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Convergence in Emerging Europe: Sustainability and Vulnerabilities

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Abstract

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The emerging European economies have been converging rapidly towards the more advanced European economies in recent years. However, large external imbalances in parts of the region have raised questions about sustainability and concerns about vulnerabilities. Empirical evidence in this paper suggest that the convergence trend of emerging Europe is based on strong fundamentals and is expected to continue, but at a slower pace. Moreover, the convergence path may be volatile as countries with large external imbalances adjust, with risks of a hard landing in some cases.

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I. INTRODUCTION

Emerging economies in Europe have been growing at a fast pace in recent years.¹ The region's annual real GDP growth has averaged 5.9 percent so far this decade (2001-2007), accelerating the recovery that started in the late 1990s.² Compared with other emerging economies, only emerging Asia grew faster in recent years. This performance has allowed emerging Europe to start closing its large income gap from the advanced European economies.

However, the sustainability of the current pace of convergence in emerging Europe has been recently questioned, because of overheating concerns and vulnerabilities due to large external imbalances. Some countries in the region have current account deficits and levels of external debt that are well above those seen in other emerging economies, not only in recent years, but also in recent decades. The eventual adjustment of these external imbalances and how it will take place will have implications for the growth performance of the region. In the meantime, some countries in emerging Europe are exposed to external shocks that could lead to a hard landing.

This paper addresses the question of sustainability of Emerging Europe's convergence and whether it could be jeopardized by large external imbalances. First, we attempt to determine the region's potential growth based on fundamentals, by using estimates from a production function and from a cross-country growth model. Second, we estimate the external imbalances that would be expected during regional convergence, using a methodology developed in Blanchard and Giavazzi (2002). And third, we simulate a debt-accounting framework developed in Milesi-Ferretti and Razin (1997) to determine the dynamics of external debt in response to a number of adverse shocks. The results are then used to discuss policy implications and challenges looking forward.

The analysis of emerging Europe's fundamental growth prospects and vulnerabilities suggests the following:

- The convergence trend of emerging Europe is based on strong fundamentals and is expected to continue. Potential growth, determined by existing fundamentals, is relatively high. Growth-enhancing reforms have progressed in most countries, recent growth has been driven primarily by productivity improvements, and investment has increased throughout the region. Large current account deficits are to some extent expected during regional convergence. Moreover, high levels of foreign direct investment and the absence of strong exchange rate appreciations in the region are reassuring.

¹ The group of emerging European economies in this paper include: Albania, Belarus, Bosnia & Herzegovina, Bulgaria, Croatia, the Czech Republic, Estonia, Hungary, Latvia, Lithuania, Macedonia, FYR, Moldova, Poland, Romania, Russia, Serbia, the Slovak Republic, Turkey and Ukraine.

² The region shrunk by an annual average of 5 percent during the first half of the 1990s.

- However, the region's growth is likely to ease. Growth rates in recent years have been well above estimates of potential growth for most countries. Reforms in some parts of the region have not progressed enough to sustain current growth rates. Recent growth has been driven primarily by the production of nontradables while the necessary, gradual shift of capital and labor toward the production of tradables is likely to involve adjustment costs.
- The convergence path may be volatile in countries with large external imbalances, with risks of a hard landing. Current account deficits, although not inconsistent with regional convergence, are well above estimates justified by fundamentals and subject to risks of an abrupt adjustment in most cases. High levels of external debt are a source of vulnerability, and debt dynamics are particularly sensitive to exchange rate movements.
- Structural reforms have been essential to raise potential growth, suggesting that, together with sound macroeconomic policies, further progress in this area will be key to ensure a smooth convergence in emerging Europe.

The extent to which these conclusions apply varies by region within emerging Europe. The Baltics have accumulated considerably larger external imbalances than the rest of the region. Although faster progress in structural reforms has increased their flexibility, adjustment to shocks may still be difficult, as their fixed exchange rate regimes preclude nominal exchange rate adjustment to cushion the impact of shocks. External imbalances in Southeastern Europe, albeit smaller, are also sizable and have been deteriorating. Moreover, these economies lag behind in structural reforms and may lack the capacity to adjust swiftly to shocks. In contrast, most of the Central-eastern European economies have smaller external imbalances and are relatively advanced in reforms, thus mitigating vulnerabilities.

II. EMERGING EUROPE'S CONVERGENCE

According to the neoclassical growth model (see Barro and Sala-I-Martin (2004)), economies with relatively low per capita income should be converging to their more developed peers, assuming that they have the same steady state. This suggests that controlling for the steady state, cross-country income disparities should be falling over time. Indeed, a large number of empirical studies have found conditional convergence, after controlling for variables related to investment, macroeconomic and structural policies, demographics, institutions, trade policy, and human capital.³ Unconditional convergence, on the other hand, does not seem to hold. If anything, the norm seems to be divergence, as documented for long historical time series in Pritchett (2004).

³ See Barro and Sala-I-Martin (2004).

In contrast to the historical norm and the experience in the rest of the world, there is clear evidence of unconditional convergence in the European economy in recent years. Figure 1 shows the correlation between Purchasing Power Parity (PPP) per capita GDP in 2003 and its growth rate in the period 2003-2007 in Europe and in the rest of the world. While the correlation is slightly positive for the latter group, it is strongly negative for the former. After the volatile 1990s, growth in emerging European economies accelerated sharply, reaching rates second only to the ones achieved in emerging Asia. Tighter integration with the more advanced European economies has allowed emerging Europe to grow considerably faster than countries in other regions with similar income levels, allowing it to display real convergence.⁴

On the supply side, recent growth in emerging Europe has been driven primarily by services, followed by industrial production (Figure 2). The relative expansion of nontradable production (primarily services) is to be expected during the beginning of the convergence process, and is associated with an increase in the relative price of nontradables and wages.⁵ However, successful convergence eventually requires a turnaround of this process and a shift of resources toward the production of tradables.

On the demand side, recent growth in emerging Europe has been driven by domestic demand, with a sharp jump in the investment-to-GDP ratios in many countries and rapid growth of consumption (Figure 3). Even though exports have been growing at a respectable pace, the contribution of net exports to growth has been negative in most countries. The large contribution to growth from consumption is mainly explained by its dominant share in GDP. Indeed, investment has been growing faster than consumption during recent years in most of the region.

III. ESTIMATES FROM A PRODUCTION FUNCTION

Production function estimates provide further insights into the factors that are driving growth in emerging Europe. Growth accounting links growth to the accumulation of capital, changes in the use of labor, and a residual factor, commonly known as total factor productivity (TFP). Growth that is primarily driven by factor accumulation without improving productivity may not prove to be sustainable because of diminishing returns to capital and labor. In contrast, growth driven by a structural transformation that improves the economy's efficiency would be reflected in faster TFP growth and would signal the capacity to grow faster than the constraints imposed by capital and labor.

⁴ For empirical evidence on the rapid economic integration within Europe in recent years see IMF (2007), Part I. For empirical evidence on positive growth spillovers from integration of emerging economies with more advanced economies see Arora and Vamvakidis (2005).

⁵ See IMF (2007), Part II, Chapter 2. Although services include tourism, which is a tradable, this is relevant primarily for Croatia and, to a lesser extent, Turkey, which have large tourism sectors. Services also include outsourcing, which, although tradable, remains a relatively small share in Europe despite rapid expansion in recent years.

We assume a Cobb-Douglas technology with two factors, capital and labor, and with constant returns to scale:

$$Y(t) = A(t) F[K(t), L(t)],$$

where, Y is real GDP, A is an index of the level of technology, or TFP, K is capital, and L is employment.⁶ Contributions to growth are then computed according to $y(t) = a(t) + \alpha k(t) + (1-\alpha)l(t)$, where α is the share of rental payments to capital in total income and $(1-\alpha)$ is the share of wage payments to labor in total income, assuming competitive product markets, and lowercase letters indicate growth rates. $a(t)$ is estimated as a residual, and although assumed to measure productivity improvements, it also captures production forces in addition to capital and labor, as well as possible measurement errors.⁷

Estimating a production function for transition economies involves some challenges. Capital stocks cannot be estimated using the initial investment shares because of very short time series. Most countries have no investment data before the 1990s, or the available data suffer from serious measurement errors and structural breaks. Therefore, an ad hoc assumption needs to be made about the starting value of the capital stock. Here, we have assumed that the initial ratio of capital to GDP in the European transition economies is somewhere between the average level in the low- and middle-income economies in the world in 1995. This leads to a range of TFP estimates for each country that may be more plausible than estimates based on short investment time series. The income shares, which are also difficult to estimate because of data problems, were taken from previous IMF country studies, or assumed to be equal to the average in the region when country data were not available.

Estimates of TFP, using a production function approach, suggest that most of emerging Europe is benefiting from a structural transformation, which bodes well for future growth prospects (see Table 1 for estimated ranges and Figure 4 for averages of estimates). Growth in emerging Europe has been driven primarily by TFP, and countries with higher TFP growth have been growing faster. Capital accumulation has also been important in most countries; meanwhile, labor has added less and even registered a negative contribution in some countries, with emigration a key factor.⁸

IV. DETERMINANTS OF ECONOMIC GROWTH

A vast empirical literature has identified a multitude of factors that can determine economic growth.⁹ Based on the main results from this literature, we compare the main possible determinants of growth in different subregions in emerging Europe, specifically, the Baltics,

⁶ All historical time series are HP filtered. For details, see Hodrick and Prescott (1997).

⁷ For more details, see Barro and Sala-i-Martin (2004).

⁸ This is consistent with Schadler, Mody, Abiad, and Leigh (2006), who find that TFP growth in Central-eastern Europe has been higher than in other emerging economies, including in east Asia and Latin America.

⁹ For more details, see Levine and Renelt (1992); Fischer (1993); Barro and Sala-i-Martin (2004); George, Oxley, and Carlaw (2004); Helpman (2004); Aghion and Durlauf (2005); and the Economic Growth Resources website (<http://www.bris.ac.uk/Depts/Economics/Growth/>, updated by Jonathan Temple).

Southeastern Europe, Central-eastern Europe and the Commonwealth of Independent States (CIS).¹⁰ These determinants are then compared with their values in the euro area, which is considered to be the region to which emerging Europe should be converging to.

