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Did EU Accesion Contribute to Growth? Evidence for the New Member States Five Years after Enlargement

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Did EU accession contribute to growth? Evidence for the New Member States five years after enlargement

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Abstract

This paper investigates the economic growth record of the new member states (NMS) of the European Union from the mid-1990 until five years after the EU enlargement of 2004. Descriptive evidence points at strong catching-up dynamics, particularly in the Baltic countries. Based on a cross-country dataset that spans 62 countries during 1960-2008, we conduct panel growth regressions and find that, on top of standard growth determinants and enlargement-related variables, the prospect of EU membership and eventual accession of the NMS is associated with significantly higher growth rates of per-capita GDP. This effect is even more sizeable in the Baltic countries although the difference with regard to the other NMS is not significant. Long-term projections indicate that the Baltics' growth potential is well below accession-related growth rates, calling for economic policies to counterbalance potential overshooting and subsequent depression.

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1 Introduction

The economic growth record of the new member states (NMS) of the European Union since 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. This paper investigates whether, on top of these growth-enhancing drivers, EU accession made a significant difference to the growth performance of the NMS. It finds that, even after controlling for a wide range of other economic and institutional factors, the prospect of EU membership and eventual accession of the NMS is associated with significantly higher growth rates of per-capita GDP.

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.

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. 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. Given non-negligible differences across countries, special attention is devoted to the fast-growing Baltic countries. Results show that the magnitude of the accession effect is larger for Estonia, Latvia and Lithuania than for the other NMS. Long-term predictions, however, indicate that the Baltics' potential growth is below accession-related growth rates, suggesting "speed limit" policies for growth to better counterbalance overshooting and subsequent depression.

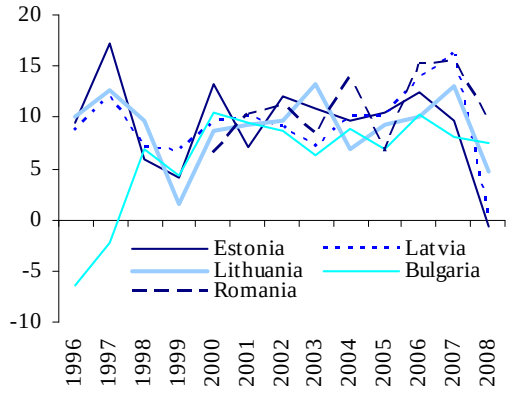
The remainder of this paper is structured as follows. Section 2 presents some stylised facts, highlighting the growth performance of the NMS over time, investigating signs of convergence and presenting several growth determinants graphically. Section 3 explains the data and methodology of the regression analysis, the results of which are presented in section 4. Section 5 concludes.

2 Stylised facts

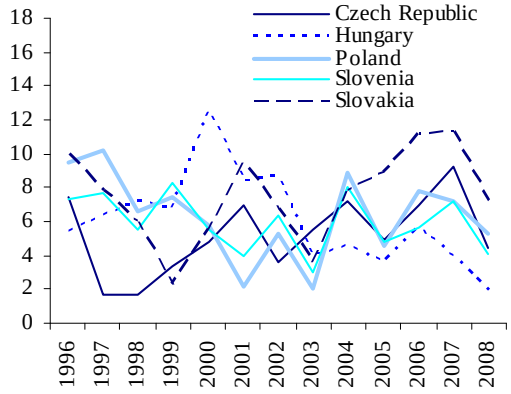
The growth performance of the NMS has been described as a typical catching-up experience, starting from lower initial per-capita income levels and characterised by faster growth than the mature economies of OMS.

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.

Graph 1: Growth rates, Baltics, BG, RO



Graph 2: Growth rates, NMS-5



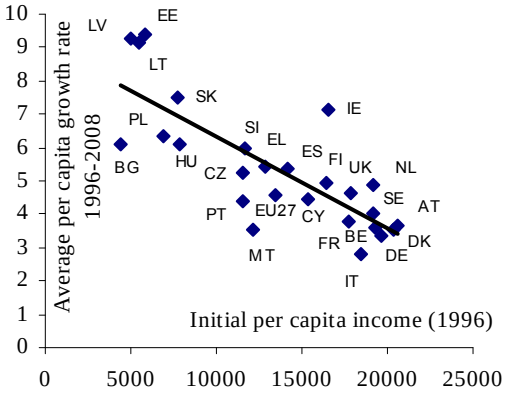
Note: Annual growth rates of per-capita GDP (PPP). Source: European Commission.

