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### **Life after the hangover: Economic growth in the new EU member states between accession boom and adjustment bust**

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# Life after the hangover: Economic growth in the new EU member states between accession boom and adjustment bust

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European Commission

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## Abstract

This paper investigates the accession-related economic boom and discusses the adjustment need in the context of cumulated economic imbalances. The analysis tests whether, on top of the standard growth determinants, the period of EU accession made a significant difference to the growth performance of the NMS and explores the role of current account imbalances and misalignments of real effective exchange rates. The paper finds that the period of EU accession is characterised by significantly larger growth rates of per-capita GDP, even after controlling for a wide range of economic and institutional factors. In the context of macroeconomic imbalances and the need for adjustment, it is found that currency misalignment is negatively related to economic growth, especially for relatively open and poor countries and those undergoing economic transition. The medium-term impact of misalignment, however, is shown to be positive, suggesting that growth may rebound after macroeconomic adjustment.

JEL Classifications: O47, F32.

Key words: EU enlargement, economic growth, external adjustment.

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# 1 Introduction

The economic growth record of the New Member States (NMS) of the European Union after the recovery from transition in the early 1990s has been impressive. The region has clearly benefited from catching-up dynamics as well as economic and institutional integration with the EU. The current financial crisis, however, hit the NMS hard and pushed growth rates below potential.

While the empirical growth literature is extensive, only a few studies have used growth regressions to analyse the impact of EU accession on growth. Crespo-Cuaresma et al. (2002) make explicit reference to EU membership in explaining growth, analysing pre-2004 accessions and finding the length of EU membership to have a significantly positive effect on economic growth. Schadler et al. (2006) analyse advanced and emerging market countries and find that income levels, population growth, investment, openness and institutional quality determine growth. Falcetti et al. (2006) and Iradian (2007) focus on the growth experience of transition countries and find a significant impact of institutional factors and transition reforms, as well as a significant impact of recovery from transition-related output losses. We make a step forward compared with the existing literature in specifically assessing the impact of EU accession on the growth performance of NMS.

The impact of currency misalignment has so far not been regarded as a standard growth determinant. Gala and Lucinda (2006) and Rodrik (2008) argue that undervaluation stimulates economic growth in developing countries. Freund and Pierola (2008) explore the role of misalignment for export competitiveness and find that export surges in developing countries tend to be preceded by real devaluations. These studies all use misalignment measures based on purchasing power parities. The situation of the NMS, however, is characterised by large current account imbalances and rapidly increasing real effective exchange rates so that misalignment measures based on current account norms appear more suitable. This paper employs an equilibrium exchange rate estimation akin

to the IMF's macroeconomic balance approach (see, for example, Lee et al. (2008)) yielding misalignment estimates that are then used as additional explanatory variables in the growth regressions. Moreover, this paper resorts to a wider range of explanatory variables to control for other growth determinants.

This paper employs a large cross-country dataset to dispose of a significant control group. The panel dataset comprises annual observations of advanced, emerging, and transition economies starting in 1960. In addition to standard determinants, per-capita GDP, population growth, investment, openness and human capital formation, we also include variables related to economic transition and EU integration, namely initial output loss, terms-of-trade growth and institutional quality of the legal system, freedom of trade, and the regulatory environment. The role of institutional quality for growth is stressed, for example, by Acemoglu et al. (2005). Controlling for all these effect, the additional EU accession impact is measured in a difference-in-difference approach. The interaction of an enlargement time dummy with a NMS region dummy permits to assess whether enlargement affected the growth rate of NMS, relative to the pre-enlargement period and to the old member states as well as other, non-EU transition economies.

The results suggest a significant EU accession effect on top of the impact of the remaining explanatory variables. While the NMS growth rates appear significantly lower than those of the old Member States (OMS) during the transition period of 1990-1994, the NMS perform significantly better than the OMS during the EU accession period. The results are basically robust with respect of the definition of the sample. Moreover, most recent data suggest that economic growth has fallen below growth rates as predicted by the empirical model, highlighting the importance of macroeconomic adjustment. In the light of this evidence, the standard growth regressions are augmented with misalignment estimates as explanatory variables which are found to be negatively associated with economic growth. This effect turns out even stronger when interacted with openness, per-capita GDP and a transition dummy, suggesting that open and relatively poor countries

with transition experience, such as the Baltics, are particularly affected by overvaluation. The results also show that in the medium term, overvaluation is followed by positive growth impacts, highlighting the potentially beneficial role of macroeconomic adjustment.

The remainder of this paper is structured as follows. Section 2 presents some stylised facts, highlighting the growth performance of the NMS over time, investigating signs of convergence and presenting several growth determinants graphically. Section 3 explains the data, methodology and results of the standard growth regression analysis to investigate growth effects of EU accession. Section 4 augments the standard empirical model with currency misalignment. Section 5 concludes.

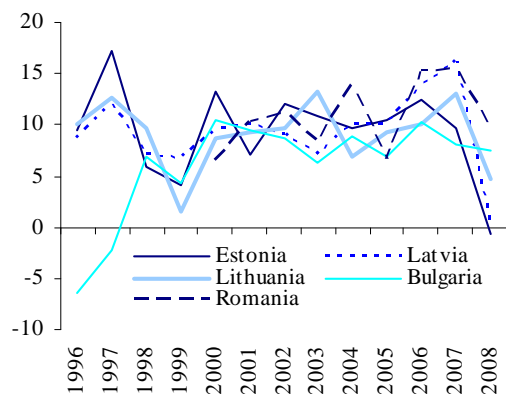
## **2 Stylised facts**

The growth performance of the NMS has been described as a typical catching-up experience, starting from lower initial per-capita income levels and characterised by faster growth than the mature economies of OMS. Before turning to growth regressions, this section takes a preliminary look at the behaviour of growth rates and their potential determinants.

