Growth and convergence in Eastern Partnership and Central Asian countries since the dissolution of the USSR—embarking on different development paths?

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Abstract

Background: Since the dissolution of the USSR, the former Soviet countries not included in the enlargement of the European Union (EU) have experienced divergent development. While the so-called Eastern Partnership (EaP) countries established closer ties with the EU, the Central Asian (CA) states mostly gravitated towards Russia and China. Thus, despite belonging to a similar economic and political system, the two groups of countries pursued transition to a market-oriented economy and fostering development with varying results, creating a neat contrast to facilitate the study of patterns of growth and disparity.

Purpose: Based on an analysis covering more than two decades, the article explores the growth paths of the EaP and CA countries. Given their bumpy economic performances, the article aims, first, to show how these affected economic disparities among them. Second, it aims to identify the factors which most influenced different development trajectories.

Approach and methods: Through analysis of panel data, the article seeks to explain long-term economic growth (1992–2015) in terms of endowments of production factors, macroeconomic stabilization and transition reforms, external conditions and institutional development. Sources of growth are identified to reveal how they affected income per capita and shaped convergence in the two groups of countries.

Findings: The EaP and CA countries show different growth patterns since the end of communism. While the EaP economies shrunk more during the 1990s compared to the CA group, they bounced back faster during the 2000s. The EaP economies, being more closely connected to the EU, were more affected by the Great Recession of 2007–2009 than those of the CA. Overall, economic disparities between these sets of countries have slightly increased. Physical capital, foreign direct investment, natural resources, openness to trade and the transition reforms significantly explain economic
After the dissolution of the Soviet Union, the post-Soviet countries not included in the enlargement of the European Union (EU) have experienced different regional contexts of transition and development. While the Eastern Partnership (EaP) countries established closer ties with the EU,1 the Central Asian (CA) states mostly gravitated around Russia and China.2 The two groups of countries share some common in-group features which have distinguished themselves from other parts of the former Soviet Union, but, at the same time, they have displayed contrasting evolutions, depending on the regional context in which they are located.

On the one hand, the five CA republics have inherited a landlocked geographic location, at the heart of Eurasia, in the proximity of such regional powers as Russia and China. In general, the Soviet experience has largely shaped the CA countries. First, under the USSR, CA started a long journey to statehood which is nowadays closely connected to an unresolved debate, namely whether the Soviet transformation of CA was a neocolonial or a modern state-building process (Kassymbekova, 2017, p. 6). Second, over roughly seven decades under a centrally planned economic system, the CA republics were not able to overcome the status of “backward periphery” within the USSR and were largely exploited economically by Moscow, which allocated the region the role of primary commodity producers (Abashin & Jenks, 2015; Kandiyoti, 2007). Third, the transition from a monolithic structure to political sovereignty and economic independence after the collapse of the Soviet Union in 1991 was a harsh one for the CA region. In fact, some of the challenges experienced by the CA states, which related inter alia to regional underdevelopment, authoritarian rule, inefficient and corrupt bureaucracy, ethnic tensions and lack of clear border demarcation, had often been linked in the literature to their Soviet past (Dieter, 1996; Larrotcha Parada, 2014). Even today Moscow still sees CA as its “near abroad”, an area of privileged interests. To this end, strong ties between CA and Russia persist, with the Russian-led Eurasian Economic Union (EAEU) currently pushing for the economic growth, with stronger effects in the EaP compared to CA countries, which suggests the EU’s neighbourhood instruments have been effective in promoting growth.

**Policy implications:** Our findings suggest that stepping up reforms, preserving macroeconomic stability, enhancing openness to trade and accumulating factors of production spurred growth in both EaP and CA countries. Pursuing closer ties with the EU economies fostered growth by strengthening investment, foreign trade, structural and market reforms, and by better use of natural resources. Given the large variations seen between countries in both groups, more detailed country diagnoses are needed to tailor interventions according to the specifics of each country.

**KEYWORDS**
Central Asia, convergence, Eastern Partnership, economic growth, European Neighbourhood Policy, transition

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1The authors are aware the Eastern Partnership denomination for the post-Soviet Eastern European states was only introduced in 2009 and includes Armenia, Azerbaijan, Belarus, Georgia, Republic of Moldova and Ukraine. Yet, in order to distinguish these countries from the other post-Soviet states, henceforth the acronym “EaP” will be used.

2The Central Asian countries are Kazakhstan, the Kyrgyz Republic, Tajikistan, Turkmenistan and Uzbekistan.
integration of the CA region. So far, Kazakhstan and the Kyrgyz Republic participate in the EAEU, while Uzbekistan joined the Union under observer status. Lately, with China’s active interest in the development of the region (see, for instance, China’s Belt and Road Initiative), the CA republics have also received Chinese development assistance and significant foreign investments, directed particularly to infrastructure projects and for the exploration of energy and natural resources. China’s activism has not only challenged Russia’s traditional dominance in the region, but has also managed to insulate the CA region from the advancement of EU and US democracy promotion and the Western model of governance (Freeman, 2018; Sharshenova & Crawford, 2017).

On the other hand, in the past two decades the EaP states have benefitted more than the CA republics from their geographic proximity to the Western structures. For instance, the EU sought to ease the convergence process by employing several mechanisms. Ever since the disintegration of the Soviet Union in 1991, the European Commission has developed a special financial and technical assistance programme (TACIS), dedicated to the Commonwealth of Independent States (CIS) to support their transition to democracy and to a functional market economy. Later on, the EU tailored its assistance to the CIS, focusing most of its resources on the former Soviet republics from Eastern Europe rather than on CA. As such, the EU consolidated relations with the ex-Soviet states from its immediate vicinity, which have been included into various EU-led frameworks. Whereas, in 2004, the European Neighbourhood Policy (ENP) was launched as an umbrella initiative to support political and economic reforms in the EU’s southern and eastern neighbours, in 2009 the Union designed a new political instrument, the EaP, devoted to the specifics and dynamics of the former Soviet states in Eastern Europe. The EaP aimed to bring these closer to the European core by transferring the Western governance model, European norms and legislation (termed “acquis communautaire”—the accumulated legislation, legal acts and court decisions that constitute the body of EU law) and by forging a co-operation framework in several domains, such as economy, society, political institutions, civil rights and liberties. Furthermore, the EaP sought to create conditions for enhanced political association and deeper economic ties and, to this end, Association Agreements (AA) and Deep and Comprehensive Free Trade Areas (DCFTA) were concluded with Georgia, the Republic of Moldova and Ukraine (EEAS, 2020). This Europeanization process has produced mixed results across the EaP region; yet, many authors generally agree on the relatively positive impact (albeit limited) that the EU initiatives have had on the neighbouring states (Bureiko & Moga, 2017; Cadier, 2014; Delcour & Wolczuk, 2013).

The different post-Soviet trajectories of the EaP and CA countries are also reflected in the geography of trade and migration flows (see Table B4 in Appendix B). According to the United Nations (UN) data, the share of migration stock in the EU originating from the EaP states increased from 19.9% to 26.6% between 1995 and 2015. In the case of the CA republics, growth was lower, from 14.1% to 16%, over the same period. Meanwhile, the Russian Federation remains the main destination for migrants, hosting 53% of migrants from the EaP countries and 70.6% from CA. When it comes to trade, the differences are even more striking. Between 1995 and 2015, the share of exports from EaP heading to the EU doubled, from 20.6 to 40.8%, while the CA exports towards EU halved (from 30.4% to 14.7%). Whereas the exports oriented towards the Russian Federation decreased for both EaP and CA groups, China became an increasingly important destination for CA exports (the share of exports

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3The countries included under the TACIS initiative were Armenia, Azerbaijan, Belarus, Georgia, Kyrgyz Republic, Kazakhstan, Moldova, Mongolia, Russia, Tajikistan, Turkmenistan, Ukraine and Uzbekistan.

4The Commonwealth of Independent States (CIS) is a regional association of sovereign states that was formed in 1991 by Russia and 11 other republics that were formerly part of the Soviet Union: Armenia, Azerbaijan, Belarus, Georgia, Kazakhstan, Kyrgyz Republic, Republic of Moldova, Tajikistan, Turkmenistan, Ukraine and Uzbekistan. Ukraine withdrew from CIS in 2014 after the Russian annexation of Crimea and beginning of the war in Donbas.
from CA directed to China rose from 5.8% to 21.9%). The imports displayed similar trends, but in this case the changes were smaller.

In spite of the divergent pathways experienced by the EaP and CA groups of countries since the collapse of the Soviet Union, both groups of states have had fairly similar growth trends. While the 1990s were mainly marked by economic decline, the two groups of countries faced remarkable recovery over 2000–2015, with an average per capita gross domestic product (GDP) growth rate of 7.4% in the EaP states and 7.2% in CA (see Table B3 in Appendix B). This “rollercoaster” type of economic development, marked by both convergent and divergent trajectories, leaves a fertile ground for empirical analysis. Thus, the article inquires, first, whether the bumpy post-communist phase led to a convergence process in terms of economic development at the level of the two groups of states. Exploring the dynamics behind the economic disparities between the two groups of states is of particular interest considering that these economic differences had been significant ever since the breakup of the USSR (e.g. the GDP per capita in Kazakhstan was almost four times larger than that of the Republic of Moldova in 1992). As such, by employing a comparative approach when looking at the growth determinants, the article inquires, second, whether different endogenous and exogenous factors have ultimately led to different growth models. As such, we have chosen to look at the production factors endowments, macroeconomic stabilization and transition reforms, institutional development and external conditions—such as foreign direct investment (FDI)—since these are the most significant determinants explaining economic growth in transition countries (Falcetti et al., 2006; Fidrmuc, 2003; Irdadian, 2007).