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.

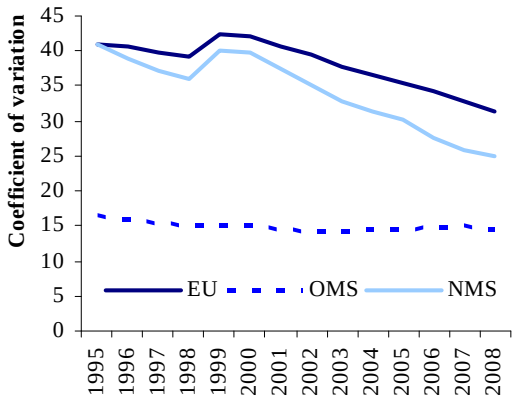
Graph 3 shows that the average annual per-capita growth rates of those EU countries with lower initial (1996) income levels tend to exhibit higher growth rates, indicated by a downward-sloping trend line. The NMS are clearly concentrated in the top-left

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.

Graph 3: Beta convergence



Graph 4: Sigma convergence

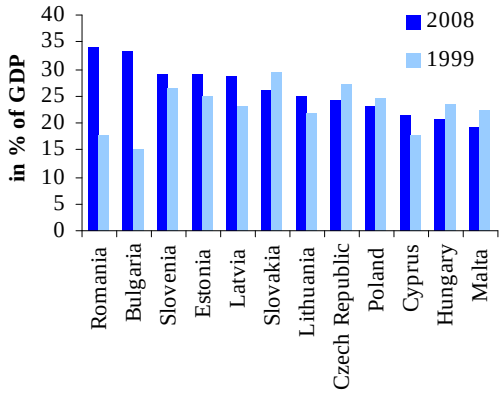


Note: Income levels and growth rates are based on real per-capita GDP in PPP terms. Source: European Commission.

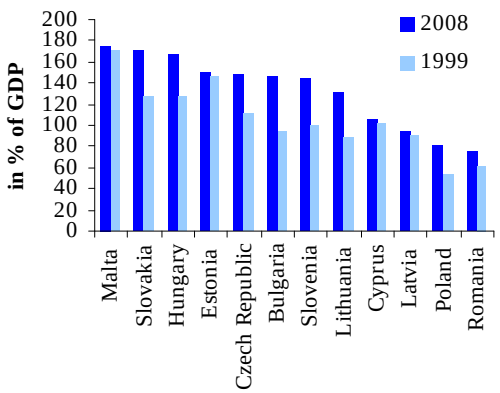
Also regarding sigma convergence, the NMS have made considerable progress since the beginning of the decade. Graph 4 shows the standard deviation of national per-capita growth rates, in percent of the average. While the cross-country variation of growth rates among the OMS remained largely stable over time, that of the NMS declined continuously since 2000. Both concepts of convergence indicate that the NMS have indeed been catching up to the OMS in terms of per-capita growth.

In addition to initial income levels, we consider various other potential determinants of NMS growth. 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

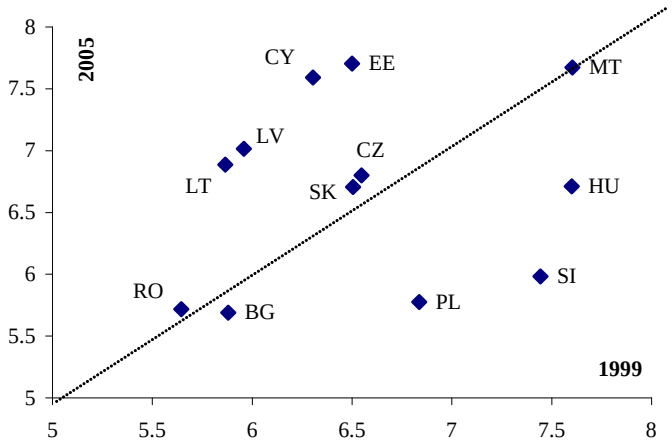


Note: Openness is measured as the sum of exports and imports of goods and services, in % of GDP. Source: European Commission.