These comparisons explain to a large extent the diverse growth experience within emerging Europe (Table 2).¹¹ Reforms that have been found to foster economic growth and productivity seem to explain fast growth in the Baltics and in Central-eastern Europe, while lower starting income positions and convergence arguments seem to explain fast growth in Southeastern Europe and in the CIS countries. The Baltics have progressed considerably faster in structural reforms, reducing the role of the state in the economy and creating a business-friendly environment that has led to larger investment shares. In some of these areas, the Baltics already compare well with the euro area.¹² Central-eastern Europe follows, with notable progress in most growth determinants. Both regions are also very open to international trade, are well advanced in the transition process, and have relatively good public infrastructure, a well-educated population, and labor markets that are more flexible than in the euro area. Southeastern Europe has fallen behind in structural reforms, while the CIS countries are lagging even more (these differences may be partly due to the EU harmonization, which drove reforms in the new EU member states in recent years). The lack of reform progress may explain why some countries in these areas have not been growing faster than the rest of emerging Europe, despite starting from a lower income position.

Other growth determinants in the region are conducive to convergence, or at least are not an obstacle. The financial sector has been developing at a fast pace across emerging Europe, although this process is far from complete. And the demographic characteristics in the region and human capital indicators are close to the ones in the rest of Europe.

In more detail:

- **Convergence.** Despite recent convergence, emerging Europe has substantial catching up to do with advanced European economies, and therefore, subject to the policies in place, is expected to continue growing fast well into the long run. Assuming that emerging and advanced European economies continue growing as fast as in the last five years, it will take 20 years for the former to reach the latter's income levels. Within emerging Europe, Central-eastern Europe has the highest income levels, at

¹⁰ Southeastern European (SEE) countries include Albania, Bosnia and Herzegovina, Bulgaria, Macedonia, FYR, Romania, and Serbia. Central-eastern European (CEE) countries include the Czech Republic, Hungary, Poland, and the Slovak Republic. The Baltics include Estonia, Latvia, and Lithuania. The CIS countries include Belarus, Russia, Moldova, and Ukraine. Turkey is not included in these regions.

¹¹ Table 2 includes factors that the literature has found to determine potential economic growth and productivity. Although the statistical and relative economic significance of many of these determinants is still subject to discussion, these factors can indicate the growth prospects of a country or region and provide guidance to policy.

¹² Assuming the euro area is the region to which emerging Europe is converging, the convergence pace of the latter is conditional on its reform progress compared with that of the euro area.

almost two thirds of the euro area in terms of PPP per capita GDP. The Baltics follow closely behind, while Southeastern Europe and the CIS countries are far behind, with income levels one third and one fourth of the euro area average respectively.

Therefore, keeping everything else constant, convergence forces should lead to faster growth in the CIS and the Southeastern European countries, followed by the Baltics and Central-eastern Europe. The fact that actual growth is considerably faster in the Baltics than in the rest of the region suggests that everything else is not constant (either policies and structural factors differ, or/and some temporary forces are driving growth).

- **Demographics.** The within Europe variation in population characteristics and dynamics is relatively small. Dependency ratios are high in both emerging and advanced European economies and are projected to increase further in the medium to long term population ages, which is expected to affect growth negatively. In addition, the population in parts of emerging Europe has been falling recently, primarily due to migration to more advanced economies.
- **Investment.** Emerging Europe invests more than the rest of Europe. This is expected during convergence. Indeed, investment shares seem to be correlated with growth, with the Baltics investing more than the rest and growing faster. Foreign direct investment is relatively high in parts of the region, primarily in Southeastern Europe and in the Baltics. However, foreign investment in some cases has been primarily driven by privatization, which suggests that is not sustainable without further progress in structural reforms (see below). Greenfield foreign direct investment has been more limited.¹³ In terms of public investment, Southeastern Europe and CIS countries spend considerably more as a share of GDP, although this may be explained by the need to catch up in infrastructure, as suggested by the related EBRD indicator in Table 2.
- **Macroeconomic policies.** Most emerging European economies do not have high general government deficits and some have small surpluses. However, this is partly because of cycle-driven revenues. Some countries have used the currently strong cycle to increase government spending, despite the need to offset overheating concerns in the private sector (see below). Still, government spending and debt in the region are well below the euro area averages relatively to GDP. In terms of monetary policy, reforms that increased the independence of central banks in emerging Europe improved their effectiveness and resulted in lower inflation in this decade compared with the 1990s. However, overheating pressures and rising commodity prices more recently have increased inflation throughout the region at rates that are well above

¹³ For a detailed discussion and empirical evidence on the foreign direct investment in Southeastern Europe see Demekas, Horváth, Ribakova, and Wu (2005).

what would be justified by the convergence process and Balassa-Samuelson effects. Moreover, fixed exchange rate regimes in a number of the countries and strong capital inflows in most of the region have created new challenges for monetary policy (see below).

- **Structural reforms.** The Baltics and Central-eastern Europe have advanced further in transition than the rest of emerging Europe. This trend may be partly explained by progress during the recent EU harmonization process in these countries. The areas in which Southeastern Europe and the CIS countries seem to lag behind include privatization, enterprise restructuring, and competition policies, all of which are linked to the competition chapter in the EU's *acquis*. Other indicators lead to similar conclusions. The index of economic freedom and its sub-components show more progress in structural reforms in the Baltics and in Central-eastern Europe than in the rest of emerging Europe, and in some cases even more than in the euro area.¹⁴ In terms of the business environment and the legal system, the Baltics compare very well with the euro area, while Central-eastern Europe still needs to catch up. Southeastern Europe and the CIS countries are further behind, with business and legal transactions taking longer there than in the rest of Europe. Slower progress in structural reforms may explain why these countries do not converge faster, despite having lower income levels other European economies.
- **Financial sector.** Despite recent progress, the financial sectors in emerging European economies still have a long way to go to reach the more advanced financial sectors in the rest of Europe. The stock of domestic bank private sector credit as a share of GDP is still small in most economies in the region relative to income levels and even more so compared with what seen in the euro area (Figure 5). However, these ratios do not include lending by nonbank financial institutions, which has been rising rapidly in emerging Europe, although from a low basis, and direct borrowing from corporates and, increasingly, households abroad (evidence for Southeastern Europe in Sorsa, Bakker, Duenwald, Maechler, and Tiffin (2007) suggests a much larger stock of credit when these sources are included). Moreover, the recent speed of financial deepening in the region may have been extreme (Figure 6). The pace of credit expansion relative to economic growth in emerging Europe has exceeded that in other emerging economies. On the other hand, debt and equity markets have considerable room to develop.¹⁵

¹⁴ The index of economic freedom is an average of a large number of sub-indices, which are grouped as follows: size of government, legal system and property rights, sound money, freedom to trade internationally, and regulation (see Table 2). For more details, definitions, and the list of indices within the above groups, see <http://www.freetheworld.com/>

¹⁵ See also IMF (2007), Part II, Chapter 3.

- Human capital. Although human capital indicators have improved considerably in emerging Europe during the last decade, they remain somewhat below levels seen in the euro area. However, if current trends continue, this gap should be closing.
- Labor market. Parts of emerging Europe still struggle with high unemployment rates, despite fast growth rates in recent years. Unemployment is particularly high in the Southeastern European region. This seems to be explained by slower progress in labor market reforms, as suggested by the index of labor market regulations. However, compared with the euro area, labor market reforms seem to have progressed faster in emerging Europe.
- New economy. Emerging Europe spends less than half as much as the euro area in research and development. The use of information technology is also less spread. However, recent trends show some catching up in both areas, particularly in the latter.

V. POTENTIAL GROWTH

For transition economies, there are several obstacles to estimating potential growth, including short time series, the unavailability of some key variables, measurement issues, and frequent changes in statistical methods. Furthermore, using historical data to estimate potential growth and recent trends to gauge future prospects may lead to false conclusions during structural transformation. However, estimates of potential output growth are still useful in determining to what extent actual growth is driven by temporary factors.

With these caveats in mind, we estimate an econometric growth model based on a large cross-country sample of 107 developed and developing economies, during 1996–2006. The estimated coefficients are used to forecast potential growth in emerging Europe based on the current values of the independent variables in each country.¹⁶ Focusing on the past 10 years has a number of advantages: the sample includes transition economies; some cross-country indices are not available for earlier years; and overall data quality has improved since previous years.

The empirical specification is the following:

$$(\text{Real GDP per capita growth})_i = c + \beta X_i + u, \quad \text{for country } i = 1, \dots, n.$$

The dependent variable is the average per capita GDP growth rate in PPP terms for each country i ; c is the constant term; β is the matrix of parameters to be estimated; X_i is the matrix of independent variables; and u is the error term (see Table 2 for data sources).¹⁷ Each

¹⁶ A similar methodology was used in Schadler, Mody, Abiad, and Leigh (2006) for Central-eastern Europe and in Moore and Vamvakidis (2008) for Croatia.

¹⁷ Causality can be difficult to determine in growth regressions (see for example Temple (2000)). Even though estimation with instrumental variables in the literature has confirmed the robustness of most of the above

(continued...)

country has one observation, which is either the average over 10 years or the initial value in 1996, depending on the variable.¹⁸

The preferred specification captures the most important, but not all, determinants of growth. A large number of empirical specifications was estimated using the growth determinants in Table 2. The preferred specification includes variables that turn out to be statistically significant and robust to changes in the specification.¹⁹ This does not imply that the omitted variables do not affect growth, since almost all of these variables were statistically significant in some empirical specifications. Since some of these variables are alternative measures of similar aspects of the economy and are highly correlated, one has to choose those that seem to explain growth the most.

The preferred specification includes:

- Convergence (the logarithm of PPP per capita GDP in 1996);
- Demographic developments (age dependency ratio);
- Investment in physical capital (gross fixed capital formation and foreign direct investment, both in percent of GDP);
- Human capital (university enrollment rate);
- Macroeconomic stability (CPI inflation rate);
- Structural reforms (index of economic freedom in 1995 and its change during 1995-2005); and
- Regional dummy variables (for European transition economies and for African countries).

The estimated preferred specification is the following:

$$\begin{aligned}
 \text{Real GDP per capita growth} = & \\
 & 11.00(2.93)** \\
 & -1.38(4.52)*** \text{ initial real GDP per capita} \\
 & -7.05(-3.86)*** \text{ age dependency ratio} \\
 & +0.13(3.93)*** \text{ investment/GDP} \\
 & +0.02(1.80)* \text{ university enrollment ratio} \\
 & -0.015(-2.34)** \text{ inflation rate} \\
 & +0.07(1.50) \text{ foreign direct investment/GDP} \\
 & +0.59(3.00)** \text{ index of economic freedom in 1995} \\
 & +0.86(3.97)*** \text{ change in the index of economic freedom during 1995–2005} \\
 & +0.90(1.73)* \text{ dummy variable for transition} \\
 & +0.67(1.69)* \text{ dummy variable for Africa}
 \end{aligned}$$

growth determinants (see for example Barro and Sala-I-Martin (2004)), one has to be cautious and interpret the estimates as broad correlations, which indicate an interaction with growth that may be going both ways.