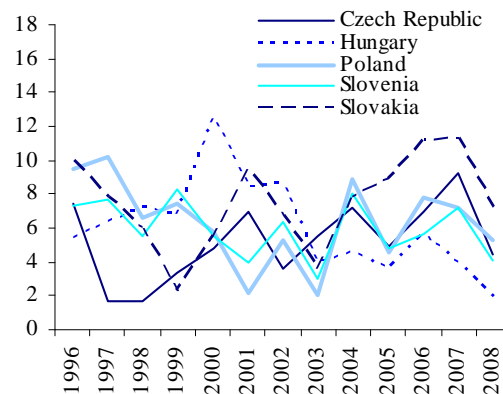
NMS growth rates have been volatile, yet mostly above those of the OMS and other mature economies. Graphs 1 and 2 show the growth rates of the ten transition NMS. The Baltics as well as Bulgaria and Romania appear strongly affected by the aftermath of the Russian economic crisis of 1998 but exhibit elevated growth rates between 2000 and 2007. Growth rates for the remaining NMS were somewhat lower, fluctuating around 6-7%. In 2008, growth rates generally slumped in the wake of the global financial crisis.

*Per-capita growth rates, 1996 - 2008*

*Graph 1: Baltics, Bulgaria, Romania*



*Graph 2: NMS-5*



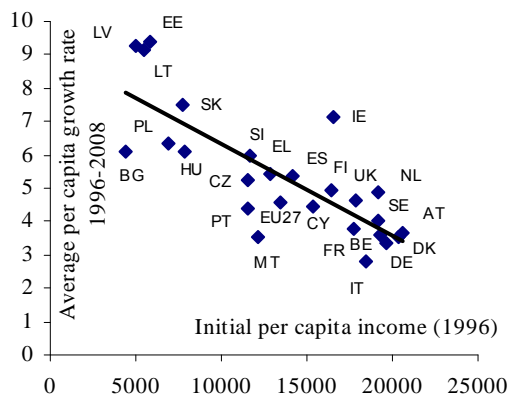
*Note: Annual growth rates of per-capita GDP (PPP). Source: AMECO database.*

Catching-up dynamics are illustrated in graph 3. The concept of catching-up, or beta convergence, stems from the convergence hypothesis of the neoclassical growth literature. A Solow-type production function with non-increasing returns to scale typically implies that the long-term behaviour of the economy will be independent of the initial conditions. Due to the concavity of the production function in the capital stock, capital-poor countries will grow sufficiently faster, i.e. catch up to the capital-rich countries to offset the initial differences. Catching up is subject to alternative possible factors, including structural transformation, endogenous growth and gains from trade (see Caselli and Tenreyro (2005)).

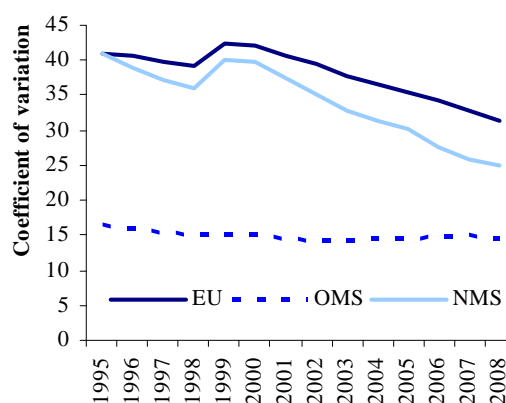
Graph 3 shows that the average annual per-capita growth rates of those EU countries with lower initial (1996) income levels tend to exhibit higher growth rates, indicated by a downward-sloping trend line. The NMS are clearly concentrated in the top-left quadrant of the graph, notably the Baltic countries. Some NMS like Slovenia and the Czech Republic, however, are located not far from OMS countries such as Portugal and Greece. The graph confirms the widely agreed conclusion that regards the EU as a

"convergence club" (see Schadler et al. (2006)).

Graph 3: Beta convergence



Graph 4: Sigma convergence

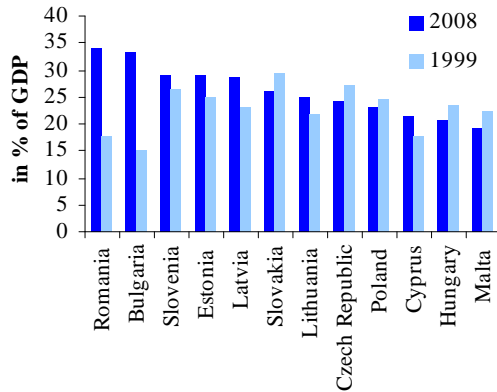


Note: Income levels and growth rates are based on real per-capita GDP in PPP terms.  
Source: Elaborations on the AMECO database.

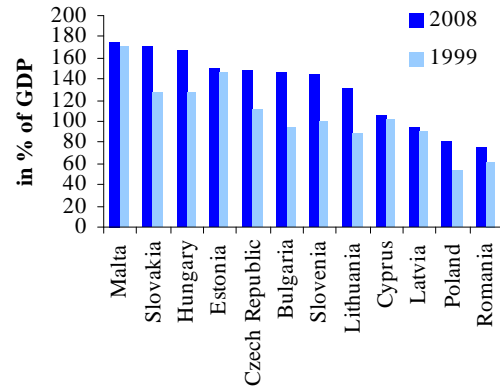
Sigma convergence is an alternative way of assessing income convergence, i.e. the decrease of cross-country variation of growth rates over time. The NMS have made considerable progress since the beginning of the decade. Graph 4 shows the standard deviation of national per-capita growth rates, in percent of the average. In contrast to the notion of the EU as a "convergence club", sigma convergence is mostly due to developments in the NMS. While the cross-country variation of growth rates among the OMS remained largely stable over time, that of the NMS declined continuously since 2000.