Turning to openness to trade, 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 improvement of institutional quality can be regarded as one of the major benefits of EU accession, alongside increasing investment and trade ratios. 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. 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 decriptive evidence suggests that catching-up dynamics were at work in the NMS. Inspecting several key drivers of economic growth graphically, however, points at important cross-country differences. The Baltic countries exhibit particularly strong growth rates in the presence of low initial income levels, increasing investment ratios as well as large improvements in institutional quality. The regression analysis in the next section will analyse the drivers of growth systematically and shed light on the EU accession effect on top of these drivers.

3 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.[1] Explanatory variables include standard 'textbook' growth determinants, namely per capita GDP, population growth, investment, openness, terms-of-trade growth and human capital formation.[2] 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)). To account for catching-up effects after the output break-downs of formerly communist countries in the early 1990s, an output loss variable is constructed as the ratio of current output to the average output during 1990-1995 (akin to Falcetti et al. (2006) and 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 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

[1] 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.

[2] 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.

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.[3] 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 interaction of the post-2000 dummy with a NMS dummy is used to assess whether enlargement affected the growth rate of NMS on top of the impact of the remaining explanatory variables.

4 Regression results

4.1 General results for the New Member States

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).

[3] Due to missing data for several variables for the 2006-2008 period, the last sub-period includes the available years between 2000 and 2008.

Table 1: NMS regression results

	Standard specification		NMS specification full sample			Transition economies
	(1)	(2)	(3)	(4)	(5)	(6)
	1960-2008		1960-2008		1990-2008	1960-2008
Log initial per capita GDP	-2.10***	-1.54***	-1.48***	-2.06***	-1.73***	-4.19***
	(-8.00)	(-7.15)	(-5.27)	(-7.33)	(-4.22)	(-3.14)
Population growth	-0.35*	-0.54***	0.23	-0.41**	-0.77***	-0.55
	(-1.81)	(-2.82)	(1.17)	(-2.18)	(-2.89)	(-0.50)
Gross capital formation	0.16***	0.15***	0.19***	0.18***	0.16***	0.13
	(6.40)	(5.87)	(6.26)	(7.56)	(4.64)	(1.05)
Openness	0.01***	0.01***	0.01***	0.01**	0.01	-0.04*
	(4.12)	(3.91)	(3.54)	(2.08)	(0.95)	(-1.88)
Years of schooling	0.26***					
	(3.55)					
Terms of trade growth			0.24***	0.17***	0.24***	0.33*
			(5.03)	(3.87)	(3.43)	(2.06)
Quality of legal system				0.27**	0.28*	2.19**
				(2.55)	(1.72)	(2.78)
Freedom of trade				0.12	0.27	1.13
				(0.92)	(1.20)	(1.59)
Quality of regulation				0.40**	0.23	0.96
				(2.33)	(0.99)	(1.48)
Output loss					2.30**	-0.43
					(2.55)	(-0.20)
NMS (dummy)			-1.49	-1.21*	-1.02	-1.15
			(-1.64)	(-1.71)	(-1.30)	(-0.71)
NMS during 1990-1994 (dummy)			-3.53***	-1.16	-0.98	-2.41
			(-3.16)	(-1.17)	(-0.88)	(-0.65)
NMS after 2000 (dummy)			3.28***	2.64***	2.71***	0.67
			(2.71)	(2.78)	(2.66)	(0.45)
Sample size	258	258	300	275	160	38
Adjusted R^2	0.49	0.47	0.52	0.50	0.52	0.75

*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. Column (1) displays standard textbook specification, column (2) repeates 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 in the specifications (1)-(5) are defined as follows: EU-15 (omitted), NMS, non-EU OECD, non-EU non-OECD. EU In specification (6), regions are defined as NMS and rest of transition economies (omitted).*

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 large significant coefficients throughout. Over the whole sample, the NMS dummy is negative but not statistically significant, given the relatively small number of observations for these countries in the whole sample.[4] The NMS, however, appear to perform significantly worse during the transition period of 1990-1994, but significantly better during the pre-accession and accession period starting in 2000. Specification (4) is the baseline equation for the whole sample, which includes indicators of quality of the legal system, freedom of trade, and the quality regulation in product, labour, and financial markets among the explanatory variables.[5] As expected, all these variables

[4] 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.

