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Transmission Channels and Real Economy Effects of the Current Global Crisis on the Economies of Central East Europe

by

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Abstract

This contribution analyses the real economy effects of the current global crisis in Central East Europe. It focuses on the transmission channels of a drying up of capital inflows, in particular on foreign direct investment inflows and on foreign currency borrowing, the current account, and the exchange rate regime. The analysis shows that the adverse real economy effects of the externally-driven capital inflow setback could be mitigated by a reduction of current account deficits, even though the latter depends on the flexibility of the exchange rate regime. Therefore, the countries with a fixed exchange rate to the Euro proved to be the countries in the region hit hardest. Next to these commonalities, the contribution also makes the case that in some cases, unsound national policies generated vulnerabilities that the crisis unveiled as non-sustainable and aggravated the real economy effects of this global crisis. Estonia's construction and housing sectors are used here as a case in point. This contribution hence provides its own insights into the role of the exchange rate regime in the face of recurring financial crisis and in the run-up to Euro adoption, and argues that whilst there is very limited room for own national policies due to the external-biased growth and development strategy of the region, those were often unsound and aggravated the adverse effects of the global crisis on Central East Europe.

Keywords: Central East Europe, Estonia, Financial Crisis, Contagion, Real Estate, Housing

JEL: F4, O2, P27

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Introduction

The financial crisis has hit the economies in Central East Europe (CEE) to very different extents in the short run, no general rule applies. Yet, with the notable exception of Poland, we observe more severe impacts in CEE than in western Europe on average. The eastern region remains more vulnerable to financial crises as compared to the West (see also Furceri and Zdzienicka, 2009). This one commonality is rooted in the same patterns of economic growth and development throughout the eastern regions, featuring recurring current account deficits despite export-orientation of manufacturing, and accommodating net capital inflows: inward foreign direct investment (FDI), portfolio investments, foreign exchange credits, and foreign aid (mainly EU's structural funds) (see e.g. Fabrizio et al., 2009).

Some of the intra-regional differences within CEE may be explained by the different exchange rate regimes that gave rise to varying transmission channels through the common growth and development patterns: with capital inflows ceding, current account imbalances in the eastern region became untenable. In some cases, a flexible exchange regime provided an equalisation mechanism, resulting in large exchange rate devaluations that served as a safety valve protecting against output decline and recession. In others, an inflexible (or even hard) currency peg, in particular currency board arrangements, kept the currency stable at its pre-crisis level, yet resulted in painful, two-digit rates of recession.

Other differences in reactions of economic activity and growth to the financial crisis lie in the foreign trade exposure of the economy in general (see e.g. Rodrick, 1989) and the integration into international production and value chains (e.g. via FDI) in particular. With world trade dramatically shrinking (with an estimated two-digit rate in 2009) and recession taking foot in foreign trade partners, and without the possibility of diverting to third (less affected) markets, production in some of the very exposed CEECs also had to decline.

Such determinants of country-specific extends of affectedness of CEECs to the unfolding global financial crisis already lead some way in explaining what happened in the East. Yet, equally important are differences that lie in the countries' respective economic policies, i.e. policies related to investment, to technology support, innovations, the housing construction sector, etc.

The aim of this contribution is to review the real economy effects in CEECs of the current crisis and to derive some experience on the relationship between the macroeconomic and policy "fundamentals" on the one hand and the severity of a financial crisis on the other. In particular, the results of the analysis are intended to contribute to two discussions that have been ongoing for some time now and have been given new impetus in the wake of the current financial crisis: the first pertains to the role of the exchange rate regime in CEECs in the run-up to their adoption of the euro in an economic environment of frequently re-occurring crisis. The second pertains to the "autonomy" of economic policies in countries that are severely constrained by unbalanced external relations (foreign trade and cross-border capital movements). The results of this analysis may provide some important insights into predicting exposure to future external financial crisis and may contribute to discussing the risks involved in the political governance of a process of catching up with respect to exchange rate regimes, the role of FDI, and particular national industrial policies.

To achieve these objectives, the paper starts with a brief summary of the experience we have made so far with the real economy effects of financial crisis in the ten new EU member states in CEE by looking at the development of GDP, at FDI inflows, at the development of the current accounts, and at nominal exchange rate movements. Those insights prompt us to venture a econometric analysis to test for the significance of determinants of real economy effects of the current crisis or channels for contagion. This is complemented by a case study of Estonia, intended to show that the "external" roots of the crisis are but one explanation of the large real economy effects of the current global crisis. The final part of the paper summarizes and suggests avenues for further research on the subject-matter.

1 Review of effects of the current financial crisis in CEECs

The current global financial and banking crisis emerged outside CEECs with the collapse of the US subprime mortgage market in August 2007 and financial contagion (à la Masson, 1998) as well as foreign trade contagion (à la Eichengreen et al., 1996) has dissipated this crisis into CEECs.¹ This was driven by (i) unveiling that external imbalances were unsustainable once capital inflows were not available in previous amounts, by (ii) a slump in world trade, (iii) by global liquidity markets (in particular the interbank money markets) drying up, and (iv) by an implosion of listed company's stock values.

The real economy effect of the current financial crisis on CEECs

The IMF dates the incidence of the current financial crisis for all CEECs to the year of 2007.² Real economy effects of the crisis can be depicted in the development of GDP growth (see Table 1), and here, some important differences emerge: (i) in countries like the Czech Republic, Estonia, Hungary, Latvia, Lithuania, Slovakia, and Slovenia, the financial crisis affected the real economies' growth rates in a somewhat protracted way with economically significantly falling rates (grey shaded fields) over a period of two or more years (starting in 2007 in Estonia, Hungary, and Latvia, and one year later in the Czech Republic and Lithuania – in the latter, economic growth even increased in 2007) and substantial rates of recession (dark grey shaded fields) in 2009 (in Estonia and Lithuania already in 2008); (ii) in countries like Bulgaria and Romania, the economies withstood the crisis even until 2008, with strongest effects appearing shock like only in 2009; (iii) Poland is a special case in which GDP growth slightly fell from more than 6 *per cent* in 2006 over the course of 2007 and 2008, with the main effect in 2009 with a comparatively still high rate of 1 *per cent*. Only two of the countries assessed here applied and were granted financial assistance from the IMF: Hungary and Latvia (for a discussion, see e.g. Cordero, 2009).

Table 1 Real GDP growth in CEECs, 2006-2010

	2006	2007	2008	2009*	2010*
Bulgaria	6.3	6.2	6.0	-6.0	-1.8
Czech Republic	6.8	6.1	2.5	-4.3	1.1
Estonia	10.4	7.2	-3.6	-13.8	-1.6
Hungary	4.1	1.0	0.6	-6.4	-0.6
Latvia	12.2	9.8	2.8	-17.8	-4.3
Lithuania	7.8	10.0	-4.6	-18.0	-4.4
Poland	6.2	6.8	5.0	1.0	2.0
Romania	7.9	6.3	6.2	-5.6	0.9
Slovakia	8.5	10.4	6.4	-5.6	2.4
Slovenia	5.9	6.8	3.5	-7.3	1.0
...EU-27	3.1	2.9	0.8	-4.0	0.7

Note: * Estimates by SVR 2009, p. 44.

Data sources: wiiw Handbook of Statistics, 2009; SVR 2008, p. 72; SVR 2009, p. 44.

¹ For a discussion of different “varieties” of crises, see Kaminsky, 2006.

² Others using the Kaminsky et al. (1998) method of market pressure index (MPI) by calculating pressures in real effective exchange rate market and diminishing official foreign exchange reserves likewise arrive at the same date (see e.g. Furceri/Zdzienicka, 2009, p. 23).

