Capital Inflows, Exports, and Growth in the CESEE Region*

(Preliminary Version)

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Abstract

Before the financial crisis unfolded, CESEE experienced an export boom as well as a surge in capital inflows. However, both exports and capital inflows came to a sudden halt in the wake of the financial crisis. The main question addressed in this paper is whether the long-term growth prospects of the CESEE countries are likely to have deteriorated as well. To answer this question we look at the interlinkages between capital flows, exports and industrial production. Our results show that exports and the stock of FDI in the CESEE region are positively related to industrial production and thus economic growth. By contrast, portfolio investment is only weakly related to the industrial growth performance of the CESEE countries. These findings imply that the CESEE countries should make determined efforts to remain attractive locations for inward FDI and to enhance their export prospects.

Keywords: Export-led growth, FDI, capital inflows, heterogeneous firms, cointegration, weak exogeneity test.
JEL-Codes: F43, F21, C32

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1 Introduction and Motivation

Most of the countries in Central, Eastern and Southeastern Europe (CESEE)[1] are seen as good examples of the growth-enhancing effect of downhill capital flows, i.e. capital flows from relatively capital-rich to relatively capital-poor countries, as well as for an export-led growth strategy (although recent papers on growth in the region often emphasize that growth in recent years had been too much driven by domestic demand). These two facets of the CESEE region's recent growth experience – substantial capital inflows and an export-led growth strategy – are closely interrelated and need to be seen in the context of the region's gradual EU integration, which culminated in the EU accession of 10 CESEE countries in 2004 and 2007. First, a large share of the capital flows into the region originated from the EU. These inflows, in particular inward FDI, arguably helped to build up the capital stock in the CESEE countries, thus facilitating export growth. Second, EU integration provided a major boost for the CESEE exporting industries by opening up a large market at the region's doorstep.

The economic and financial crisis, which started in 2007 (or 2008 for most of the CESEE region), had a major impact on these two facets of the CESEE growth model.[2] First, capital inflows into the region took a severe hit – although the worst-case scenario of a financial meltdown did not occur. Second, import demand in Western European countries, the region's main trading partners, was significantly reduced, although external demand has recently picked up again. Taken together, these developments led to a rise in uncertainty regarding the region's medium- and long-term growth prospects. In particular, a possible permanent decline of capital flows (Jevčák et al., 2010) was generally seen as a potential cause of concern for the long-term growth prospects of the region. In addition, there is considerable uncertainty about the long-term prospects of external demand (Francois and Wörz, 2009; Keppel and Wörz, 2010).

In this paper, we approach the issue of medium-term growth prospects for the CESEE region by testing empirically the available evidence for both the investment-led growth hypothesis and the export-led growth hypothesis. These two hypotheses are often mentioned in the literature as important elements of the CESEE growth model, but to the best of our knowledge, they have not been tested jointly to date. Still, we believe that a rigorous

[1] We focus on the following countries: Bulgaria, Czech Republic, Croatia, Estonia, Hungary, Latvia, Lithuania, Poland, Romania, Slovakia and Slovenia

[2] On the impact of the crisis on the region, see e.g. Gardó and Martin (2010).

quantitative cross-country examination of the interlinkages between capital flows, exports and industrial production can help to assess the possible long-term implications of the economic and financial crisis for the countries in the region.[3]

The paper is organized as follows. Section 2 reviews the relevant literature. Section 3 provides stylized facts on the key variables we are using, and section 4 describes the estimation strategy as well as the empirical results. Section 5 concludes and proposes some policy recommendations.

2 Literature Overview

2.1 Foreign Activities and Economic Growth

There is a long tradition of economic theories relating exports and other foreign activities to economic growth. Basically, these arguments go back to mercantilism and classical trade theories as presented by Adam Smith and David Ricardo. The importance of economic openness for growth gained popularity again when a number of Southeastern Asian emerging market economies (EMEs), e.g. Hong Kong, South Korea, Taiwan and Singapore, posted very rapid growth, especially between 1960 and 1980.[4] This was generally seen as a result of these countries opening up their economies, reducing trade barriers and attracting FDI. More generally, these explanations for rapid growth in a number of very open economies resulted in the development of the export-led growth hypothesis (Balassa, 1978; Marin, 1992). This theory, in turn, was also one of the intellectual arguments in favor of a rapid economic opening-up of the CESEE countries after the end of the cold war and their integration into the EU.[5]

Nevertheless, the theoretical explanation of the export-led growth hypothesis remained rather weak. Several authors proposed models including learning-by-exporting effects (Krugman, 1980; Grossman and Helpman, 1991; Bernard et al., 2003), but the empirical evidence

[3] Besides addressing this important policy question, the paper also extends the existing literature in this field by using more recent empirical approaches such as cointegration analysis and weak exogeneity tests.

[4] For a critical discussion with a focus on Korea, see Rodrik (1995).

[5] More recently, the dynamic growth in China and India is often also seen from this perspective (Herrerias and Orts, 2010).

supporting these models remained weak.[6] More recently, foreign trade theory based on heterogeneous firms (Melitz, 2003; Helpman et al., 2004) stressed the relationship between productivity and different modes of international activities. In this strand of the literature, the productivity of firms at the domestic level is regarded as a major determinant of activities abroad. Once a firm achieves a certain productivity threshold, it starts to export to foreign markets. The most productive firms also set up subsidiaries abroad, which in turn inherit the high productivity from their parent companies. This link ("pecking order") between activities abroad and the relative level of productivity is due to the relationship between transport costs or the fixed costs of market entry and the variable costs of serving foreign markets from the home location. Only firms with a sufficiently high productivity level can export and compete with local firms. The productivity differential must be so high that products are competitive although they are subject to transport costs. Furthermore, only the most productive firms can afford to invest abroad, which is the microeconomic explanation why such inward investment flows increase the aggregate productivity level in the receiving country. This "self-selection channel" (Wagner, 2007) between foreign activity and productivity is referred to as the extensive margin of trade and FDI in the new trade literature. At the macroeconomic level, the access of the most productive firms to foreign markets causes a link between foreign activity and growth, which is at the core of the export- and investment-led growth hypothesis.