Investment rates feature prominently among the variables used in growth regressions. Graph 5 compares investment ratios for the NMS in 1999 and 2008. The largest investment ratios are recorded for Romania and Bulgaria who, at the same time, exhibit the largest increase in investment over time. Other countries with increasing investment ratios include Slovenia, Cyprus and the Baltics.

Graph 5: Gross capital formation



Graph 6: Openness to trade



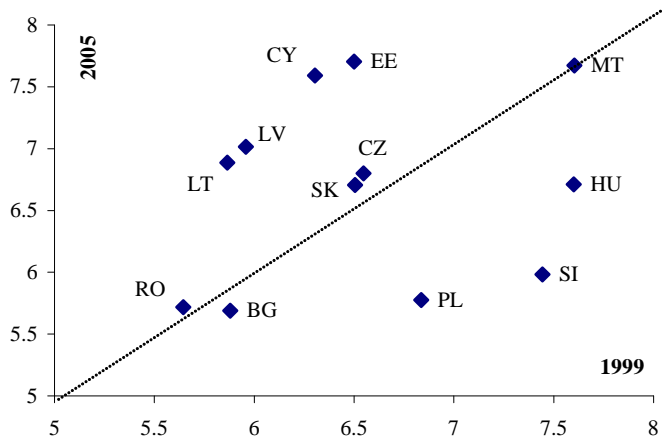
Note: Openness is measured as the sum of exports and imports of goods and services, in % of GDP. Source: AMECO database.

Turning to trade openness, graph 6 shows that, between 1999 and 2008, all NMS increased their integration in international trade. In line with expectations, the smallest country (Malta) is the most open economy, while the largest countries (Poland, Romania) range at the end of the openness scale. Some countries increased their openness ratio considerably, such as Slovakia, Hungary, Bulgaria and Slovenia.

The role of institutional quality is increasingly at the core of growth theory. Graph 7 shows the Fraser Institute's index for the quality of the legal system, ranging from 1 for poor to 10 for optimal systems of legal protection and property rights. Comparing 1999 to 2005 shows that notably the Baltic countries as well as Cyprus clearly improved their legal system quality. This evidence supports the view that EU integration was associated with institutional improvement. Hungary, Slovenia and Poland, however, appear to have deteriorated in terms of legal system quality. The indices of the other NMS have not changed much over time.



Graph 7: Quality of the legal system



Note: Larger indices indicate higher quality of the legal system. Source: Fraser Institute.

Taken together, the descriptive evidence suggests that catching-up dynamics were at work in most NMS. Visual inspection of several key drivers of economic growth, however, points at important cross-country differences. The Baltic countries exhibit particularly strong growth rates in the presence of comparably low initial income levels, increasing investment ratios and large improvements in institutional quality. The aim of the regression analysis in the following section is therefore to explore the growth experience systematically and to shed light on the role of EU accession on top of these growth determinants.

## 3 Assessing the EU accession boom

### 3.1 Data and methodology

To conduct the panel regressions, a large cross-country dataset is used to dispose of a significant control group. The dataset comprises annual observations of 62 advanced, emerging, and transition economies from 1960 to 2008. Besides the 27 EU member states and the remaining 11 OECD countries, 24 additional middle-income countries are considered.<sup>1</sup> Explanatory variables include standard 'textbook' growth determinants, namely per capita GDP, population growth, investment, openness, terms-of-trade growth and human capital formation.<sup>2</sup> Standard growth regression specifications are augmented to take into account explanatory factors specific to the growth performance of transition and NMS. To control for the impact of changing terms of trade following transition-related structural change and developments in world commodity prices, terms of trade changes are included among the set of explanatory variables (Iradian (2007)). Furthermore, in light of the shaping view that institutions are key to the development process (e.g., Acemoglu et al. (2005)), and in line with recent analogous analyses on growth in transition economies and NMS, standard specifications of growth regressions are augmented with the inclusion of various indicators are employed to proxy for the institutional quality of the legal system, freedom of trade, and the regulatory environment.

The data on real per-capita GDP in PPP-terms, population growth and terms of trade are taken from the World Bank's World Development Indicators (WDI). Openness ratios are provided by the Penn World Tables. Years of schooling come from the human

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<sup>1</sup>The countries included in the sample were as follows: Albania, Argentina, Australia, Austria, Belgium, Belarus, Brazil, Bulgaria, Canada, Chile, China, P.R.:Hong Kong, China,P.R.: Mainland, Colombia, Croatia, Cyprus, Czech Republic, Denmark, Egypt, Estonia, Finland, France, Germany, Greece, Hungary, Indonesia, Iceland, Ireland, Israel, Italy, Japan, Korea, Latvia, Lithuania, Luxembourg, Morocco, Mexico, Macedonia: FYR, Malta, Malaysia, Netherlands, Norway, New Zealand, Philippines, Poland, Portugal, Romania, Russia, Singapore, Slovak Republic, Slovenia, Spain, Sweden, Switzerland, Thailand, Tunisia, Turkey, Ukraine, United Kingdom, Uruguay.

<sup>2</sup>See, e.g., Barro and Sala-i-Martin (2004), Levine and Renelt (1992), and Temple (1999), for an overview of explanatory variables in empirical growth analysis.

capital database of Barro and Lee (2000). The source of the indices on institutional quality is the Fraser Institute.