Moving beyond existing strands of literature on post-communist transition which mostly focused on Central and Eastern Europe and the Russian Federation (Akindinova et al., 2016; Vachudova, 2006), our analysis seeks to fill the gap and address also the CA and EaP countries, which so far have received considerably less attention (Mazhikeyev et al., 2015). Our comparative analysis brings novelty to the study of the post-Soviet space. First, by capturing the difference in terms of growth determinants in the EaP, compared to CA countries. Second, in methodological terms, our analysis relies on a panel data model which accounts for the unobserved country heterogeneity, as well as for the endogeneity of some of the explanatory variables, while more estimation techniques are used in order to check for the robustness of our results. The advantage of panel analysis derives from the fact that it allows controlling for omitted variables bias, particularly with respect to differences in the initial level of technology among countries, and also enables dealing with the endogeneity of some of the variables and measurement errors (Bond et al., 2001; Hsiao, 2007).

The article is structured as follows: Section 2 scrutinizes the literature on convergence and economic growth in post-Soviet countries. Section 3 shows the econometric strategy used in modelling economic growth and convergence, as well as the data used. Section 4 summarizes the results obtained, followed by a consideration of the results and related discussions in Section 5. Section 6 presents the conclusions.

2 | EMPIRICAL EVIDENCE ON CONVERGENCE AND GROWTH IN POST-SOVIET COUNTRIES

The CA and EaP countries faced a painful transition process which pushed their economies to negative growth rates during the 1990s, followed afterwards by a remarkable economic recovery during the 2000s. This upturn was mainly the result of the structural and market reforms (IMF, 2014; Irdadian, 2007) that allowed their economies to bounce back after the major economic contractions they faced at the start of the post-communist period. Given the different approaches to the
transition from communism to market economy, studies on convergence in transition economies have evidenced mixed results. On the one hand, empirical research focusing on the early transition period (1990–1998) found no statistically significant evidence for 25 transition countries, including EaP and CA (Campos, 2001). These results were reinforced by Polanec (2004), who also found no evidence for convergence during the same period, while he found evidence of both absolute and conditional convergence only for the advanced stage of transition (1998–2002). Conversely, more recent studies have found evidence for a conditional convergence process. Iradian (2007) showed that 27 transition countries (including EaP and CA states) displayed a convergence process for the period 1991–2006, mainly triggered by the recovery of the lost output in the early 1990s, macroeconomic stabilization, market reforms and favourable external conditions. More recently, Becker and Olofsgård (2018) showed that a parsimonious growth model defined earlier by Levine and Renelt (1992) is also a good predictor of growth rates in 25 transition countries over 2000–2015. While the model assumed a conditional convergence process and a positive contribution of both human capital and investments, the small difference between the predicted and actual values confirmed that the economic growth in these countries can be characterized as “normal”, being driven by the same classical growth drivers.

The importance of market-oriented reforms and initial conditions (which refer to the different starting points prior to the transition) in supporting growth was also evidenced in 25 countries in transition during 1989–2003 (Falcetti et al., 2006). Yet, the progress in reforms and economic liberalization affecting economic growth was proved to depend on political factors during the first post-communist decade (Fidrmuc, 2003). The role of robust institutions and good governance in preserving macroeconomic stability was also shown to be essential for growth in 25 transition countries (including the EaP and CA states) for a longer time span, namely 1989–2007 (Gerry et al., 2010).

Some studies that also specifically focused on the CIS countries revealed that the macroeconomic stabilization and market reforms accelerated growth rates. Hakimov (2010) estimated a conditional convergence rate of about 2%, similar to the convergence “iron law” evidenced by R. J. Barro and Sala-i-Martin (1992), which was mainly driven by market-oriented reforms and institutional development. Along with the reforms, the recovery of the lost output (after the drop from the early 1990s) and the favourable external conditions represented two other major drivers to growth, which accounted for about half of the 8.2% growth displayed in the CIS countries during the period from 2001 to 2006 (Iradian, 2007).

Additionally, besides the pace in reforms, Azam (2015) confirmed the role of human capital as promoter of economic growth during 1993–2011 period in the CIS countries, while the impact of FDI was found less compelling because of their lack of attractiveness in times of uncertainty and economic instability. As an alternative to FDI, the existence of a financial market may also represent a substitute for getting the necessary amounts for investments.

As former Soviet states, CIS economic outcomes were also shown to hinge on Russian economic growth, especially before the economic crisis which hit Russia in 1998 (Shiells et al., 2005). However, after the financial meltdown experienced by Russia, when the oil prices collapsed, Russia’s economy grew rapidly during the 2000s, this time helped by a sudden increase in oil revenues. In fact, in spite of the Great Recession, around two thirds of Russia’s GDP growth in 2000–2015 were determined by changes in international oil prices (Shleifer & Treisman, 2005; Becker & Olofsgård, 2018). This has also had positive consequences over the economies of the EaP and CA states with which Russia maintains strong economic ties (e.g. workers’ remittances to their EaP and CA home countries, trade and financial flows originating from Russia). For example, looking at the trade flows, Belarus is by far the most reliant on Russia, responsible for about half of commercial flows (on average, 58% of imports and 46% of exports between 1995 and 2015). Over the same period, on average, Kazakhstan
and Ukraine also received more than a third of their imports from Russia, while Moldova directed almost a quarter of its exports to Russia.

In the case of the EU neighbours, the increasingly close partnership with the EU under the neighbourhood frameworks has positively affected their economic performance. Bergman and Varga (2018) pointed out that the terms of association between the EU and its neighbours had been attractive for the ENP states because they provided incentives to trade, innovation and know-how, among other positives, in the partner countries, coupled with the gradual adoption of the EU acquis. For instance, İşleyen (2014) argues that the twinning programme has been a successful tool for the EU to introduce market principles into the individual and institutional practices developed in Tunisia and Egypt, while Roccu (2018) underscores the importance of the EU’s promotion of regulatory reforms in the neighbouring countries and shows how the EU’s regulatory externalities have positively impacted three economic sectors: agriculture, banking and telecoms. Similarly, Di Guardo et al. (2016) show the probability of doing business deals between the EU and the neighbouring countries (particularly in the field of mergers and acquisitions) to be proportional to the existing cultural, political and spatial distances. As far as the EU’s eastern neighbours are concerned, the importance of the EU’s bilateral and multilateral agreements (such as the ENP and the EaP), and the establishment of durable political and economic ties with the EaP states, appears to be salient for the increasing trade flows and sectoral co-operation (Eastern Partnership Civil Society Forum, 2018), while joining the trade agreements with the EU provides a greater stimulus to trade than participating in the agreements promoted by Russia (Gylfason et al., 2015). Accordingly, the quality of institutions stimulated by the EU’s complex free trade agreements has positively affected trade in the EaP countries. This is also the view of López-Tamayo et al. (2018), who admit the validity of the bilateral action plans and the positive effects of convergence with the EU in terms of enhancing the catch-up among the ENP countries. Our article builds on these findings and holds that the EU has had a significant impact on the EaP economies.

3 | ECONOMETRIC STRATEGY

In order to investigate whether a convergence/divergence process in terms of GDP per capita took place between the CA and EaP countries, we rely on two convergence concepts usually described in literature as β-convergence and σ-convergence (Barro & Sala-i-Martin, 2004). The β-convergence occurs when poor economies are growing faster than rich ones, as the growth rates of per capita income are positively correlated with the distance from the steady-state level and negatively correlated with the initial level of per capita income; the σ convergence occurs when there is a decrease in income per capita dispersion within a group of economies and can be measured by the cross-sectional standard deviation of the log of per capita GDP. Although β-convergence tends to reduce variance and thus support the σ-convergence, it is not a sufficient condition as, if individual country shocks are occurring, these shocks tend to raise dispersion.

Studies on convergence also differentiate between absolute and conditional convergence. Whereas absolute convergence assumes that the countries are homogenous and tend to reach to the same steady-state level in the long run, conditional convergence accounts for differences across regions assuming that they converge to different stable states (Barro & Sala-i-Martin, 1992).