In terms of the size of the crisis effects, the three Baltics are hit hardest with an estimated level of 81.8 in 2010 of the IMF-defined pre-crisis 2007 level in real GDP for Estonia, 80.9 for Latvia, and 74.8 for Lithuania. Poland was least affected with growth rates falling sharply but always remaining positive; Poland reaches 108.2 *per cent* of the 2007 level in 2010. All countries are projected to either reach positive growth rates by 2010 or at least less severe recession rates. Other real economy effects of the financial crisis include social effects like growing unemployment, pressures on social security benefits, rents, pensions, etc. As important as they undoubtedly are, those remain beyond the scope of this contribution.³

The capital inflows setback as a crisis transmission channel in CEECs

Amongst the most obvious transfer channels from the global financial and banking crisis to the real economies in CEE is the drying up of capital inflows⁴. To provide just one indicator of development of capital inflows, we observe FDI flows: on a global scale, the aggregated flow of capital categorised as FDI (i.e. minimum 10 *per cent* ownership share) is estimated to have contracted by 20 *per cent* in 2008 and is expected to fall even more in 2009 (UNCTAD, 2009). Main reasons of this fall are related to weakening capabilities of firms to afford (foreign) investments due to a tightening of credit conditions, to negative economic prospects in most countries due to the global nature of the crisis, and the reduced asset values that likewise reduce the value of mergers and acquisition. Amongst the broad regions of the world, the steepest decline is recorded for developed economies, whereas the group of transition economies as a group actually still enjoyed larger FDI inflows in 2008 as compared to 2007 (UNCTAD, 2009, p. 6). This, however, was mainly due to sustained rises in FDI in the European CIS countries (Belarus, Moldova, Russia, and Ukraine) (Hunya, 2009, p. 8). In the 10 new EU member states, FDI inflows fell by 9 *per cent* in 2008 after still substantial growth of also 9 *per cent* from 2006 to 2007 (see Figure 1). A country-comparative view on FDI developments is constrained by the medium-term character of FDI projects that gives rise of lagged reactions to crisis episodes and by distorting effects of large single FDI projects⁵. Still, we can make out some important trends and differences between the CEECs: a setback in 2007 as an immediate reaction to the crisis is only indicated for Hungary (the large fall in FDI inflows in 2007 in Romania that may be attributed to the crisis was offset in the following year). The decline of FDI inflows is most obvious for 2008, where Bulgaria, the three Baltic states, and Poland were not able to sustain their previous levels of inflows. The Czech Republic experienced a one-year episode of decline in 2006 only, and Slovenia tends to be still unaffected until 2008 and catching up with the other CEECs in terms of attracting foreign investors.

³ If we were to consider the three Baltic countries and Slovenia as particularly small countries, and Poland as a large country (at least amongst the countries in CEE), then we find some preliminary support for Aghion et al. (1999), who hold that small economies, less diversified, will tend to be more vulnerable to external shocks. The following analysis attempts to provide more explanations for the differing real economy effects of the current financial crisis amongst CEECs.

⁴ For an account of channels of contagion through financial linkages, see Árvai et al., 2009.

⁵ For some interesting cases of FDI projects in the current crisis (Dell in Poland, Hitachi in the Czech Republic, Flextronics in Hungary, etc., see Hunya, 2009, p. 11).

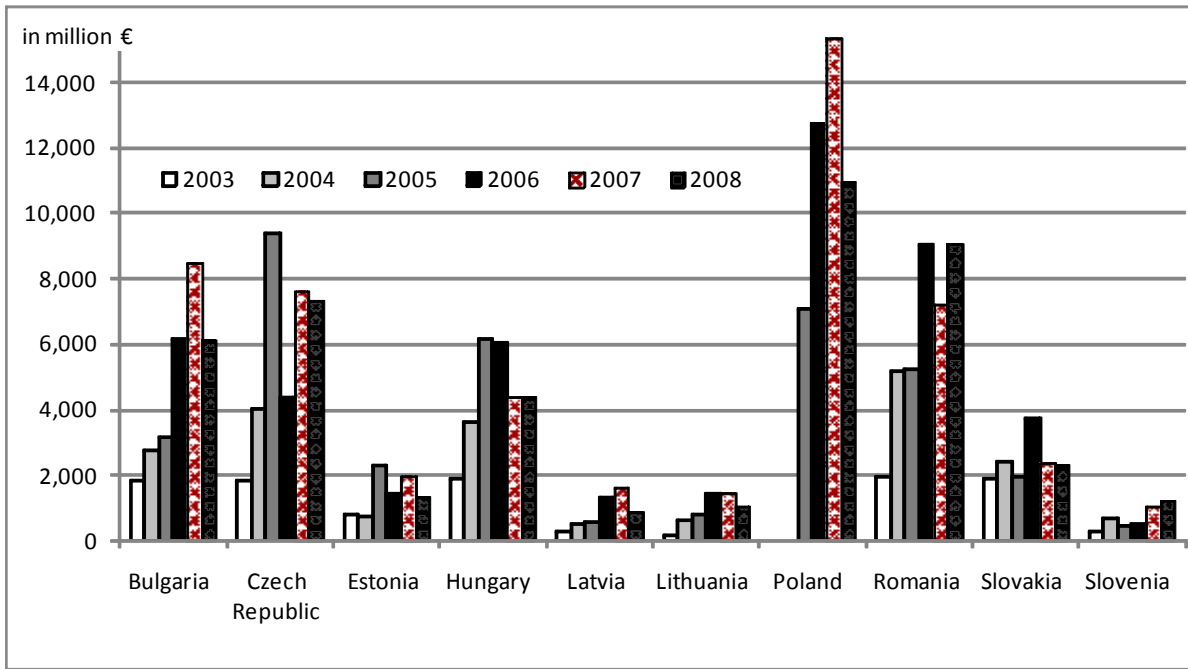


Figure 1 The development of FDI inflows, 2005 – 2008
Data source: Hunya, 2009.

The first data available for 2009 indicate continued and even more pronounced losses in FDI inflows in most CEECs: Estonia with a fall in nominal terms of nearly 80 *per cent* may experience the largest losses, Slovenia with 67 *per cent*, Bulgaria with 46 *per cent* and Poland with 44 *per cent*, whereas the inflows into the Czech Republic are still projected to be positive with a plus of more than 10 *per cent* (Hunya, 2009, p. 10).⁶

Some of the CEECs record substantial FDI outflows. Such outflows may potentially aggravate the pressure generated by external trade imbalances. We may even assume that potential investors may decide to relocate investments into countries less affected by the crisis (or outright capital flight as happened previously in Russia). In fact, however, FDI outflows from the 10 new EU member countries fell in parallel to inward-FDI and actually with higher rates (approx. 11.5 *per cent* between 2006 and 2007, and nearly 27 *per cent* in 2008, Hunya, 2009, p. 26). Rather than exerting additional pressure through capital flight, falling outward-FDI actually eased some of the macroeconomic imbalances (this not neglecting the negative firm-level effects generated by the crisis that had led to this fall in outward-FDI).

