. and R. Smith. 1999. Pooled mean group estimation of dynamic heterogeneous panels. Journal of the American Statistical Association. 94. 621–634.

8. Appendix

8.1 Data Appendix

Starting dates (the series end in 2004:Q4 unless indicated otherwise)
Private credit (the same applies to public credit unless indicated otherwise in parentheses):
OECD: 1975:Q1 to 2004:Q4.
Emerging markets: 1975:Q1 to 2004:Q4 except for AR: 1982:Q3 (1983:Q3); BR: 1988:Q3 (1989:Q3); ID: 1980:Q3; PE: 1984:Q1 (1985:Q1).
Transition economies: HU, PL: 1990:Q4; BG, EE, SI: 1991:Q4; LT: 1993:Q1; LV: 1993:Q3; CZ, SK: 1993:Q4; HR: 1993:Q4 (1994:Q2); EE: 1991; RO: 1996:Q4.

Spread:

OECD: 1975:Q1 except for DE: 1977:Q3; NO: 1979:Q1; IE: 1979:Q3; FI, NL: 1981:Q1; NZ: 1981:Q4; ES: 1982:Q1; IT: 1982:Q3.
Emerging markets: ID, KR, PH: 1975:Q1; CL, TH: 1977:Q1; ZA: 1977:Q4; IN, MX: 1978:Q1; IL: 1983:Q1; PE: 1988:Q1; AR: 1993:Q2; BR: 1997:Q1.
Transition economies: HU, PL: 1990:Q1; BG: 1991:Q1; SI: 1991:Q4; HR: 1992: Q1; CZ, LT, SK: 1993:Q1; EE: 1993:Q2; LV: 1993:Q3; RO: 1995:Q4.

PPI (in parentheses CPI and industrial production (IP) if time span different):

OECD: 1975:Q1 except for PPI in NO, NZ: 1977:Q1; BE: 1980:Q1; IT: 1981: Q1.
Emerging markets: 1975:Q1 except for AR: 1987:Q1 (1994:Q1; not available); BR: 1992:Q1 (1992:Q1, 1991:Q1); CL: 1976:Q1 (1976:Q1, 1975:Q1); ID: IP:1976:Q1; IL: IP not available; KR IP: 1980:Q1; PE: 1980:Q1 (1980:Q1, 1979:Q1); PH: 1993:Q1 (1975:Q1, 1981:Q1).
Transition economies: BG: 1991:Q1; CZ: 1993:Q1; HR: 1993:Q1; EE: 1993:Q1 (1992:Q1, 1993:Q1); HU: 1990:Q1; LV: 1994: Q1 (1992:Q1, 1993:Q1); LT: 1993:Q1; PL: 1991:Q1; RO: 1992:Q1; SK: 1991:Q1 (1993:Q1, 1990:Q1); SI: 1992:Q1.

Real GDP:

OECD: 1975:Q1 except for BE: 1980:Q1; DK, PT: 1977:Q1; NZ: 1982: Q2.
Emerging markets: IN, IL, KR: 1975:Q1; CL, MX: 1980:Q1; PE: 1979:Q1; PH: 1981:Q1; BR: 1990:Q1; AR, ID, TH: 1993:Q1.
Transition economies: SI: 1992:Q1; HR, EE, LV, LT, RO, SK: 1993:Q1; CZ: 1994:Q1, HU, PL: 1995:Q1; data for IN and RO are linearly interpolated from annual to quarterly frequency.
All series stop in 2004:Q4.

GDP per capita in PPS:

Data based on the euro for *transition economies:* CZ, PL, RO: 1990; BG, HU, SI: 1991; LV, LT: 1992; EE, SK: 1993; HR: 1995.
Data based on the U.S. dollar for *transition economies:* HR, HU, PL, RO: 1990; BG, EE, LV, LT, SK, SI: 1991; CZ: 1992.

Housing prices:
OECD: The starting date of the series is as follows: DK, DE, NL, UK, US: 1975:Q1; JP: 1977:Q1; ZA: 1980:Q1; FR: 1980:Q4; CA: 1981:Q1; FI: 1983: Q1; SE: 1986:Q1; AU: 1986:Q2; ES: 1987:Q1, AT: 1987:Q2; PT: 1988:Q1; NZ: 1989:Q4; IE: 1990:Q1; BE, NO: 1991:Q4; GR: 1994:Q1. The series stop in 2004:Q4.
Transition economies: CZ: 1999:Q1 to 2004:Q4; EE: 1994:Q2 to 2004:Q4; HU: 1991:Q1 to 2004:Q4; LT: 2000:Q1 to 2004:Q4.