¹⁸ Taking long-term averages allows for estimates that are not subject to the business cycle.

¹⁹ These results are available from the author.

***, **, and * denote statistical significance at the 1, 5, and 10 percent level, respectively; the number of observations is 107; the adjusted R² is 0.59; heteroscedasticity-consistent t-statistics are in parentheses.

The results suggest that, keeping everything else constant, a country with a relatively low income level, a low dependency ratio, a large investment share, a low inflation rate, and a relatively educated population grows faster. The index of economic freedom, which measures a number of different aspects of macroeconomic and structural policies and reforms, has a positive and statistically significant estimate. The FDI-to-GDP ratio has a positive coefficient but is statistically significant at only the 15 percent level.

Separate constants for transition economies and for African countries are positive and significant at the 10 percent level. Other regional dummy variables did not turn out statistically significant.²⁰ The estimate of the dummy variable for transition economies suggests that these economies have been growing faster during the past 10 years than would be justified by the growth determinants in this specification—by 0.9 percent annually in terms of per capita GDP.²¹ However, this “growth bonus” may not continue in the future, or at least not to the same extent.

Using these estimates and the latest values of the independent variables for each economy gives a range of potential growth estimates and the growth impact of economic reforms (Table 3; some countries are dropped from the sample because of missing values for some of the growth determinants). The lower end of the range assumes that the transition growth bonus will not continue in the medium term, while the upper end assumes that it will. The range with no reforms assumes no further progress in structural reforms (the index of economic freedom remains at its 2005 level), which may be an extreme assumption, while the range with reforms assumes that structural reforms continue at the same pace, which may also be an extreme assumption because past reforms started from a very low level. The average of all these estimates, in the fifth column of Table 3, is assumed to be the potential growth rate for each economy.

According to these estimates, although good fundamentals justify high potential growth rates in emerging Europe, actual growth rates seem to have been even higher, suggestive of overheating pressures.²² Potential growth is estimated to be high throughout the region. However, comparisons of the growth model estimates with actual growth rates reveal that all emerging European economies have been growing at above-potential rates in the past five years, except Hungary, which has remained below potential. The difference is the largest for Latvia, Russia, and Ukraine. On average, the region is estimated to have grown faster than

²⁰ The dummy variable for Africa is usually negative in growth regressions for earlier decades. The positive estimate in the above specification suggests that African countries have been growing faster than would be expected based on fundamentals in the last ten years.

²¹ A dummy variable for Turkey (not included in the above specification) has a statistically significant estimate of 1.7, which is taken into account in the range of potential growth for Turkey in Table 3.

²² Firm conclusions on the degree of overheating are difficult to draw as the level of potential output is hard to pin down.

potential by 2 percent during 2003–07 (1.8 percent excluding Russia). Therefore, although emerging Europe’s convergence is expected to continue, its pace may slow.

The estimates also suggest that further structural reforms could substantially increase potential growth rates in emerging Europe, in some cases to even above current growth rates. Continuing with reforms at the same pace as in the last ten years is estimated to increase potential growth by an average of 1.6 percent annually. If reforms were to increase the growth determinants in Southeastern Europe to their level in the Baltics, then potential growth would accelerate by 2.2 percent annually.

The above growth model produces lower potential growth estimates for emerging Europe than other methodologies. Table 4 presents comparisons of the averages of the estimates from the growth model with estimates from the Hodrick-Prescott (HP) filter (which took into account the latest IMF projections for medium-term growth in each country) and estimates from the production function estimated above, assuming that TFP will continue growing at the average rate of the last five years and investment and employment trends are as projected in the IMF’s World Economic Outlook. The estimates from the HP filter are closer to the estimates from the growth regression and higher only by 0.3 percent. However, the estimates from the production function are higher than the estimates from the growth regression by an average of 1.6 percent. The latter difference is highly sensitive to the TFP projection. This suggests that if currently fast productivity growth continues in the medium term, then emerging Europe should continue growing fast, although not as fast as in recent years. This is not necessarily inconsistent with the growth model forecasts. Continuation of fast productivity growth will most likely require further progress in structural reforms, which will also lead to faster growth according to the above growth model. Indeed, the difference between the upper range of the growth model estimates in Table 3, which assume further progress in reforms, and the production function estimates for potential growth is much smaller—the latter is higher than the former by only 0.3 percent.

VI. CURRENT ACCOUNT BALANCES DURING REGIONAL CONVERGENCE

Fast growth in emerging Europe has been associated with large imbalances in several economies, raising questions about sustainability and concerns about vulnerabilities. Although converging economies are expected to attract foreign savings to help finance investment and smooth consumption, most emerging European economies have current account deficits that are larger for their income levels than the rest of the world’s (Figure 7). Expectations of fast convergence have generated large capital inflows in search of high returns in the region.

Although large external imbalances could make the region vulnerable to external shocks (see below), other trends are more reassuring:

- Most of the recent deterioration of current account balances in emerging Europe seems to be driven by an increase in investment (Figure 8). In almost half of the countries, savings actually rose. In most countries with large deficits, such as the Baltics and Bulgaria, investment increased the most, although in many cases savings also declined. High

investment is expected to improve the region's growth prospects and eventually help reduce the current account deficits.

- Foreign direct investment (FDI) has financed most of the current account deficits in emerging Europe in recent years (Figure 9). FDI is less volatile than other capital flows as it cannot leave the country on short notice. One of its key features is that it fully shares in the economic risks and often signals approval of a country's economic policies and positive expectations about its prospects. Therefore, FDI-financed current account deficits are generally more sustainable and tend to adjust more gradually than deficits financed by debt or portfolio flows (although a sudden stop of FDI inflows cannot be excluded). However, an important caveat is that some of the recent FDI into emerging Europe was linked to privatization and, therefore, may not be repeated. Furthermore, foreign bank borrowing from parent banks has been financing an increasing share of the current account deficits in most countries, primarily in the Baltics and in Southeastern Europe.
- Despite real appreciation in most countries, emerging Europe has been gaining export market share. As a share of world imports, exports of goods and services (excluding oil) have risen in all countries in the region, but in Croatia, since 2003—in some considerably so (Figure 10). Moreover, real exchange rate appreciation is too limited in most countries to explain the emergence of large current account deficits.

However, estimates of expected current account deficits based on fundamentals suggest that some countries in emerging Europe have excessive external imbalances (see Abiad, Leigh, and Mody (2007) and Rahman (2008)).²³ Although such estimates are subject to uncertainty and very sensitive to empirical specification, their gaps from actual deficits in most countries in the region are substantial and suggest the need for an adjustment in the medium term.

In what follows, we estimate a model of intertemporal optimization during regional convergence, based on Blanchard and Giavazzi (2002). The model assumes that emerging economies converge toward the more advanced economies in the same region by borrowing in international capital markets. This model is used to forecast the levels of the current account balances that are consistent with regional convergence in emerging Europe. According to this model, the current account balances of emerging European economies depend on a time effect, relative per capita income, demographic factors, and the business cycle. Foreign borrowing finances relatively high consumption and investment in the present, based on expectations that living standards will improve in the future. Thus, fast growth in

²³ There are multiple methodologies to estimate equilibrium current account deficits, with the so-called CGER approach the standard at the IMF. CGER stands for the Consultative Group on Exchange Rate Issues, which was established in the IMF in 1995 to strengthen its capacity to assess current account positions and exchange rate levels. The CGER assessments are based on three complementary approaches: the macroeconomic balance approach, the reduced-form equilibrium real exchange rate approach, and the external sustainability approach. For more details, see Isard and Faruquee (1998); Isard and Kincaid and Fetherston (2001); and IMF (2006). Recent IMF staff reports for emerging European countries have published such estimates.

emerging European economies is expected to be associated with large current account deficits.

The regression equation is:

$$ca_{it} = \alpha_t + \beta_t(y_{it} - y_t) + \gamma X_{it} + \varepsilon_{it},$$

where ca_{it} is the current account balance of country i at time t , α_t is a common time effect, y_{it} is the log per capita GDP of country i at time t , y_t is the log of the average per capita GDP in the euro area, and X_{it} is a set of other control variables for country i at time t , including the age dependency ratio and real GDP growth. We would expect that the larger the income gap of an emerging economy from the advanced economies in the same region, the higher the age dependency ratio, and the stronger the current growth cycle, the larger its current account deficit. The coefficient of relative income varies over time. As argued in Blanchard and Giavazzi (2002), financial integration in Europe has increased substantially in recent years, allowing emerging economies to borrow more, invest more, and save less during convergence, and leading to larger current account deficits over time. The sample includes all European economies, for the period 1976–2007 (beginning in the mid-1990s for most transition economies).²⁴

Although the model does predict large current account deficits in emerging Europe, the results show that actual deficits are only partly driven by regional convergence (Table 5). For the period 2003–2007, the model predicts deficits lower than the actual deficits in the region for more than half of the countries, with the larger gaps in the Baltics and in some of the Southeastern European countries (particularly Bosnia & Herzegovina, Bulgaria, Serbia, and Romania).

Considering the 95 percent confidence bands leads to a more reassuring picture (see third column in Table 5). All current account deficits in emerging Europe were within this band during 2003–2007, but in Latvia, which was, however, only slightly lower. However, these ranges are wide, and about one third of the countries are very close to the upper limit. Furthermore, current account deficits increased further in most countries during this period, and in 2007 Latvia and Bulgaria had deficits well above the estimated 95 percent band (see last column in Table 5).