The aim of the analysis is to assess, whether on top of the effect of explanatory variables, NMS performed differently during and after accession. Following standard practice in the estimation of growth regressions, annual observations are converted into averages over five-year, non-overlapping sub-periods, in order to avoid that short-term disturbances affect results.<sup>3</sup> Dummy variables capture the idiosyncratic effects of time periods and of geographic regions. The interaction between time and geographical effects permits to assess whether a particular group of countries performed above average in a particular period. Although enlargement for the EU-10 was formally completed as of 1 May 2004 (that of Bulgaria and Romania 1 January 2007), there is agreement that much of the enlargement-related growth effects took place already before the official dates, in light of the economic and institutional restructuring associated with the achievement of the 'acquis communautaire', EU transfers related to accession, and boosted investment, FDI, and technology transfer in anticipation of EU accession (e.g., Schadler et al. (2006)) Hence, the interactions of the 2000-04 and the post-2005 dummies with a NMS dummy are used to assess whether enlargement affected the growth rate of the NMS on top of the impact of the remaining explanatory variables.

### **3.2 The growth effect of EU accession**

Basic specifications provide a satisfactory performance. Table 1 presents the regression results. Specification (1) includes standard growth regression variables used to assess conditional convergence in large cross-sections of countries. Per capita GDP growth in PPP terms is regressed on the initial sub-period values of the log of per capita GDP, population growth, investment ratios, openness and a proxy for human capital (average years of schooling over the whole population).

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<sup>3</sup>Due to missing data for several variables for the 2007-2009 period, the last sub-period includes the available years between 2005 and 2009.

Table 1: NMS regression results

	(1)	(2)	(3)	(4)	(5)
	1960-2008		1960-2008		1990-2008
Log initial per capita GDP	-1.62*** (-5.28)	-1.10*** (-4.75)	-1.35*** (-4.20)	-1.53*** (-5.07)	-1.39*** (-3.62)
Population growth	-0.53** (-2.25)	-0.69*** (-2.98)	0.06 (0.16)	-0.59** (-2.01)	-0.46 (-1.38)
Gross capital formation	0.19*** (8.45)	0.17*** (7.74)	0.18*** (5.64)	0.16*** (6.54)	0.16*** (5.54)
Openness	0.01*** (3.47)	0.01*** (3.04)	0.01*** (3.19)	0.01** (2.07)	0.01 (1.09)
Years of schooling	0.26*** (3.38)				
Terms of trade growth			0.16** (2.37)	0.12*** (2.95)	0.10* (1.89)
Quality of legal system				0.20 (1.55)	0.26 (1.57)
Freedom of trade				0.24* (1.94)	0.33* (1.82)
Quality of regulation				0.10 (0.50)	-0.11 (-0.42)
NMS (dummy)			-1.57* (-1.72)	-1.44 (-1.61)	-1.28 (-1.32)
NMS during 1990-1994 (dummy)			-3.56** (-2.55)	-0.68 (-0.42)	-0.72 (-0.42)
NMS during 2000-2004 (dummy)			3.03*** (3.03)	2.87*** (3.01)	3.13*** (3.13)
NMS after 2005 (dummy)			2.14** (2.24)	1.82* (1.95)	2.07** (2.17)
Sample size	254	254	305	289	208
Adjusted R <sup>2</sup>	0.57	0.54	0.47	0.53	0.52

Notes: Estimation method: OLS. *t* statistics are reported in parentheses. The panel structure employs non-overlapping five-year periods, except for the last sub-period which includes the available years from 2000. \*, \*\*, \*\*\* denote statistical significance at 10, 5, and 1 per cent level, using robust standard errors. Column (1) displays standard textbook specification, column (2) repeats the same regression excluding the schooling variable but using the same sample as (1). All specifications include world region dummies, time period dummies (1995-1999 period omitted), and the interaction between the two set of dummies. World regions are defined as follows: EU-15 (omitted), NMS, non-EU OECD, non-EU non-OECD.

The coefficients are all significant and show the expected signs. Human capital

variables, however, are either not available for most of the NMS (Barro and Lee data), or available only some NMS, and few years (World Development Indicators). Hence, to keep a sufficiently large amount of data on NMS, the baseline regressions to assess the impact of enlargement exclude human capital variables. Of course, as a result of the exclusion of a largely significant explanatory variable, an omitted variable bias issue arises. However, as shown in specification (2), which is based on the same sample as (1) but excludes the schooling variable, it appears that the bulk of the bias is found in the coefficient of initial income per capita (omitting the human capital variable leads to an underestimation of the speed of convergence), while the performance of the remaining explanatory factors is fairly robust.

The basic specification is augmented to take into account NMS-specific growth determinants and institutional factors. Specifications (3) and (4) employ the entire sample and supplement the regression with relevant additional control variables to test the impact of enlargement on New Member States. Terms of trade growth plays an important role and exhibits significant coefficients throughout. In line with expectations, in specification (3), the NMS perform significantly worse during the 1990-94 period and significantly better in 2000-04 and post-2005, both relative to the omitted reference period 1995-99.<sup>4</sup> The size and significance level of the coefficient for the 2000-04 period are both larger than in the following post-2005 period, indicating that the bulk of the enlargement effect materialised in the run up to and during the same year of the 2004 accession. Specification (4) includes in addition three institutional indicators, measuring the quality of the legal system, freedom of trade and the quality of regulation in product, labour and financial markets.<sup>5</sup> As expected, all three variables are positively associated with growth.

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<sup>4</sup>In all regressions, the omitted regional dummy is that for the EU-15, while the omitted period dummy is the 1995-1999 period. Hence, the non-omitted region and time dummies represent the difference with respect to the EU-15 in the 1995-1999 period.

<sup>5</sup>The indicators are taken from the Fraser institute. These indicators permit to capture major transition-related and accession-related elements, including change in ownership of financial and non-financial firms and protection and enforcement of property rights. Compared with the EBRD transition indicators (used, for instance, in Falchetti et al., 2006), they are available also for non-transition countries.