8.2 Estimation Results

Table A1

Estimation Results – Equation 2 and 3

	ip	C^G	$i^{lending}$	p^{PPI}	spread	gdpr	C^G	$i^{lending}$	p^{PPI}	spread
Large OECD										
OLS	4.799***	−0.609***	3.367***	−0.444	−0.229	0.089***	−0.733***	3.033***	−4.442**	0.026
FE_OLS	0.655***	−0.206***	−0.031	−1.643***	0.013	0.557***	−0.202***	−0.055*	−1.296***	−0.026
DOLS	0.925***	0.018	0.143***	−0.635***	0.120***	0.700***	0.023	0.184***	−0.897***	0.158***
MGE	0.39	0.13	0.056	−3.480***	0.364**	0.067	0.119	−0.022	−2.406**	0.316*
Small OECD										
OLS	0.405***	−0.033***	−0.210***	−2.423***	−0.067***	0.512***	0.037***	−0.107***	−1.111***	−0.051***
FE_OLS	0.767***	−0.115***	−0.089***	−0.888***	−0.134***	1.163***	−0.099***	0.029*	−0.334***	−0.108***
DOLS	1.113***	−0.011	0.029**	0.024	0.038**	1.272***	0.036**	0.038***	0.306***	−0.119
MGE	2.533***	0.254*	0.024	−2.903*	0.945**	2.111***	0.018	0.101	−1.169	0.458
Emerging economies										
OLS	0.375***	−0.200***	−0.153***	−0.311**	−0.224***	0.172***	−0.208***	0.059	0.066	0.116**
FE_OLS	0.483***	−0.097***	0.078***	−0.416***	−0.003	0.419***	−0.119***	0.097***	−0.150**	0.019
DOLS	0.589***	−0.006***	0.077***	−0.503***	−0.201***	0.729***	−0.030***	0.133***	−0.212*	−0.148***
MGE	0.502***	−0.253***	0.867	−0.333***	−0.555	0.109***	−0.089***	0.885**	−0.908**	−0.986
CEE-11										
OLS	−0.244**	0.317***	−0.462***	0.072	−0.263***	−0.263	0.209***	−0.535***	−0.512**	−0.221***
FE_OLS	0.918***	0.079**	−0.044	0.04	−0.651***	1.972***	−0.200***	0.071	0.129	−0.331***
DOLS	0.857***	−0.151***	0.062	−0.647***	−0.202***	1.957***	0.09	0.212***	−0.182*	−0.155***
MGE	0.228	−0.49	−1.018	−1.013**	−0.949	4.441***	0.32	−0.275	−1.563**	0.687
CEE-5										
OLS	−0.207	−0.338***	−0.266***	−1.694***	−0.059	−0.231	−0.316***	−0.275***	−1.793***	−0.112
FE_OLS	−0.105	−0.293***	−0.181***	−1.202***	−0.379***	0.639***	−0.282***	−0.086	−1.018***	−0.472***
DOLS	0.158	−0.347***	−0.05	0.848***	−0.121**	0.980***	−0.109	0.089	1.012***	−0.198***
MGE	−1.088*	−0.467***	−0.830**	1.030	−1.157	0.83	0.065	−0.067***	0.056	−0.587*
B-3										
OLS	1.063***	−0.256***	−0.493***	1.273***	−0.486***	2.167***	−0.284***	−0.132	1.116***	−0.413***
FE_OLS	1.589***	−0.004	−0.290***	0.621*	−0.463***	2.771***	0.006	0.128	0.411	−0.376***
DOLS	1.905***	−0.087	0.371***	−3.927***	0.709***	3.169***	−0.076	0.423***	−1.885***	−0.184
MGE	1.198	2.772**	−2.259	−3.632***	0.827	12.374**	1.258*	−0.757	−4.716***	−1.985
SEE-3										
OLS	1.192***	0.777***	−0.079	−0.103	0.265***	0.954***	0.426***	−0.403***	−0.397***	0.249***
FE_OLS	0.908***	0.096	−0.729	0.166	−1.349***	3.464***	0.129	0.308**	−1.920***	0.159
DOLS	0.973***	0.11	−0.682	0.14	−1.247***	3.464***	0.129	0.308**	−1.920***	0.159
MGE	2.174**	−0.197	0.091	−1.799	0.722	4.023***	−0.145	0.431	−2.743**	0.231

Source: Authors' calculations.