2.2 Capital Inflows and Growth

The second facet of the CESEE growth model that we address in this paper – the substantial capital inflows in recent years – triggered a large amount of research that focused on its determinants and economic implications. Starting with the determinants for downhill capital flows, Lane (2008) emphasizes that EU accession implied lifting all capital controls at the time of accession at the latest and resulted in a range of institutional provisions that arguably fostered capital inflows. In addition, the region's increasing financial integration with the EU, in particular the widespread foreign ownership of the CESEE banking sector, also contributed to capital inflows (Herrmann and Winkler, 2008).[7]

Turning to the economic implications of capital inflows into the region, Mileva (2008) finds that during the period 1995–2005, FDI into 22 transition countries added to the capital stock

6 While some authors found that exports had a positive impact on firms' productivity (Baldwin and Gu, 2003; Blalock and Gertler, 2004), others found no such impact (Bernard and Jensen, 1999; Arnold and Hussinger, 2005).

7 On the determinants of capital flows, see also e.g. Gibson and Tsakalotos (2004).

and stimulated additional investment in the host countries, at least in the less advanced transition economies. By contrast, loans (often from parent banks to local subsidiaries) are found to have only a significant positive effect on other investment in advanced transition economies, notably the new EU Member States and candidate countries. Mileva finds no significant effect for portfolio capital inflows. In another cross-country study, Gheeraert and Malek Mansour (2005) use a structural econometric model based on earlier work by Islam (1995) and find a significantly positive relationship between private capital flows and economic growth in 45 EMEs, including five CESEE countries as well as Russia. The results for FDI are, however, considerably more significant than for portfolio and equity investment.

Generally speaking, the academic debate on capital inflows into CESEE tended to be less skeptical of possible negative effects than it was for other emerging market regions (von Hagen and Siedschlag, 2008). This was partly because a relatively large share of capital inflows was FDI, which is seen as less volatile and more beneficial for economic development than short-term capital flows (Abiad, Leigh and Mody, 2009). Lane and Milesi-Ferretti (2006) argued, for example, that the large capital inflows to the CESEE countries had a positive impact on convergence and stressed that FDI provided "attractive risk-sharing and technological benefits." Other authors emphasized, however, that the sustainability of the rapid convergence process in these countries depends also on the use of capital inflows. For instance, Bems and Schellekens (2007) argue that the recent rapid financial deepening process in emerging Europe disproportionately benefited the non-tradable sector including real estate and construction rather than exports.[8] Following the same line of reasoning, Atoyan (2010) maintains that future growth in the CEE countries should rely more on exports rather than domestic demand and more on domestic savings rather than foreign capital. Another hotly debated issue related to recent capital inflows into the region is whether credit growth is still an equilibrium phenomenon. Zumer, Egert and Backé (2009) argue that the ratio of private sector credit stocks to GDP reached or surpassed its estimated equilibrium level by early 2009 in most countries of the region.

Looking at EMEs outside the CESEE region, Sethi and Patnaik (2007) find long-run equilibrium relationships between private capital inflows into India, economic growth and the exchange rate for the period 1995–2006. More specifically, they find that FDI and, to a

[8] Supporting this argument, Brixiova et al. (2009) find that the massive recent capital inflows into Estonia led to an excessive allocation of resources in the non-tradable sector.

smaller extent, portfolio investment are positively affecting economic growth, while foreign institutional investment (FII) has a negative effect.[9] The BIS Committee on the Global Financial System (BIS, 2009) finds cross-country evidence that equity flows, especially FDI, are beneficial for growth because they diversify risk abroad and are often linked with a transfer of valuable expertise. By contrast, the benefits from debt flows are found to be more ambiguous. In fact, the report suggests that the opening up of capital accounts only exerts a positive impact on the level of real income via the broadening and deepening of domestic financial markets, the strengthening of local financial institutions and the improvement of macroeconomic policies. The liberalization of capital flows is actually found to entail economic dangers if these elements are absent. Sabarowski (2009) looks at the appreciation of the real exchange rate due to capital inflows and the resulting possible destabilization of the macroeconomic situation. In line with the BIS report, he argues that this effect can be partly mitigated by developing a deep financial sector. Moreover, he finds that flexible exchange rate regimes help to reduce the negative impact of capital inflows on the real exchange rate.

The long-term implications of the crisis for the growth prospects of the region have been widely discussed since the global economic and financial crisis started to affect the CESEE region, inter alia via a considerable decrease in capital imports and a collapse in export demand. Furceri and Zdzienicka (2010), looking at 11 European transition economies, find a stronger negative long-term effect on output in smaller transition countries with a relatively higher dependence on external financing. They also find that this negative effect is much stronger in transition countries than in more advanced EU economies.[10]

To what extent external financing will resume remains to be seen, however. In the fall of 2009, the IMF (2009) assumed that FDI inflows to emerging Europe would decline by 49% in the 2008-14 period compared to 2004-07. Based on this and other assumptions, the IMF predicted a substantial drop in medium-term growth for emerging Europe. By spring 2010, capital inflows to some – but not all – of these countries had resumed, and the focus of the debate shifted back to making the best use of capital inflows, and notably to finding an appropriate balance between the tradable and non-tradable sector (IMF, 2010).