Freedom of trade is 10% significant, institutional quality is borderline significant. As a result of the inclusion of the institutional variables, the impact of accession shrinks somewhat in size, suggesting that improvements in institutional quality themselves were associated with the accession process.

Results appear to be robust with respect to the definition of the sample. Focusing on the post-1990 period, specification (5) provides a broadly similar picture to that of the baseline specification. Openness seems less relevant as a driver of growth while the positive accession impact for the NMS during the 2000-04 and the post-2005 periods are still significant.

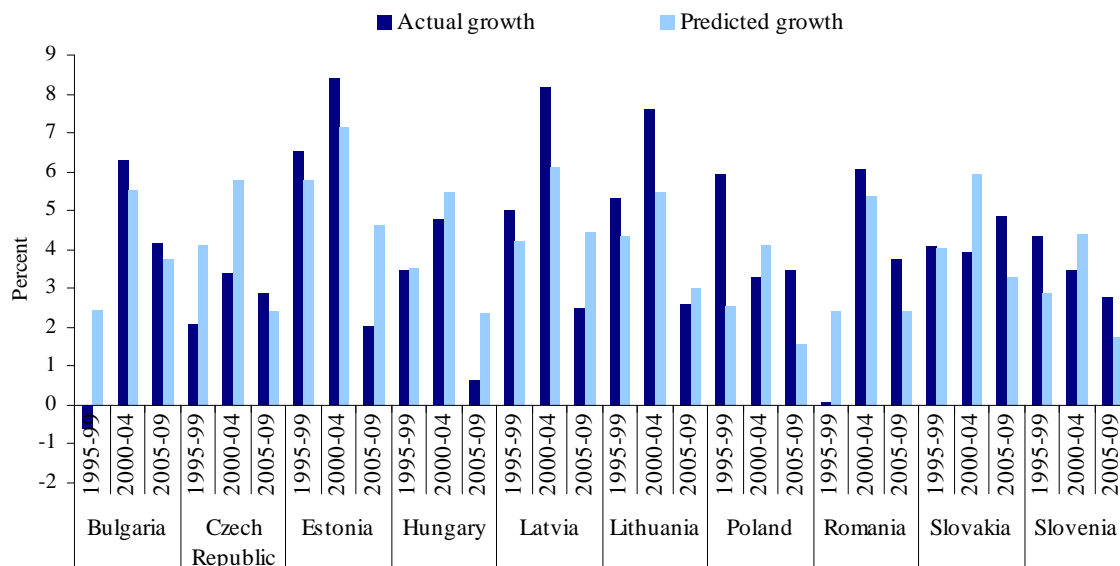
Average results mask non-negligible differences across countries. The baseline specification (4) provides significant results in line with expectations and explains roughly half of the variance of the observed growth rates. However, it is important to note that for some countries actual growth rates diverged quite considerably from the prediction of the empirical model. Graph 8 illustrates this point. The graph plots the actual and predicted average growth rates over the three 5-year periods between 1995 and 2009 for the transition NMS, showing partly sizeable deviations. In line with expectation, the actual growth rates exceed model-predicted rates in many cases, notably during the accession period (2000-2004) while, thereafter, actual growth rates affected by the current financial crisis fall behind model predictions.

Some of the cross-country differences easily meet the intuition, e.g. Latvia and Lithuania exceeding model predictions until the mid-2000s, while Hungary and the Czech Republic falling short of them; others appear to challenge somehow expectations, e.g. Slovakia, after controlling for its comparatively high investment rate and high scores in terms of institutional quality, performs worse than predicted.

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Compared with the World Bank Governance Indicators (used, e.g., in Iradian (2007)), they are available for a longer time period.

Graph 8: Actual and predicted growth rates



Notes: Actual average annual growth rates are compared to model predictions, based on the baseline regression specification (4) in table 1.

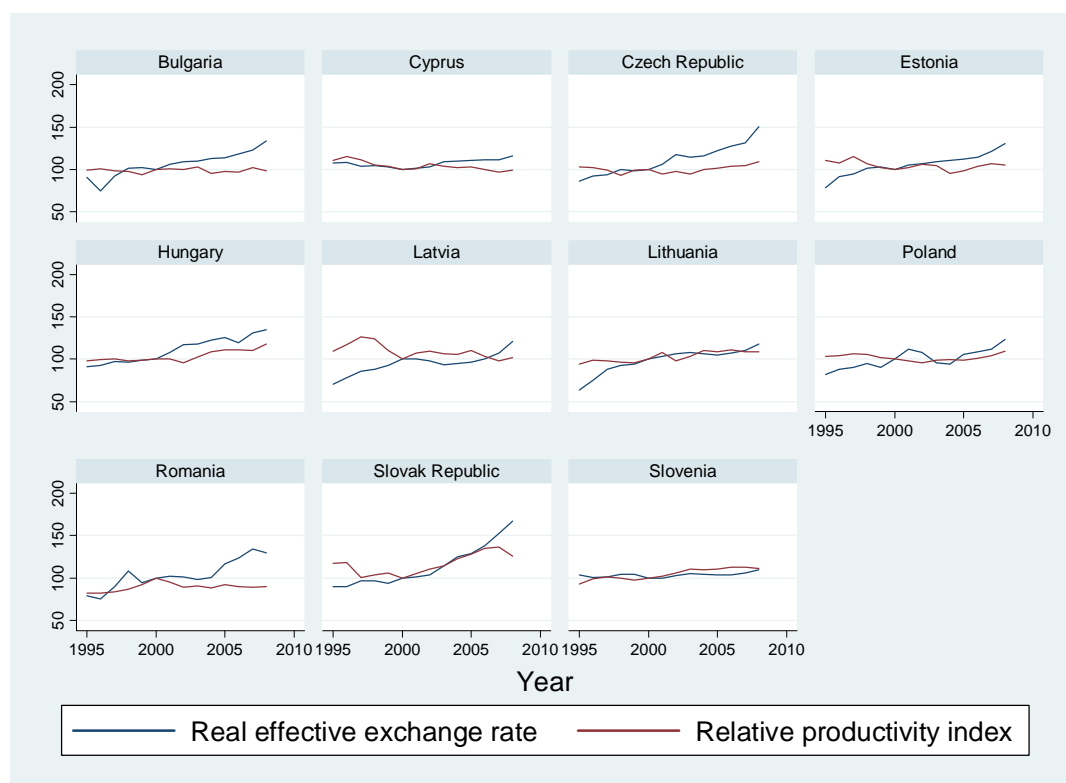
## 4 Growth implications of external adjustment