Our model is expressed as a typical growth model (Barro & Sala-i-Martin, 2004; Bond et al., 2001), being defined as:

\[ \log y_{it} - \log y_{i,t-1} = \alpha + \beta y_{i,t-1} + \gamma h_{i,t} + \epsilon_{i,t}, \quad \text{with } b = e^{-\beta t} - 1 \]  

(1)
Equation (1) may be analogously expressed in a standard dynamic growth, as follows:

\[ y_{i,t} = a' + \delta y_{i,t-1} + \theta h_{i,t} + \rho x_{i,t} + \eta_i + \epsilon_{i,t}, \text{ with the convergence speed } b = -\ln \delta/t \]  

(2)

where \( x_{i,t} \) is a set of controlling variables, \( \eta_i \) is the unobserved country-specific effects (which capture the initial level of unobserved fixed parameters leading to dissimilar regional steady states, as well as country-specific measurement errors), and \( \epsilon_{i,t} \) the error term, all the other notations being the same as already described for equation (3).

As well as analysing the evolution of the EaP and CA economies in terms of convergence, the model also includes interaction terms in order to find evidence about differences across the EaP and CA groups regarding the role of different growth determinants.

Two dynamic estimators were used in order to check for the robustness of our estimations, namely System GMM (Generalized Method of Moments) (Arellano & Bover, 1995; Blundell & Bond, 1998) and corrected least squares—Least Squares Dummy Variable Correction (LSDV) (Bruno, 2005; Kiviet, 1995), because they were shown the lowest Root Mean Square Error (RMSE) in estimating the lagged dependent variable (Flannery & Hankins, 2013), which is particularly important for measuring the absolute \( \beta \)-convergence and the convergence speed.

The LSDVC (Least Squared Dummy Variables Corrected) estimator corrects the biased Ordinary Least Squares estimated coefficients using an estimate of the short-panel bias computed from each country's data (Bruno, 2005). This method is being confirmed as the best alternative when \( N \) is smaller and the regressors are strictly exogenous (Flannery & Hankins, 2013), while it still remains accurate for the lagged dependent variable and exogenous regressors when such problems exist. Moreover, it has a relatively smaller variance than IV and GMM estimators. Therefore, \textit{xtlsdvc} command in Stata 13 was used, while \textit{AB} estimator (Arellano & Bond, 1991) was chosen to initialize the bias correction, as it displayed the lowest standard errors.

The System GMM estimator was also used (performed by using the \textit{xtabond2} command in Stata 13), since, besides controlling for country heterogeneity, it can also account for the potentially endogeneity of explanatory variables, as well as for econometric problems, such as measurement errors and weak instruments (Bond et al., 2001; Flannery & Hankins, 2013; Roodman, 2009). The GMM estimators are corrected for heteroskedasticity bias and endogeneity between variables by using the levels equation to obtain a system of two equations: one differenced and one in levels. While the level equation is instrumented with lagged differences, the one in differences is instrumented with the lagged variable in levels, so increasing estimation efficiency.

The model specifications match Roodman’s (2009) recommendations. As the number of panels is shorter than the number of time periods and the number of instruments increases with the number of time periods, the estimation generates by default a large number of instruments. We have limited instrument proliferation because this may overfit endogenous variables and weaken the model specification tests. Therefore, the instruments were “collapsed” and only three to six at the highest lags were used as instruments. Finally, the validity of instruments was tested, while also checking if estimations are not facing second-order serial correlation.

### 4 EXPLANATORY VARIABLES DESCRIPTION

In our panel data, which is set for 11 EaP and CA countries studied from 1992 to 2015, we have used a range of explanatory variables in order to check for absolute and conditional convergence in terms of real GDP per at purchasing power parity (PPP) in constant 2011 USD taken from Penn World Table
version 9.1. (PWT) (Feenstra et al., 2015). The explanatory variables account for four sets of factors affecting growth: production factor endowments, macroeconomic stabilization and transition reforms, external conditions and institutional development (please check Table B1 in Appendix B for a full description of our variables).

Following the neoclassical Solow model (Mankiw et al., 1992; Solow, 1956), our model controls for physical and human capital accumulation, as well as for the labour stock. Accumulation of physical capital is the oldest known determinant of economic growth. In line with the many empirical studies on economic growth, we relied on the share of gross fixed capital formation to GDP for measuring physical capital (Azam, 2015; Teixeira & Queirós, 2016).

Besides capital, the size of potential labour force has also been shown to influence economic growth (Headey & Hodge, 2009). Thus, our model also controls for the available labour by including the share of active age population (15–64 years), which is regularly used in growth studies (e.g. Bloom & Finlay, 2009). Furthermore, it is not only labour size that matters, but also the skills level, as more human capital accumulation is conducive to growth (Barro & Sala-i-Martin, 2004). Given that human capital proxies are hardly available for such a long period of time for the countries, our estimations rely on educational attainment from the Institute for Health Metrics and Evaluation (IHME). Similar proxies were also used for other studies for measuring human capital (Teixeira & Queirós, 2016; Viner et al., 2017).

Along with labour and capital, our model also accounts for the natural resource endowment. Although the impact on growth of possessing rich natural resources is not so far entirely clear (Havranek et al., 2016), their relevance is given by the specifics of both CA and EaP countries, which display large differences in terms of natural resources endowments. Thus, we have relied on rents from natural resources (as a percentage of GDP), which have also been used in other growth studies (Bhattacharyya & Hodler, 2010; Cavalcanti et al., 2011).

The progress achieved in implementing reforms and preserving macroeconomic stability is particularly important, given the transition process that both EaP and CA have been experiencing. Their performance in structural and market reforms was accounted for by including the EBRD transition index, which is often used in transition studies (Falcetti et al., 2006; Fidrmuc, 2003; Iradian, 2007). As well as the transition index, the inflation rate was also used as a proxy for measuring macroeconomic stabilization following similar empirical works (Barro, 2013; Kremer et al., 2012).

Openness to trade is another marker of macroeconomic stability and growth which was addressed in the literature (e.g. Huchet-Bourdon et al., 2018). Openness to trade can influence economic growth in various forms, like using comparative advantages, increasing the scale of the economy through the development of new markets, diffusion of technologies and obtaining new knowledge, etc. Most empirical studies have used the share of trade in GDP as proxy for openness (e.g. Barro, 2015; Rani & Kumar, 2018), and we have also relied on this measurement of openness.

Our model also controls for the FDI stock as a proxy for the external factors. The availability of external capital sources such as FDI can accelerate economic activity in resource-deficient economies, provided that it represents a sufficiently large proportion of GDP (Azam, 2015; Batten & Vo, 2009).

For economies in transition, institutions are particularly important, as they play a decisive role in initiating reforms and preserving macroeconomic stability. Their leading role in promoting growth was widely evidenced by the several strands of literature focusing on economic growth (Acemoglu et al., 2002; Beck & Laeven, 2006). In order to capture the impact of institutions and governability, our study relies on the Worldwide Governance Index (WGI) of the World Bank (Kaufmann et al., 2010), on the assumption that institutional quality is a significant driver of economic growth. Other empirical growth studies also considered these indexes as good proxies for the quality of institutions and governance (e.g. Uddin et al., 2017).
Given that the post-communist economic growth in both EaP and CA regions was affected by several political conflicts hindering growth, particularly during the 1990s, the model also accounts for the major episodes of political violence, by employing data from the Center for Systemic Peace (see Table B1 in Appendix B for full description).

Finally, in order to account for the enforcement of the bilateral action plans after the ENP was launched, a dummy variable was computed, similar to that used by López-Tamayo et al. (2018). This variable takes the value 1, since the action plan was ratified by each of the EaP member states.

5 | RESULTS AND DISCUSSION

The results using different estimation methods and different model specifications are reported in Tables A1 and A2 (Appendix A). While Table A1 shows results for LSDVC estimator, Table A2 presents findings for System GMM in a comparable display of models. Both LSDVC and System GMM estimators are considered to be the most precise for the lag coefficient (Dang et al., 2015; Flannery & Hankins, 2013).

Standard specification tests were carried out, proving the reliability of our estimates. The Arellano-Bond test for AR(2) shows no evidence for second-order autocorrelation. Similarly, the Hansen and Sargan tests for overidentification indicates that the null hypothesis of exogeneity of instruments is not rejected. Despite using the “collapse” specification for limiting instruments proliferation, the number of instruments stays larger than the number of groups, which might cause overfitting concerns (Roodman, 2009).

Model 1 in both Table A1 and Table A2 (Appendix A) displays our results for unconditional $\beta$-convergence and reveals that, overall, the EaP and CA countries displayed a slight divergence process over the 1992–2015 period (at a divergence speed between 0.23% and 0.65% per year), meaning that the countries with higher per capita GDP grew at a higher speed. Figure 1 reveals the heterogeneity of the economic trajectories both in terms of cross-country differences and to differences across time. There was remarkable economic growth over the 2000s. Figure 1 reports average growth rates over 1992–2015, but also since 2000. The first striking observation comes from the evolution of the GDP per capita between 1991 and 1999, since all the countries faced falls in GDP per capita. For instance, Azerbaijan, the Kyrgyz Republic and Tajikistan were the most affected, as they faced GDP per capita falls of more than 70% between 1991 and 1999. The large falls were also caused by the civil unrests and conflicts they experienced (such as the 1992–1994 war between Azerbaijan and Armenia over the Nagorno-Karabakh region or the civil war in Tajikistan, between 1992 and 1997). While Azerbaijan managed to catch up, particularly after 2000, when it displayed an average growth of almost 14%, Kyrgyz Republic and Tajikistan were among the main laggards, with lower average growth rates and increasing divergence from the other countries (around 4% for Kyrgyz Republic and 6% for Tajikistan over 2000–2015).