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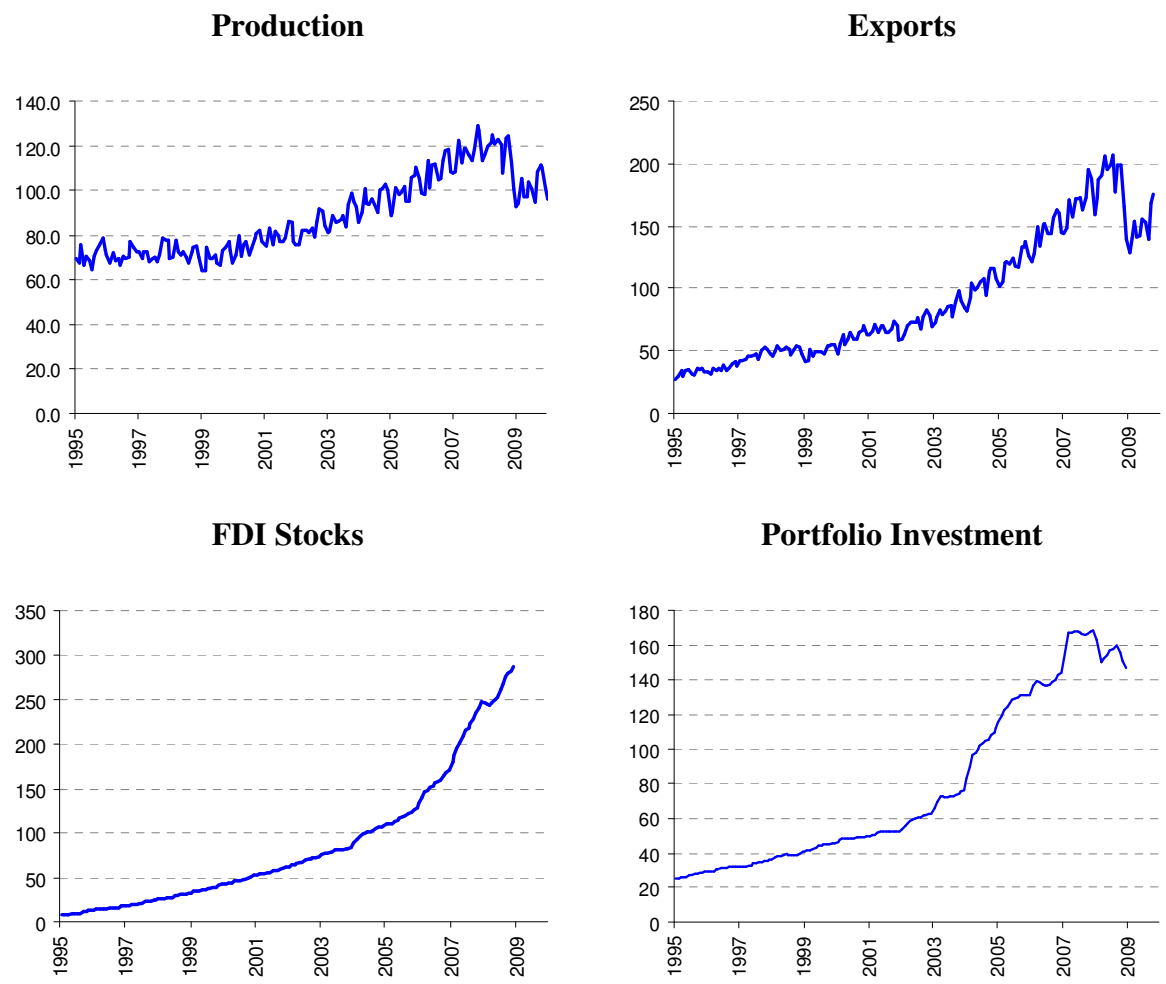
[9] Kim and Yong Yang (2008) find that inflows into South Korea led to a rise in stock prices but not land prices.

[10] In a related analysis on a much larger sample of countries, Abiad et al. (2009) find that output tends to be substantially depressed following banking crises with no rebound to the pre-crisis trend. The recent international economic and financial crisis did not, however, result in "classic" banking crises in the CESEE region, thus limiting the applicability of these findings.

Chart 1: Stylized Facts on Production, Exports and Capital Flows



Note: Unweighted average of 11 CESEE countries, May 2004=100.

Source: IMF, ECB, OeNB.

3 Stylized Facts

In this section, we provide some stylized facts about the key variable used in the empirical analysis conducted in section 4 of the paper, namely exports, industrial production (excluding construction) and the stock of FDI and portfolio investment in the CESEE countries for the period 1995–2009. Looking first at exports, the (unweighted) CESEE aggregate shows an upward trend over time until the international economic and financial crisis hit the region in 2008 (chart 1). The rate of growth for the regional aggregate accelerated around 2003, i.e. just before the EU accession of eight CESEE countries. A look at the development of exports country by country (chart A1 in the annex) shows some country-specific differences, for

example with regard to the severity of the impact of the 2008 crisis, but the overall picture is rather homogeneous.

Turning to the index of industrial production (excluding construction), a rather steady increase can be observed both in the CESEE aggregate charts and the country-specific charts (chart A2 in the annex). In addition, the impact of the 2008 crisis is also clearly visible in almost all countries under review. A closer look at the scaling of the index shows, however, that the growth rate of industrial production was much less pronounced than that of exports. Whereas a number of countries in the sample, e.g. Bulgaria, Croatia, Lithuania, Latvia and Romania, managed to increase their exports from around 50% of the 2004 level to almost 300% of that level just before the crisis, the corresponding growth pattern for industrial production seems much more modest und ranges generally from around 80% of the 2004 level in the late 1990s to around 150% of that level before the start of the crisis. The differences in the relative development of these indicators suggest that the CESEE economies became substantially more open over time.

The development of the stock of FDI and portfolio investment also shows a strong increase over time. Given that this is a stock variable, the impact of the 2008 economic and financial crisis is, however, less visible than for exports and industrial production. By contrast, the step change in growth around the time of EU accession in 2004 is more noticeable for the stock of FDI and portfolio investment than for the other two indicators. The country-specific charts in the annex (chart A3) show that cross-country differences are also more pronounced than for the other two variables. Using May 2004 as the base level again, the FDI stock in some CESEE countries, such as Bulgaria, Hungary and Romania, had increased by a factor of around five to six by 2009.

Overall, the stylized facts for the three key variables we will be using in the analysis below suggest some strong similarities, in particular a dynamic growth pattern up until the outbreak of the economic and financial crisis in the CESEE region in 2008, the (more or less pronounced) positive change in the rate of growth around the time of EU accession and different degrees of heterogeneity across countries.