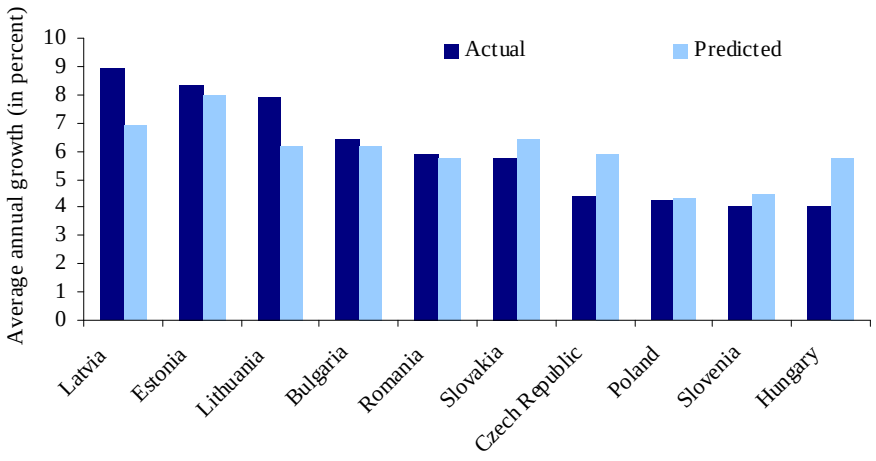
[5] The indicators are taken from the Fraser institute. These indicators permit to capture major transition-related and accession-related elements, including change in ownership of financial and non-financial firms and protection and enforcement of property rights. Compared with the EBRD transition indicators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

appear to exhibit a positive impact on growth, particularly those for legal system and regulation quality. As a result of the inclusion of this latter group of variables, the impact of accession appears to be reduced, although remaining largely significant. This suggests that improvements in the quality of the legal system, reduced trade barriers and capital controls, and improved market regulations were themselves associated with the accession process.

Average results mask non-negligible differences across countries. The baseline specification in (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 have diverged quite considerably from the prediction of the empirical model. Graph 1 illustrates this point. The graph plots the average regression residuals over the whole period and 2000 onwards for transition NMS. It is visible that there are non-negligible deviations of country performances from model predictions. Some of the results easily meet the intuition based on an uncontrolled comparison of actual growth rates (e.g., Latvia and Lithuania exceeding model predictions, while Hungary and 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 regulation quality, appears to perform worse than predicted).

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 for the 2000-2005 period, based on regression specificatin (4) in table 1.

Results appear to be robust with respect of the definition of the sample. Focusing on the post-1990 period, specification (5) provides a broadly similar picture to that of the baseline specification applied to the whole sample. Focusing the sample on these sub-period, permits to introduce and additional variable, capturing the extent to which transition was associated with a loss of output during the 1990-1994 period. The additional variable of output loss reduces the significance of the dummy for 1990-1994 period in NMS. Openness appears to be less relevant as a driver of growth starting from the 1990s, while terms of trade effects become stronger. Among institutional factors, regulation quality exhibits a lower explanatory power restricting the sample to the post-1990 period. The positive impact of accession appears very robust instead with respect to the definition of the sample. Finally, specification (6) repeats the specification in (5) but restricting the sample to transition economies. In spite of the limited number of observations, the results obtained for the whole sample of countries are broadly confirmed.