Next to the manufacturing sector (section D), it was mainly financial intermediation (section J) and real estate, renting and business service activities (section K) that drove FDI. Whereas typically in CEE, the manufacturing sector dominates FDI inflows, it is the banking sector that received the

⁶ It is important to note that FDI inflows not only give rise capital inflows. The more FDI projects in a receiving country mature, the more likely will those projects produce profits that will increasingly be repatriated to headquarters or subsidiaries in other countries rather than being reinvested. In some countries, such capital outflows, induced by inward FDI, already exceed capital inflows from inward FDI, namely in Hungary and Slovakia (see Hunya, 2009, p. 19).

largest share of FDI into the Slovenian, Estonian and Latvian economies.⁷ In fact, nearly all of the Estonian banking sector is foreign owned today. Due to the particular origins of this current financial and banking crisis, the setback of capital inflows into CEECs is much stronger in the financial sector than in the manufacturing sector in all CEECs: the previous credit boom generated by foreign invested banks with (often foreign) currency borrowing from parent banks abroad had to come to a grinding halt with the financial difficulties that western banks experienced themselves in the course of the crisis. This provides a direct and immediate channel for the global crisis to impact on the real economy sphere – in particular, that of countries with a large share of foreign-owned banks, like Estonia.

But it is also falling capital inflows into the manufacturing sector that gives rise to this transmission channel: the development strategy of export-led growth had to fail with falling demand in export target markets in East and West (see: Allard, 2009) and the global slump in world trade with a fall in volume in 2009 in excess of 10 *per cent* in comparison to the previous year (SVR, 2009, p. 27, also see: UN, 2010, p. 15). This produced overcapacities and let expected profits from further FDI and/or profit re-investment decline. The tightening of credit conditions in financial and capital markets around most of the world, if only for revolving credits and existing capacity, aggravated the downward pressure on FDI into CEEC's manufacturing industries.

Another important driver of the capital inflow-transmission channel pertains to foreign currency borrowing and foreign indebtedness: first and foremost, the financing of current account deficits in CEECs by way of FDI-inflows that characterised the growth and development patterns in the region that came under pressure in the course of the current financial crisis currently effects growing foreign debts. Where those foreign debts are with firms, they may not be as problematic, because firms tend to hedge such debts against exchange rate devaluation risks and because such debts are of a more short-term nature (with firms that use imports as inputs into production, often for exports will reduce imports to counterbalance the decline in demand). Quite on the contrary, foreign debts of private households and of the public sector, typically driven quite rationally by interest rate differentials and expectations of long-term exchange rate appreciations⁸, remain more often than not uncovered against exchange rate risks: with exchange rates devaluating in the course of the crisis (unexpected at the time of borrowing), debt burdens increase beyond the planned extent and make borrowers vulnerable to default – and with them the banks (often foreign invested) that made the loans may come under increased pressure. Moreover, private household and public foreign debts are typically of a more long-term nature (e.g. 10-20 years mortgages and government bonds), so that possibly sustained lower exchange rate levels and lower credit ratings (with their resulting increases in interest rates⁹) in the aftermath of the crisis may result in medium to long-term increased burdens on private households and the state budgets. Amongst CEECs, foreign debts are typically with mainly firms and households, in Hungary, public foreign debts are also substantial. Foreign currency-

⁷ Around 35 to 45 per cent of FDI inflows were directed towards the manufacturing sectors in the Czech Republic, in Hungary, in Lithuania, in Poland, in Romania, and in Slovakia. In the cases of Slovenia, Estonia, and Latvia, the main recipients were banks (with shares of around 30 to 40 per cent). Source: Hunya, 2009.

⁸ We can infer from past experience and economic theory that a long-term trend of currency appreciation can be rationally expected for countries catching up in terms of productivity. Also, this does not exclude the possibility of intermediate currency devaluations in crisis episodes.

⁹ Typically, fixed-rate mortgages rarely exist for borrowers in Central East Europe (Marer, 2010, p. 18).

denominated debts in private households' portfolios are in fact substantial in some of the CEECs: in Latvia, the exposure is highest with a share of nearly 90 *per cent* in 2008, Estonia with over 80 *per cent*, Hungary over 70 *per cent* to list just the most exposed countries (Marer, 2009, p. 19). Here, either interest rate differentials were particularly large or exchange rate regimes suggested non-existent exchange rate risks. In the Czech Republic, prudent fiscal policies and stable monetary conditions kept domestic interest rates at low levels, reducing the incentive to borrow abroad.

The exchange-rate driven additional burden due to the financial crisis obviously depends on the particular exchange rate regime of the country where the borrower resides (and earns the financial means to pay debt service): where a fixed regime is in place (Baltics and Bulgaria) and remains sustainable, the additional burden from the crisis may be limited to rising interest rates.

The mechanisms rebalancing the growing external imbalances in CEECs

The growth and development patterns common to all transition economies in Central East Europe have resulted in recurring current account deficits ever since their external liberalisation. The current financial crisis has aggravated the external imbalances in most countries of the region (see Figure 2): in Bulgaria, the three Baltics, Romania and Slovenia, the deterioration of the external balance in 2007 was particularly pronounced, whereas in the Czech Republic and Slovakia, current account deficits fell in the period before the crisis. After 2007, current account balances actually improved (or are estimated to improve) in all countries bar Slovakia and Slovenia, which can be assumed to be an effect of reduced imports that serve as inputs for economic activity and an effect of falling domestic demand, both effected by the crisis.

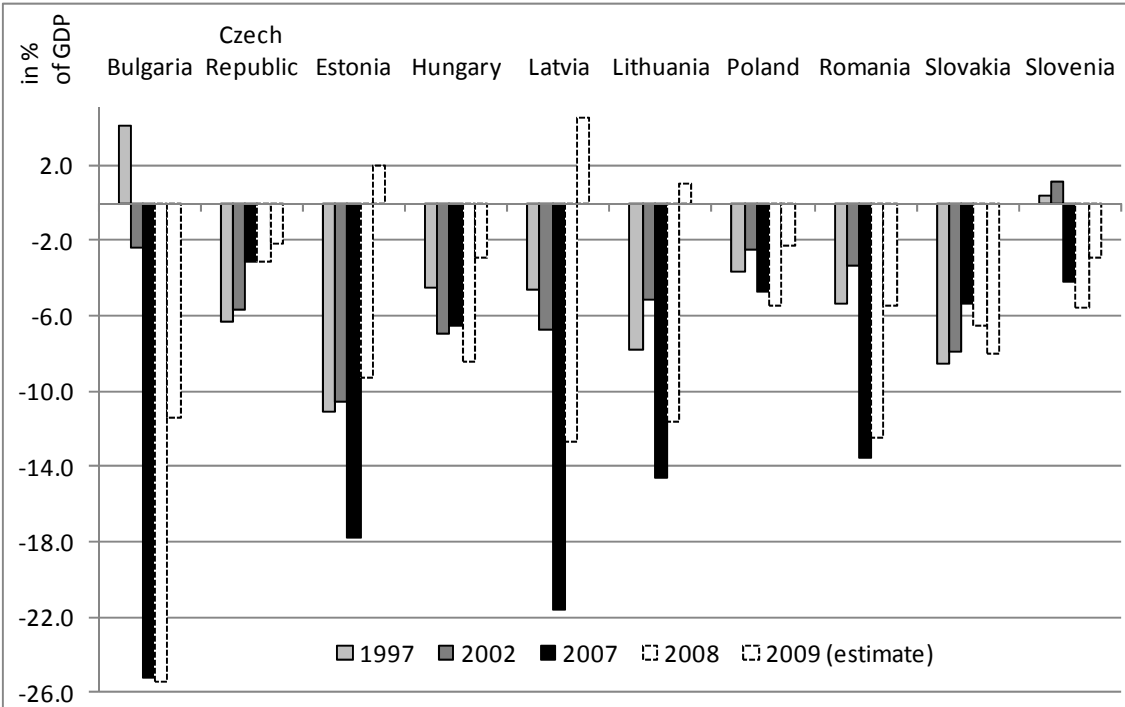


Figure 2 Current accounts in CEECs, 1997, 2002, 2007
 Data source: IMF, World Economic Outlook-data.