This section extends the growth regression analysis by including misalignment measures and investigating their impact on economic growth. The previous sections have shown that the NMS benefited considerably from EU accession. However, the presence of sizeable macroeconomic imbalances, as reflected in large current account deficits and potential overvaluation, highlights the need for adjustment. Indeed, the current financial and economic crisis has dramatically revealed the adjustment need and, in some cases, imposed painful adjustments with adverse economic impacts.

## 4.1 Stylised facts

The positive development of the NMS was in large parts accompanied by real effective exchange rate (REER) appreciation. Graph 9 shows REER indices based on CPI and double-weighted vis-à-vis 35 trading partners, plotted with a relative productivity index based on the ratio of productivity in tradables over that in the whole economy compared with competitors. All NMS except the non-transition countries Cyprus and Slovenia are characterised by strong real appreciation in recent years, suggesting deteriorating export competitiveness. The deviation from relative productivity developments is most pronounced in Bulgaria, the Czech Republic, Romania and, recently, Slovakia.

Graph 9: Real effective exchange rates and relative productivity, 1995-2008

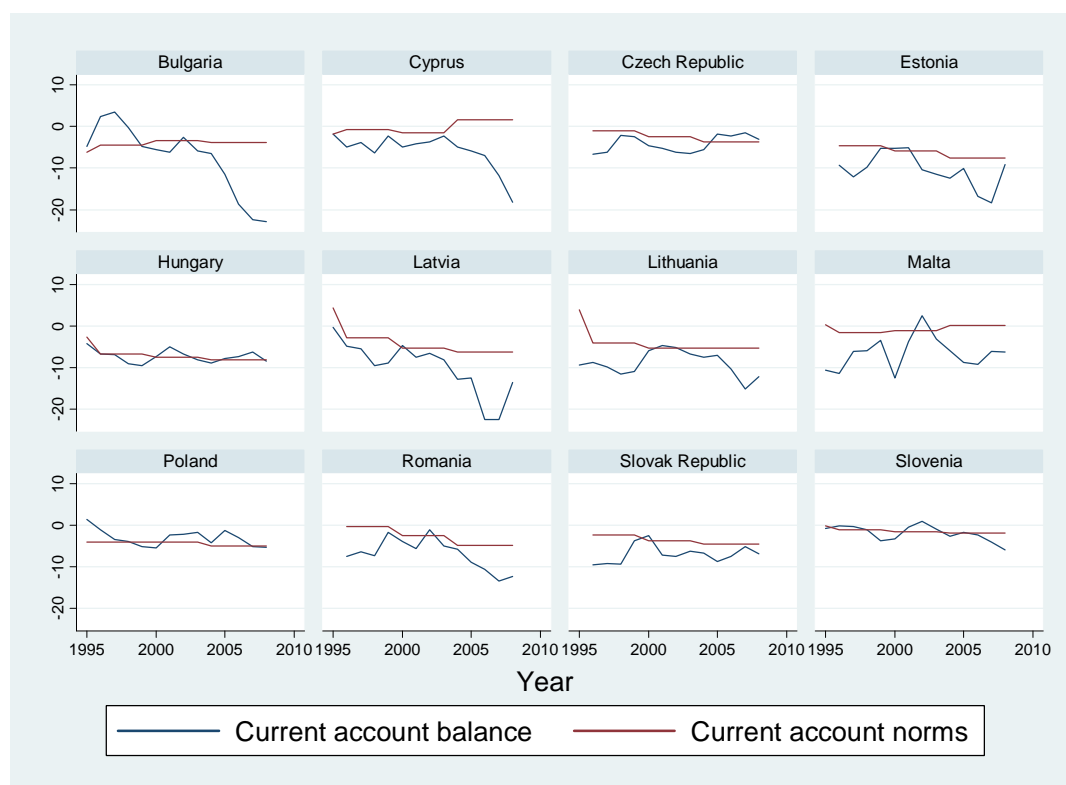


Note: Increasing values denote appreciation. Source: Elaborations on the AMECO database.



This development is also reflected in partly sizeable current account deficits, shown in Graph 10. The current account deficits of all three Baltic countries as well as those of Bulgaria and Romania widened significantly over recent years and deviated markedly from the estimated current account norms. Bulgaria's and Latvia's deficits climbed to 20% of GDP in 2007. Only in 2008, due to the slump in imports induced by the financial crisis, the current account balance of several countries improved slightly.

*Graph 10: Current account balances and norms, 1995-2008*



*Source: Elaborations on the AMECO database.*

## 4.2 Methodology

The measure of exchange rate misalignment is based on current account gaps, defining the "equilibrium" real effective exchange rate as the REER which is consistent with external and internal balance over the medium-to-long term. External balance is satisfied when a country's current account position is at an "appropriate" level as specified by an estimated current account benchmark. Internal balance requires output to be equal to its potential. Misalignment is defined as the percentage change in the REER which is required to close the gap between the current account benchmark and the cyclically-adjusted current account balance.