4 Empirical Analysis

4.1 Tests of Export- and FDI-Led Growth

A major problem for the empirical analysis relates to the availability and quality of the necessary data. Because standard quarterly time series are relatively short, we use monthly proxies including industrial production and exports. Stocks of FDI are interpolated into monthly data because there are no monthly proxies for these time series. Given the high persistence of FDI stocks, this is not likely to bias the results. All variables are in logs and are seasonally adjusted using the standard X12 seasonal filter. Standard unit root tests confirm that all variables can be considered as integrated variables.[11]

The modern literature on trade, FDI and productivity concentrates on the analysis of individual firm data. However, in view of the limited data availability, we concentrate on aggregate data for industrial production, exports, and FDI for 11 CESEE economies (Bulgaria, Czech Republic, Croatia, Estonia, Hungary, Latvia, Lithuania, Poland, Romania, Slovakia and Slovenia). For most countries, the data start in 1995. For some countries, however, data are only available from the end of the 1990s.

We use the stock of inward FDI, because outward FDI is generally not important in CESEE. On the one hand, this corresponds with the investment-led growth hypothesis. On the other hand, outward FDI may have ambiguous effects. In particular, it can support domestic production by supplying cheap intermediate materials. It can also increase the demand potential for domestic products. However, outward FDI can also have a negative effect on domestic production, if it is related to outsourcing of labor-intensive parts of the production process. The CESEE countries are therefore especially attractive for testing the investment-led growth hypothesis, because only a few large firms in the region are also active as investors abroad.

Output, exports, and the stock of FDI are expected and found to be non-stationary. We therefore estimate the following vector error correction model:

$$\Delta \mathbf{X}_t = \boldsymbol{\alpha}\boldsymbol{\beta}\mathbf{X}_{t-1} + \sum_{i=1}^{p} \mathbf{A}_i \Delta \mathbf{X}_{t-i} + \boldsymbol{\varepsilon}_t \qquad (1)$$

where vector **X** includes output and the selected variable of foreign activity (exports or FDI). Furthermore, the long-run relationship includes also the deterministic components (intercept,

[11] Detailed results are available upon request from the authors.

trend, and selected dummy variables for EU membership, the Russian crisis and the current financial crisis or similar events). While the cointegration approach corresponds to the time series properties of the analyzed data, this approach also reflects that all variables are possibly endogenous. On the one hand, exports or investment abroad are expected to react to productivity growth. On the other hand, output might catch up as a result of exports and investment, which enhance productivity (although the theoretical literature does not discuss this channel). The coefficients estimated on the error correction term, which are the elements of the vector α, show how important these channels are for particular variables. These coefficients will therefore receive particular attention in the discussion of the results.

4.2 Estimation Results and Weak Exogeneity Tests

We start with the estimation of the export-led growth hypothesis in table 1. Panel B shows that a robust cointegrating relationship between industrial production and exports can be found for all selected countries. Panel A reports the estimated cointegration relationships. In general, we can see a strong relationship between exports and production. The coefficients are very close to unity in all countries with the exception of the Czech Republic and Slovenia. In turn, we find a surprisingly high coefficient for Estonia only (1.9). The cointegration tests confirm that the estimated relationship is a cointegrating relationship for all countries. However, the results are rather sensitive to outliers and policy changes, which are covered by various dummies (including especially EU membership, Russian crisis, financial crisis, etc.).

When we compare these results with the results for the relationship between industrial production and FDI (table 2), we can see that the latter relationship is slightly weaker. In particular, the cointegration tests present mixed evidence on the existence of a cointegrating relationship between industrial production and FDI for Bulgaria, the Czech Republic and Slovakia. This outcome may, however, also reflect data restrictions, given that the stock of FDI relates to the whole economy and not only the industrial sector.

Despite these problems, we get robust cointegrating relationships between FDI and industrial production in all countries. FDI seems to be a highly significant determinant of industrial production in all CESEE countries (and particularly so in Lithuania and Slovakia), which broadly confirms the FDI-led growth hypothesis for the countries in the region.

Table 3 presents the results for portfolio investment, which performs much worse than the previous specifications. This is not really surprising, also in view of some empirical studies mentioned above, because portfolio investments are less related to technology transfers than

FDI. More specifically, a cointegration relationship appears to exist only for Latvia, Lithuania and Poland. However, the coefficient for portfolio investment in the growth equation for Lithuania is negative and the coefficient for Latvia is low compared to previous FDI-based estimations.[12] Overall, the results do not provide much support for possible growth effects of portfolio investments in the CESEE region.

Further insights can be gained from the inspection of the estimated coefficients for the correction terms. In particular, the last panels of tables 1 and 2 present the results of the weak exogeneity tests, i.e. the likelihood ratio tests of the restriction that a particular adjustment coefficient is set to zero. This constraint should be rejected if a particular variable adjusts to deviations from the common trend. The results of the estimations with portfolio investments are not presented, because we did not find stable cointegrating relationships for these specifications.

The weak exogeneity tests show that in many cases either production or external activity is important for long-run growth. In general, the adjustment coefficient for the external variables, especially FDI, seems to be more significant than that estimated for industrial production. This casts some doubt on the positive effects of extremely high capital inflows to these countries. It seems that the absorption capacity in CESEE countries was below the volume of inflows in some periods, an interpretation which is broadly confirmed by the behavior of the error correction terms.

Looking at individual countries, output growth in Poland, Romania, Slovakia, and Slovenia profited highly from exports and FDI. By contrast, in Bulgaria and Hungary the effect on growth was less pronounced. Quite the opposite, foreign activity adjusted to growth in these countries. The remaining economies do not show a clear pattern of growth.

5 Conclusions and Policy Recommendations

As of 2008, the CESEE economies were strongly affected by the economic and financial crisis, with the effects being mainly transmitted through the trade and financial channel (Gardó and Martin, 2010). All countries of the region suffered from severe declines of external demand and much lower (at times even negative) capital inflows. The growth implications for the region were dramatic. In fact, the CESEE region was more seriously

[12] For the remaining countries, the estimated long-run relationships are often insignificant (e.g. Slovakia), low in comparison to previous FDI coefficients (e.g. Slovenia) or negative (e.g. Croatia).

affected than any other region worldwide, with performance being especially low when compared to other EMEs, notably China and India (Fidrmuc and Mayer, 2010).