The explanatory power of investment ratios is lower, a phenomenon common to previous studies, which reflects over-capitalisation of previously planned economies and capital scrapping during transition. NMS during after 2000 appear to have grown faster than the rest of transition countries. Although the degree of statistical significance does not reach the 10 per cent level, possibly due to the limited size of the sample, the magnitude of the coefficient is close to that for the whole sample. After 2000, the average yearly growth rate of real per capita GDP in NMS has been on average about 2 per cent more compared with the previous 5 years and the rest of transition economies.

4.2 The Baltic countries

Graphical inspection of the main economic indicators has shown that the Baltic countries outperformed most other NMS during the 2000-2005 period. Moreover, the econometric model presented above underestimated the Baltic growth experience when compared to actual values. This subsection therefore checks whether there are Baltic-specific effects, besides the general NMS enlargement effects already detected. The NMS dummy and the interaction dummy for the NMS after 2000 is now replaced by an analogous Baltics dummy. Table 2 presents two specifications, using the OMS and the non-Baltic NMS as alternative benchmarks.

The standard explanatory variables are significant and show the expected signs. Lower initial per capita GDP and population growth are associated with higher average growth rates while gross capital formation, openness and terms-of-trade growth have a significantly positive impact on growth. Out of the three institutional indicators, legal system and regulation quality come out as significant.

Specification (1) allows for separate enlargement effects on the Baltics and the remaining NMS vis-à-vis the OMS and compared to the reference sub-period (1995-1999). The results show that both dummy variables, each interacted with the post-2000 period, are positive and significant with regard to the OMS reference group although the Baltics

dummy is of slightly larger magnitude. It seems that the Baltics benefited even more from enlargement than the remaining NMS, controlling for other factors.

Specification (2) compares the growth performance of the Baltics to the other NMS, using the non-Baltic NMS rather than the OMS as reference group. Results point at a positive but not significant difference between the two country groups. It appears that, although the Baltics enjoyed stronger growth rates during the early 2000s, this performance has no significant structural underpinning based on long-term growth determinants.

Table 2: Regression results for the Baltic countries

	(1)	(2)
Reference group	EU-15	Non-Baltic NMS
Log initial per capita GDP	-1.97***	-1.98***
	(-6.99)	(-7.01)
Population growth	-0.35*	-0.37*
	(-1.86)	(-1.93)
Gross capital formation	0.18***	0.18***
	(7.53)	(7.63)
Openness	0.01**	0.01**
	(2.08)	(1.99)
Terms of trade growth	0.16***	0.16***
	(3.82)	(3.82)
Quality of legal system	0.27**	0.27**
	(2.61)	(2.55)
Freedom of trade	0.11	0.13
	(0.85)	(1.01)
Quality of regulation	0.36**	0.36**
	(2.07)	(2.09)
Baltics after 2000 (dummy)	3.10**	0.18
	(2.11)	(0.11)
Non-Baltic NMS after 2000 (dummy)	2.54**	
	(2.40)	
Sample size	275	275
Adjusted R^2	0.51	0.51

Notes: See table 1 notes for specification details.

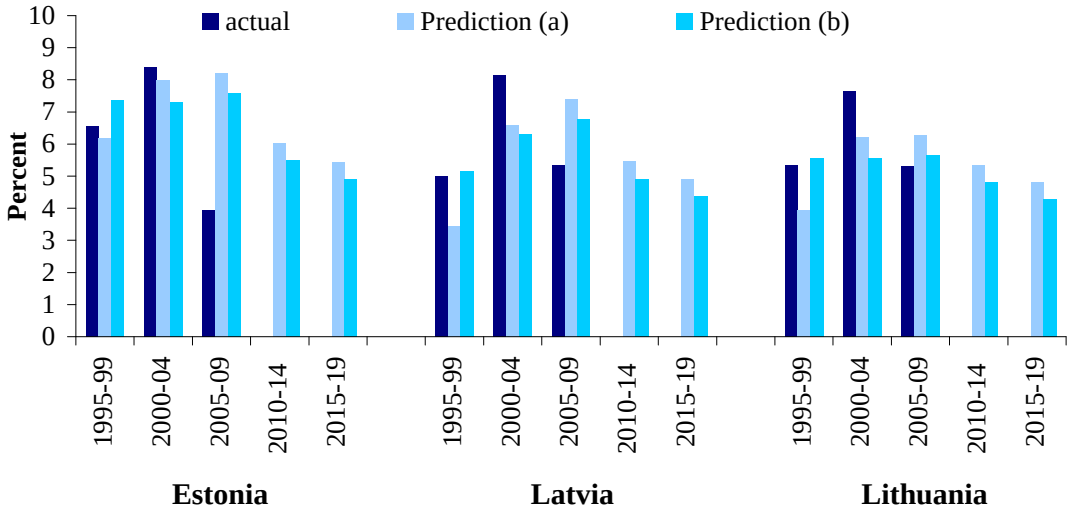
Until the mid-2000s, predicted growth rates are largely below actual growth. Graph 9 compares actual five-year-average annual growth rates to model predictions. Predic-