The two other countries which managed to break through were Kazakhstan and Turkmenistan. Despite their already high income per capita levels, they displayed remarkable economic growth rates, particularly over the second transition phase (9.6% for Kazakhstan and 8.1% for Turkmenistan over 2000–2015). Therefore, in their particular cases, it is the resource-abundant countries that displayed the highest growth rates. Armenia and Georgia have also shown average growth rates close to 8%
since 2000, which has helped them catch up with the slower-growing economies of Ukraine and Belarus. With an economic performance strained by the Transnistrian conflict over the first transition decade, Moldova has been slowly catching up with Belarus, Ukraine and Uzbekistan, although it remains among the poorest countries in the region.

The other models in Table A1 and Table A2 show estimates for the β conditional convergence, while controlling for production factors endowments, macroeconomic stabilization and transition reforms, institutional development and external conditions. While models in Table A1 employs the LSDVC estimator, models in Table A2 use System GMM and controls for the endogeneity of some of the explanatory variables. However, regardless of the specifications used, conditional convergence is strongly supported by our findings and reveal that the EaP and CA countries converged at annual rates below 1% over the analysed period, which is half of the 2% rule of thumb for cross-country estimates of convergence evidenced (Barro, 2015). Physical capital, human capital, active population, openness and transition reforms were confirmed as significant drivers for economic growth within the EaP and CA groups of states, while inflation and conflicts proved to negatively impact growth (see Table 1 for the summary results).

The σ profile displays different results across the two group of countries (Figure 2). Within the EaP group of countries, the coefficient of variation in GDP per capita showed only slight variations, such as the surge during the initial transition years (probably caused by the political shocks/conflicts some of these states were facing) (Hughes & Sasse, 2014), during the Russian crisis (1998–1999; caused by the tight relations with Russia) (Shiells et al., 2005), as well as during the Great Recession, which have all differently affected the EaP states. Unlike the EaP group, among the CA countries, these differences had expanded almost continuously and at increasing pace during the early transition years, and also in the late 1990s, due to the Russian and Asian economic crises. The coefficient of variation

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7The variables referring to physical and human capital, macroeconomic stability, trade openness, FDI, institutional quality, transition index and their interaction terms were considered endogenous.
displayed by the CA group had overreached the EaP level in the late 1990s and increased ever since, indicating that the disparities in terms of real GDP per capita are almost twice as high in CA as compared to the EaP countries, despite a similar average in 2015.

As a sensitivity test, the interaction terms measuring the potential differences as regards impact (between EaP and CA) are progressively included in the model, as well as all together, in order to check for possible overfitting issues. Therefore, following Levine and Renelt (1992), we have defined a set of variables to be included in the regression, namely a basic model specification, which accounts for physical and human capital, inflation, trade openness, share of active population, as well as the EaP and ENP ratification dummies (model (2)).

Other variables and interaction terms are being progressively added to the basic specification in models (3)–(9). Finally, based on the results obtained when each interaction term was separately included in the model, the last four models report the full specifications (models (10)–(13)). Regardless of the specification used, most of the variables have the theoretically expected sign (see Table 1). Their consistency across different model specifications and estimators used is a proof of their robustness.

Overall, our findings echo previous studies arguing that there was “normal” growth in the EaP and CA countries driven by fundamental growth determinants (Becker & Olofsgård, 2018; Shleifer & Treisman, 2014). As expected, physical capital proved to be a significant predictor of growth

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### Table 1 Summary of estimation of GDP per capita in the EaP and CA countries, 1992–2015

| Determinants                         | EaP & CA (LSDV) | EaP & CA (System GMM) | EaP impact compared to CA (LSDVC) | EaP impact compared to CA (System GMMM) |
|--------------------------------------|-----------------|-----------------------|-----------------------------------|----------------------------------------|
| **Production factors endowments**    |                 |                       |                                   |                                        |
| Physical capital                     | (+) Sig.        | (+) Rarely Sig.       | Stronger impact                   | Stronger impact                        |
| Human capital                        | (+) Sig.        | Not sig.              | Not sig.                          | Not sig.                               |
| Active population                    | (+) Sig.        | (+) Sig.              | Stronger impact                   | Stronger impact                        |
| Natural resources                    |                 |                       |                                   |                                        |
| **Macroeconomic stabilization and transition reforms** |                 |                       |                                   |                                        |
| Inflation                            | (−) Sig.        | (−) Sig.              | Not sig.                          | Lower impact                           |
| Openness                             | (+) Rarely Sig. | (+) Sig.              | Not sig.                          | Stronger impact                        |
| Transition index                     |                 |                       | Stronger impact                   | Stronger impact                        |
| **External conditions**              |                 |                       |                                   |                                        |
| FDI                                  |                 |                       | Not sig.                          | Stronger impact                        |
| ENP ratification                     | (+) Sig.        | (+) Rarely Sig.       | Stronger impact                   |                                        |
| **Institutional quality and stability** |                 |                       |                                   |                                        |
| Institutional quality                |                 |                       | Not sig.                          |                                        |
| Conflicts                            | (−) Sig.        | (−) Sig.              |                                   |                                        |

*Note: We used “Sig.” if the variable turned statistically significant in more than a third of the models, “Rarely sig.” for variables significant in less than a third and “Not sig.” if it did not turn statistically significant in none of the models. Source: Authors’ representation based on estimation results.*

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8In order to further investigate the robustness of our finding by checking for possible overfitting issues, the same models were also estimated while dropping trade openness and inflation from the basic model specification. A more parsimonious model, following Levine and Renelt (1992) and Becker and Olofsgård (2018), displayed similar results.
Incaltarau et al. (although rarely statistically significant when using System GMM). Our findings are in line with other studies showing the leading role of physical capital accumulation for GDP per capita growth (Iqbal & Daly, 2014; Podrecca & Carmeci, 2001). When the interaction regressor for physical capital was included, in order to capture the different impact in the EaP as compared to the CA group, the results indicated that physical capital accumulation were more conducive to growth in the EaP than in CA (Models (3) and (10) in Tables A1–A2). Although the difference between CA and EaP is not high (15% in EaP as compared to 14% in CA), the EaP countries displayed a much higher level of physical capital accumulation than CA, especially from the mid-2000s to the Great Recession.

As for human capital proxy, the coefficients proved to be significant only when using the LSDV estimator (Model (4) in Table A1). Our results are in line with other findings which show that regions with a more educated and more highly skilled workforce are growing faster (e.g. Azam, 2015; Teixeira & Queirós, 2016). The interaction term for human capital does not become significant in any of the models. This may be justified by the small difference between the EaP and CA groups. Although both groups of countries displayed an increase in years of schooling, the difference between them remained small over the period analysed, while being barely larger in the EaP countries.

Along with physical and human capital accumulation, the size of the active population has also been confirmed as promoting growth. Thus, while the average proportion of the population aged from 15 to 64 years in EaP countries was higher than in CA (accounting for 68% and 62% of total population, respectively), CA countries display higher fertility rates and hence a larger ratio of young people,9 who are not yet reflected in the proportion of the population that is active.

The variables controlling for the impact of macroeconomic environment and the progress in structural and market reforms have also generally displayed the theoretically expected sign. First, inflation is confirmed as a negative predictor of growth over the 1992–2015 period. Our findings can also be brought in line with earlier empirical evidence showing that higher inflation undermines growth (Barro, 2013; Vinayagathasan, 2013). During the early transition period in our sample (1992–2002) both groups of countries were facing hyperinflation (the average inflation rate during 1992–2001

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9The share of population below the age of 15 is 25% in EaP, compared to 29% in CA.
reached 405% in CA and 903% in the EaP countries, with Georgia’s 2,878% being the highest average inflation rate over the same interval). Since the beginning of the 2000s, both EaP and CA countries reached a level of macrostabilization (during 2002–2015 the average inflation rate decreased to 12% in EaP countries and 14% in CA countries). The interaction regressor became statistically significant only when using System GMM, and revealed that the EaP economies had been less hurt by inflation than the CA group of countries (Models (5) and (10) in Table A2).10

Second, the results generally confirmed that openness to trade has positive effects on GDP per capita growth, which is also in line with the empirical literature (Vinayagathasan, 2013). The interaction term for openness to trade reveals a stronger growth effect in EaP (Model (6) in Table A2). Such an effect might be related to the beneficial effects of non-tariff barriers and improved access to the EU market after the ENP was established (Maliszewska et al., 2011; Montalbano & Nenci, 2014). In addition, as displayed in the summary Table B2 (Appendix B), the average values between the two groups is slightly larger in the EaP countries, at 100% compared to 96% in CA.

