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## Economic impact of the EU Eastern enlargement on New Member States revisited: The role of economic institutions

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### Abstract

The paper analyses the economic implications of the accession of New Member States (NMS) to the European Union (EU) in 2004 and 2007. The estimation effects of integration with the EU were carried out as a comparative case study using the synthetic control method (SCM) proposed by Abadie and Gardeazabal. Compared to previous studies analysing the effects of accession to the EU (Campos, Coricelli and Moretti), we check for the importance of the quality of economic institutions for the matching process of the analysed economies with their comparators. The results of the econometric analysis show a positive impact on the country performance 6 years and 12 years after accession to the EU. The gains from accession are large but not universal. For 5 of the 10 analysed countries the difference in levels of per capita gross domestic product (GDP) against the counterfactual is at least 30%.

### Keywords

EU enlargement | New Member States | synthetic control method

### JEL Codes

F13, F15, P2

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## 1. Introduction

During the largest enlargement of the European Union (EU) in 2004, 10 new member states (NMS) acceded to the EU, including eight post-communist countries from Central and Eastern Europe (CEE). The group of NMS was enlarged by Bulgaria and Romania, which joined the EU in 2007. There are many economic studies analysing the partial effects of European integration (focused on trade, investment and/or structural funds), but there is still little work to quantify the overall benefits ex post. In this paper, we extend the study of the effects of integration within the EU conducted by Campos, Coricelli and Moretti (2014), and Campos et al. (2019) based on the synthetic control method (SCM). This approach consists of construction counterfactuals for countries that joined the EU. Our paper is based on more recent data and on a broader set of dependent political variables as well as a broader set of comparator countries.

The main goal of the article is to quantify the impact of EU accession on the level of economic development in the analysed countries. Additionally, we analyse the importance of the institutional environment for the creation of counterfactual and, in turn, the observed gains from integration. The SCM, developed by Abadie and Gardeazabal (2003), was used to estimate the overall GDP implications of terrorism in the Basque region of Spain. This method was also used to analyse the effects on the countries joining the EU (Campos et al., 2014 first working paper version, 2019 journal publication).

The article consists of four parts. The first part is devoted to a literature review of the accession of NMS to the EU and their economic transition. The second part presents a literature review dealing with the estimation effects of the EU membership, including studies using SCM. The third part discusses the statistical data and research methodology, while the fourth presents the estimation results and conclusions.

## 2. Accession to the EU and Transition Towards Market Economies

The West European integration started already in the 1950s (European Coal and Steel Community). The scope of integration was gradually deepened and enlarged through subsequent accessions to the European Communities (EC). The Treaty of Maastricht shaped the current form of European integration establishing the EU in 1993. At that time, the Single European Act also entered into force. Trade liberalisation within the (single) internal market was to increase the growth and competitiveness of the EU economy by enlarging the size of the market along with better allocation of factors of production. At present, the EU's single internal market is based on free movement of goods, services, capital and labour.<sup>1</sup>

However, the literature on the effects of European integration on the economic growth and productivity remains somewhat inconclusive, because of significant methodological difficulties (Eichengreen, 2007; Crafts, 2016). Probably the most serious difficulty is the heterogeneity of country experiences before and after their accession to the EU.

The experience of the Central and East European countries acceding to the EU was very different from that of the West European countries. Until 1989, all of them were under the strong political and economic domination of the Soviet Union and had non-market economies. In the early 1990s, all the CEE countries were in the process of profound political and economic transformation. These countries were seeking the means to bring their economies from a system of state ownership and central planning based on the Soviet model, to one characterised by private ownership and market mechanisms, based on the model of Western developed countries.