The setback of capital inflows into CEECs had an immediate effect on the balance of payments in the structural current account deficit-countries: import surpluses would now translate into increasing

foreign debts until either exchange rate (re-)adjustments or recession or even deflation (precisely lower inflation than in foreign trade partners) would rebalance the current account. In fact, the first two rebalancing mechanisms can be observed in CEECs and draw a demarcation line between those countries that are heavily affected by the crisis and yet see their exchange rates remain stable, and other countries, where (in some cases massive) exchange rate devaluations serve as a buffer against rising foreign imbalances. Experience from previous financial and banking crisis tells us that countries with flexible exchange rate regimes typically perform better in crises episodes (see e.g. Kaminsky and Reinhart, 1999; Goldstein et al. 2000; Cerra et al., 2009).

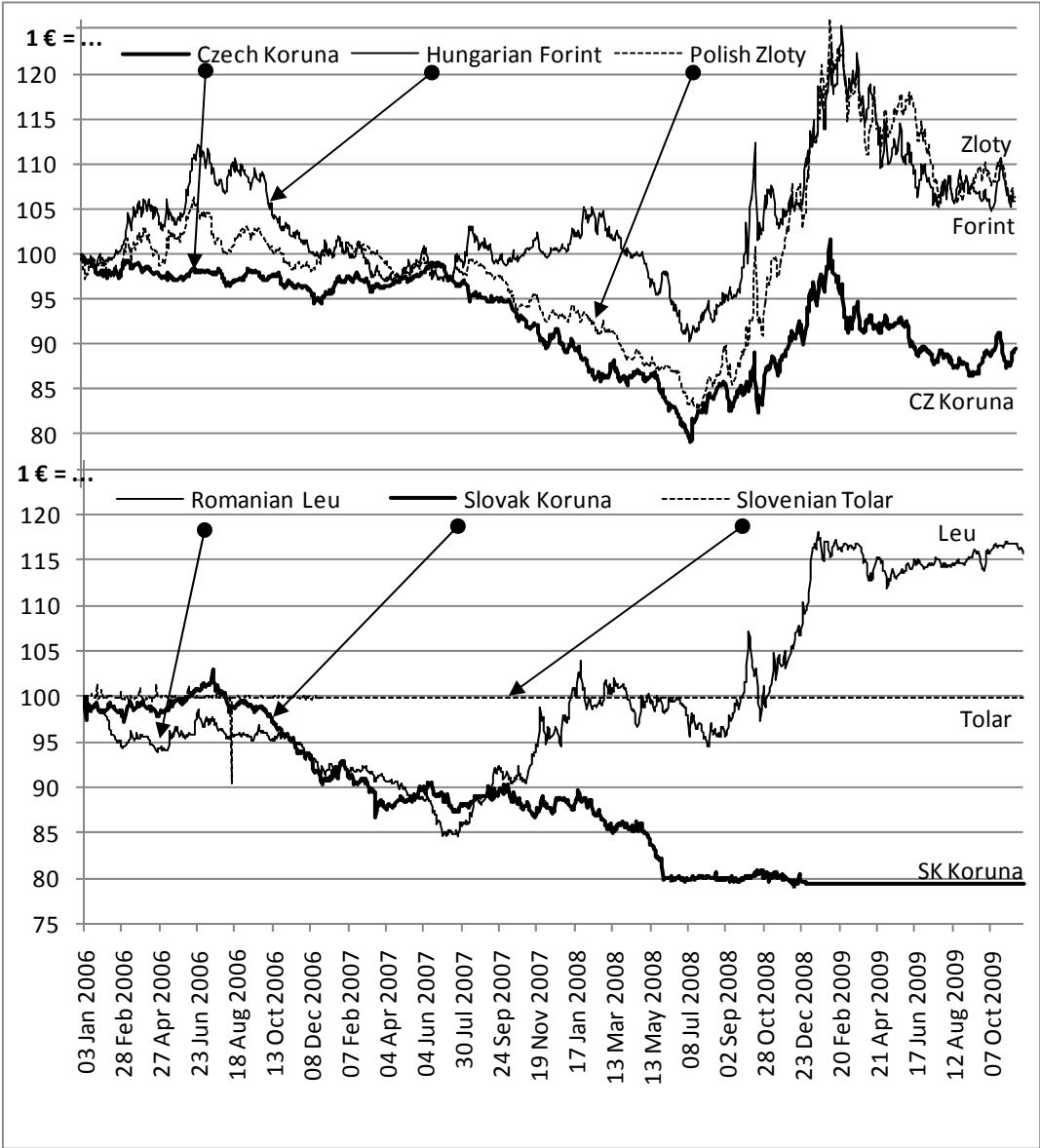


Figure 3 Exchange rate developments in selected CEECs, 2006-2009
Data source: EUROSTAT.

What appears to be a trade-off between exchange rate stability and recession as possible effects of the crisis, may not be as clear-cut: while exchange rate devaluations typically make exporters more competitive in the short term and helps to improve the current account, imports that often serve as inputs for domestic economic activity become more expensive (imported inflation), and may

necessitate contractive monetary policy with the growth-hampering effects of this policy in the medium term. On the other hand, strong exchange rate devaluations in the course of a (external) crisis may expectancies on financial markets that the currency is under upward-pressure. This will typically alleviate some of the dampening effect of the crisis on capital inflows (even if only motivated in the short-term).

In Poland, Hungary, the Czech Republic, and to some extent in Romania, the flexible exchange rate regimes have so far shielded the countries to some extent from the crisis by currency devaluations: the Polish Zloty lost some 46 *per cent* of its value between August 2008 and February 2009, the Hungarian Forint around 30 *per cent*, the Czech Koruna around 20 *per cent*, and the Romanian Leu around 25 *per cent* (see Figure 3). Yet, Poland is still estimated to have lost 4.0 percentage points in economic growth in 2009, Hungary 7.0 percentage points, the Czech Republic 6.8 percentage points, and Romania even 11.8 points. Latvia (20.6), Lithuania (13.4), Slovakia and Bulgaria (12.0), Slovenia (10.8), and Estonia (10.2) with their fixed exchange rates (or € membership) have experienced a more severe recession.¹⁰

2 Determinants of real economy effects of financial crisis

The above description of the current financial crisis and its observable effects on the development of GDP, and the roles attached to capital flows, current accounts, and exchange rates (or their regimes) suggests a few hypothesis about the determinants of the real economy effects of an external financial crisis via contagion, namely:

- a setback in capital inflows is a transmitter of external crises to domestic GDP;
- large and increasing current account deficits due to a slump in world trade translate into falling domestic GDP growth;
- exchange rate devaluations in a flexible regime provide a (short-term) shield against the transmission of the external crisis to domestic GDP.

In the following, those hypothesis shall be tested empirically on the case of CEECs during the current financial crisis. For the empirical analysis, we use a econometric model analysis of GDP as the independent variable and a few determinants that are typically used for such an analysis. The model assesses the period of 2003, i.e. some years before the crisis, to 2009 with the latest available data and still well within the real economy effects of the current crisis. We consider the ten new EU member states in CEE: although they are very different economically in most respects, they share a common intense integration into West Europe and the EU by way of FDI, other capital flows, and foreign trade (which distinguishes them from countries like Russia, the CIS, Belarus, the Ukraine, etc.). By including several different countries across a common time-span, the analysis assumes a panel structure.

Lacking a general theory of a financial crisis or GDP development under crisis-episodes, we refrain from constructing a general equilibrium model and to put this to empirical testing. But, previous experience with real economy effects of financial crises, economic theory, and plausibility assumptions allow us to determine the most important GDP-factors to be included in the analysis.