Third, there is also a strong link between progress in market reforms and economic growth, measured by EBRD reform index (Model (7) and (10) in Tables A1–A2), even after controlling for its possible endogeneity caused by the two-way relationship between reforms and growth, which echoes other empirical studies (Falcetti et al., 2006; Iradian, 2007).11 Furthermore, both LSDVC and System GMM estimators revealed a stronger impact of this indicator in the EaP. The launch of the neighbourhood frameworks (ENP and EaP) may have been among the triggers for reform. Provided the EaP and the CA countries were displaying a similar progress in reforms before the ENP creation (2.44 was the average transition score for the EaP countries during the first period, as compared to 2.31 within the CA), the difference grew after the ENP enforcement (3.06 within the EaP group, compared to 2.65 within the CA). Similarly, other studies also recognize the positive effects the ENP has had on the eastern neighbours, where the EU through its neighbourhood frameworks has managed to partially stimulate structural reforms and macro-policies, and also lifted trade barriers with the EaP states (López-Tamayo et al., 2018).

Looking at the external conditions, FDI appears to make a stronger contribution to growth in the EaP countries (Model 8 in Table A2). This might also be related to the investment mechanisms provided under the ENP, such as the Neighbourhood Investment Facility that was founded in 2007, but also to their more efficient use for growth in EaP countries. However, this result was only significant in System GMM estimations.

The role of institutions was not confirmed as being a significant predictor of growth, despite their fundamental role in supporting human and physical capital accumulation and a more efficient allocation of resources. This result is in line with other findings which showed that the ENP countries had a weaker institutional convergence to the EU than candidate countries, which may undermine the effectiveness of ENP mechanisms while also limiting their impact on growth (Bartlett et al., 2017). This might also be explained by the violent military and ethnic conflicts which affected both the EaP and the CA countries over the post-communist period, which ultimately deterred stronger economic growth (this was also confirmed in our findings, see columns 11–13 in Tables A1 and A2).

Considering that there are several resource-rich countries, the rents gained from natural resources were also accounted for in the model. Although the CA countries are, on average, richer in resources,

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10As indicated by the sum of the interaction term and main effect (equation (5) in Table A2).
11There are at least two reasons for not including the transition index in the whole equations. First, this index stops in 2014, so including it in the other equations would have reduced our number of observations. Second, the transition index encloses more transition reform indicators which have already been controlled in our model, such as trade openness, quality of governance, macroeconomic stabilization, etc.
natural endowments were shown to be more conducive to growth in the EaP group (model 13 in Tables A1 and A2).\textsuperscript{12} One explanation might be that there are countries benefitting from wealth related to natural resources in both EaP and CA groups. While Kazakhstan and Turkmenistan saw the highest rents from natural resources among the CA republics (with respective averages of 21.1\% and 45.8\% of GDP over the 2000–2015 period), Azerbaijan is the main beneficiary in the EaP group (30.7\% of GDP over the same period). The stronger impact of natural resources may also be related to relatively better governance in the EaP than in CA, which managed to better leverage them to growth. This calls for an increased focus on reducing potential rent-seeking behaviour, which is usually associated with resource richness, and may cancel their potential negative effects, particularly in the CA countries (Boschini et al., 2013; Caras, 2020).

There is a clear distinction between the 1990s, mostly characterized by economic turmoil and the 2000s, which featured as “normal” in terms of growth performance (Becker & Olofsgård, 2018). Thus, a dummy variable was also included in models (11)–(13) in order to account for the structural break caused by the two distinct phases of growth. While this variable indicated a significant positive impact derived from the higher growth rates registered ever since 2000, the results displayed by the other variables hold, thus confirming the robustness of the model.

Finally, our findings reveal that the EaP countries displayed lower GDP per capita compared to CA over the period analysed, as evidenced by the intersection dummy that showed a negative sign (see Table A2). However, while being part of the EaP group has generally translated into lower GDP per capita levels, the ENP ratification has generated a positive impact, as shown by the ENP dummy variable. This provides evidence that the ENP bilateral action plans have proved overall to be more decisive to growth in the EaP compared to CA.

\section{Conclusions}

This article has sought to explore differences of the growth pathways in the EaP and CA countries during the post-communist period by emphasizing the different impact various growth determinants hold. Acknowledging the different importance these factors yield in determining economic growth may nudge the decisions of political elites from these two groups of countries into restructuring and improving their economic strategies. In addition, our analysis examined whether the post-communist development trajectories of these countries, alternating large contractions and high economic growth rates, had ultimately led to a reduction of the disparities across the two groups of countries.

Considering both the economic dynamics and the role of various growth determinants, our findings showed that the two groups of countries displayed distinct growth patterns according to their different regional context. On the one hand, in the early 1990s the EaP countries faced greater economic contractions compared to the CA group. On the other hand, in the context of the economic openness provided by the ENP, the EaP countries displayed higher growth in the 2000s until the 2008–2009 crisis (10.4\% average growth of real GDP per capita in EaP countries from 2000 to 2008, and 7.8\% in CA countries). This could certainly be explained by the closer links between the EaP states and the EU, which facilitated growth. Trade liberalization, economic integration with the EU countries, institutional transformations and the co-operation promoted within the ENP implementation spurred growth in the EaP. The Great Recession, however, turned this opportunity into a vulnerability. The

\textsuperscript{12}The same result holds when the interaction term for natural resources is the only interaction term included. Additionally, this result remains unaltered even when dropping some of the explanatory variables or changing estimators (LSDVC and OLS fixed effects).
increasing integration of the EaP countries into the EU economy also increased their exposure to the contagion effects of the crisis. The EaP’s higher share of trade with the EU (compared to the CA group), alongside their greater economic openness, led the EaP to come to a sudden economic halt. Unlike the EaP countries, the CA group benefitted from a relatively higher share of trade with China, which maintained high growth rates during the crisis.

Accounting for different sources of growth, we reach a similar conclusion: the two groups of countries have experienced and continue to display different models of economic growth, but with a tendency towards convergence. Our findings showed that economic disparities had increased at between 0.23% and 0.66% per year over the 1992–2015 period (divergence was also indicated by σ convergence), with Azerbaijan, Kazakhstan and Turkmenistan as the main performers, while the Kyrgyz Republic and Tajikistan were the main laggards. However, when the specific differences—in terms of production factors, macroeconomic stabilization, external conditions and institutional quality—were accounted for, the results evidenced that the disparities have slightly diminished at a pace of almost 1% per year.

Physical and human capital, an active population, openness to trade and transition reforms were validated as significant growth enhancers within both the EaP and CA states, while inflation and conflicts were shown to be growth deterrents. From this perspective, the favourable and unfavourable conditions for growth are in line with previous studies on growth. In addition, our study revealed the differences between EaP and CA groups of countries in terms of impact intensity of each of these growth factors. The results suggest that the implementation of reforms along with trade openness were more conducive to growth and less impacted by inflation in the EaP than in the CA group.

6.1 | Policy recommendations

From a policy-making perspective, our findings suggest, first, that policy-makers aiming at fostering economic growth in the EaP and CA regions might want to consider strengthening their ties with the EU economies. The Europeanization process and integration with the EU economy have strengthened the role of FDI and physical capital, foreign trade, encouraged structural and market reforms and ensured a higher performance of the use of natural resources as a source of growth in the EaP countries. This is in line with other studies (e.g. Lavenex & Schimmelfennig, 2009) which show that the post-Soviet Eastern European states have been significantly impacted by the EU’s external governance and regionalization projects, which aimed at expanding the EU’s acquis beyond the EU borders, first and foremost in the immediate vicinity. Furthermore, the EaP states have also benefitted from other indirect effects (such as, trade with and investment from the EU), in contrast to the fairly limited contact with the EU experienced by the CA region. Casier (2019) argues about the “unintended consequences” of the association of the eastern neighbours with the EU, since their significant interaction with the European Union has led to their importing EU rules and the alignment of the companies and states to EU standards, ultimately influencing domestic legislation and political structures, as well as overall preferences at the decision-making level.

Secondly, policy incentives for further accumulation of production factors, such as physical and human capital, should also be pursued, as these factors were shown to be growth enhancers. Such strategies are likely to be particularly successful where there are greater endowment shortages and a high gap between the skills and technology frontiers (Rodríguez-Pose & Wilkie, 2019). Furthermore, preserving macroeconomic stabilization and stepping up the application of market-oriented reforms should remain priorities, as they also increase the efficiency of physical capital and FDI accumulation, as well as levelling out the effects induced by domestic cyclicality. This is in line with other studies that have
shown that slow and gradual reformers suffered costly periods of economic underperformance, unlike countries that opted for early and deep reforms (Shleifer & Treisman, 2014; Becker & Olofsgård, 2018).

Thirdly, both the EaP and CA groups are heterogenous, which in turn makes fine-grained diagnosis necessary. To design more effective development policies, interventions need to be tailored according to the specifics of each of these countries (Korosteleva & Petrova, 2020). Thus, a “one-size-fits-all” framework such as the ENP can only have limited impact on the EaP countries (Nitoiu, 2018; Vieira, 2020).

Finally, while some of these countries benefit from high natural resource endowments, they need to leverage their resource wealth to invest in infrastructure which might improve the productivity of other production factors (Romp and De Haan, 2007). A better connectivity might also help structural diversification of both economic activities and trade.