The political situation in the CEE countries was diverse. Some of them had experience as 'almost independent' states with more politically liberal regimes as in Hungary or Poland, while some had seen less liberal, such as in Bulgaria, Czechoslovakia or Romania. On the other hand, some of the future EU-members like Estonia, Latvia and Lithuania were the republics of the Soviet Union committed to deep

reforms and to be reintegrated with Europe. The transformation in other ex-republics of the Soviet Union, including Belarus, Ukraine, Russia or the Transcaucasian states, started much later and was far less dynamic. There were also huge differences in terms of institutions. In the independent states, some institutions were functioning and had to be adapted to the Western standards and rule of law, while the Baltic States had to create new institutions from scratch.

The economic situation in the late 1980s and early 1990s of the prospective member states was also different. For example, Poland was in a stage of deep macroeconomic crisis, with a very high rate of inflation,<sup>2</sup> large budget deficit and foreign indebtedness, while the macroeconomic situation in Czechoslovakia was relatively stable. In 1990, during the crisis the GDP in Poland declined to 82% in comparison to the previous year; the decline in the Baltic republics was even steeper and amounted to 67% in Estonia, 59% in Latvia and 44% in Lithuania (De Melo, Denizer & Gelb, 1996, p. 405). Thus, the transformation of the Baltic States was extremely difficult at the beginning of the 1990s – no own currency, no central banks and an abrupt collapse of trade relations with the former Soviet republics.

Therefore, the economic and political conditions in the early 1990s were diverse and affected the pattern and speed of economic transformation among the CEE countries. Some of them such as Poland or the Baltic States had to adopt the 'Big Bang' strategy of rapid market-oriented reforms, while other countries, such as Czechoslovakia or Hungary, could introduce the economic and political reforms gradually.

Almost all CEE countries were committed to integration with the EC. Already in December 1991, Czechoslovakia, Hungary and Poland had signed the so-called Europe Agreements, 'establishing an association between the EC' and these countries, and thus creating the framework for future economic and political cooperation. The Europe Agreements enabled creation of the Free Trade Areas (FTA) between the EC and CEE countries for all goods with the exception of agricultural products. The agreement also included the expectations regarding future structural reforms. In particular, it was stated in Article 68 of Poland's Europe Agreement that 'The Contracting Parties recognise that the major precondition for Poland's economic integration into the Community is the approximation of that country's existing and future

<sup>1</sup> See e.g. Baldwin and Wyplosz (2009). Integration of the market for services was introduced gradually, *inter alia*, through the Services Directive.

<sup>2</sup> The CPI in Poland in 1989 was equal to 739.6.

legislation to that of the Community. Poland shall use its best endeavours to ensure that future legislation is compatible with Community legislation.’ Similar clauses were included in two other Europe Agreements with Czechoslovakia and Hungary. Later, the other CEE countries concluded similar Europe Agreements.

In June 1993, the EU members set up the so-called Copenhagen criteria, which state that member countries must have stable, functioning democratic institutions, which can ensure protection of the EU’s fundamental values. They must also have functioning market economies, with the ability to withstand competition in the single market. Thus, it was assumed that the CEE countries, aspiring to become EU members, should reform their economies in such a way as to be able to fulfil the Copenhagen criteria.

In April 1994, Poland made a request for membership in the EU and in December of the same year the EU adopted a pre-accession strategy, defining the areas and forms of cooperation recognised as essential to speed-up integration. In October 1996, the Office for European Integration in Poland came into force, created to ensure the implementation of the tasks related to coordinating policies and responsible for coordination of measures for the adaptation of Poland to meet the European standards. In January 1997 Poland adopted the National Strategy for Integration (NSI), whose role was to accelerate and direct the work of government institutions as well as help in raising societal awareness of the possible consequences of Polish membership in the EU.

In March of 1998 the EU started accession negotiations with five CEE countries (Poland, Czech Republic, Hungary, Slovenia and Estonia) as well as Cyprus. Soon after, Lithuania and Latvia joined the negotiations. For the purpose of the negotiations, the EU set up 37 task forces that were responsible for developing agreements. The aim of the negotiations was to prepare the accession treaty. Polish negotiations with the EU ended during the EU summit in Copenhagen, on 13 December 2002.