VII. EXTERNAL INDEBTEDNESS

A number of emerging European economies have levels of external debt that, as a share of GDP, are considerably higher than in most other emerging economies (Figure 11). High levels of external indebtedness, as well as of domestic debt in foreign exchange, could expose parts of the region to shocks, including rollover difficulties, sharp interest rate and exchange rate movements, changes in investors' sentiments, and changes in the expansion

²⁴ For earlier applications of this model to Latvia, Lithuania, and Hungary, see Gray and Miyajima (2006), Leigh (2005) and Abiad, and Leigh (2005), respectively.

plans of foreign banks, which own the lion's share of banking assets in most countries in emerging Europe. About half of the countries in the region have external debt-to-GDP ratios that are well above the average level in emerging economies worldwide, primarily the Baltics, Croatia, Hungary, Bulgaria, and Serbia. Repayment would require that indebted economies either export their way out or reduce their domestic demand. The first path is obviously preferable, but achieving it will depend on progress with reforms.²⁵

While most debt is of medium- and long-term maturities, reserve coverage of short-term debt is low in a number of countries. A ratio of short-term debt to central bank foreign reserves higher than 100 is not usually considered to provide a sufficient buffer during shocks. About half of emerging European economies are well below this limit, about one-fourth are very close to or somewhat above it, and the rest (the Baltics and Belarus) are well above it (Figure 12).²⁶

Based on a methodology described in Milesi-Ferretti and Razin (1997), a standard debt-accounting framework can be used to determine the dynamics of external debt in response to a number of adverse shocks. The path of external debt as a share of GDP is determined by the following process:

$$d_{t+1} - d_t = (1/(1+g_t+\rho_t+g_t\rho_t))^* [r_t - g_t - \rho_t(1+g_t)] d_t - tb_{t+1},$$

where d is the ratio of external debt to GDP, r is the effective nominal interest rate on external debt, g is the rate of real GDP growth, tb is the noninterest current account balance in percent of GDP, and ρ is the change in the domestic GDP deflator in euros: $(1+\rho_t) = (1+\pi_t)(1+\varepsilon_t)$, where π_t is domestic GDP deflator inflation and ε_t is the rate of nominal appreciation.²⁷

Three shocks are considered: a 20 percent depreciation of the exchange rate (in countries with flexible exchange rates), an increase in lending interest rates of 2 percentage points, and a fall of real GDP growth by 2 percent from the baseline of the IMF's spring 2008 World Economic Outlook.²⁸

All three shocks are projected to lead to higher debt levels in the medium term than in the baseline projections (Table 6). As expected, the exchange rate shock has a considerably stronger impact on economies with high levels of external debt. It results in double-digit

²⁵ See IMF (2007), Part II, Chapter 2.

²⁶ Net external debt, which adjusts for private sector foreign assets, is considerably lower in most countries. In Latvia, for example, where external debt is the highest in emerging Europe, net debt was about 52 percent of GDP in 2007—the ratio of net short-term debt to foreign reserves was about 98 percent. Although a large share of foreign assets could provide some buffer during external shocks, possible mismatches between asset owners and debtors suggest that there is no immunity.

²⁷ This methodology assumes no further accumulation of foreign reserves. For an application of this framework to Lithuania, see Leigh (2005).

²⁸ An exchange rate depreciation is an unlikely scenario in countries with fixed exchange rate regimes in emerging Europe, including Bosnia and Herzegovina, Bulgaria, Estonia, Latvia, Lithuania, and Macedonia, FYR.

increases in about half of the countries, with the largest impact on Hungary and Croatia. The other two shocks have a smaller impact, which is more severe on Latvia, Bulgaria, Hungary, Croatia, and Estonia.

VIII. CONCLUSIONS AND POLICY IMPLICATIONS

Analysis of the prospects and vulnerabilities of emerging Europe in this paper suggests that the convergence trend of the region is based on strong fundamentals and will therefore continue, albeit at a slower pace. Structural reforms have progressed in most countries, thanks to which growth has been driven primarily by productivity improvements. However, growth rates in recent years have been above estimates of potential for most countries and an adjustment should be expected. Indeed, a slowdown started in the region at the second half of 2007 and continues in 2008.

Fast growth has been associated with rising external imbalances in several economies, including large current account deficits and high levels of external debt, raising risks of a hard landing. Although the results in this paper suggest that fundamentals justify relatively large current account deficits in the region, deficits in some countries may be excessive, suggesting the need for adjustment in the medium term. High external debt levels and balance sheet exposures in some countries are an additional source of vulnerability.

The results suggest that macroeconomic policies and structural reforms need to do more to address emerging Europe's imbalances.²⁹ Monetary policy needs to be tightened further in countries with flexible exchange rates.³⁰ Fiscal consolidation will have to take full advantage of the strong cycle and play a more prominent role in managing domestic demand, particularly in countries where monetary policy focuses on exchange rate stability. The analysis particularly reveals a strong link between structural reforms and potential growth, suggesting that further progress in these reforms may be essential to ensure a smooth convergence in emerging Europe. Moreover, structural reforms will facilitate the gearing of resources toward the tradable sector, thereby helping to reduce external imbalances.

²⁹ See IMF (2008), Chapter 3, for a detailed discussion of the current stance of macroeconomic policies in emerging Europe.

³⁰ See Hilbers, Ötger, Pazarbasioglu, and Johnsen (2005) for a discussion of available monetary policy options.

Figure 1. Convergence in Emerging Europe and in the Rest of the World, 2003–07

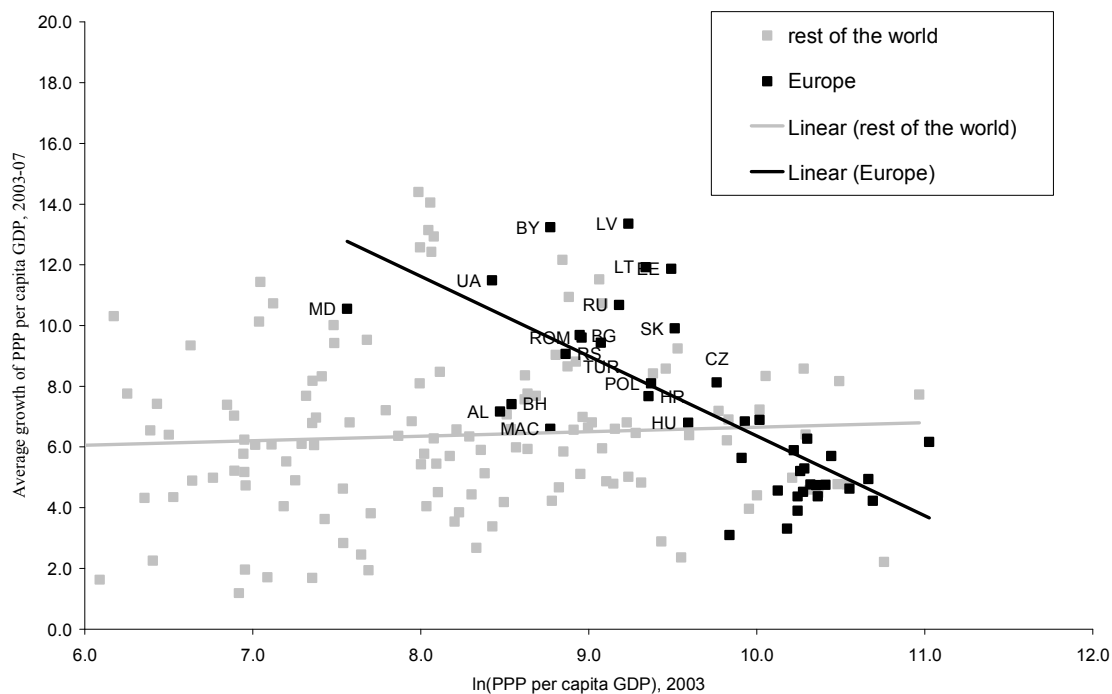


Figure 2. Emerging Europe: Value Added by Sector, Contributions to Real GDP Growth, 2002–06 (Cumulative percentage points)

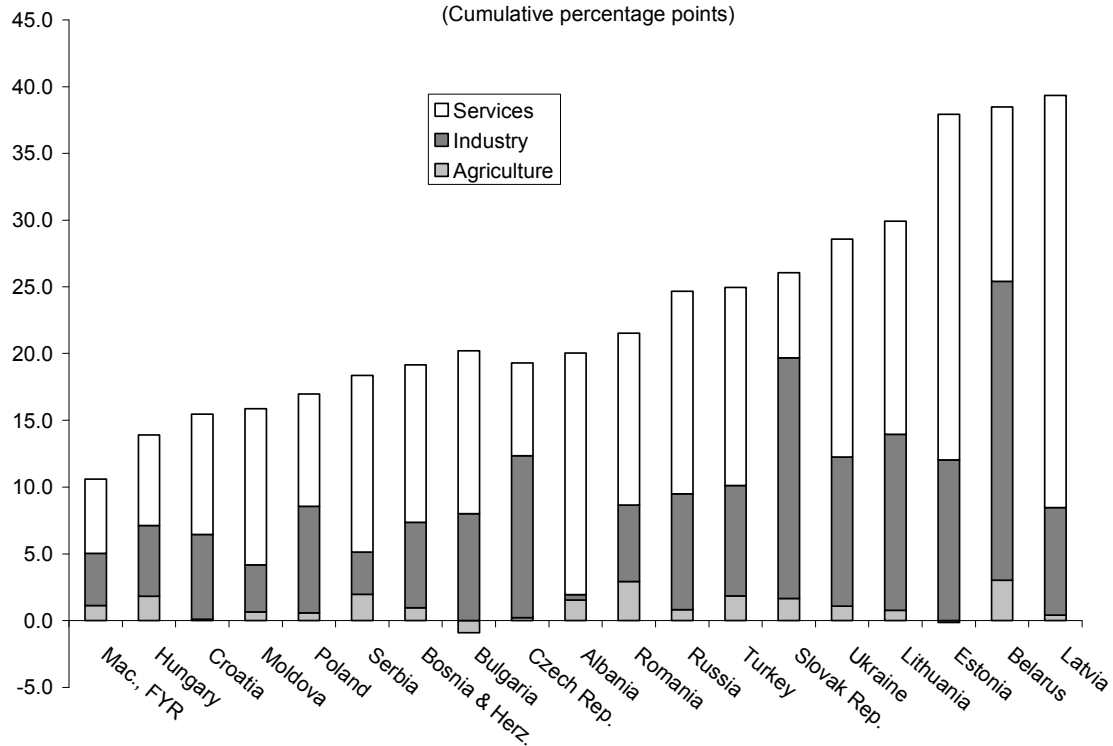


Figure 3. Emerging Europe: Domestic and External Demand, Contributions to Real GDP Growth, 2002–06
(Cumulative percentage points)