The main question addressed in this paper is whether the long-term growth prospects of the CESEE countries are likely to have deteriorated as well. To answer this question – even though the prospects for external demand and capital inflows are still unknown – we look at the interlinkages between capital flows, exports and industrial production. Our results show that exports and the stock of FDI in the CESEE region are positively related to industrial production and thus economic growth. In nearly all CESEE countries under review, exports and FDI have a significant impact on industrial growth performance. Exports seem to be more important than the stock of FDI, but this may at least partly reflect statistical problems. By contrast, portfolio investment is only weakly related to the industrial growth performance of the CESEE countries.

A number of policy implications can be derived from this analysis. First, the importance of the FDI stock for industrial production implies that the CESEE countries should make determined efforts to remain attractive locations for inward FDI. Such efforts can include a diverse set of policy measures ranging from macroeconomic stability to microeconomic (structural) reforms. Second, a reduction of portfolio investments is unlikely to have significant repercussions for the growth prospects of the region. In fact, the literature on capital inflows suggests that large portfolio inflows may at times also entail economic risks. Third, countries should undertake suitable policies to enhance their export prospects, ranging from specific measures such as export promotion to more general policy reforms, which are often closely related to those that help supporting a countries' attractiveness for FDI inflows.

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Annex

Table 1: Production and Exports in Selected CESEE Countries

A. Estimation Results

	Bulgaria	Czech R	Croatia	Estonia	Hungary	Latvia	Lithuania	Poland	Romania	Slovakia	Slovenia
Period	00:3-09:12	95:4-09:12	95:4-09:12	98:4-09:11	95:4-09:10	99:1-09:11	97:4-09:12	95:4-09:10	95:4-09:12	95:3-09:11	95.4-09:12
Lags	1	2	2	2	2	2	2	2	2	2	2
No. of observations	118	177	177	140	175	131	153	175	177	177	177
Exports	1.135	0.472	0.694	1.933	0.779	0.916	0.675	0.761	0.875	0.820	0.368
t-stat	*12.997*	*8.651*	*19.348*	*5.996*	*18.852*	*8.599*	*16.093*	*10.920*	*7.620*	*9.950*	*18.587*
Intercept	1.481	1.133	1.989	-3.564	-2.601	3.941	2.338	0.549	1.038	-0.775	1.688

B. Cointegration Tests

	Bulgaria	Czech R	Croatia	Estonia	Hungary	Latvia	Lithuania	Poland	Romania	Slovakia	Slovenia
Trace statistics	18.140 **	18.321 **	37.734 ***	18.911 **	28.359 ***	15.536 **	16.507 **	20.521 ***	24.608 ***	21.062 ***	22.695 ***
p-value	0.020	0.018	0.000	0.015	0.000	0.049	0.035	0.008	0.002	0.007	0.004
ME Statistics	17.968 **	18.174 **	36.589 ***	16.815 **	24.829 ***	14.669 **	16.089 **	20.377 ***	21.381 ***	19.312 ***	21.209 ***
p-value	0.012	0.012	0.000	0.019	0.001	0.043	0.026	0.005	0.003	0.007	0.003

C. Weak Exogeneity Tests

	Bulgaria	Czech R	Croatia	Estonia	Hungary	Latvia	Lithuania	Poland	Romania	Slovakia	Slovenia
Ind. production	0.485	15.513 ***	3.045 *	1.469	1.774	4.229 **	11.853 ***	13.567 ***	10.922 ***	5.882 **	19.359 ***
p-value	*0.486*	*0.000*	*0.081*	*0.226*	*0.183*	*0.040*	*0.001*	*0.000*	*0.001*	*0.015*	*0.000*
Exports	14.974 ***	1.765	27.109 ***	13.837 ***	7.018 ***	4.172 **	1.235	0.903	4.089 **	3.072 *	5.481 **
p-value	*0.000*	*0.184*	*0.000*	*0.000*	*0.008*	*0.041*	*0.266*	*0.342*	*0.043*	*0.080*	*0.019*

Note: Dummy variables for EU membership, Russian and financial crisis or similar events are not reported. Source: Own estimations.

Table 2: Production and FDI in Selected CESEE Countries

A. Estimation Results

	Bulgaria	Czech R	Croatia	Estonia	Hungary	Latvia	Lithuania	Poland	Romania	Slovakia	Slovenia
period	00:3-09:9	95:4-09:9	95:4-09:9	98:4-09:9	95:4-09:09	99:1-09:9	97:4-09:9	95:4-09:9	98:1-09:9	95:4-08:12	96:5-09:9
lags	1	2	2	2	2	2	2	2	2	2	2
No. of obs.	115	174	174	138	174	129	150	174	141	165	172
FDI	0.457	0.268	0.451	0.516	0.789	0.314	1.715	0.685	0.342	0.976	0.157
t-stat	*8.759*	*4.767*	*8.509*	*12.494*	*9.379*	*2.413*	*4.878*	*6.386*	*9.257*	*3.694*	*5.727*
trend						-0.013				-0.019	
t-stat						*-5.254*				*-2.995*	
intercept	2.138	2.010	1.933	1.142	-4.328	-4.859	-3.980	-0.737	2.302	1.614	3.107

B. Cointegration Tests

	Bulgaria	Czech R	Croatia	Estonia	Hungary	Latvia	Lithuania	Poland	Romania	Slovakia	Slovenia
Trace Statistics	15.384 *	16.369 **	50.073 ***	29.905 ***	54.505 ***	36.030 ***	18.493 **	19.664 **	29.485 ***	29.454 **	19.508 **
p-value	0.052	0.037	0.000	0.000	0.000	0.002	0.017	0.011	0.000	0.017	0.012
ME Statistics	15.380 **	13.598 *	48.160 ***	27.708 ***	53.839 ***	34.136 ***	15.309 **	19.158 ***	28.982 ***	18.987 *	16.999 **
p-value	0.033	0.064	0.000	0.000	0.000	0.000	0.034	0.008	0.000	0.057	0.018

C. Weak Exogeneity Tests

	Bulgaria	Czech R	Croatia	Estonia	Hungary	Latvia	Lithuania	Poland	Romania	Slovakia	Slovenia
Ind. production	2.474	10.140 ***	3.814 *	17.936 ***	0.514	26.825 ***	2.447	11.414 ***	21.085 ***	7.779 ***	14.196 ***
p-value	*0.116*	*0.001*	*0.051*	*0.000*	*0.473*	*0.000*	*0.118*	*0.001*	*0.000*	*0.005*	*0.000*
FDI	13.895 ***	1.971	43.846 ***	9.503 ***	50.107 ***	8.075 ***	9.462 ***	6.282 **	11.718 ***	0.696	0.278
p-value	*0.000*	*0.160*	*0.000*	*0.002*	*0.000*	*0.004*	*0.002*	*0.012*	*0.001*	*0.404*	*0.598*

Note: Dummy variables for EU membership, Russian and financial crisis or similar events are not reported. Source: Own estimations.