Thus, the transformation reforms and liberalisation of CEE economies constituted an important element of the accession strategy to the EU. The Copenhagen criteria required the ability to cope with the competitive pressures exerted by the EU single market and required that the acceding countries create the appropriate institutional environment, based on ‘rule of law’. But the speed of implementation of reforms leading to creation of stable, functioning democratic institutions, which can ensure the protection of the

**Table 1.** Macroeconomic implications of accession to the EU: GDP growth rates in 2000–2009 for eight acceding countries (without Bulgaria and Romania)

Scenarios	2000–2009	2000–2004	2005–2009
Baseline scenario (no accession)	3.0	3.1	2.9
Central scenario	4.3	4.0	4.6
Optimistic scenario	5.1	4.0	6.1

Source: vfd p. 33.

EU, European Union.

EU’s fundamental values could have been somewhat differentiated among acceding countries.

The importance of structural (transition) reforms in the context of accession was shown in the ex-ante study prepared by the European Commission (2001). The implications of various scenarios that took into account consumption and technological differences between countries are presented in Table 1.

Scenarios:

- (i) No accession: an anti-world with no enlargement before 2010, but reforms which have been introduced till that year will continue, albeit perhaps at a slower rate;
- (ii) Central scenario: sustained commitment to, and implementation of, the chosen reform path by policymakers in acceding countries will be continued to meet the membership criteria;
- (iii) Optimistic scenario: transition will be deepened further, with trade and capital movements enhancing the integration and with EU structural and social fund transfers helping to finance essential physical infrastructures and to contribute to human capital improvements.

There is no simple answer about the extent to which the transition reforms were ‘imposed by’ and/or ‘resulted from’ the accession strategy. According to a political scientist, ‘Although acknowledging the EU was at times a motor of change, its power was limited to particular points in the accession process and varied significantly across policy areas. Even in cases such as Slovakia, often used to demonstrate the power of EU conditionality, the influence of the EU on domestic actors and policy change has been exaggerated. The EU’s ‘transformative power’ is at its greatest when deciding to open accession negotiations...’ (Houghton, 2007).

On the other hand, there is no doubt that the speed of transition reforms in the European post-Soviet countries which did not sign Europe Agreements and did not start the accession negotiations with the EU was much slower and far less efficient. In the case of Russia, Ukraine and Belarus the commitment to follow market-oriented reforms and introduction of new institutions in line with 'rule of law' was much weaker.

The question of endogeneity of transition reforms in the post-Soviet countries is somewhat ambiguous. This issue, in the context of transition and 'mass privatisation' in Russia, was analysed by Hoff and Stiglitz (2002). They construct the dynamic equilibrium model of political economy in which no individual or subgroup has the power to establish their own version of law and order. The authors argue that the political demand for the 'rule of law' may fail even if it is the Pareto efficient 'rule of the game'. The reason is that uncertainty about the legal regime can lead to asset stripping, and thus give agents an incentive in prolonging the absence of the 'rule of law'.

Thus, one may conclude that even in the case of the big bang strategy of reforms, the creation of the 'rule of law' state would not happen automatically. The external pressure, in the form of pre-accession commitments, can facilitate the transition process and creation of institutions representing the 'rule of law'. In our analysis, we decided to treat the institutions representing economic freedom, rule of law or other characteristics reflecting the quality of regulations, as additional variables, which should be taken into consideration in constructing the alternative scenarios. In the case of the CEE countries, the opportunity to join the EU made a particular set market oriented reforms to anticipate large rewards from coordinating them with *acquis communautaire*, which helps to explain the successful transitions in these economies (Roland and Verdier, 2003).