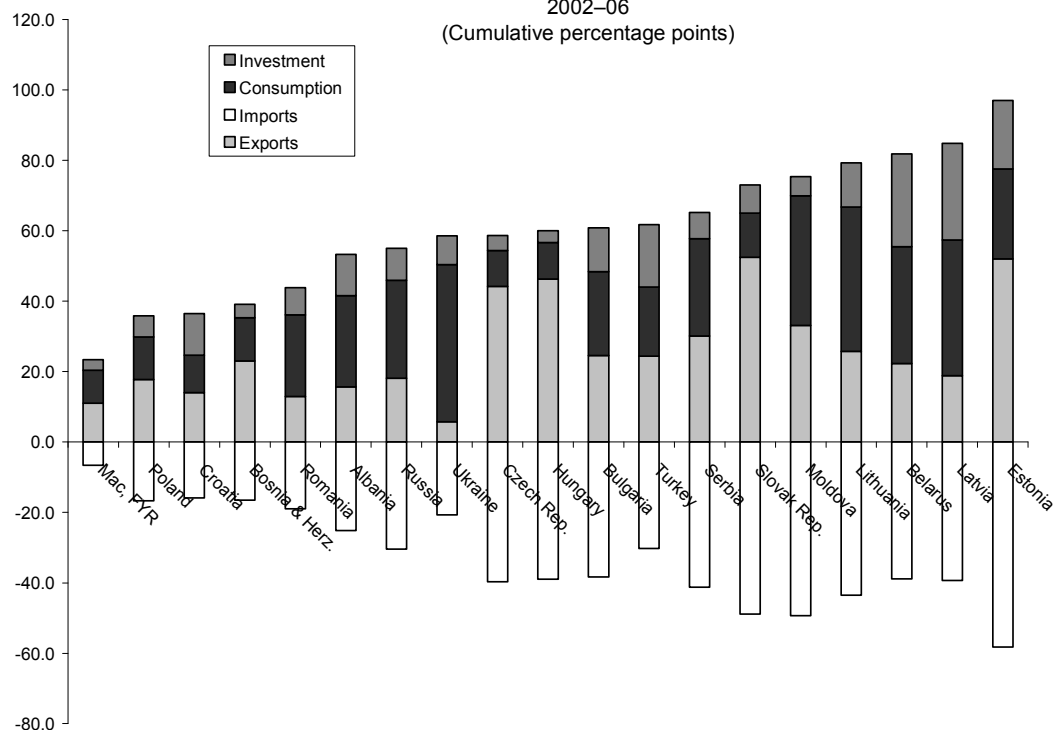


Figure 4. Emerging Europe: Growth Accounting, 2002–06
(Percent per year)