¹⁰ A correlation analysis across countries between GDP percentage points changes for 2008 and exchange rate changes in the above period suggests a close simultaneous relationship with a correlation coefficient of -0.73 (significant at the 5 per cent level).

The empirical analysis then tests statistical significance of each GDP growth determinant and the direction of the influence, negative (growth moderating and recession aggravating) or positive (growth enhancing and recession moderating). Determinants included in the analysis are (i) GDP growth p.a. in the respective previous periods as an autoregressive factor, (ii) FDI inflows, (iii) current account balances, (iv) nominal exchange rates, and (v) a set of three dummies testing the dating of the crisis.

The use of an autoregressive factor for GDP is common in such an analysis and should result in a positive relationship. Our tests suggest that a one period lag is sufficient for CEECs in this turbulent period. FDI inflows have a direct, yet slightly delayed effect on GDP, and we should expect a positive sign. The change in FDI inflows may have an own effect on GDP beyond their size, due to its signalling to domestic and foreign investors, which can be assumed to be immediate, as well as due to its also immediate effect on the current account and exchange rates as discussed above (see also Lipsey, 2001). Again, a positive relationship is expected.

The effect of the current account balance and its changes over time on GDP is ambiguous in two respects: first, it remains uncertain as to whether the relationship should be positive or negative, and second with respect to the direction of causality between current account balances and real economy effects of financial crises. Both ambiguities will depend on whether imports are predominantly competing away domestic producers (negative relationship) or are mainly used as inputs for domestic production (positive relationship), and on whether changing volumes of exports are a result of a change in international competitiveness (positive relationship) or rather a reflection of changing domestic aggregate demand (e.g. domestic production increasingly in excess of falling domestic absorption). With respect to the direction of causality, the latter already suggests that current account changes may be a result of GDP changes (i.e. in the case of financial crisis, they may be considered effects of financial crisis), or indeed changes in current account balances may have effected changes in GDP. In the large body of literature on financial crises, large current account deficits (as relevant in most CEECs) are an important lead indicator of upcoming financial crisis with its negative effects of GDP (see e.g. Kaminsky and Reinhart, 1999).

In our analysis, we assume that the slump in world trade was at the root of deteriorating current account balances in CEECs (Allard, 2009). We hence use of a one-year lag for current account balances to account for the uncertain direction of causality and to stay in line with the literature. Then, just as was the case for FDI inflows, we consider both the sizes of the current account (per GDP) as well as the rates of change of current account balances. Whilst the former indicates vulnerability to a financial crisis, which suggests a positive relationship between falling current account surpluses (or increasing deficits) and falling GDP, we let the data speak with respect to the effect of changes in current account balances.

With respect to the hypothesis of a flexible exchange rate regime offering a shield against the real economy effects of a external crisis, we use average annual nominal exchange rate changes to proxy the rates of revaluation and devaluation of CEEC-currencies. These averages do not represent the largest fluctuations, and still remain largely in line with the flexibilities of the respective exchange rate regimes. Here, the effects are assumed to be immediate, hence no lags are used. We expect large-scale adjustments to be positively related to GDP growth (a fall in exchange rates denotes devaluations).

Whilst the IMF dates the impact of the financial crisis on CEECs to the year of 2007, the most pronounced real economy effects can be observed for the years of 2008 and 2009 (see Table 1). We again let the data speak and introduce dummies for the years of 2007, 2008, and 2009. The linear regression model reads in its theoretical form:

$$y_{i,t} = \alpha_i + \beta_1 y_{i,t-1} + \beta_2 FDI_{i,t-1} + \beta_3 dFDI_{i,t} + \beta_4 CA_{i,t-1} + \beta_5 dCA_{i,t-1} + \beta_6 dEXRA_{i,t} + \sum_{j=07}^{09} \delta_j D_j + \varepsilon_{i,t}$$

where y is output, i denotes the countries, t time in years, FDI are the size of FDI inflows in per GDP, whereas $dFDI$ denotes percentage changes to FDI inflows each year. CA is the size of the current account balance in per GDP, and dCA its percentage changes to previous years. $dEXRA$ is the annual average nominal exchange rate change in *per cent*, and D are the dummies for the crisis years of 2007, 2008, and 2009. α_i is the constant¹¹, $\beta_{1...6}$ are the estimated coefficients for the determinants, and δ_j are the ones for the crisis-dummies. We correct for possible heteroskedasticity by using White robust standard errors (heteroskedasticity-robust standard errors), while potential problem of autocorrelation is considered by lagging determinants. Before we run the linear OLS regression in the pooled sample, we test that multicollinearity does not pose a problem by pairwise correlations. The data for the analysis is taken mainly from Eurostat, but in particular the information about FDI inflows into CEECs is best sourced from the wiiw (Hunya, 2009).

We test several model specifications to check for robustness of our model (see Table 2). All models pass the standard F tests. In model A, we use only the lagged GDP and the three crisis-dummies to establish a basic model. The lagged GDP is significant, and the three dummies suggest that 2007 is not a crisis-year, but 2008 and 2009 are. Model B adds the two FDI-related determinants, the two current account balance-related determinants, and exchange rate changes. Whilst the results of the baseline model remain unchanged with respect to levels of significance and signs, neither of the two change variables for FDI or the current account turn out to be significant. Amongst the two stock variables of the size of FDI inflows and the size of the current account balance, their lagged variables are both significant and positive, as expected. The FDI-related result confirms the theoretical expectation that dependence of external financing increases vulnerability to external crises and corroborates previous findings (see e.g. Braun and Larrain, 2005; Kose et al., 2006; Tong and Wei, 2009). In line with our theoretical expectations, the exchange rate turns out to be significant and positive, as expected: currency devaluations (positive sign) to some extent help economies weather the burdens of external crises.

The empirical analysis shows that both the capital inflow setback and current account deficits in fact have significant crisis-accelerating effects on GDP and hence can be viewed as transmitters of the external crisis on CEECs. Exchange rate flexibility (foremost with respect to the possibility of a downward adjustment by currency devaluations) does however acts as a moderator of real economy effects of a crisis in today's CEECs.

¹¹ We assumed that the α_i reflect differences between the countries in the panel not accounted for by the determinants used in the analysis. In fact, Hausman specification tests and Breusch and Pagan Lagrangian multiplier test for random effects tests both consistently suggest the use of the random effects model specifications over fixed effects, by rejecting H1 that differences between coefficients are systematic and that $\text{var}(u) = 0$. The results, however, do not differ much between fixed and random effects models.

Table 2 Determinants of real economy effects of crisis in CEECs, OLS pooled regression, re

dep. var = GDP	Model A			Model B			Model C		
GDP(-1)	.688	(4.56)	***	.674	(4.50)	***	.654	(4.23)	**
D ₀₇	-.007	(-.92)		.002	(.27)		.002	(.24)	
D ₀₈	-.049	(-3.42)	***	-.033	(-3.18)	***	-.034	(-3.00)	***
D ₀₉	-.130	(-7.87)	***	-.114	(-7.31)	***	-.117	(-6.24)	***
dEXRA				.191	(2.42)	**	.195	(2.44)	**
FDI(-1)				.002	(2.10)	**	.002	(2.08)	**
dFDI				.009	(1.35)		.009	(1.39)	
CA(-1)				.003	(2.49)	**	.003	(2.47)	**
dCA(-1)				.003	(1.36)		.003	(1.19)	
dFDI*dCA							-.003	(-2.22)	**
const.	.026	(2.83)	***	.026	(2.67)	***	.028	(2.72)	***
N	60			56			56		
R ²	.808			.813			.815		

Note: The table reports the coefficients α_i , $\beta_{1...6}$, and δ_j . The data in parenthesis are the heteroskedasticity-robust t statistics. Wald tests confirm that all independent variables are significantly distinct from 0.