Current account benchmarks are estimated and predicted on the basis of fundamentals relating to the determinants of the saving-investment balance of the economy. Regressions on an unbalanced panel of 60 industrial and emerging economies over the 1970-2008 period are used to estimate the link between the current account and a series of explanatory variables representing fundamental determinants. The estimated current account norm for each country and each of the 4-year sub periods are obtained as in-sample predictions from these regressions. Along with Chinn and Prasad (2003) and Lee et al. (2008), the following determinants are considered: general government budget balance ratio, old age dependency ratio, real GDP per capita in PPP terms, real GDP per capita growth, net foreign asset ratio, oil balance.

Results are significant and in line with expectations (Table 2). Since most variables are broadly stationary, OLS estimation techniques are used without resorting to panel cointegration techniques. The regression explains about 40 per cent of the variance of current account / GDP ratios. The size of the coefficients is also on line with that of existing studies (Lee et al., 2008). Regression coefficients have the expected sign.

Table 2: Current account norms regression

Dependent variable: current account/GDP	
Explanatory variables	
Government budget balance/GDP	0.236*** (3.19)
Old-age dependency ratio	-0.150*** (-2.99)
Real GDP per capita in PPP term relative to US	2.213* (1.91)
Growth rate in GDP per capita	-0.318*** (3.02)
Initial NFA/GDP	0.057*** (7.24)
Oil balance	0.004*** (3.95)
Interaction monetary union dummy* Real GDP per capita in PPP term relative to US	2.731*** (3.16)
Constant	
N. observations	324
R squared (within-R squared if fixed effects included)	0.40

Notes: Estimation: OLS with standards errors robust with respect to heteroschedasticity and residual correlation within panels. The absolute value of  $t$  tests is reported in parentheses. \*, \*\*, \*\*\* denote, respectively, statistical significance at 90, 95, 99 per cent. For the last period of estimation the average is over the 2004-2008 five-year period.

The resulting REER change which is needed to close the gap between the current account norm and the cyclically-adjusted current account is defined as misalignment. Misalignments are expressed in percentages, with positive numbers denoting overvaluation. Hence, negative coefficients in the growth regression would indicate that overvaluations hamper growth rates while undervaluations promote growth.

### 4.3 The growth effect of misalignment

Table 3 presents the results of the regression set-up as employed above, supplemented by misalignment measures and interaction variables. The misalignment estimate of the

initial year of each 5-year period is used. In column (1) of Table 3, the percentage misalignment enters with a negative although not significant coefficient. The remaining variables still show the expected signs with largely significant coefficients.<sup>6</sup>

*Table 3: Misalignment and growth results*

	(1)	(2)	(3)	(4)	(5)
Misalignment	-0.02 (-1.14)	-0.06*** (-3.12)	-0.02 (-1.26)	-0.01 (-0.11)	-0.06*** (-2.62)
Misalignment*openness		-0.09*** (-3.72)			-0.07*** (-2.63)
Misalignment*per capita GDP			0.03** (2.18)		
Misalignment*transition dummy				-0.15*** (-4.79)	
Misalignment (lagged)					0.02 (1.61)
Log initial per capita GDP	-1.83*** (-5.90)	-1.84*** (-5.98)	-1.56*** (-6.26)	-1.88*** (-6.30)	-1.68*** (-4.31)
Population growth	-1.00*** (-3.87)	-0.97*** (-4.11)	-1.02*** (-4.10)	-0.89*** (-3.83)	-0.76*** (-2.58)
Gross capital formation	0.13*** (4.92)	0.16*** (5.84)	0.13*** (4.59)	0.13*** (-4.93)	0.16*** (5.04)
Openness (standardised)	0.49*** (3.33)	0.37*** (2.67)	0.55*** (3.72)	0.53*** (3.93)	0.30 (1.53)
Terms of trade growth	0.09** (2.08)	0.09** (2.40)	0.08** (2.09)	0.06* (1.89)	0.06 (1.61)
Quality of legal system	0.30** (2.21)	0.27** (2.05)	0.30** (2.38)	0.32** (2.40)	0.29 (1.50)
Freedom of trade	0.13 (0.94)	0.15 (1.08)	0.10 (0.67)	0.11 (0.86)	0.19 (1.01)
Quality of regulation	0.01 (0.02)	0.04 (0.22)	-0.01 (-0.01)	0.05 (0.28)	0.01 (0.02)
NMS (dummy)	-0.31 (-0.24)	-0.07 (-0.06)	-0.56 (-0.45)	-1.02 (-1.47)	0.84 (1.25)
NMS during 2000-04 (dummy)	1.25 (0.88)	1.47 (1.13)	1.41 (1.03)	2.43** (2.55)	
NMS after 2005 (dummy)	0.35 (0.25)	0.22 (0.17)	0.54 (0.40)	1.20 (1.34)	-0.44 (-0.61)
Sample size	228	228	228	228	180
Adjusted R <sup>2</sup>	0.56	0.65	0.64	0.66	0.57

*Notes: Misalignment is defined as the percentage deviation of the real effective exchange rate from the equilibrium REER, estimated with the current account norms ap-*

<sup>6</sup>The dummy variables which were used previously to capture growth effects of accession are still positive but no longer significant. This is due to a reduction in the sample when the misalignment variables are included. Indeed, the data points that are dropped in this case pertain mostly to early NMS observations during their weak-growth periods. Hence, the exercise in this section cannot be directly compared to the previous regressions. Instead, the aim here is to investigate the general behaviour of misalignment and growth and draw conclusions for the situation of the NMS.