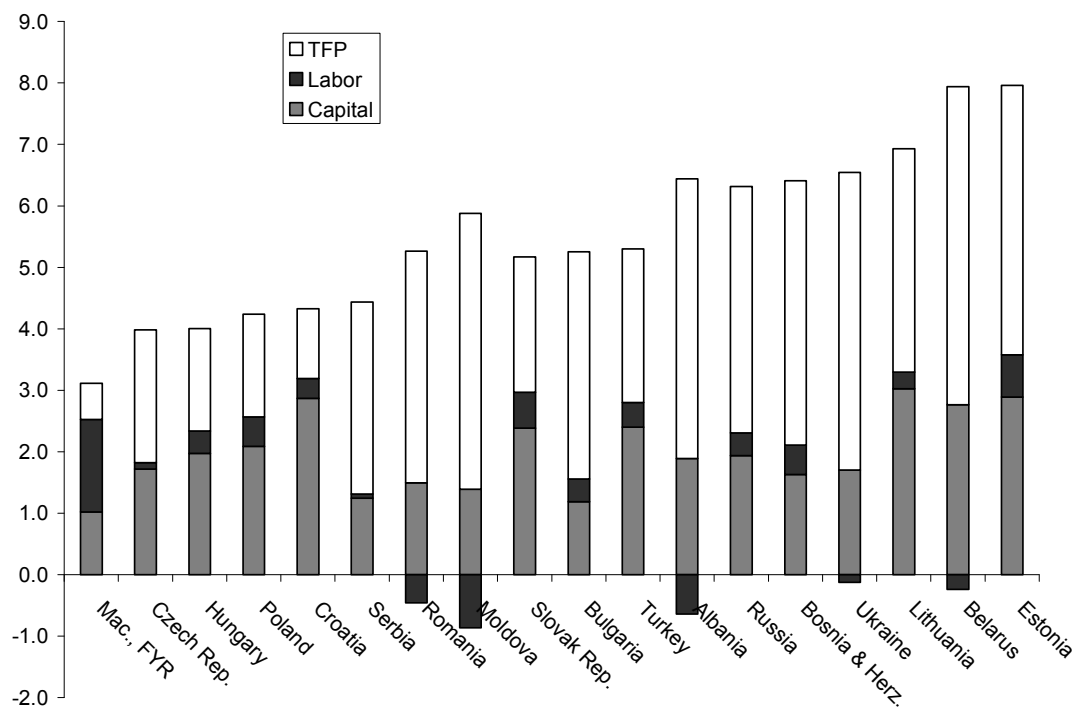


Figure 5. Stock of Private Sector Credit and Per Capita GDP, 2002-2006

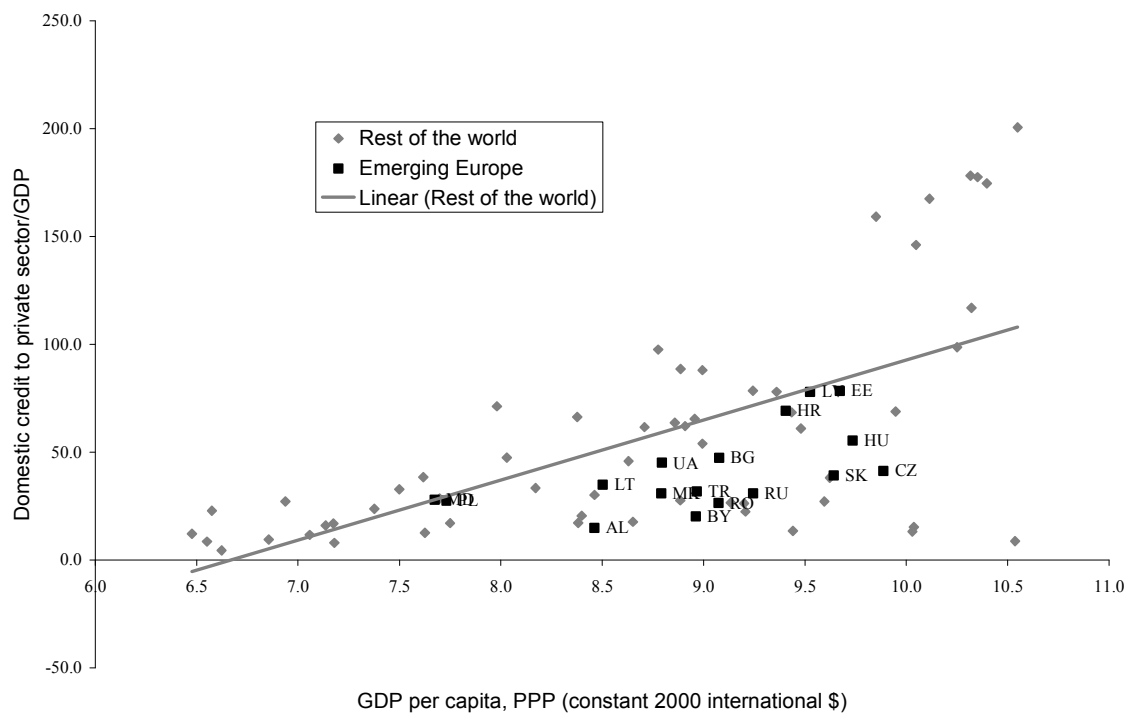


Figure 6. Growth and Private Sector Credit Growth, 2002-06

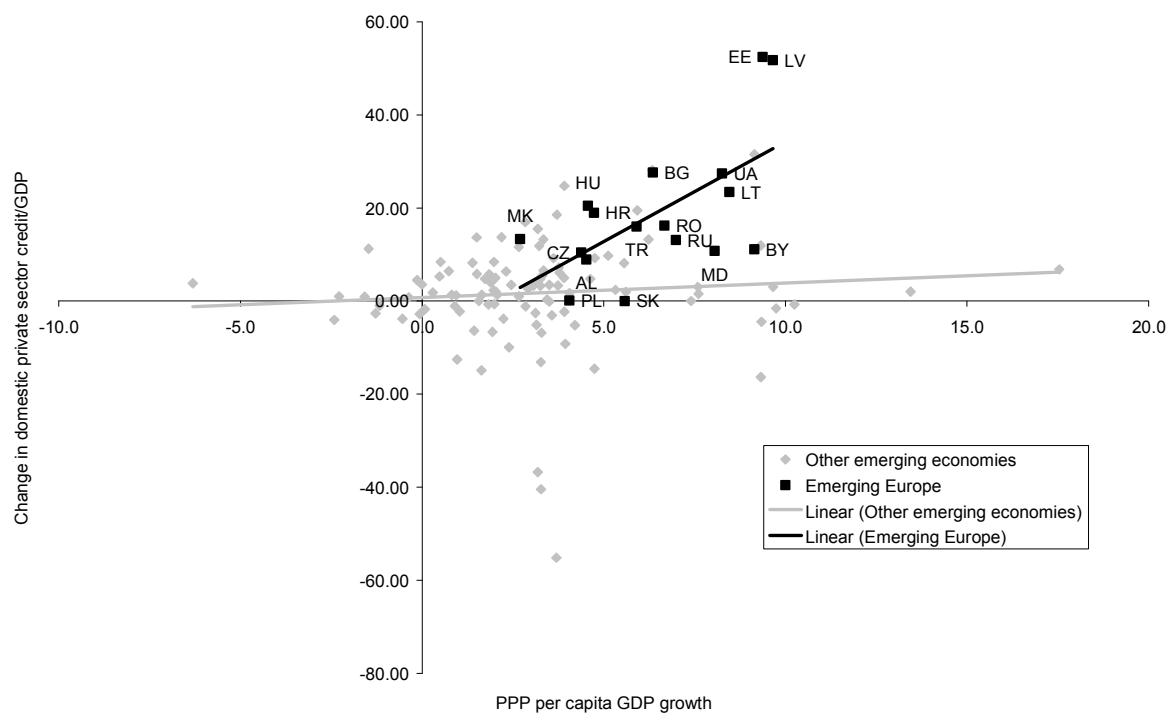


Figure 7. GDP per Capita and Current Account Balances, 2007

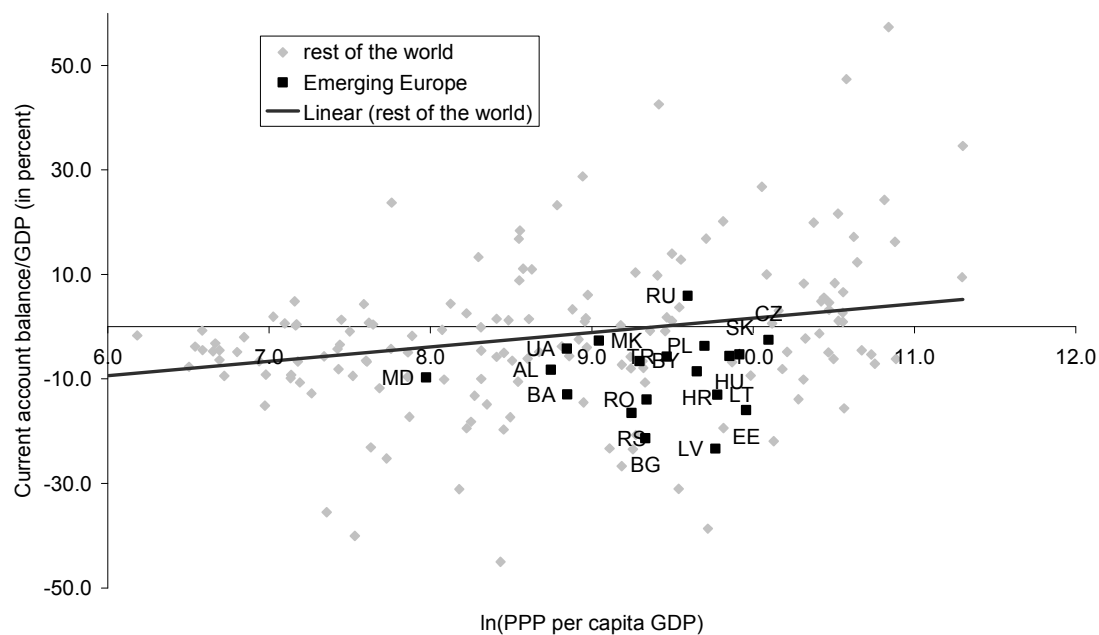


Figure 8. Emerging Europe: Contributions to Current Account Deficit, 2003–07 (Percent)

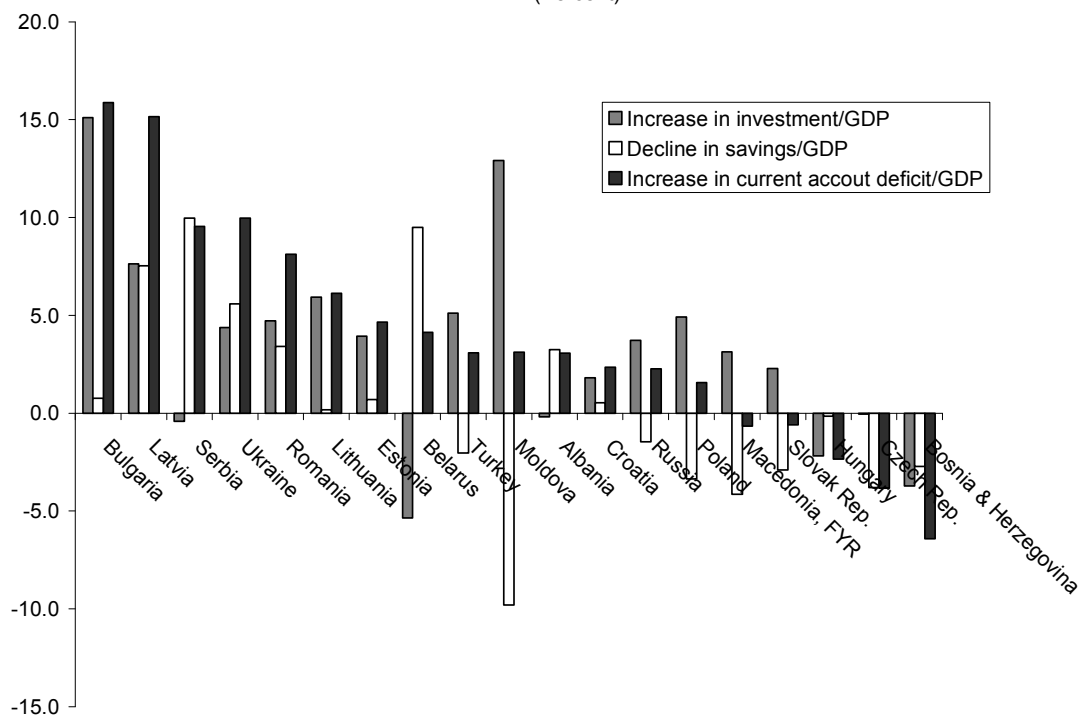


Figure 9. Emerging Europe: FDI Coverage of Current Account Deficit, 2003–07
(Percent)

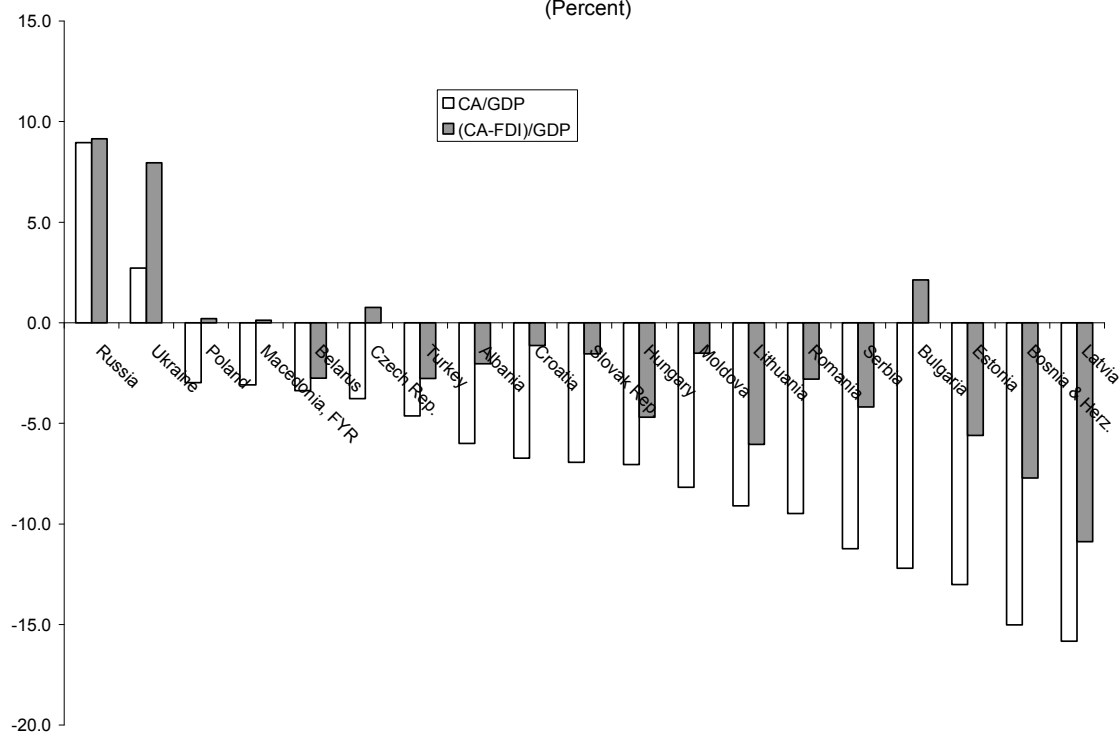


Figure 10. Emerging Europe: Percentage Change in Export Market Shares in the World Economy,
2003–07
(Goods and Services, Excluding Oil)