In a further augmented model specification C, we test for the relationship between simultaneous current account passivations and FDI inflow setbacks. The intuition behind this is that the negative effect of capital inflows setbacks could be counterbalanced by falling current account deficits, so as to reduce their negative effects on GDP (or: falling FDI inflows paired with increasing current account deficits have a negative effect on GDP). The interaction term between changes of FDI inflows and changes to the current account ($dFDI*dCA$) in fact turns out to be significant and negative, giving support to our intuition: as long as reductions of FDI inflows are met by reductions in current account deficits, crisis-induced recession can be mitigated.

3 The particular case of Estonia

As much telling and informative as such an econometric analysis is, it cannot capture the particularities of each of the countries not accounted for in the comparative determinants. Those, however, may be particularly telling for an analysis of real economy effects of the current crisis. Hence, we turn in the next chapter to Estonia as one example of how the determinants assessed above act in this particular country, what other repercussions those determinants may have, and finally what determinants we were unable to look at in our cross-country analysis. This is supposed to complement our cross-analysis above.

Estonia's currency board and financial crises

In the case of Estonia, the currency board arrangement was probably the most decisive factor in transmitting the current financial crisis into real economy contraction (the analysis above already established that exchange rate devaluations did in fact shield CEECs from the transmission of the external crisis-shock where the regime allowed this). Two mechanisms are at work in a currency board in general: first, external imbalances that imply falling foreign reserves (insufficient capital inflows to compensate current account deficits) force money supplies to contract in order to safeguard the legally binding requirement to have at least 100 *per cent* backing of the domestic money supply.

In Estonia, inflation has typically exceeded that of the Euro-area, and foreign trade balances and current account balances were typically negative. Capital inflows (to a large extent increasing foreign debts), however, still allowed a steadily increasing trend in the domestic money supply (see Figure 4). This trend reversed towards end of 2007 with the sudden and unprecedented jump of the current account deficit to nearly 18 *per cent* of GDP in 2007. It is a particular feature of Estonia’s currency board that gross reserves slightly exceed money supply M1 (notes and coins plus demand deposits), hence granting some flexibility to the Estonian Central Bank to weather some contraction in reserves. Ultimately, however, the Central Bank has to execute monetary contraction by neutralising that part of the domestic money supply that equals the fall in reserves that exceeds the preferred over-fulfilment of the reserve backing.

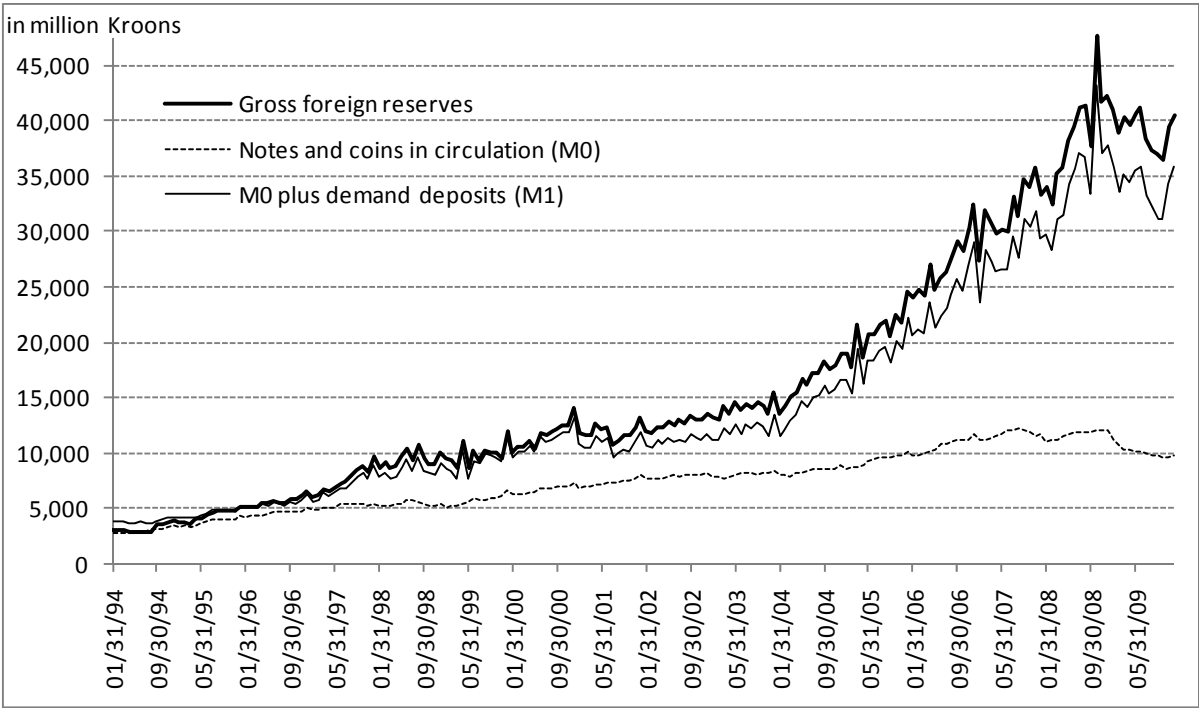


Figure 4 Development of reserves and monetary aggregates in Estonia, 1994-2009
 Source: Central Bank of Estonia.

The second mechanism pertains to the reactions of the monetary system to crisis episodes: whereas in flexible exchange rate regimes, commercial banks can refinance with the central bank as a lender of last resort, a currency board is deprived of this function; attempts of currency speculation against the fixed exchange rate call upon the central bank to contract money supply. Regardless of whether triggered externally or internally, currency-board arrangements typically experience interest rate hikes in crisis episodes.

This kind of interest rate – contagion for external crises are a common feature of the Estonian currency board, and have triggered interest rate hikes of over 10 percentage points within a few weeks in the aftermath of the Asian crisis in late 1997 and in the course of the Russian crisis in late 1998 (see e.g. Brüggemann et al., 2000, p. 123). In the most recent crisis, Estonian money market interest rates (Talibor) jumped in December 2007 and yet again nearly one year later (see Figure 5). Interesting to note, Euribor rates did not display any of those jumps, the long-term gradual upward trend in the wake of the global crisis even came to a halt in October 2008 in line with relaxing monetary policies in the West. In the case of Estonia, the rates remained at their high level (in

particular the 12 months Tablibor) with widening gaps to Euribor rates (whilst interest rate parities were very low until early 2007, they reached a hefty 4.5 percentage points for the 1 months rate and even over 6 points for the one month rate). Credit rates are also on the increase, yet more protracted. Important to note here, short term rates (maturities of up to 3 months) experienced a hike in mid-2008 (jumping nearly 14 percentage points) and even surpassing long-term rates (this inverse term-structure may indicate a credit crunch).

Both mechanisms, monetary contraction as well as (real) interest rate hikes obviously imply a heavy burden on economic activity. This perspective allows us to better appreciate the vast real economy breakdown in this country as compared to the effects of the crisis on other CEECs with more flexible exchange rate regimes.