### 3. The Ex-Ante and Ex-Post Analyses of the Effects of the Accession to the EU (Based on Theoretical Models and SCM)

There have been several ex-ante studies analysing or simulating the possible economic implications of accession to the EU. Probably the best known study

was elaborated by Baldwin et al. (1997). In this study, based on the computable general equilibrium (CGE) model the authors assumed that entrance to the European Single Market (ESM) would reduce the real costs of trade by 10%. In this case the real income of the acceding countries would increase by 1.5%. In addition, they analyse the scenario in which joining the EU significantly reduces the risk premium on investment in the EEA countries. In this case, the inflow of capital, according to their simulations, could increase the real income of the acceding countries by 18.8% in comparison to the scenario of non-accession. Moreover, the authors also analysed the likely implications of money transfer via the EU budget. Thus, the overall benefits of accession for the CEE countries are very large according to these simulations. The authors conclude that 'the bottom line is unambiguous and strongly positive: enlargement is a very good deal for both the EU incumbents and the new members.'

A different ex-ante study was elaborated by Kohler (2004), who estimated the country-specific implications of Eastern enlargement for the old EU-15 members. He developed a framework for the welfare calculations of enlargement for individual countries. According to his analysis the Eastern enlargement should increase the welfare of the majority of EU-15 countries (especially for Austria and Germany) and only some of them (Ireland, Greece, Spain and Portugal) may suffer some minor welfare decrease.

Another set of ex-ante simulations was provided by the EU Commission (*The Directorate General for Economic and Financial Affairs* (2001)). This study was based on a modified Solow macroeconomic model and anticipated a very significant increase in the growth rate of acceding CEE countries. The results of the study are shown in Table 1.

Ex-post studies of the economic implications of EU integration are numerous, but those specific to Eastern enlargement are quite rare. Crafts (2016) surveys papers on the ex-post effects of European integration for trade and income. He demonstrates that 'traditional' studies were analysing increases in trade flows between members states based on the relative shares of European countries. The newer approaches, usually based on panel estimations of gravity models, were estimating changes in trade flows related to the subsequent steps of European integration. For example, Bayoumi and Eichengreen (1995), analysing progress in integration, estimated that creation of the European Economic Community

(1956–1973) increased internal trade by 3.2%; then in the period 1972–1980, trade increased by 5.9% and Southern enlargement increased trade in Spain, Portugal and Greece by 2.0–2.9%.<sup>3</sup> In another study, Baier et al. (2008) found that EU membership raised bilateral intra-EU trade after 15 years by 4.8–5.6% per year.

Basing on these trade estimates it is possible to estimate the welfare gains.<sup>4</sup> For example, Harrison, Rutherford and Tarr (1994) estimated that the impact of ESM on the welfare-triangles gain from reduced trade costs would be about 0.5% of EU GDP. Another approach is based on the presumption that increase in trade openness by 1% would raise the GDP by 0.5%.<sup>5</sup> Using the estimates made by Baier et al. (2008) and applying to the data in 2000, the estimated impact of integration would be an increase of EU GDP by 8.6–9.5%.

Some authors applied panel data to growth regressions, based on endogenous growth theory, in order to analyse the impact of EU accession on growth. For example, Crespo-Cuaresma, Ritzberger-Grünwald and Silgoner (2008) studied the consequences of EU membership in explaining growth when analysing the pre-2004 accessions. They found that the length of EU membership has a significantly positive effect on the economic growth of CEE EU members. In another study, Badinger (2005) estimated that ‘GDP per capita of the EU would be approximately one-fifth lower today if no integration had taken place since 1950’, but these results are ‘not completely robust’.

A similar analysis was performed by Bower and Turrini (2009). The authors run panel regressions, for 62 advanced, emerging and transition economies from 1960 to 2008. Explanatory variables include standard growth determinants, namely per-capita GDP, population growth, investment, openness, terms-of-trade growth and human capital formation. This baseline growth regression specification is augmented to take into account explanatory factors specific to the growth performance of transition countries and NMS. Furthermore, in light of the view

that institutions are key to the development process (e.g. Acemoglu, Johnson & Robinson, 2005), standard specifications were augmented with the inclusion of various indicators that were used to proxy for the institutional quality of the legal system, freedom of trade and the regulatory environment.