Further developments should also be considered. First, both the EaP and the CA groups are themselves quite heterogeneous, thus zooming in separately on each of these countries could provide a much more refined understanding of the specific factors conducive to growth on a case by case basis. Second, given the limited number of observations, our study includes almost the whole post-Soviet period and does not make a clear distinction between the ex-ante and ex-post ENP effects by carrying out separate estimations. Additionally, whereas our study is limited to the EaP and the CA groups of states, similar studies of other former Soviet states or the countries from the southern Mediterranean neighbourhood of the EU should be carried out to increase the probability of correctly identifying the factors conducive to economic growth that were operationalized there.

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### APPENDIX A

**TABLE A1** LSDVC dynamic panel data estimation of GDP per capita determinants in EaP and CA countries, 1992–2015

|                | (1)   | (2)   | (3)   | (4)   | (5)   | (6)   | (7)   | (8)   | (9)   | (10)  | (11)  | (12)  | (13)  |
|----------------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|
| ln(GDPpc)     | 1.168*** | 0.824*** | 0.832*** | 0.824*** | 0.817*** | 0.826*** | 0.867*** | 0.808*** | 0.875*** | 0.886*** | 0.898*** | 0.933*** |
| (ln(GDPpc))   | (0.00180) | (0.0242) | (0.0234) | (0.0243) | (0.0252) | (0.0246) | (0.0279) | (0.0235) | (0.0283) | (0.0282) | (0.0292) | (0.0338) |
| Physical capital | 0.309** | −0.0538 | 0.297** | 0.265** | 0.298** | 0.181 | 0.335** | −0.222 | 0.00769 | −0.0220 | 0.0919 |
| Human capital | 0.610*** | 0.612*** | 0.523*** | 0.635*** | 0.624*** | 0.304 | 0.888*** | 0.333*   | 0.550*** | 0.365 | 0.129 |
| Inflation     | −0.00271*** | −0.00256*** | −0.00269*** | −0.0000785 | −0.00260*** | −0.00160*** | −0.00270*** | 0.00106 | −0.00198 | −0.00164 | −0.000415 |
| Openness      | 0.0325 | 0.0422 | 0.0317 | 0.0312 | 0.0492 | 0.0425 | 0.0264 | 0.0761** | 0.0828** | 0.0785** | 0.0697** |
| Active population | 1.203*** | 1.106*** | 1.350*** | 1.309*** | 1.175*** | 1.524*** | 0.662 | 1.428*** | 0.693 | 0.494 | 0.688* |
| ENP ratification | 0.0758*** | 0.0785*** | 0.0642* | 0.0705*** | 0.0735*** | 0.0242 | 0.0894*** | 0.0244 | 0.0198 | 0.0216 | 0.00538 |
| Physical capital x EaP | 0.567** | 0.562** | 0.281 | 0.237 |

(Continues)
|                     | (1) ln(GDPpc) | (2) ln(GDPpc) | (3) ln(GDPpc) | (4) ln(GDPpc) | (5) ln(GDPpc) | (6) ln(GDPpc) | (7) ln(GDPpc) | (8) ln(GDPpc) | (9) ln(GDPpc) | (10) ln(GDPpc) | (11) ln(GDPpc) | (12) ln(GDPpc) | (13) ln(GDPpc) |
|---------------------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|
| Human capital x EaP| 0.116         |               |               |               |               |               |               |               |               |               |               |               |               |
|                     | (0.213)       |               |               |               |               |               |               |               |               |               |               |               |               |
| Inflation x EaP    | −0.00272      | −0.00255      | 0.000357      | 0.0000488     | −0.00772      |               |               |               |               |               |               |               |               |
|                     | (0.00269)     | (0.00322)     | (0.00302)     | (0.00302)     | (0.00804)     |               |               |               |               |               |               |               |               |
| Openness x EaP     | −0.0465       | −0.0633       | −0.0428       | −0.0545       | −0.0234       |               |               |               |               |               |               |               |               |
|                     | (0.0553)      | (0.0644)      | (0.0630)      | (0.0618)      | (0.0544)      |               |               |               |               |               |               |               |               |
| Transition index   | 0.0332        | 0.0524        | 0.00845       | 0.0195        | 0.0986        |               |               |               |               |               |               |               |               |
|                     | (0.0347)      | (0.0400)      | (0.0390)      | (0.0402)      | (0.0728)      |               |               |               |               |               |               |               |               |
| Transition index x EaP | 0.0781***   | 0.0517        | 0.0464        | 0.0344        | −0.0933       |               |               |               |               |               |               |               |               |
|                     | (0.0350)      | (0.0444)      | (0.0428)      | (0.0440)      | (0.0831)      |               |               |               |               |               |               |               |               |
| FDI                 | 0.00300       |               |               |               |               |               |               |               |               |               |               |               |               |
|                     | (0.0910)      |               |               |               |               |               |               |               |               |               |               |               |               |
| FDI x EaP           | −0.124        |               |               |               |               |               |               |               |               |               |               |               |               |
|                     | (0.108)       |               |               |               |               |               |               |               |               |               |               |               |               |
| Conflicts           | −0.0393***    | −0.0386***    | −0.0174       |               |               |               |               |               |               |               |               |               |               |
|                     | (0.00923)     | (0.00924)     | (0.0165)      |               |               |               |               |               |               |               |               |               |               |
| Structural break   | 0.0480*       | 0.0609***     |               |               |               |               |               |               |               |               |               |               |               |
|                     | (0.0277)      | (0.0200)      |               |               |               |               |               |               |               |               |               |               |               |

(Continues)
| (1) | (2) | (3) | (4) | (5) | (6) | (7) | (8) | (10) | (11) | (12) | (13) |
|-----|-----|-----|-----|-----|-----|-----|-----|------|------|------|------|
| ln(GDPpc) | ln(GDPpc) | ln(GDPpc) | ln(GDPpc) | ln(GDPpc) | ln(GDPpc) | ln(GDPpc) | ln(GDPpc) | ln(GDPpc) | ln(GDPpc) | ln(GDPpc) | ln(GDPpc) |
| Natural resources | | | | | | | | | | | -0.0408 |
| | | | | | | | | | | | (0.0809) |
| Natural resources x EaP | | | | | | | | | | | 0.952*** |
| | | | | | | | | | | | (0.198) |
| Convergence speed | -0.65 | 0.81 | 0.77 | 0.81 | 0.84 | 0.80 | 0.62 | 0.89 | 0.58 | 0.53 | 0.47 | 0.30 |
| Observations | 264 | 257 | 257 | 257 | 257 | 247 | 252 | 247 | 247 | 247 | 204 |
| Groups | 11 | 11 | 11 | 11 | 11 | 11 | 11 | 11 | 11 | 11 | 11 |

Notes: Standard errors in parentheses. Significance levels: * p < 0.1, ** p < 0.05, *** p < 0.01. Arellano-Bond estimator was chosen to initialize the bias correction. Level 3 of accuracy was used for bias correction, while 100 replications were applied for calculating the bootstrap variance-covariance matrix.

Source: Authors’ estimations
### Table A2: System GMM dynamic panel data estimation of economic growth determinants in EaP and CA countries, 1992–2015

|                | (1c)    | (2)    | (3)    | (4)    | (5)    | (6)    | (7)    | (8)    | (9)    | (10)   | (11)   | (12)   | (13)   |
|----------------|---------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|
| ln(GDPpc)     | 1.057***| 0.938***| 0.970***| 0.945***| 0.930***| 0.895***| 0.915***| 0.967***| 0.968***| 0.891***| 0.882***| 0.906***| 0.932***|
| ln(GDPpc)_{t-1} | (0.0122) | (0.0444) | (0.0344) | (0.0374) | (0.0430) | (0.0393) | (0.0581) | (0.0609) | (0.0401) | (0.0314) | (0.0322) | (0.0768) |
| Physical capital | 0.436 | −0.247 | 0.459 | 0.665** | 0.441 | 0.128 | 0.471 | 0.987** | 0.317 | 0.545** | 0.527** | 0.499 |
|                | (0.368) | (0.320) | (0.366) | (0.216) | (0.304) | (0.328) | (0.286) | (0.336) | (0.436) | (0.183) | (0.170) | (0.359) |
| Human capital | 0.0325 | −0.211 | 0.159 | 0.0106 | −0.0993 | 0.186 | −0.717 | 0.0418 | 0.229 | 0.529* | 0.217 | −0.336 |
|                | (0.195) | (0.204) | (0.254) | (0.173) | (0.346) | (0.303) | (0.490) | (0.330) | (0.304) | (0.271) | (0.330) | (0.358) |
| Inflation     | −0.00902*** | −0.00936*** | −0.0100*** | −0.0347*** | −0.00887*** | −0.00439 | −0.00992*** | −0.0357 | −0.0308*** | −0.0299*** | −0.0284*** | −0.0225*** |
|                | (0.00246) | (0.00262) | (0.00320) | (0.0135) | (0.00352) | (0.00301) | (0.00376) | (0.0430) | (0.0103) | (0.00965) | (0.00931) | (0.00725) |
| Openness      | 0.139*** | 0.183*** | 0.131*** | −0.0292 | −0.0849 | 0.106* | 0.0700 | 0.0826* | −0.0136 | −0.0543 | −0.0442 | 0.0377 |
|                | (0.0420) | (0.0471) | (0.0532) | (0.0935) | (0.118) | (0.0550) | (0.0698) | (0.0423) | (0.117) | (0.144) | (0.135) | (0.0845) |
| Active population | 1.446** | 1.736** | 1.205* | 0.753 | 1.586 | 1.919*** | 2.879* | 0.242 | 1.357 | 0.440 | 0.404 | 1.900** |
|                | (0.588) | (0.600) | (0.599) | (0.825) | (1.153) | (0.558) | (1.313) | (0.649) | (0.849) | (0.964) | (0.921) | (0.706) |
| EaP ratification | −0.0851* | −0.276** | 0.589 | −0.131*** | −0.611*** | −0.716*** | −0.204* | −0.166 | −0.641*** | −0.576*** | −0.418 | −0.153 |
|                | (0.0426) | (0.0903) | (0.669) | (0.0509) | (0.266) | (0.280) | (0.103) | (0.108) | (0.227) | (0.235) | (0.251) | (0.329) |
| ENP ratification | 0.0277 | 0.0431 | 0.0499 | 0.102* | 0.0795 | −0.0775 | −0.0149 | 0.0826* | 0.0593 | 0.0500 | 0.0502 | 0.0318 |
|                | (0.0416) | (0.0452) | (0.0452) | (0.0552) | (0.0576) | (0.0758) | (0.0576) | (0.0409) | (0.0721) | (0.0695) | (0.0645) | (0.0516) |
| Physical capital | 1.229** |          |        |        |        |        |        |        |        |        |        |        |
| x EaP          | 0.599 |          |        |        |        |        |        |        |        |        |        |        |
|                | (0.530) |          |        |        |        |        |        |        |        |        |        | (0.697) |
| Human capital  | −0.281 |          |        |        |        |        |        |        |        |        |        |        |
| x EaP          | (0.276) |          |        |        |        |        |        |        |        |        |        |          |