Table 3: Production and Portfolio Investment in Selected CESEE Countries

A. Estimation Results

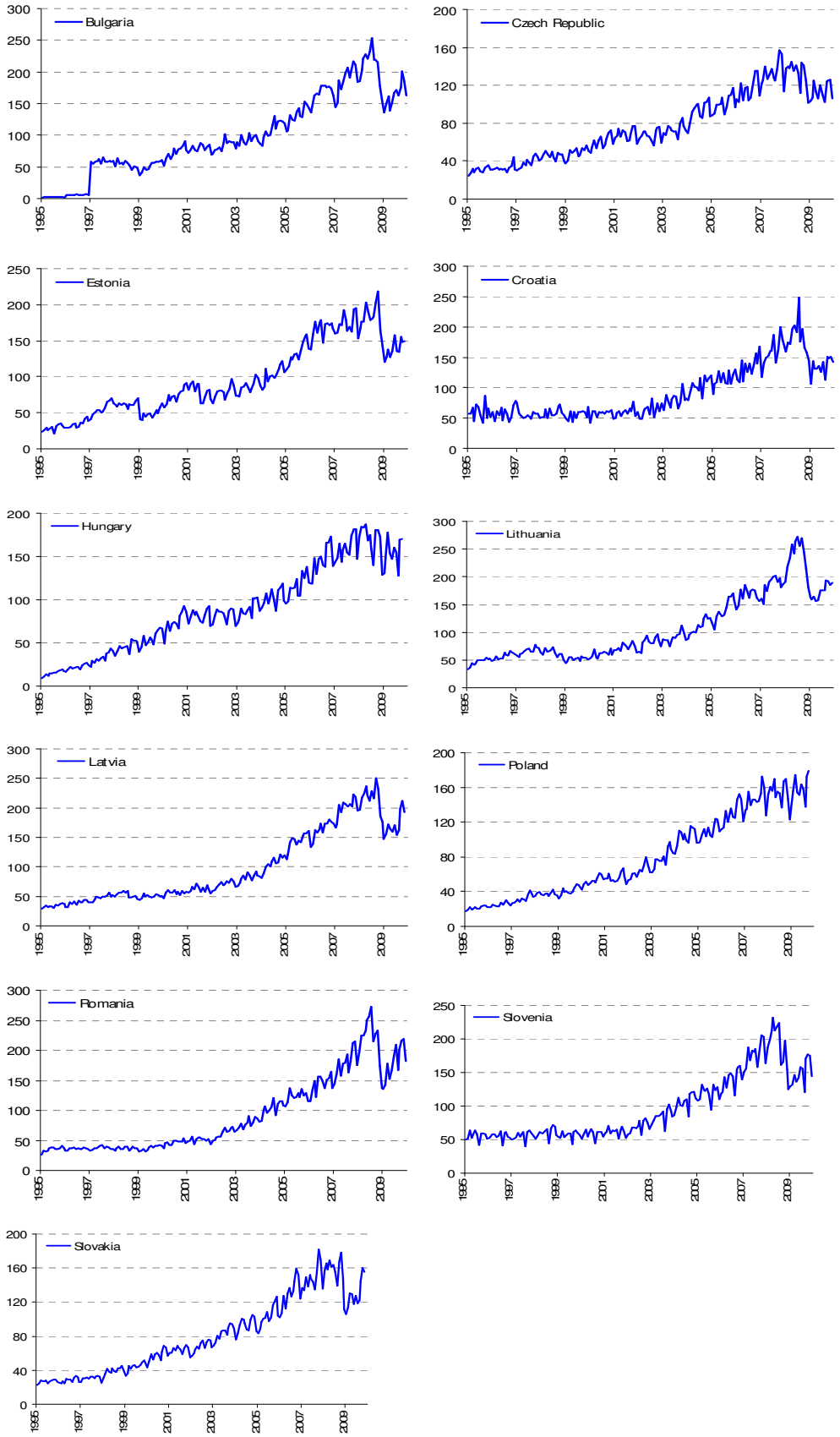
	Bulgaria	Czech R	Croatia	Estonia	Hungary	Latvia	Lithuania	Poland	Romania	Slovakia	Slovenia
Period	00:3-09:9	95:4-09:9	95:6-09:9	98:4-09:9	95:4-09:9	99:01-9:09	97:4-09:9	95:4-09:9	98:1-09:9	95:4-08:12	95:4-09:9
Lags	1	2	2	2	2	2	2	2	2	2	2
No. of observations	115	174	172	138	174	129	150	174	141	165	174
PI	0.952	1.020	-0.209	6.596	1.514	0.573	-0.031	1.829	0.703	0.028	0.193
t-stat	*2.593*	*3.832*	*-1.717*	*3.017*	*7.207*	*5.621*	*-0.506*	*6.494*	*4.151*	*0.256*	*4.315*
Trend	0.012									0.003	
t-stat	*6.091*									*2.258*	
Intercept	1.433	-3.907	5.643	-30.100	-12.066	3.729	4.527	-8.450	1.404	-4.016	2.967

B. Cointegration Tests

	Bulgaria	Czech R	Croatia	Estonia	Hungary	Latvia	Lithuania	Poland	Romania	Slovakia	Slovenia
Trace statistics	17.640	14.349 *	15.726 **	12.267	14.366 *	23.605 ***	19.954 ***	33.413 ***	12.874	9.620	24.463 ***
p-value	0.369	0.074	0.046	0.145	0.073	0.002	0.010	0.000	0.120	0.940	0.002
ME statistics	14.714	12.238	13.337 *	9.602	13.389 *	20.739 ***	16.886 **	33.019 ***	12.787 *	8.063	13.312 *
p-value	0.210	0.102	0.070	0.239	0.068	0.004	0.019	0.000	0.085	0.816	0.070