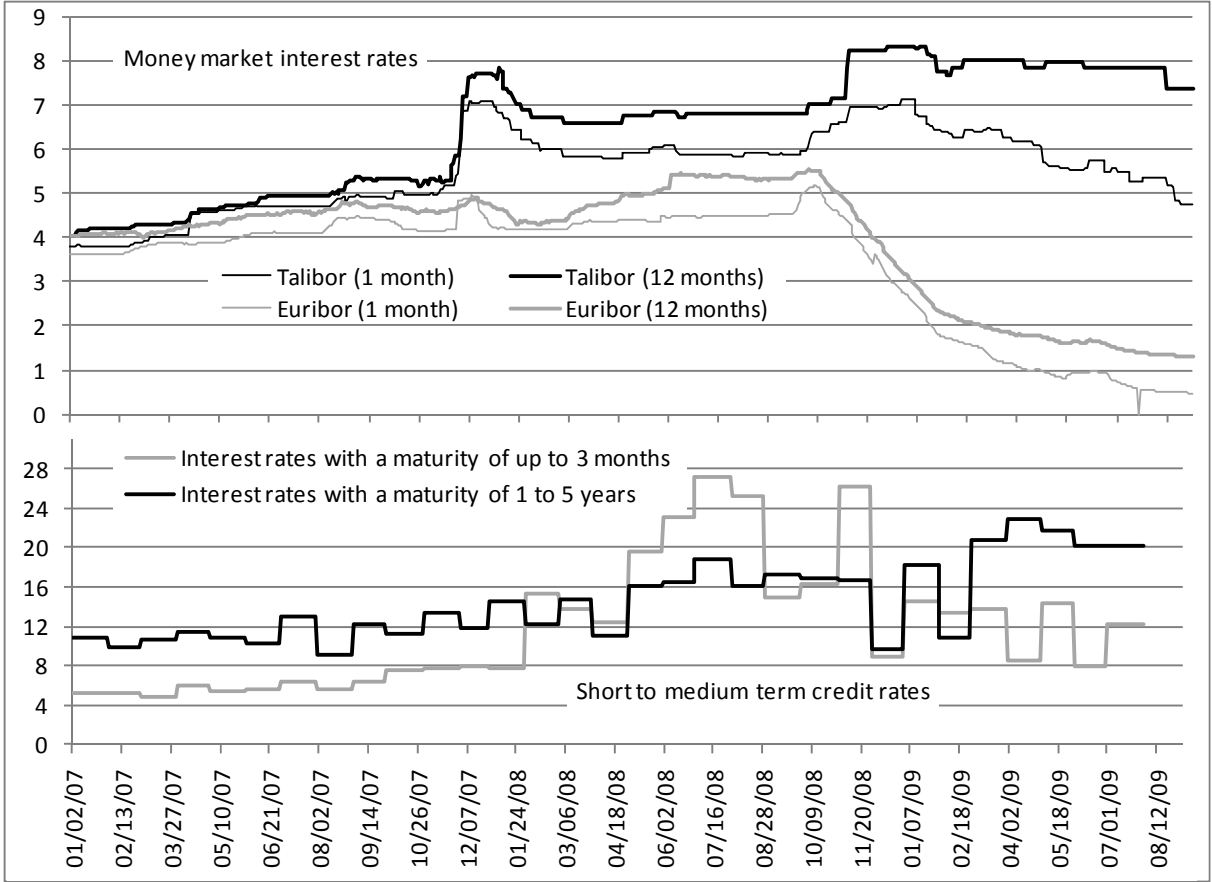


Figure 5: Interest rates in Estonia and the EURIBOR, 2007-2009
 Data source: EUROSTAT and Central Bank of Estonia.

It is in particular this behaviour of currency boards in crisis episodes that have fuelled hope in Estonia that the country could adopt the Euro soon, and in particular without a testing period of a more flexible exchange rate regime in the EU exchange rate mechanism II. Whether or not this will actually come true, remains ultimately a political question. From our analysis, we may already conclude that the currency board arrangement was clearly amongst the factors driving the exorbitant recession in this country: whilst it has undoubtedly served the country well in establishing a stable

monetary system in the country, its inflexibility during times of productivity catch-up and times of external crisis raise doubts about the preferability of this regime for Estonia.¹²

Estonia's real estate sector

Alas, it is not only macro-economic transmission channels that have triggered the crisis-induced recessions in Central East Europe. A closer look at the domestic policies in those countries unveils other growth-contracting or recession aggravating factors and vulnerabilities that lie within the realms of the countries themselves. The Estonian real estate sector is a case in point: This sector, being closely related to financial and capital markets due to its interest-rate sensitivity, will typically come under pressure in episodes of financial crisis. Sound real estate and constructions markets, however, should be able to weather the additional burdens from increased interest rates and credit crunches. In the case of Estonia, the crisis-inflicted additional burden led to a near breakdown of these markets: whilst production in the construction industry has skyrocketed in Estonia at least since 2005, whilst prices for new residential buildings have likewise increased over-proportionately since around mid-2006, those developments have proven to be non-sustainable: production plummeted from early 2008 to the latest available figure in Q3/2009 by 82 *per cent*, and prices followed suit half a year later (Eurostat-data).¹³ In particular, those developments were in sharp contrast to the average development of production and prices in construction in the EU-27.

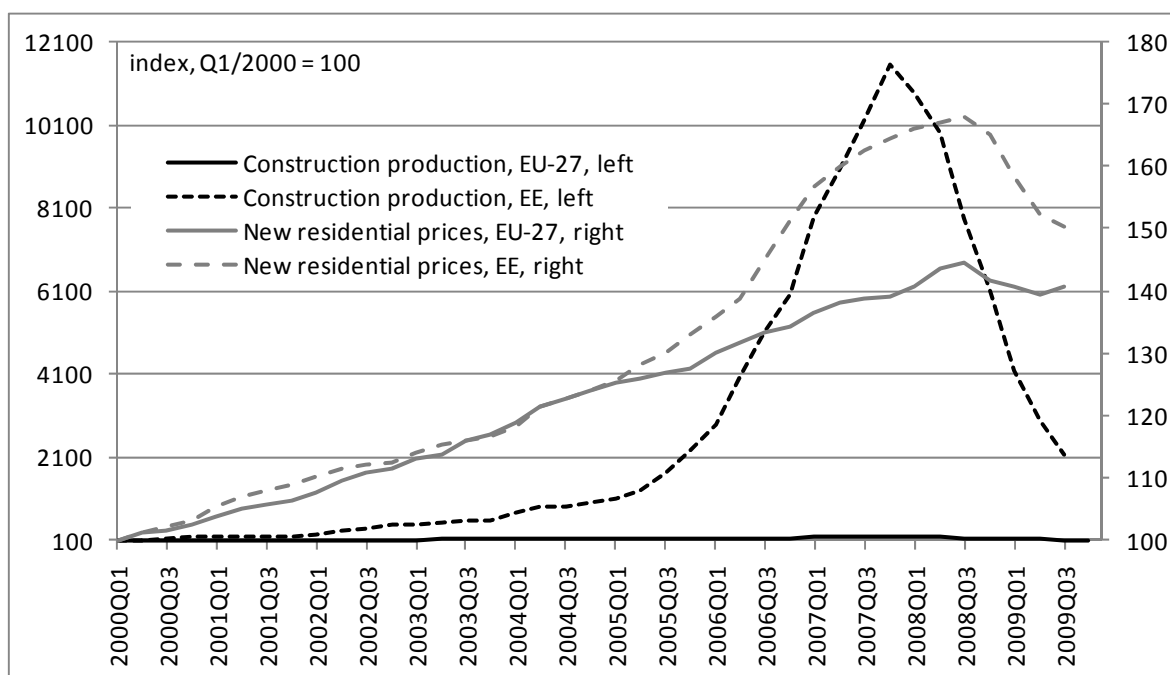


Figure 6: Construction market development in Estonia and the EU-27, 2000-2009
Data source: EUROSTAT.

The housing market is of particular importance in Estonia with a share of construction in GDP of nearly 30 *per cent*, and only 4 *per cent* of all households living in rented apartments, the

¹² In particular, Brixiova et al, 2009, hold that the economy is only weakly synchronized with those of the euro area and the structure of the Estonian economy also differs from the euro zone.