(Continues)
|                          | (1c)  | (2)  | (3)  | (4)  | (5)  | (6)  | (7)  | (8)  | (9)  | (10) | (11) | (12) | (13) |
|--------------------------|-------|------|------|------|------|------|------|------|------|------|------|------|------|
| ln(GDPpc)                |       |      |      |      |      |      |      |      |      |      |      |      |      |
| ln(GDPpc)                |       |      |      |      |      |      |      |      |      |      |      |      |      |
| ln(GDPpc)                |       |      |      |      |      |      |      |      |      |      |      |      |      |
| ln(GDPpc)                |       |      |      |      |      |      |      |      |      |      |      |      |      |
| ln(GDPpc)                |       |      |      |      |      |      |      |      |      |      |      |      |      |
| ln(GDPpc)                |       |      |      |      |      |      |      |      |      |      |      |      |      |
| ln(GDPpc)                |       |      |      |      |      |      |      |      |      |      |      |      |      |
| ln(GDPpc)                |       |      |      |      |      |      |      |      |      |      |      |      |      |
| ln(GDPpc)                |       |      |      |      |      |      |      |      |      |      |      |      |      |
| ln(GDPpc)                |       |      |      |      |      |      |      |      |      |      |      |      |      |
| ln(GDPpc)                |       |      |      |      |      |      |      |      |      |      |      |      |      |
| Inflation x EaP          | 0.0328** | 0.0308** | 0.0320*** | 0.0303*** | 0.0192** |       |      |      |      |      |      |      |      |
|                          | (0.0146) | (0.0105) | (0.00896) | (0.00919) | (0.00847) |      |      |      |      |      |      |      |
| Openness x EaP           | 0.524*  |       |      |      |      |      |      |      |      |      |      |      |      |
|                          | (0.267) |      |      |      |      |      |      |      |      |      |      |      |      |
| Transition index         |       |      |      |      |      |      |      |      |      |      |      |      |      |
|                          |       |      |      |      |      |      |      |      |      |      |      |      |      |
| Transition index x EaP   | 0.239** | 0.176** | 0.185** | 0.144 | 0.0567 |       |      |      |      |      |      |      |      |
|                          | (0.105) | (0.0779) | (0.0738) | (0.0818) | (0.0823) |      |      |      |      |      |      |      |
| FDI                      |       |      |      |      |      |      |      |      |      |      |      |      |      |
|                          |      |      |      |      |      |      |      |      |      |      |      |      |      |
| FDI x EaP                | 0.348*  |       |      |      |      |      |      |      |      |      |      |      |      |
|                          | (0.178) |      |      |      |      |      |      |      |      |      |      |      |      |
| IQ                       |       |      |      |      |      |      |      |      |      |      |      |      |      |
|                          |      |      |      |      |      |      |      |      |      |      |      |      |      |
| IQ x EaP                 |       |      |      |      |      |      |      |      |      |      |      |      |      |
|                          |      |      |      |      |      |      |      |      |      |      |      |      |      |
| Conflicts                |       |      |      |      |      |      |      |      |      |      |      |      |      |
|                          |      |      |      |      |      |      |      |      |      |      |      |      |      |
| Structural break         |       |      |      |      |      |      |      |      |      |      |      |      |      |
|                          |      |      |      |      |      |      |      |      |      |      |      |      |      |
| Natural resources        |       |      |      |      |      |      |      |      |      |      |      |      |      |
|                          |      |      |      |      |      |      |      |      |      |      |      |      |      |

(Continued)
### Table A2 (Continued)

| (1c) | (2) | (3) | (4) | (5) | (6) | (7) | (8) | (9) | (10) | (11) | (12) | (13) |
|------|-----|-----|-----|-----|-----|-----|-----|-----|------|------|------|------|
| ln(GDPpc) | ln(GDPpc) | ln(GDPpc) | ln(GDPpc) | ln(GDPpc) | ln(GDPpc) | ln(GDPpc) | ln(GDPpc) | ln(GDPpc) | ln(GDPpc) | ln(GDPpc) | ln(GDPpc) | (0.143) |

Natural resources x EaP

| Constant | -0.480*** | -0.613*** | -0.435 | -0.817* | 0.110 | 0.184 | -0.776 | 0.0960 | -0.0643 | -0.0786 | -0.0845 | 0.325 |
|----------|-----------|-----------|-------|--------|-------|-------|--------|--------|---------|---------|---------|-------|
|          | (0.101)   | (0.330)   | (0.446) | (0.411) | (0.393) | (0.520) | (0.433) | (0.733) | (0.622) | (0.449) | (0.439) | (0.441) |

Convergence speed

| Observations | 264 | 257 | 257 | 257 | 257 | 257 | 257 | 252 | 184 | 247 | 247 | 247 | 204 |
|--------------|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|

| Countries | 11 | 11 | 11 | 11 | 11 | 11 | 11 | 11 | 11 | 11 | 11 | 11 | 11 |
| Instruments | 3 | 18 | 21 | 21 | 21 | 24 | 24 | 24 | 33 | 32 | 33 | 32 | 35 |
| AR(1) | 0.050 | 0.012 | 0.016 | 0.017 | 0.051 | 0.021 | 0.038 | 0.028 | 0.028 | 0.064 | 0.057 | 0.050 | 0.034 |
| AR(2) | 0.417 | 0.268 | 0.205 | 0.228 | 0.909 | 0.970 | 0.818 | 0.122 | 0.104 | 0.943 | 0.675 | 0.692 | 0.124 |
| Sargan test | 0.600 | 0.232 | 0.582 | 0.381 | 0.458 | 0.841 | 0.375 | 0.864 | 0.001 | 0.771 | 0.580 | 0.715 | 0.180 |
| Hansen test | 0.130 | 1.000 | 1.000 | 1.000 | 1.000 | 1.000 | 1.000 | 1.000 | 1.000 | 1.000 | 1.000 | 1.000 | 1.000 |

Notes: Robust standard errors are given in parentheses. Significance levels: * p < 0.1, ** p < 0.05, *** p < 0.01. Estimations are in orthogonal deviations. Lagged dependent, physical capital, human capital, inflation, trade openness, FDI, institutional quality, transition index and their interaction terms were treated as endogenous, being instrumented by third and deeper lags. The controls for active population, natural resources, their interaction, conflicts, the EaP, ENP ratification and structural break dummies, ENP ratification natural were assumed as strictly exogenous. The AR(1) and AR(2) tests are the Arellano-Bond tests testing the null of no single and second-order serial correlation. Hansen and Sargan tests have the null hypothesis that the instruments are exogenous.