*proach. Overvaluation is thus expressed in positive, undervaluation in negative numbers. Misalignment refers to the initial value of each 5-year period. For the further specification details, see notes to Table 1.*

In a next step, the misalignment variable is interacted with openness, per-capita GDP and a dummy for transition countries. It turns out that, with openness included, an overvalued REER is associated with significantly lower growth rates of real per-capita GDP while undervaluation has a positive impact on growth. The negative impact of misalignment on growth is further reinforced, as reflected by a negative and significant coefficient of the interaction variable in column (2). Hence, countries which are more exposed to international trade tend to suffer more from an overvalued REER than relatively closed economies.

Specification (3) interacts per-capita GDP with misalignment, resulting in a positive and significant coefficient. The result suggests that the misalignment effect on growth is stronger, the poorer a country is. This result is in line with Rodrik (2008) who finds that the relationship between misalignment and growth is largely driven by lower income countries. He argues that, in poorer countries, the tradable sector suffers more than the non-tradable sector from institutional weaknesses and market failures. Undervaluation, in turn, can serve as a second-best mechanism to alleviate these distortions and thereby improve economic growth.

The aspect of institutional weakness is especially relevant for countries in transition from command to market economy structures. Colum (4) reports the result of interacting a dummy for transition countries, including most NMS, with misalignment. The negative and significant coefficient confirms the hypothesis that, on top of the control variables, the negative misalignment effect on growth is aggravated in transition economies.

The results so far have shown that the simultaneous effect of misalignment on growth is negative and, when interacted with openness, significant. After several years of adjustment, however, the impact on growth may turn out to be positive. Column (5)

shows that, while misalignment is negatively associated with growth, the lagged value of misalignment exhibits a borderline-significant positive coefficient. It appears that, despite the prevailing negative simultaneous effect, countries with large overvaluations undergoing adjustment may turn out to benefit from higher growth rates thereafter.

In sum, the results show that overvaluation is associated with lower growth rates while undervaluation and growth are positively correlated. This effect is stronger for countries that are relatively open, poor or undergo economic transition. The medium-term impact of misalignment, however, appears to be positive, with the adjustment of the imbalances being the most likely channel. These results are particularly relevant for the NMS which have experienced overvaluation, in the presence of large degrees of openness, relatively low per-capita GDPs and the background of economic transition. The prospect of positive growth effects already one 5-year period later, however, calls for increased adjustment efforts by shifting resources from the non-tradable into the tradable sector in order to improve international competitiveness.

## **5 Conclusion**

This paper investigated the growth performance of the NMS in the context of the EU enlargement boom and macroeconomic adjustment. Descriptive evidence suggests catching-up dynamics and partly large current account imbalances, followed by growth breakdown below potential, particularly in the Baltic countries. Based on a large cross-country dataset, panel regressions test for standard growth determinants as well as enlargement-related variables. The analysis finds that, on average, the enlargement period was characterised by an overall positive growth experience for the NMS, on top of the effects of other explanatory variables. Interestingly, this positive effect remains significant even after controlling for institutional factors that are possibly related to accession, such as freedom of trade and the quality of the legal and regulatory system.

This suggests that TFP growth improvements associated with accession-related factors, like FDI and technology transfer, could have played a relevant role.

Comparing actual growth rates with model predictions reveal considerable differences across countries. Particularly the Baltic economies outperformed predictions until the mid-2000s before the picture reversed in the light of the financial crisis and the related breakdown in growth rates.

To account for the large current account imbalances, the growth regressions are augmented by misalignment measures of the real effective exchange rate. Results suggest that overvaluation is negatively associated with economic growth, especially for relatively open and poor countries as well as those in economic transition. These characteristics apply to most NMS and may partly explain why their growth has fallen below its potential in recent years. It is also shown, however, that the lagged impact of overvaluation is positive, suggesting that macroeconomic adjustment after large overvaluations may eventually help growth rates rebound. As a result, increased efforts are needed, e.g. by shifting resources from the non-tradable to the tradable sector, with a view to improving competitiveness in the NMS.

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## 7 Annex

### Details on data sources and variable definitions

- Growth in real GDP per capita (PPP, %). Source: World Development Indicators.
- Initial real GDP per capita (PPP): value recorded in the first year of each five-year periods Source: World Development Indicators.
- Population growth (%). Source: World Development Indicators
- Openness: sum of imports and exports on GDP (%). Source: Penn World Tables.
- Years of schooling: average years of schooling across whole population. Source: Barro and Lee.
- Terms of trade growth (%). Source: World Development Indicators.
- Quality of legal system: index computed by Fraser Institute summarising elements of legal system and property rights protection.
- Freedom of trade: index computed by Fraser Institute summarising information on tariff and non tariff barriers and capital movement controls.
- Quality of regulation: index computed by Fraser Institute summarising elements (including the extent of public versus private ownership) of regulations affecting labour, product, and financial markets.
- Real effective exchange rates (2000 = 100), based on double-trade weights vis-à-vis 35 partner countries. Source: AMECO.
- Relative productivity index: ratio of productivity in tradables over that in the whole economy compared with competitors. Productivity is proxied by value added per person employed. The relative productivity in the competitor group is obtained via aggregations with the same double export weights as used for the construction of the REER. The tradable sector is defined as the sum of agriculture and manufacturing, excluding construction. Source: AMECO.
- Current account/GDP ratio. Source: AMECO, integrated by IMF IFS data.
- General government budget balance/GDP ratio. Source: AMECO, complemented by IMF WEO.
- Old-age dependency ratio (fraction of population older than 65 years over the working-age population (between 15 and 64 years old)). Source: AMECO, complemented by United Nations.
- Net foreign asset/GDP ratio (value at the beginning of each 4-year sample sub-period). Source: AMECO, complemented by IMF Balance of Payments data.
- Oil balance (percentage difference between oil barrels per year produced and consumed). Source: BP and US Energy Information Administration.