¹³ As an early indicator, new orders in the construction industry already started to fall sharply in early 2007 (Eurostat-data).

overwhelming majority owns own private household dwellings. But still, this overblown development was driven by autonomous domestic policy: residential buildings are substantially subsidised, by allowing mortgage costs to be held against income taxes, and all profits made from selling real estate are free of taxation. Increasing wages and earnings as well as a pro-cyclical fiscal policy have additionally fuelled this expansion.

The sharp increase in interest rates, the large share of foreign exchange-denominated mortgages, and the fact that most mortgages feature adjustable interest rates (see above) exposed the expansion of this sector as unsound and produced the kind of vulnerability of the domestic economy that led to the painful reversal of the very promising growth path of the past and the double-digit recession in the course of the unfolding crisis. In Estonia, the crisis hence acted as a catalyst to anyway unsustainable developments which had been generated by domestic economic policy – the real economy effects of the crisis via contagion could have been less severe if the structure of the Estonian economy would have been on a healthier footing.

Considering these characteristics of the Estonian economy today, the way out of the crisis obviously has to include a re-consideration of the exchange rate regime, of fiscal policy with a view on its cyclical nature, and a yet more pronounced structural change. Future projections of economic developments in Estonia assume a near-recovery already from 2010 onwards (see Table 1). This is based on the assumption that the current account deficits will vanish or even turn into surpluses to ease the pressure on the currency board in light of still falling capital inflows (see projected fall in FDI inflows of nearly 80 per cent in 2009 alone). Much will depend on whether the external imbalances will improve – and this will ultimately be an issue of the exchange rate regime. Fiscal policy on the other hand, having previously ameliorated the unhealthy growth of the construction and housing sectors, became increasingly tight as the crisis unfolded, just at a time where the economy may have needed some support.¹⁴

The financial crisis has put the possibility of an early adoption of the Euro top of the agenda in Estonia (so far, the national target is January 2011). This, however, will depend politically on the view taken about the role of the currency board for the convergence criteria. In particular: are interest rates too high only because of the particular mechanisms of the currency board regime and would hypothetically be lower if the currency would be more flexible? Will budget deficits remain below the 3 per cent criterion?¹⁵ In economic terms, preferability of a Euro adoption of course hinges on the extent of synchronisation of business cycles – and not least on the opinion about whether monetary union can and will make Estonia and the Euro-countries an optimal currency area or *vice versa*. In any case, Estonia is likely to benefit from the adoption of the Euro only, if adjustment mechanisms to divergent external developments are able to work, and those include in particular the flexibility of the labour market and the ability to conduct anti-cyclical fiscal policies (see for a discussion, e.g. Brixiova et al, 2009). It is clear from the analysis above that the currency board is not the best solution for Estonia in today's world that is characterised by recurring crisis and intense contagion on

¹⁴ For a discussion of the impact of the global financial crisis on public finances in CEECs and the challenges arising from the crisis in the short and medium term, see e.g. Staehr, 2010 or Darvas, 2009).

¹⁵ In an official communiqué from 27 June 2004, the EU Commission accepts Estonia to join the exchange rate mechanism ERM II with the currency board arrangement (see http://ec.europa.eu/economy_finance/publications/publication6166_en.pdf, accessed 28 February 2010). This is also attested in the convergence reports of the EU, more can be found in: www.euro.eesti.ee.

in general vulnerable transition economies. And from a more general point of view: a currency board arrangement may in any case be considered a suboptimal regime for a country in which the economy is catching up with productivity growth exceeding that of the economies it is catching up to. Relative productivity growth would necessitate exchange rate revaluations; in a fixed rate regime, the result is a gradual reduction of international competitiveness.

4 Summary and Discussion

Our analysis highlights the main transmission channels of the current global financial crisis to a selection of Central East European Countries. Those pertain mainly to the capital inflow setback, analysed by focussing on FDI inflows, that set in in some countries already in 2008 and will be more pronounced even in 2009. With capital inflows drying up, the current account deficits that are so typical amongst all transition economies, became increasingly unsustainable. The previously widely used foreign exchange borrowing both by the public and the private sectors of CEECs put additional pressure on foreign debts and their servicing.

Due to the different characteristics of the economies with respect to those transmission channels, the effects of the crisis on the real economies are very different across the countries. In particular, those with a fixed exchange rate regime (e.g. a currency board) experienced a more severe recession whilst Poland, as an example of a free float regime saw growth rates fall significantly, yet no recession.

The analysis of determinants of real economy effects of the financial crisis suggests that the most severe real economy effects, driven by the determinants explicitly included in the empirical analysis, have only set in in 2008 and 2009, i.e. somewhat later than in West Europe and at variance with the dates suggested by multinational organisations like the IMF. The analysis moreover shows that exchange rate devaluations in fact acted as a short-term buffer against the external shock in those countries where the exchange rate offered some flexibility, and that the real economy effects could be mitigated by FDI inflows and current account surpluses (or relatively small deficits). Finally, countries are found to offset to some extent the negative effect of falling FDI inflows on their real economies by likewise falling current account deficits (or increasing surpluses). Those results are largely in line with what is being discussed currently in related research.

The analysis also shows that the crisis effects are not only of a contagion kind but the current global crisis also uncovered unsustainable developments and structures within CEECs. This is an issue largely overlooked in the current academic discussion of the effects of the global crisis on CEECs. Estonia was used here as a case in point: the state-subsidized construction and housing sectors were already blown up and vulnerable before the crisis unfolded and unveiled those market developments as non-sustainable. The crisis only served as a trigger, the painful corrective process in these sectors aggravated the recession in 2009 and possibly will still do in 2010. This was exacerbated by the interest rate hike that is so typical for currency board arrangement.

Our analysis is intended to contribute to two ongoing discussions in academia and policy, namely the role of the exchange rate regime in CEECs in the run-up to their adoption of the euro and the perceived “autonomy” of economic policies in countries that are severely constrained by unbalanced external relations.

The results of this analysis show that a flexible exchange rate regime does in fact protect against contagion to some extent, but also that this protection comes at the expense of the Copenhagen convergence criterion of two consecutive years of stability within the EU's ERM II (see e.g. Poland's devaluation in the second half of 2008). On the other extreme, a fixed exchange rate comes at the expense of the interest rate criterion, according to which long-term interest rates must not be more than 2 percentage points higher than in the three lowest inflation member states (see e.g. Estonia's interest rate hikes end of 2007 and end of 2008, as well as the widening parity in long-term rates from end of 2008 onwards). If, therefore, those criteria are being applied on the basis of actual data (as frequently suggested by the European Central Bank, see e.g. Stark, 2008; Tumpel-Gugerell, 2009, yet arguably not in the strict sense in the case of Slovakia for ex-ante expectation of public debt in 2008), then neither the Polish nor the Estonian solutions are role models for a swift adoption of the Euro. Yet, the Polish situation of a (now possibly over-)corrected exchange rate may make it easier to sustain stability in ERM II, whilst the high interest rates in Estonia typically remained high even well after the crisis effects had abated in other countries.

In sum, CEECs have little room for political manoeuvre to define own national policies in light of their unbalanced integration into the EU and the accommodating capital inflows. Where there appears to be an autonomy to define national policies, they should be targeted at improving the conditions for catching up within their model of externally-generated or supported growth and development. In particular during times of dynamic change will some markets tend to inflate and create bubbles that are not sustainable in the long term and increase the vulnerability to external shocks. Though it will prove painful to actively cool down profit and income generating markets without the immediate need to do so, this is amongst the most important lessons to be learned from the real economy effects of the current global crisis.

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