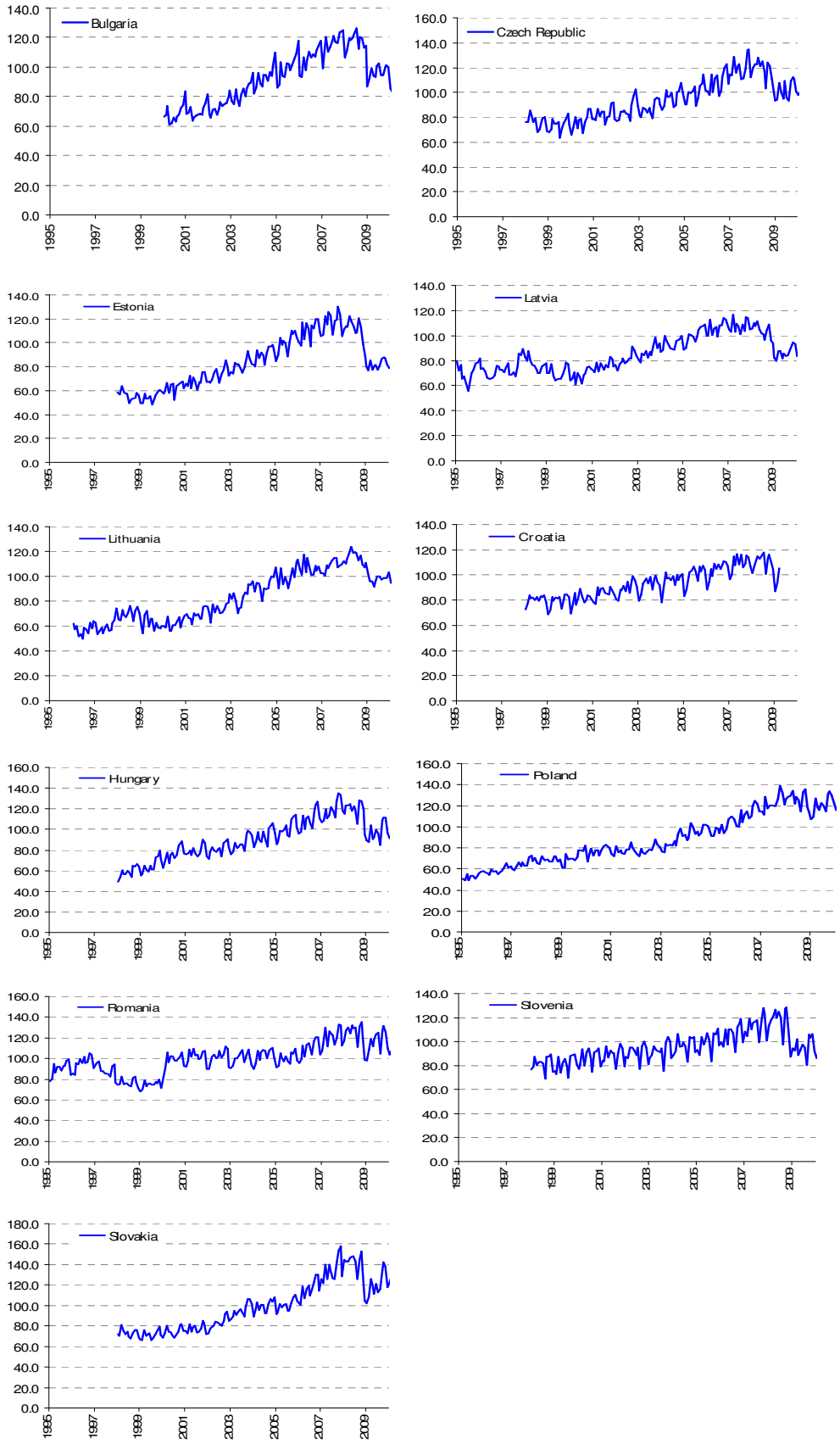
Source: Own estimations.

Chart A1: CESEE Exports (May 2004=100)



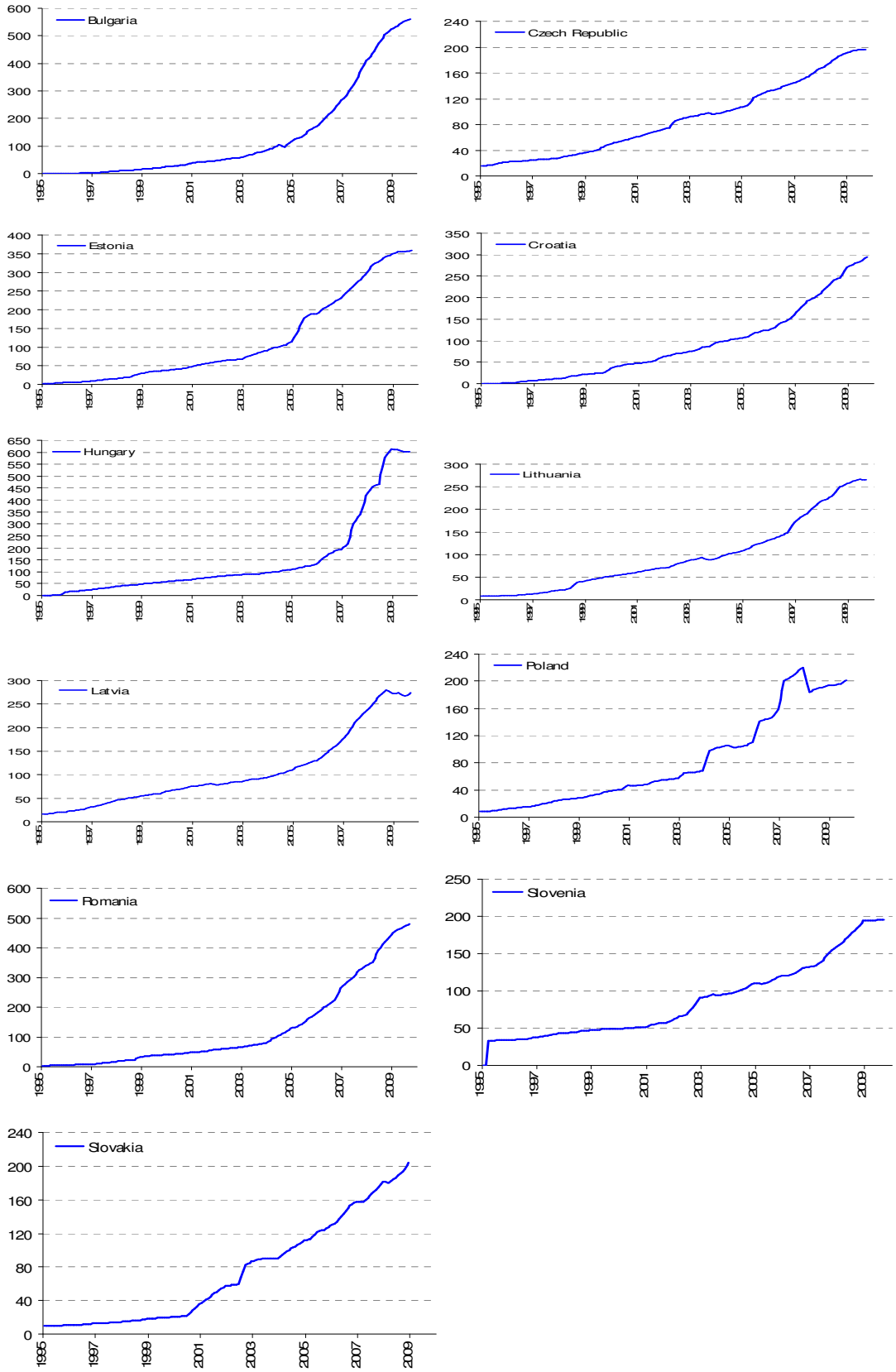
Source: IMF, ECB, OeNB.