Eichengreen and Boltho (2008) adopted a very different approach in analysing the implications of European integration. These authors were imagining the non-existence of a specific integration initiative and assuming that nothing else of substance would have changed. They followed economic historians such as Robert Fogel (1964) in attempting to specify the counterfactuals. They tried to push the argument that European living standards, growth rates and economic structure would have been different in the absence of the institutions and processes of European integration. For example, they argue that integration affected investment and profitability, which depend on wage pressure (Bruno and Sachs, 1985), and European integration with a more competitive environment led to wage moderation. They conclude that European incomes would have been roughly 5% lower today in the absence of the EU. Thus, Eichengreen and Boltho (2008) argue that one has to construct a counterfactual world in order to better understand ex-post the implications of integration. The crucial question is how this alternative world should be constructed.

The concept of an ‘objective’ counterfactual world, called the SCM, was first proposed by Abadie and Gardeazabal (2003). The main feature of this method is that in a given case, the inference is made not on the basis of a comparison to a control unit or a group of control units (like ion difference-in-difference (DID) method), but to the so-called synthetic unit. The creation of a synthetic unit requires the use of a combination of characteristics of the units constituting the control group in which individual units (e.g. regions or countries) have a specific weight. Such an approach allows – as it may be assumed – to better reconstruct the situation in which the analysed phenomenon would not occur in the analysed country/region.

Abadie and Gardeazabal (2003) used this concept to reconstruct the economic effects of terrorism in the Basque Country. This analysis compared the economic development of the Basque Country during the era of terrorism to a synthetic unit, the so-called ‘synthetic’ Basque Country. The use of SCM allowed to isolate the influence of terrorism on the development of the Basque economy. According to this analysis

3 At the same time extra-EEC trade decreased by 2–3%.

4 A standard static tariff analysis shows that increase of a tariff leads to production and consumption deadweight losses. By contrast, trade liberalization increases the welfare.

5 See: Frankel and Romer (1999). The EU membership, according to Baier et al. (2008), had raised intra-EU trade by 100% to 125%, from a counterfactual intra-EU trade openness of 15.6–17.3% of GDP to the actual intra-EU of 34.6 percent.

the estimated GDP per capita in the Basque Country fell by 10 percentage points as a result of terrorism, compared to its synthetic version.

SCM was also applied by Abadie, Diamond and Hainmueller (2015) to study the consequences of the reunification of Germany in 1990. The aim of the article was to check how the reunification of Germany changed the GDP per capita in West Germany (Germany). Due to the boom that followed the reunification, in 1990–1992 West Germany's GDP per capita did not differ from the estimated one for their synthetic version. However, starting from 1993, the gap in GDP per capita widened until the end of the analysed period (2003). The authors estimated that over the entire 1990–2003 period, per capita GDP was reduced by about US\$1,600 per year on average, which amounts to approximately 8% of the 1990 baseline level.<sup>6</sup>

The recent paper by Campos et al. (2019) was the main source of inspiration for our analysis. The authors empirically examined the effects of joining the EU. They studied four rounds of EU enlargement, namely the accession of Denmark, Ireland and Great Britain in 1973, the further 'southern enlargement' of the Union (Greece, Spain and Portugal in the 1980s), the accession of Austria, Finland and Sweden in 1995 and the accession of countries from CEE in 2004 and 2007. The authors found that the growth effects from EU membership are large and positive, with the exception of Greece. However, there is a substantial variation across countries and over time; for example, the GDP per capita after 10 years was higher by 5.9% in Poland and by 24.1% in Estonia.<sup>7</sup> They check the vulnerability of results to different specifications. Campos et al. (2019) estimate that without European integration, the GDP per capita would have been, on average, approximately 10% lower in the first 10 years after joining the EU.<sup>8</sup>

## 4. The SCM

In this paper, we conduct a comparative analysis between the level of GDP per capita of NMS after accession to the EU and the counterfactual level of GDP per capita but in the scenario of non-accession to the EU. We use the SCM, which consists in constructing 'synthetic versions' of these countries, based on the countries from the control group which did not accede to the EU. The control group of countries is selected according to the availability of certain relevant characteristics. The main advantage of SCM, in comparison to the DID methodology, is that it enables to study the country-specific implications (GDP pc) of accessions to the EU.