*Note: *, ** and *** indicate statistical significance at the 10%, 5% and 1% significance levels, respectively. OLS stands for ordinary least squares, FE_OLS for fixed effect OLS, DOLS for dynamic OLS and MGE for mean group estimator. The CEE-11 cover Bulgaria, Croatia, the Czech Republic, Estonia, Hungary, Latvia, Lithuania, Poland, Romania, Slovakia and Slovenia, the CEE-5 the Czech Republic, Hungary, Poland, Slovakia and Slovenia, the SEE-3 Bulgaria, Croatia and Romania.*

Table A1 – cont.

Estimation Results – Equation 4 and 5

	capita	C^G	$i^{short-term}$	p^{PPI}	spread	capita	C^G	$i^{lending}$	p^{CPI}	spread
Large OECD										
OLS	2.910***	0.158	0.632***	12.095***	−1.300***	2.372***	−0.309***	3.172***	0.146	−0.661***
FE_OLS	0.426***	−0.202***	0.027	−0.520**	0.005	0.362***	−0.201***	0.037	−1.687***	−0.024
DOLS	0.412***	−0.002***	0.071***	0.122	0.206**	0.361***	−0.025***	0.177***	−0.681**	0.155***
MGE	0.007	0.147	0.097	−2.471**	0.288***	0.044	0.15	0.088	−2.788***	0.198**
Small OECD										
OLS	0.295***	−0.017*	−0.152***	−1.871***	−0.099***	0.386***	0	−0.273***	0.916***	−0.106***
FE_OLS	0.501***	−0.177***	−0.054***	−0.173	−0.045***	0.544***	−0.157***	−0.110***	1.181***	−0.039***
DOLS	0.447***	−0.085***	−0.105***	0.741***	−0.112***	0.626***	−0.002***	−0.149***	1.645***	−0.165***
MGE	0.686***	0.045	−0.06	−0.103	0.222	0.756***	0.573*	−0.165	−1.196	−0.592
Emerging economies										
OLS	0.358***	−0.244***	0.038*	0.02	0.217***	0.388***	−0.204***	0.111***	−0.409***	0.137***
FE_OLS	0.508***	−0.237***	0.004	0.115*	0.112***	0.485***	−0.082***	0.143***	−0.414***	0.065*
DOLS	0.621***	−0.049***	−0.089	0.319*	0.023	0.716***	−0.032***	0.041*	−0.327***	−0.018
MGE	0.426***	−0.521***	−0.36	−0.852	−1.352	0.813***	−0.034***	0.239	−1.171***	−0.176
CEE-11										
OLS	1.074***	0.180***	0.145***	0.028	0.213***	0.936***	0.224***	−0.038	0.209**	0.005
FE_OLS	1.352***	0.090***	0.131***	0.002	−0.618***	1.731***	0.045*	0.295***	−0.033	−0.663***
DOLS	0.653***	−0.175***	−0.078	−0.607***	−0.345***	0.976***	−0.067***	0.024	−0.19	−0.264***
MGE	1.549	−0.065	−0.175***	−1.901***	−0.658**	−3.712	−0.254	−0.595***	−7.518	−1.341*
CEE-5										
OLS	0.006	−0.378***	−0.183***	−1.528***	−0.082	0.078	−0.348***	−0.212***	−1.023**	−0.021
FE_OLS	0.102	−0.288***	−0.085**	−1.154***	−0.476***	0.21	−0.272***	0.005	−1.095***	−0.412***
DOLS	−0.28	−0.272***	0.04	0.211	−0.057	0.207**	−0.263***	−0.135	0.467**	−0.296***
MGE	0.019	−0.216**	−0.105***	−0.729	−0.619	−5.367*	−0.401***	−0.776***	−12.111	−3.641**
B-3										
OLS	1.711***	−0.081	0.057	0.382	−0.457***	1.995***	−0.064	0.266**	−0.351	−0.570***
FE_OLS	2.148***	0.021	0.217***	0.581**	−0.192**	2.611***	0.005	0.479***	−0.385*	−0.522***
DOLS	2.183***	−0.179	0.002	−1.625***	−0.337	2.018***	0.121	0.160***	−1.375***	−0.011
MGE	4.174	0.313	−0.759	−5.100**	−1.178*	−3.755	0.285	−0.344	−7.268	−0.905
SEE-3										
OLS	1.311***	0.794***	−0.051	−0.039	0.008	1.350***	0.781***	−0.011	−0.059	0.066
FE_OLS	0.678***	0.009	−0.354	−0.953**	−1.024***	1.217***	0.073	−0.024	0.099	−0.463***
DOLS	0.678***	0.009	−0.354	−0.953**	−1.024***	1.217***	0.073	−0.024	0.099	−0.463***
MGE	1.539***	0.284	0.058	−0.654**	−0.204	0.911**	0.548	−0.546	−0.112	0.245

Source: Authors' calculations.