Chart A2: CESEE Industrial Production (May 2004=100, excluding construction)



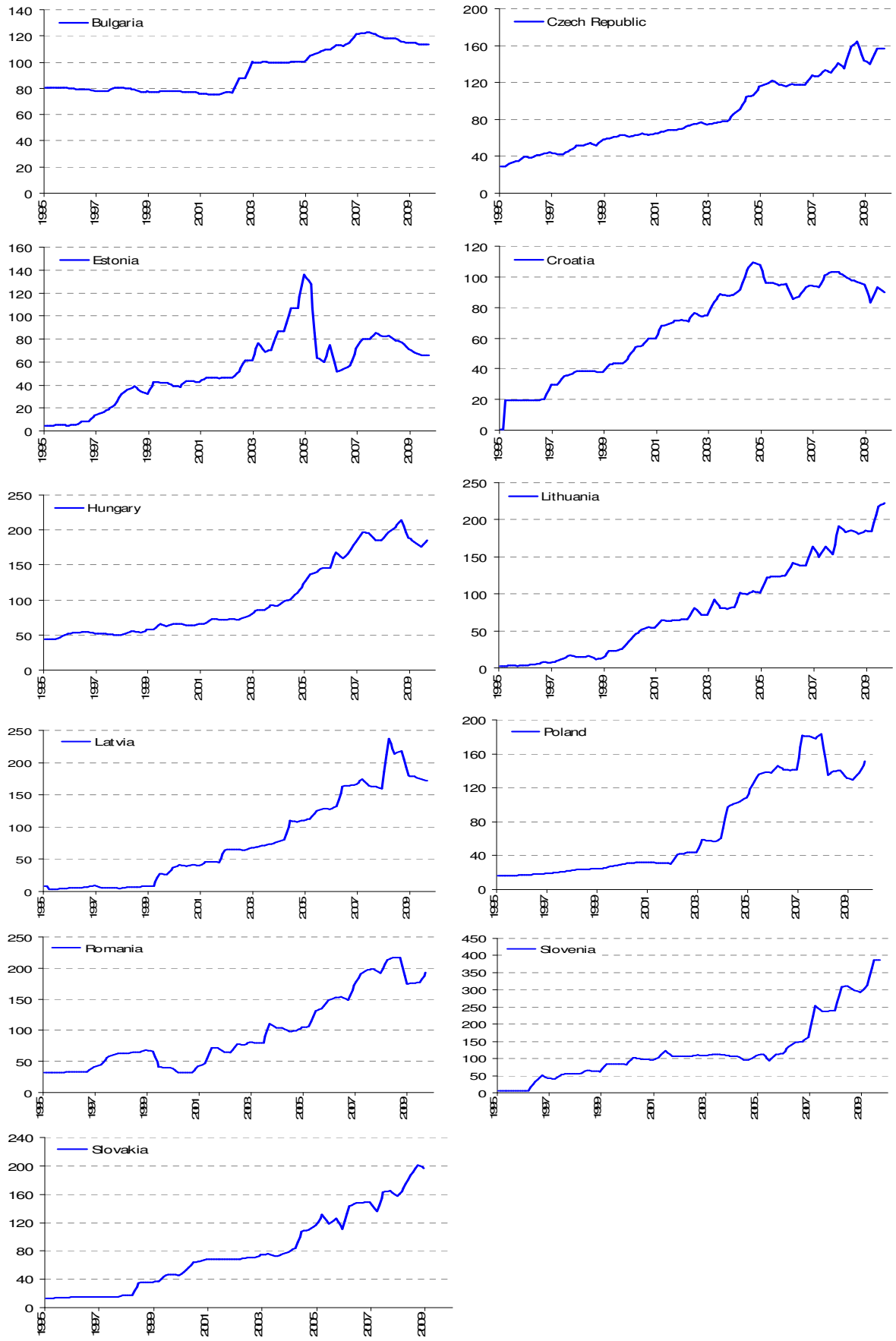
Source: IMF, ECB, OeNB.

Chart A3: Foreign Direct Investment Stock in CESEE (May 2004=100)



Source: IMF, ECB, OeNB.

Chart A4: Portfolio Investments in CESEE (May 2004=100)



Source: IMF, ECB, OeNB.