A gap between the actual GDP per capita and that estimated for the synthetic unit will constitute a quantitative estimate of the benefits/losses achieved as follows:<sup>9</sup>

$$\tau_{it} = Y_{it}^I - Y_{it}^C$$

where:

$Y_{it}^I$  – is the outcome (GDP pc) of treated unit  $i$  at time  $t$ ;

$Y_{it}^C$  – is the outcome (GDP pc.) of synthetic unit  $i$  (which has not been treated) at time  $t$ .

The approach proposed by Abadie, Diamond and Hainmueller (2010) to the empirical analysis of the consequences of event  $\tau_{it}$  is based on estimating the potential outcome for the following general model:

$$Y_{it}^I = \delta_t + \theta_t Z_i + \lambda_t \omega_i + \alpha_{it} D_{it} + \varepsilon_{it}$$

$$Y_{it}^C = \delta_t + \theta_t Z_i + \lambda_t \omega_i + \varepsilon_{it},$$

where:

$\delta_t$  – is the unknown common factor for all units (countries) at time  $t$ ;

$\theta_t$  – is the vector of parameters;

$Z_i$  – is the vector of independent variables at country level;

$\lambda_t$  – is the unknown common factor;

$\omega_i$  – is the country-specific unobservable term for the  $i$  unit;

$\varepsilon_{it}$  – is the zero mean transitory shock.

<sup>6</sup> In 2003, per capita GDP in the "synthetic" West Germany is estimated to be about 12% higher than in the actual West Germany.

<sup>7</sup> Campos et al. (2019), p. 98.

<sup>8</sup> The SCM was also used in the estimation of effects of Turkey-EU customs union (see: Aytuğ et al., 2017). According to this analysis Turkish GDP per capita would have been 13 per cent lower in the absence of the customs union.

<sup>9</sup> We present the synthetic control method basing on notation used by Campos et al. (2014).

$\alpha_{it} D_{it} = \tau_{it}$ , where  $D_{it}$  is the binary variable that takes the value of 1, when the unit (country)  $i \in I$  is exposed to the treatment and 0 otherwise.<sup>10</sup>

Having the data on GDP per capita of the treated countries, for countries from the control group, and a set of characteristics describing their economies both for the pre-accession and post-accession periods, we can construct a synthetic control unit based on these characteristics. For this purpose, we have to estimate  $Y_{it}$ , weighted average of characteristics  $Z_i$  of control group units ( $i = 2, \dots, N+1$ ) in such a way so as to be as close as possible to the  $Y_{it}$  in the pre-treatment period. Thus, we look for weights  $W = (w_2, \dots, w_{n+1})$  (for  $w_i \geq 0$   $i = 2, \dots, N+1$  and  $\sum_{i=2}^{N+1} w_i = 1$ ) to get:

$$\sum_{i=2}^{N+1} w_i Y_{it} = Y_{it}$$

$$\sum_{i=2}^{N+1} w_i Z_i = Z_1.$$

In order to describe the implication of an event, we need to estimate the behaviour of the non-event control unit. It narrows down to calculation of the optimal vector of weights  $W^*$ , so that  $\sum_{i=2}^{N+1} w_i^* Y_{it}$  is an approximate estimation of  $Y_{it}^C$  after the event. Then the treatment effects of the event  $\tau_{it}$  are estimated as:

$$\hat{\tau}_{it} = Y_{it} - \sum_{i=2}^{N+1} w_i^* Y_{it} \quad \text{dla } t \geq T_0.$$