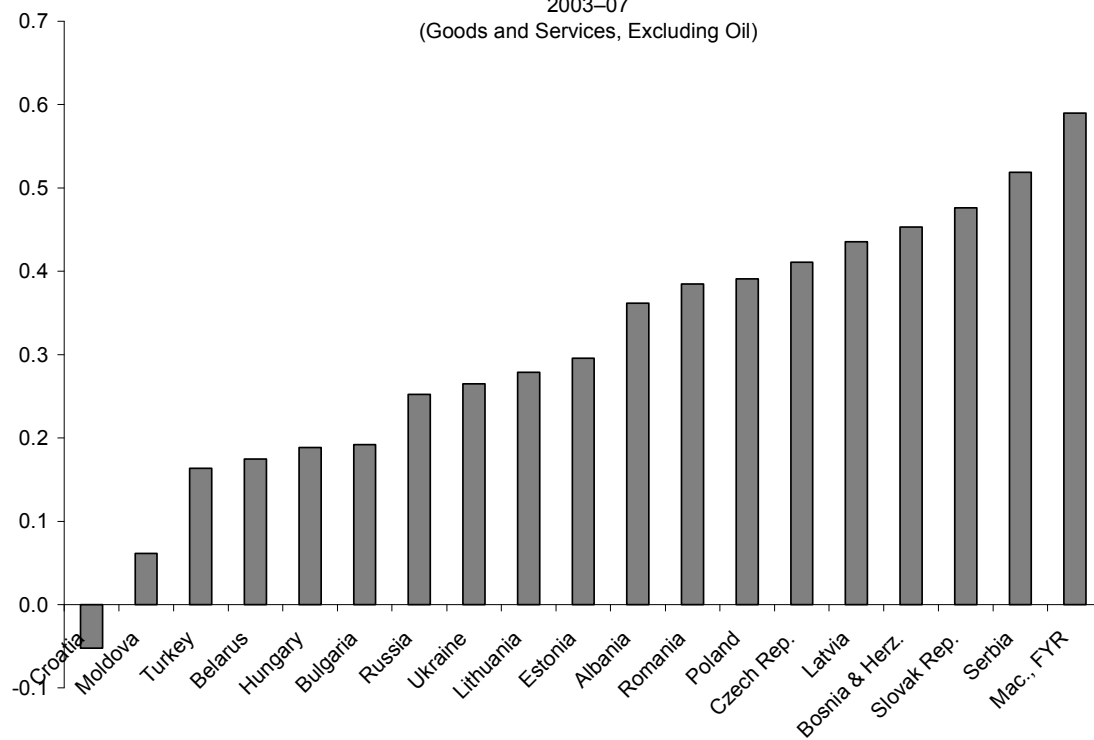


Figure 11. External Debt/GDP, Emerging Europe, 2007

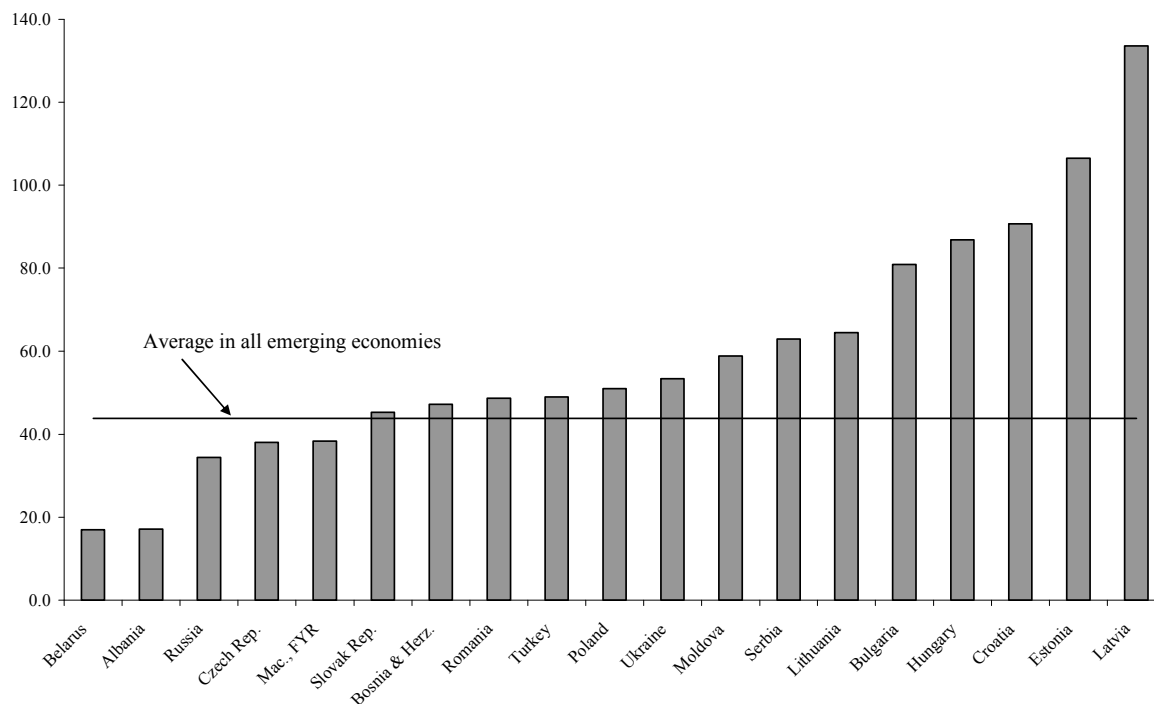
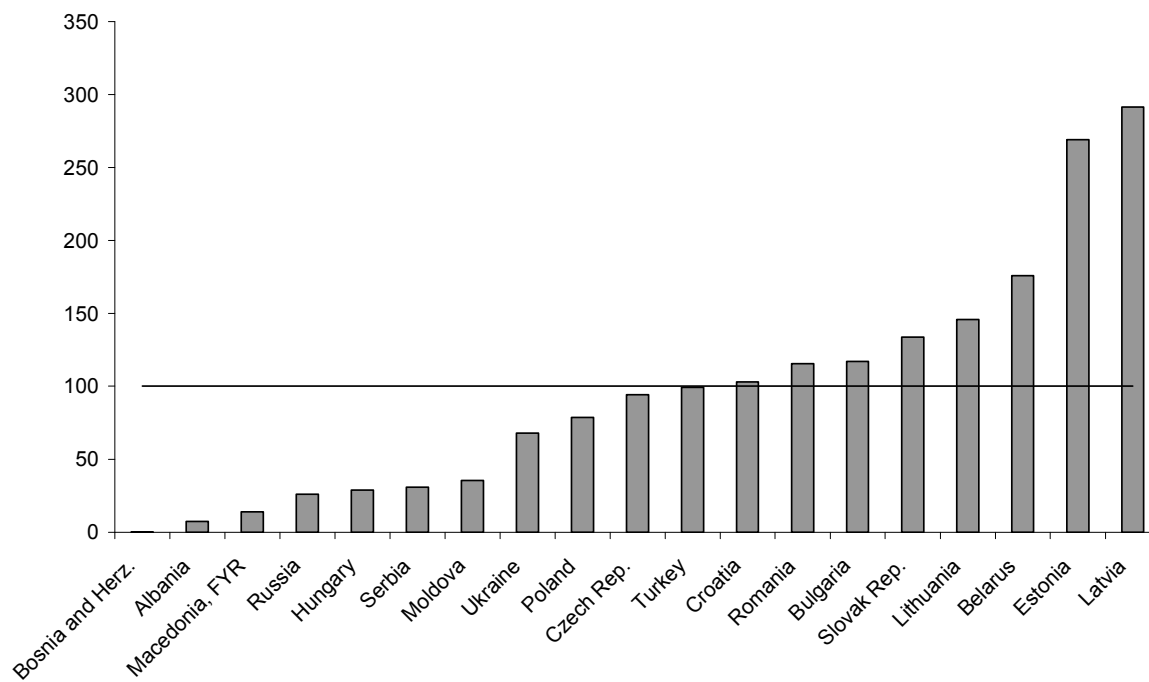
Figure 12. Short-term Debt (Remaining Maturity)/Foreign Reserves, 2007
(in percent)

Table 1. GDP Growth and Contributions, Emerging Europe, 2002-2006
Estimates from a Production Function

	Real GDP growth (HP filtered)	Capital		Contributions to growth Labor	Productivity	
Albania	5.8	1.7	2.1	-0.6	4.3	4.8
Belarus	7.7	2.5	3.1	-0.2	4.9	5.5
Bosnia & Herzegovina	6.4	1.3	2.0	0.5	4.0	4.6
Bulgaria	5.3	1.0	1.4	0.4	3.5	3.9
Croatia	4.3	2.5	3.2	0.3	0.8	1.5
Czech Republic	4.0	1.5	1.9	0.1	1.9	2.4
Estonia	8.0	2.6	3.2	0.7	4.1	4.7
Hungary	4.0	1.7	2.2	0.4	1.4	1.9
Latvia	8.0	3.2	4.0	1.0	3.0	3.8
Lithuania	6.9	2.6	3.4	0.3	3.2	4.0
Macedonia, FYR	3.1	0.8	1.2	1.5	0.4	0.8
Moldova	5.0	1.1	1.6	-0.9	4.2	4.7
Poland	4.2	1.8	2.4	0.5	1.4	2.0
Romania	4.8	1.3	1.7	-0.5	3.5	4.0
Russia	6.3	1.6	2.3	0.4	3.7	4.3
Serbia	4.4	0.9	1.5	0.1	2.8	3.4
Slovak Republic	5.2	2.1	2.7	0.6	1.9	2.5
Turkey	5.3	2.4	2.0	0.4	2.5	5.1
Ukraine	6.4			-0.1		

Table 2. Determinants of Growth in Emerging Europe, 2003-2007
(Unweighted averages; percent unless otherwise indicated)

	Emerging Europe	Baltics	SEE	CEE	CIS	Euro area	Source
Convergence							
Real GDP growth, 2003-07	6.5	9.0	5.4	5.3	7.3	2.0	WEO
Real GDP per capita, PPP adjusted, in percent of euro area, 2007	40.7	56.8	30.5	60.6	26.9	100.0	WEO
Demographics							
Age dependency ratio, 2006	0.4	0.5	0.4	0.4	0.4	0.5	WDI
Population growth, 2003-07	-0.1	-0.5	0.1	0.0	-0.8	0.6	WEO
Investment							
Gross fixed capital formation (in percent of GDP), 2003-07	23.9	28.6	23.2	23.0	23.3	20.7	WEO
of which							
private	18.3	24.3	16.0	21.5	17.9	.	WEO
public	5.4	3.5	7.2	3.9	4.3	.	WEO
Foreign direct investment inflows (in percent of GDP), 2003-07	4.9	5.1	6.9	3.9	3.2	.	WEO
Fiscal policy							
General government balance (in percent of GDP), 2007	-0.7	0.5	-0.7	-3.3	1.4	-0.6	WEO
General government, total expenditure and net lending (in percent of GDP), 2007	39.9	36.7	39.0	43.3	42.7	46.7	WEO
General government, gross debt (in percent of GDP), 2006	28.0	10.7	33.0	36.1	19.5	68.6	WEO
Monetary policy							
CPI inflation (in percent), 2007	6.2	7.5	4.1	4.0	10.7	2.1	WEO
Sound money index, increasing from 1 to 10), 2005	7.9	9.0	7.9	9.2	6.8	9.5	EFN
Transition							
Average transition index, increasing from 1 to 5), 2007	3.3	3.8	3.1	3.8	2.8	.	EBRD
of which							
Large scale privatization	3.3	3.9	3.3	3.8	2.7	.	EBRD
Small scale privatization	3.9	4.3	3.8	4.3	3.4	.	EBRD
Enterprise restructuring	2.7	3.2	2.5	3.6	1.9	.	EBRD
Price liberalization	4.1	4.3	4.2	4.3	3.8	.	EBRD
Competition Policy	2.6	3.3	2.3	3.2	2.3	.	EBRD
Economic freedom index (index, increasing from 1 to 10), 2005	6.7	7.7	6.3	7.2	6.3	7.3	EFN
Size of government (index, increasing from 1 to 10), 2005	5.8	6.9	5.4	5.4	5.7	5.0	EFN
Financial sector development							
M2 (in percent of GDP), 2006	46.1	44.5	48.6	57.9	33.4	.	WDI
Domestic credit to private sector (in percent of GDP), 2006	42.1	78.1	38.3	45.2	31.0	122.0	WDI
Interest rate spread (lending rate minus deposit rate), 2006	5.3	3.0	7.5	3.0	5.4	4.0	WDI
Credit market regulation (index, increasing from 1 to 10), 2005	8.5	9.5	8.4	9.1	7.8	8.2	WDI
Market capitalization of listed companies (in percent of GDP), 2006	42.5	28.0	42.6	31.4	87.2	72.9	WDI
Stocks traded, turnover ratio (in percent), 2006	41.2	18.6	17.2	53.6	35.1	56.0	WDI
Finance (% of managers surveyed ranking this as a constraint), 2005	28.7	11.3	34.1	28.8	33.1	20.1	WDI
Banking reform & interest rate liberalization (index, increasing from 1 to 5), 2007	3.3	3.9	3.0	3.8	2.8	.	EBRD
Securities markets & non-bank financial institutions (index, increasing from 1 to 5), 2007	2.7	3.3	2.2	3.6	2.3	.	EBRD
Business environment							
Business regulations (index, increasing from 1 to 10), 2005	5.7	6.8	5.3	5.9	4.9	6.8	EFN
Time required to start a business (days), 2006	30.6	25.7	31.0	29.5	40.0	21.5	WDI
Time required to register property (days), 2006	111.1	36.0	165.0	103.8	106.0	53.8	WDI
Ease of doing business index (rank, 1=most business-friendly regulations), 2006	75.5	19.0	86.0	57.3	114.0	40.3	WDI
Legal system and corruption							
Legal system & property rights (index, increasing from 1 to 10), 2005	5.9	7.2	5.0	6.5	5.6	7.8	EFN
Time required to enforce a contract (days), 2006	423.1	227.0	477.3	675.0	224.0	472.5	WDI
Time to resolve insolvency (years), 2006	3.8	2.6	3.5	4.6	3.8	1.3	WDI
Courts (% of managers surveyed ranking this as a constraint), 2005	18.3	7.2	25.5	23.1	12.1	7.1	WDI
Corruption (% of managers surveyed ranking this as a constraint), 2005	17.6	8.8	24.8	13.9	15.6	7.0	WDI
International trade							
Trade (% of GDP), 2006	113.1	135.2	98.4	140.2	104.4	109.0	WDI
Freedom to trade internationally (index, increasing from 1 to 10), 2005	6.9	7.7	6.4	7.7	6.7	7.5	EFN
Trade and foreign exchange system (index, increasing from 1 to 5), 2007	4.0	4.3	4.1	4.3	3.7	.	EBRD
Infrastructure							
Overall infrastructure reform (index, increasing from 1 to 5), 2007	2.7	3.1	2.5	3.3	2.3	.	EBRD
Human capital							
Secondary school enrollment ratio (in percent of relevant age group), 2005	92.5	98.5	90.9	96.6	89.4	106.8	WDI
Tertiary school enrollment ratio (in percent of relevant age group), 2005	52.4	72.0	34.4	54.3	59.0	67.3	WDI
Labor skills (percent of managers surveyed ranking this as a constraint), 2005	11.0	13.3	8.7	12.0	12.8	10.4	WDI
Labor market							
Unemployment rate (in percent), 2006	12.1	6.1	19.7	10.4	5.4	8.2	WEO
Labor market regulations (index, increasing from 1 to 10), 2005	5.9	6.5	5.6	6.1	6.2	5.1	EFN
New economy							
Research and development expenditure (in percent of GDP), 2004	0.8	0.7	0.6	0.8	1.0	1.9	WDI
Personal computers (per 1,000 people), 2004	136.8	277.1	82.4	218.7	53.6	421.3	WDI
Internet users (per 1,000 people), 2004	269.2	439.4	175.5	323.2	198.8	439.4	WDI