*Note: *, ** and *** indicate statistical significance at the 10%, 5% and 1% significance levels, respectively. OLS stands for ordinary least squares, FE_OLS for fixed effect OLS, DOLS for dynamic OLS and MGE for mean group estimator. The CEE-11 cover Bulgaria, Croatia, the Czech Republic, Estonia, Hungary, Latvia, Lithuania, Poland, Romania, Slovakia and Slovenia, the CEE-5 the Czech Republic, Hungary, Poland, Slovakia and Slovenia, the SEE-3 Bulgaria, Croatia and Romania.*

Table A2

Estimation Results – Equation 6 and 7

	capita	C^G	$i^{lending}$	p^{PPI}	spread 2	capita	C^G	$i^{lending}$	p^{PPI}	finlib
Large OECD										
OLS	2.550***	−0.384***	3.958***	3.939*	−0.134***	−0.072	−0.680***	4.096***	1.069	2.549***
FE_OLS	0.408***	−0.207***	0.026	−0.495**	−0.003	0.381***	−0.285***	0.015	0.022	0.111***
DOLS	0.362***	−0.056***	−0.029***	0.391***	−0.004	0.435***	0.012	0.122***	−0.660***	−0.304***
MGE	0.047	−0.093	−0.097	−2.716***	0.03	0.405	0.041	0.16	−0.583***	0.084
Small OECD										
OLS	0.347***	0.022**	0.038	−1.959***	−0.061***	0.305***	0.037	0.057	0.212	0.187***
FE_OLS	0.504***	−0.154***	0.004	−0.177	−0.022***	0.483***	−0.088***	−0.131***	0.192	0.223***
DOLS	0.645***	−0.021***	0.052**	0.690***	−0.037***	2.337***	−2.619*	2.274	2.076	4.722
MGE	0.592***	0.054	0.017	−1.772	−0.039**	1.077	−0.283	−0.463	−0.638	0.307***
Emerging economies										
OLS	0.347***	−0.197***	0.053*	−0.459***	0.002***	0.227***	−0.079***	0.005	−0.114**	0.232***
FE_OLS	0.488***	−0.113***	0.114***	−0.319***	0.001**	0.269***	0.069***	−0.035**	0.137***	0.302***
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**
CEE-11										
OLS	0.951***	0.201***	−0.029	−0.02	0.013***	1.166***	0.199***	−0.172***	0.12	−1.218***
FE_OLS	1.875***	0.043	0.614***	−0.011	−0.009***	2.362***	−0.013	0.323***	0.054	−1.529***
DOLS	1.321***	−0.123*	0.270***	−0.136	−0.029***	1.446***	−0.137***	0.046	−0.268	−1.446***
MGE	−7.493	4.527	−2.173*	−13.771***	0.474	10.417	−0.769*	−4.388***	−0.17	−1.874**
CEE-5										
OLS	0.02	−0.344***	−0.249***	−1.148***	0.007	0.175**	−0.225***	−0.269***	−1.836***	−1.296***
FE_OLS	0.232*	−0.335***	0.168***	−1.356***	−0.022***	0.663***	−0.298***	−0.008	−1.412***	−0.985***
DOLS	0.518***	−0.331***	0.124	1.081***	−0.029***	0.906***	−0.408***	−0.121	0.698	−1.304***
MGE	−1.045	−0.163**	−0.034	0.985	−0.180***	−19.708	−1.645**	−8.252***	2.034	−4.405
B-3										
OLS	1.865***	−0.309***	−0.06	0.403	0.044***	1.740***	−0.089*	0.349***	1.085***	1.088**
FE_OLS	2.738***	−0.002	0.589***	0.729***	−0.013	2.713***	−0.085*	0.485***	0.694**	−0.013
DOLS	2.344***	0.085	0.311***	−1.563***	−0.02	2.002***	0.123	0.135*	−1.924***	−0.041
MGE	27.900	15.375**	−6.492	−47.236***	−1.891	2.828	0.353	−0.735***	−2.427	−0.312***
SEE-3										
OLS	1.296***	0.732***	−0.05	−0.170***	0.010***	2.335***	0.683***	−0.153***	0.074	−1.211***
FE_OLS	1.636***	0.187**	0.472***	−0.736	−0.038***	1.792***	0.053*	0.101	−0.221	−3.087***
DOLS	1.636***	0.187**	0.472***	−0.736	−0.038***	1.792***	0.053*	0.101	−0.221	−3.087***
MGE	1.317	0.952	−1.530	−1.615***	0.146***	2.523**	−0.432	1.600**	−1.588**	−0.16