tion (a) refers to the general NMS specification (4) of table 1. Prediction (b) employs estimates from specification (1) of table 2 and applies the *non*-Baltic NMS dummy coefficients to the Baltics in order to abstract from possible transitory effects affecting the Baltic economies. Actual growth rates exceed the predictions (a) from NMS growth regressions between 1995 and 2004, indicating that, for a protracted period, the growth experience in Baltic economies has been above what could be justified on the basis of fundamentals.[6] During the late 2000s, actual growth rates slumped below predictions, most notably in Estonia and due to collapsing growth in 2008 and 2009 in the wake of the global financial crisis.

Out-of-sample predictions indicate a long-term growth potential for the Baltic countries of around 4 to 5 percent. The cross-country dataset was complemented with most recent AMECO data and forecasts for the Baltic countries until 2009. The ratio of gross capital formation to GDP was estimated using its elasticity to real per-capita GDP in the large country set. Population growth, the openness ratio, terms-of-trade growth as well as the institutional variables were assumed constant. The initial levels of per capita GDP per 5-year sub-period were iteratively estimated, using the estimated growth rates from the respective previous periods. The resulting growth estimates for the period 2015-2019 amount to 5.4 percent for Estonia, 4.9 percent for Latvia and 4.8 percent for Lithuania. When applying the non-Baltic NMS coefficients in prediction (b), the respective values fall to 4.9, 4.4 and 4.3 percent. It needs to be borne in mind, however, that these predictions are based on long-term determinants and judgemental assumptions and can therefore have only indicative character.

[6] During the 1995-1999 period, predictions (b) exceed actual growth rates. It appears that "Baltic-specific" factors first played against the Baltics' growth before they contributed to boosting growth until 2007. From 2008 onwards, however, the Baltics seem again particularly severely affected by the unfolding financial crisis.

Graph 9: Actual and predicted average annual growth rates, Baltic countries



Notes: Predictions (a) are based on the general NMS regression (specification 4 in table 1), predictions (b) draw on the specific Baltics regression (specification 1 in table 2), applying however the non-Baltics NMS coefficient to abstract from transitory, Baltic-specific factors. Actual data for the years 2008 and 2009 refer to AMECO forecasts. Source: European Commission.

5 Conclusion

This paper investigated the growth performance of the NMS in the context of EU enlargement. Descriptive evidence suggests catching-up dynamics, 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. We find that, on average, the enlargement process had an overall positive effect on growth for the NMS, on top of the effect played by other explanatory variables. Interestingly, this positive effect remains significant also after controlling for institutional factors that are possibly related to accession like freedom of trade, and quality of 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 countries outperformed predictions between 2000 and 2007. To account for the specific growth experience of the Baltic countries, we conduct separate regressions for the Baltics and find that the size of their enlargement effect, controlling for other variables, is larger than that of the remaining NMS. The difference in the growth effect is, however, not significant. Hence, although the Baltics benefited to a larger extent from EU accession, this performance does not seem to have significant underpinning based on structural growth determinants. Long-term growth predictions indicate that the Baltics' growth potential is below accession-related growth rates, calling for "speed limit" policies to better offset overshooting and subsequent depression.

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7 Annex

Details on data sources and variable definitions

Dependent variable: 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: Would 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.