Sources: IMF, *World Economic Outlook* (WEO); World Bank, *World Development Indicators* (WDI); European Bank for Reconstruction and Development (EBRD); and Economic Freedom Network (EFN).

Notes: Southeastern European (SEE) countries: Albania; Bosnia and Herzegovina; Bulgaria; Macedonia, FYR; Romania; and Serbia. Central-eastern European (CEE) countries: the Czech Republic, Hungary, Poland, and the Slovak Republic. Baltics: Estonia, Latvia, and Lithuania. CIS: Belarus, Russia, Moldova, and Ukraine.

Table 3. Potential Growth Based on a Growth Model in Emerging Europe

Table 3. Potential Growth Based on a Growth Model in Emerging Europe							
	(Percent)						
	Growth model estimates					Average growth in 2003-07	Growth in 2007
	Potential growth without further reforms		Potential growth with reforms		Average		
	lower	higher	lower	higher			
Transition economies	2.4	3.2	4.1	5.0	3.7	6.6	7.2
of which							
South Eastern Europe	3.2	4.1	5.2	6.1	4.6	6.0	6.0
Baltics	5.3	6.2	7.5	8.4	6.9	8.9	8.8
Central Eastern Europe	3.0	3.9	4.3	5.2	4.1	5.1	6.0
Albania	3.5	4.4	4.9	5.8	4.6	5.6	6.0
Bulgaria	3.2	4.1	5.2	6.1	4.7	6.1	6.2
Croatia	3.2	4.1	4.9	5.8	4.5	4.9	5.8
Czech Republic	3.1	4.0	4.1	5.1	4.1	5.5	6.5
Estonia	5.3	6.2	7.4	8.3	6.8	8.8	7.1
Hungary	3.0	3.9	4.0	4.9	4.0	3.7	1.3
Latvia	4.3	5.2	6.3	7.2	5.7	9.7	10.2
Lithuania	5.8	6.7	8.1	9.0	7.4	8.4	8.8
Poland	2.8	3.7	4.3	5.2	4.0	5.1	6.5
Romania	3.1	4.0	5.3	6.2	4.7	6.3	6.0
Russia	2.1	3.0	3.6	4.5	3.3	7.3	8.1
Slovak Republic	3.6	4.5	5.2	6.1	4.8	7.1	10.4
Turkey 1/	4.3	4.7	4.8	5.1	4.7	6.9	4.5
Ukraine	2.6	3.5	4.6	5.5	4.0	7.7	7.3

Sources: IMF, *World Economic Outlook*; and IMF staff calculations.

1/ A dummy variable for Turkey has a statistically significant estimate of 1.7, which is taken into account in the range of potential growth in the table.

Table 4. Potential Growth in Emerging Europe, Alternative Estimates

	(percent)		
	HP filter	Production function	Growth model
Albania	5.4	7.5	4.6
Belarus	6.5	7.9	.
Bosnia & Herzegovina	4.6	6.6	.
Bulgaria	5.5	5.8	4.7
Croatia	4.4	4.8	4.5
Czech Rep.	4.5	4.3	4.1
Estonia	5.8	8.4	6.8
Hungary	3.0	3.6	4.0
Latvia	4.7	8.2	5.7
Lithuania	6.1	8.8	7.4
Macedonia, FYR	4.5	6.4	.
Moldova	6.1	6.5	.
Poland	4.5	5.8	4.0
Romania	5.4	5.9	4.7
Russia	6.1	7.4	3.3
Serbia	5.3	5.3	.
Slovak Rep.	6.0	5.7	4.8
Turkey	4.9	5.4	4.7
Ukraine	5.2	7.6	4.0

Table 5. Sustainability of Current Account Deficits Based on a Model of Regional Convergence, 2003-2007

	Current account/GDP (in percent)			
	Actual balance, 2003-07	Central model prediction, 2003-07	Current account balance in 2003-07 relatively to the 95 percent confidence band	Current account balance in 2007 relatively to the 95 percent confidence band
Albania	-6.0	-6.0	Within	Within
Belarus	-3.4	-5.3	Within	Within
Bosnia & Herzegovina	-15.0	-5.3	Within	Within
Bulgaria	-12.2	-5.1	Within	Lower, by 4 percent
Croatia	-6.7	-4.5	Within	Within
Czech Republic	-3.8	-3.0	Within	Within
Estonia	-13.0	-4.3	Within	Within
Hungary	-7.0	-3.6	Within	Within
Latvia	-15.8	-4.9	Lower, by 0.3 percent	Lower, by 5.6 percent
Lithuania	-9.1	-4.7	Within	Within
Macedonia, FYR	-3.1	-5.1	Within	Within
Moldova	-8.2	-6.0	Within	Within
Poland	-3.0	-4.1	Within	Within
Romania	-9.5	-5.0	Within	Within
Russia	9.0	-4.6	Within	Within
Serbia, Republic of	-11.2	-5.3	Within	Within
Slovak Republic	-6.9	-3.8	Within	Within
Turkey	-4.6	-5.2	Within	Within
Ukraine	2.7	-5.8	Within	Within

Sources: IMF, *World Economic Outlook*; and IMF staff calculations.

Table 6. Responses of External Debt-to-GDP Ratio to Adverse Shocks, 2007-11

	Baseline model projections 1/			Shocks in 2008, deviations from baseline projections					
	2007	2008	2011	20 percent depreciation (with respect to the euro)2/		Interest rates increase by 2 percent		Growth is lower by 2 percent	
				2008	2011	2008	2011	2008	2011
Albania	19.4	26.1	33.5	4.7	4.1	0.4	1.9	0.4	1.9
Belarus	26.6	28.3	41.7	5.8	3.9	0.4	1.8	0.4	1.8
Bosnia & Herzegovina	50.6	60.3	88.9	...	...	0.9	4.7	0.9	4.8
Bulgaria	93.1	102.6	113.9	...	...	1.6	6.9	1.6	6.9
Croatia	85.7	86.3	88.4	20.5	18.5	1.6	6.3	1.6	6.4
Czech Republic	38.1	38.2	38.4	9.1	8.4	0.7	2.8	0.7	2.8
Estonia	106.0	97.1	91.9	...	...	1.7	5.9	1.7	6.0
Hungary	92.6	89.5	86.2	22.1	20.9	1.7	6.6	1.8	6.9
Latvia	129.0	127.2	121.0	...	...	2.2	8.8	2.1	9.0
Lithuania	65.8	66.1	68.7	...	...	1.1	4.2	1.1	4.2
Macedonia, FYR	35.8	38.6	42.5	...	...	0.7	2.8	0.7	2.8
Moldova	58.8	60.4	69.2	13.2	10.3	1.0	4.0	1.0	4.0
Poland	51.3	51.4	55.6	12.2	11.3	0.9	3.8	0.9	3.9
Romania	42.7	51.4	66.3	9.8	8.0	0.8	3.6	0.8	3.6
Russia	34.4	22.9	13.0	7.3	5.2	0.6	1.2	0.6	1.2
Serbia, Republic of	63.1	71.9	90.5	14.5	11.3	1.1	4.8	1.1	4.9
Slovak Republic	54.9	52.1	45.6	12.9	11.2	1.0	3.6	1.0	3.6
Turkey	33.0	37.6	48.8	7.7	6.6	0.6	2.7	0.6	2.8
Ukraine	53.4	45.2	48.1	10.7	7.1	0.8	2.6	0.8	2.7

Sources: IMF, *World Economic Outlook*; and IMF staff simulations.

1/ Assuming no further accumulation of reserves.

2/ With respect to the euro. The table does not report results for an exchange rate shock in countries with a currency board arrangement or a fixed euro exchange rate.

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