Source: Authors' calculations.

*Note: *, ** and *** indicate statistical significance at the 10%, 5% and 1% significance levels, respectively. OLS stands for ordinary least squares, FE_OLS for fixed effect OLS, DOLS for dynamic OLS and MGE for mean group estimator. The CEE-11 cover Bulgaria, Croatia, the Czech Republic, Estonia, Hungary, Latvia, Lithuania, Poland, Romania, Slovakia and Slovenia, the CEE-5 the Czech Republic, Hungary, Poland, Slovakia and Slovenia, the SEE-3 Bulgaria, Croatia and Romania.*

Table A2 – cont.

Estimation Results – Equation 8

	capita	C^G	$i^{lending}$	p^{PPI}	spread 2	reg
Large OECD						
OLS	2.257***	−0.557***	1.774***	8.736***	−1.078***	1.830***
FE_OLS	0.484***	−0.174***	−0.067***	−0.165	−0.036***	0.236***
DOLS	0.180***	−0.006	0.059***	−0.12	0.025	0.042
MGE	−0.237	0.144	−0.089	−1.365	0.088	−0.064
Small OECD						
OLS	0.413***	−0.104***	−0.053**	−1.043***	−0.030*	0.404***
FE_OLS	0.484***	−0.174***	−0.067***	−0.165	−0.036***	0.236***
DOLS	0.059***	0.006	0.024***	0.006	0.008	0.011
MGE	0.038	0.074	0.005	−0.209	0.024	−0.015
Emerging economies						
OLS	0.539***	−0.284***	0.284***	−0.318***	0.167***	−0.433***
FE_OLS	0.733***	−0.177***	0.000***	0	0	
DOLS						
MGE						
CEE-11						
OLS	1.113***	0.348***	−0.026	0.037	−0.063	−0.351***
FE_OLS	1.546***	0.066**	0.285***	−0.044	−0.603***	−0.068*
DOLS	0.686*	0.062	0.023	−0.492	−0.296***	−0.043*
MGE	1.222	0.261	0.051	−1.749***	0.221	−0.286***
CEE-5						
OLS	0.053	−0.345***	−0.224***	−1.234***	−0.027	−0.002
FE_OLS	0.220*	−0.257***	−0.011	−1.096***	−0.208*	−0.119**
DOLS	0.253**	−0.068	0.222***	0.104	−0.069	−0.146***
MGE	0.139	0.015	0.232**	−0.183	0.001**	−0.170***
B-3						
OLS	3.168***	0.146**	0.193	0.976***	−0.973***	−0.695***
FE_OLS	2.580***	0.012	0.412***	0.619**	−0.394***	0.157
DOLS	0.439	0.254**	0.152***	−1.739**	0.017	−0.005***
MGE	0.377	0.640*	0.5	−4.486	0.767	−0.565**
SEE-3						
OLS	1.298***	0.842***	0.048	−0.065	0.160*	0.325***
FE_OLS	1.919	0.182**	0.120***	0.334	−0.828***	−0.269***
DOLS	1.919	0.182**	0.120***	0.334	−0.828***	−0.269***
MGE	4.965***	0.470***	1.015***	−0.907***	0.112	−0.577***

Source: Authors' calculations.

*Note: *, ** and *** indicate statistical significance at the 10%, 5% and 1% significance levels, respectively. OLS stands for ordinary least squares, FE_OLS for fixed effect OLS, DOLS for dynamic OLS and MGE for mean group estimator. The CEE-11 cover Bulgaria, Croatia, the Czech Republic, Estonia, Hungary, Latvia, Lithuania, Poland, Romania, Slovakia and Slovenia, the CEE-5 the Czech Republic, Hungary, Poland, Slovakia and Slovenia, the SEE-3 Bulgaria, Croatia and Romania.*