Source: Authors’ estimations
## APPENDIX B

### TABLE B1  Data description

| Determinants               | Description and source                                                                                                                                 |
|----------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------|
| **Log of GDPpc**           | Natural log of real GDP per capita, PWT version 9.1 (Robert C. Feenstra et al., 2015)                                                                         |
| **Production factors endowments** |                                                                                                                                 |
| Physical Capital           | Gross fixed capital formation at current PPP (% of GDP) from PWT version 9.1 (Robert C. Feenstra et al., 2015)                                            |
| Human Capital              | Educational attainment (population weighted education per capita, age 25+, mean years) from Institute for Health Metrics and Evaluation (IHME, 2015) |
| Active population share    | Population of age 15–64 (% of total) from World Development Indicators (WDI) database of World Bank                                                      |
| Natural resources          | Total natural resources rents are the sum of oil rents, natural gas rents, coal rents (hard and soft), mineral rents, and forest rents (WDI database of World Bank). |
| **Macroeconomic stabilization and transition reforms** |                                                                                                                                 |
| Inflation                  | Inflation, GDP deflator (annual%) from WDI database of World Bank                                                                                     |
| Openness to trade          | Trade (% of GDP) from WDI database of World Bank                                                                                                       |
| Transition index           | EBRD reform index, European Bank for Reconstruction and Development. The scores lie between 1 and 4.3, with higher scores corresponding to a higher progress in transition. |
| **External conditions**    |                                                                                                                                 |
| FDI                        | Foreign direct investments stock (% of GDP), UNCTAD Statistics                                                                                       |
| ENP ratification           | Dummy variable taking the value 1 since the ENP action plan ratification: Armenia, Azerbaijan, Georgia (November 2006), Moldova, Ukraine (February 2005), Belarus (No negotiations until human rights situation improves) (Wesselink & Boschma, 2017) |
| **Institutional quality and stability** |                                                                                                                                 |
| Institutional quality (IQ) | Worldwide Governance indicators index (estimate) from WGI database of World Bank (Kaufmann et al., 2010)                                                |
| Conflicts                  | Total summed magnitudes of societal and interstate major episodes of political violence (MEPV). Scale: 1 (lowest) to 10 (highest) for each MEPV; Magnitude scores for multiple MEPV are summed; 0 denotes no episodes (Marshall, Center for Systemic Peace - MEPV and conflict regions, 1946-2018). |
| **Other variables**        |                                                                                                                                 |
| EaP                        | Dummy variable taking the value 1 for EaP members, or 0 otherwise                                                                                       |
| Structural break           | Dummy variable taking the value 1 over 2000-2015 period, or 0 otherwise                                                                              |
| Variables                  | Obs. | Mean  | SD   | Min   | Max    |
|----------------------------|------|-------|------|-------|--------|
| **EaP**                    |      |       |      |       |        |
| Log of GDPpc               | 144  | 8.60  | 0.63 | 7.49  | 9.83   |
| Physical capital           | 144  | 0.15  | 0.06 | −0.00 | 0.41   |
| Active population share    | 144  | 0.68  | 0.03 | 0.61  | 0.74   |
| Human capital              | 144  | 2.40  | 0.11 | 2.15  | 2.61   |
| Natural resources          | 97   | 0.16  | 0.17 | 0.00  | 0.82   |
| Inflation                  | 140  | 3.31  | 14.85| −0.19 | 154.44 |
| Openness to trade          | 141  | 1.00  | 0.27 | 0.46  | 1.67   |
| Transition index           | 138  | 2.74  | 0.67 | 1.17  | 3.50   |
| FDI                        | 141  | 0.28  | 0.23 | 0.00  | 1.18   |
| Institutional quality      | 102  | −0.56 | 0.32 | −1.10 | 0.39   |
| Conflicts                  | 125  | 0.18  | 0.71 | 0.00  | 3.00   |
| **CA**                     |      |       |      |       |        |
| Log of GDPpc               | 120  | 8.49  | 0.77 | 7.07  | 10.07  |
| Physical capital           | 120  | 0.14  | 0.09 | 0.05  | 0.44   |
| Active population share    | 120  | 0.62  | 0.05 | 0.52  | 0.69   |
| Human capital              | 120  | 2.34  | 0.11 | 2.09  | 2.54   |
| Natural resources          | 121  | 0.06  | 0.10 | 0.00  | 0.45   |
| Inflation                  | 120  | 1.77  | 4.35 | −0.05 | 30.89  |
| Openness to trade          | 117  | 0.96  | 0.35 | 0.22  | 2.00   |
| Transition index           | 115  | 2.47  | 0.69 | 1.00  | 3.39   |
| FDI                        | 118  | 0.24  | 0.20 | 0.00  | 0.84   |
| Institutional quality      | 85   | −1.04 | 0.32 | −1.66 | −0.41  |
| Conflicts                  | 150  | 0.45  | 1.22 | 0.00  | 6.00   |
| **EaP & CA**               |      |       |      |       |        |
| Log of GDPpc               | 264  | 8.55  | 0.70 | 7.07  | 10.07  |
| Physical capital           | 264  | 0.15  | 0.07 | −0.00 | 0.44   |
| Active population share    | 264  | 0.65  | 0.05 | 0.52  | 0.74   |
| Human capital              | 264  | 2.37  | 0.11 | 2.09  | 2.61   |
| Natural resources          | 218  | 0.11  | 0.15 | 0.00  | 0.82   |
| Inflation                  | 260  | 2.60  | 11.30| −0.19 | 154.44 |
| Openness to trade          | 258  | 0.98  | 0.31 | 0.22  | 2.00   |
| Transition index           | 253  | 2.62  | 0.69 | 1.00  | 3.50   |
| FDI                        | 259  | 0.26  | 0.22 | 0.00  | 1.18   |
| Institutional quality      | 187  | −0.78 | 0.40 | −1.66 | 0.39   |
| Conflicts                  | 275  | 0.33  | 1.03 | 0.00  | 6.00   |
| Year | EaP Real GDP per capita growth | CA Real GDP per capita growth | EaP Real GDP per capita index | CA Real GDP per capita index |
|------|-------------------------------|-------------------------------|-------------------------------|-------------------------------|
| 1991 | 100.0                         | 100.0                         | 100.0                         | 100.0                         |
| 1992 | -16.9                         | -29.0                         | 83.1                          | 71.0                          |
| 1993 | -9.0                          | -19.6                         | 75.6                          | 57.1                          |
| 1994 | -23.5                         | -15.6                         | 57.9                          | 48.2                          |
| 1995 | -9.9                          | -6.9                          | 52.1                          | 44.9                          |
| 1996 | -2.6                          | 0.0                           | 50.8                          | 44.9                          |
| 1997 | -4.2                          | -1.9                          | 48.6                          | 44.0                          |
| 1998 | -2.4                          | -2.4                          | 47.5                          | 43.0                          |
| 1999 | 2.7                           | -0.5                          | 48.8                          | 42.8                          |
| 2000 | 13.1                          | 4.1                           | 55.1                          | 44.5                          |
| 2001 | -0.3                          | 6.2                           | 55.0                          | 47.3                          |
| 2002 | 3.3                           | 5.4                           | 56.8                          | 49.8                          |
| 2003 | 6.4                           | 8.0                           | 60.4                          | 53.8                          |
| 2004 | 7.1                           | 9.6                           | 64.7                          | 58.9                          |
| 2005 | 13.1                          | 13.7                          | 73.2                          | 67.0                          |
| 2006 | 11.5                          | 16.5                          | 81.6                          | 78.1                          |
| 2007 | 9.1                           | 16.5                          | 89.1                          | 91.0                          |
| 2008 | 7.0                           | 13.9                          | 95.3                          | 103.7                         |
| 2009 | 5.5                           | -4.9                          | 100.6                         | 98.6                          |
| 2010 | 12.5                          | 10.5                          | 113.2                         | 108.9                         |
| 2011 | 15.0                          | 16.9                          | 130.1                         | 127.3                         |
| 2012 | 2.9                           | 1.2                           | 133.9                         | 128.8                         |
| 2013 | 8.2                           | 0.7                           | 144.8                         | 129.7                         |
| 2014 | 4.5                           | 0.1                           | 151.4                         | 129.8                         |
| 2015 | -0.6                          | -3.0                          | 150.4                         | 125.9                         |

Source: Authors’ calculations using data from PWT version 9.1.
| Destinations/Partners | China 1995 | EU28 1995 | Russian Federation 1995 | China 2015 | EU28 2015 | Russian Federation 2015 |
|-----------------------|------------|-----------|-------------------------|------------|-----------|-------------------------|
| Share of migration stock |          |           |                         |            |           |                         |
| EaP                   | 19.86 1995| 56.43 1995| 26.56 2015              | 52.96 2015 |           |                         |
| CA                    | 14.12 1995| 72.91 1995| 15.96 2015              | 70.60 2015 |           |                         |
| Share of exports      |            |           |                         |            |           |                         |
| EaP                   | 1.12 1995 | 20.63 1995| 37.24 2015              | 4.94 2015  | 40.81 2015| 14.40 2015              |
| CA                    | 5.79 1995 | 30.43 1995| 24.15 2015              | 21.92 2015 | 14.71 2015| 9.72 2015               |
| Share of imports      |            |           |                         |            |           |                         |
| EaP                   | 0.19 1995 | 26.58 1995| 31.69 2015              | 7.41 2015  | 32.83 2015| 24.13 2015              |
| CA                    | 1.75 1995 | 22.16 1995| 28.25 2015              | 22.08 2015 | 14.56 2015| 25.55 2015              |

Notes: due to unavailable data from 1995, data from 1996 were used for Uzbekistan in computing the CA average.

Source: Authors’ calculations using UN (2019) and UNCTADstat data.