As mentioned above, SCM was used for the first time by Abadie and Gardeabazal (2003) to study the effects of terrorism in the Basque Country. The method gradually entered into the econometric literature. Athey and Imbens (2017) believe that SCM is one of the most important econometric innovations, next to the DID method, for analysis of the effects of certain events. The main advantage of SCM is that we can calculate the country (unit)-specific implications of some events. The main disadvantage is that we cannot calculate the statistical significance of the estimated results. In this context, Firpo and Possebom (2018, p. 23), recognising the advantages of SCM, propose parametric  $p$ -value weights for testing the sensitivity of the estimation results and additional tests on the null hypothesis. In our analysis, we stick

to the standard SC method as proposed by Abadie and Gardeabazal (2003) and analyse the sensitivity of our results by adding additional control variables.

## 5. Empirical Analysis

Our empirical analysis is inspired by the study of Campos et al. (2019) looking at the effects of EU integration. We use a similar sample of donor countries: Albania, Algeria, Argentina, Australia, Belarus, Brazil, Canada, Chile, China, Colombia, Indonesia, Malaysia, Mexico, Moldova, Morocco, New Zealand, Macedonia, Philippines, Russian Federation, Switzerland, Thailand, Turkey, Ukraine and Uruguay, which include the non-EU OECD countries, the newly industrialised countries and the immediate neighbours of the EU. Compared to the original study, we additionally include Israel and Korea Rep., (OECD members) and Ukraine and Moldova (neighbouring countries) in the donor pool.<sup>11</sup> Unlike Campos et al. (2019), we do not include Croatia in the donor pool as it became a member of the EU in 2013.<sup>12</sup> The choice of the rest of the donor pool follows the same criteria as in the original study, balancing the size of the donor pool and data availability.

We measure the effects of EU integration with the level of GDP per capita. We make two alternative choices of variables used for creation of the synthetic counterfactual. One closely follows Campos et al. (2014) and includes structural variables such as the population growth, share of industry in total value added, share of agriculture in total value added, share of investment in GDP, the level of real GDP and the secondary and tertiary schooling indicators (the primary source for the National Accounts type of variables is the Penn World Tables v. 10, while the remaining socio-economic variables come from the World Bank's World Development Indicators). The extended version of the model also includes several institutional variables related to the level of economic freedom in the country. We assume that these variables reflect both phenomena: progress in transition process of accession of NMS to the EU.

<sup>11</sup> We drop Japan and Iceland due to data availability.

<sup>12</sup> Running the procedure with Croatia included results with a considerably high weight for it in the counterfactual, which shows a high degree of comparability to other NMS. However, the EU accession to Croatia clearly violates the requirement for the counterfactual countries to be unaffected by the treatment.

<sup>10</sup> Abadie A., Diamond A., Hainmueller J. *Synthetic Control Methods for Comparative Case Studies: Estimating the Effect of California's Tobacco Control Program*. Journal of the American Statistical Association. 2010, 105(490). s. 495.

**Table 2.** Summary statistics for the donor pool

Variable	Source	Mean	SD	Min	Max
Real GDP per capita	PWT	17,589.66	13,757.82	2,289.263	71,831.64
Population growth	WDI	0.7860545	0.8181689	-1.523536	2.59392
Real GDP	PWT	12.74676	1.597858	9.1772	16.81404
Share of agriculture in VA	PWT	8.77402	5.422181	0.6498945	36.4107
Share of industry in VA	PWT	30.52559	8.004571	15.34689	59.48079
Investment share in GDP	PWT	0.2301817	0.0738198	0.0691244	0.4830763
Secondary enrolment	WDI	87.82568	18.7099	36.64821	157.1677
Tertiary enrolment	WDI	42.94293	22.58071	3.61141	120.9657
Tax burden	Heritage	74.39966	9.964509	37.3	92.8
Business freedom	Heritage	68.89915	12.68835	38.7	99.9
Monetary freedom	Heritage	71.83525	17.48437	0,00	95.4
Trade freedom	Heritage	73.42695	11.92106	17.6	92.4

Source: Own elaboration based on the empirical data.

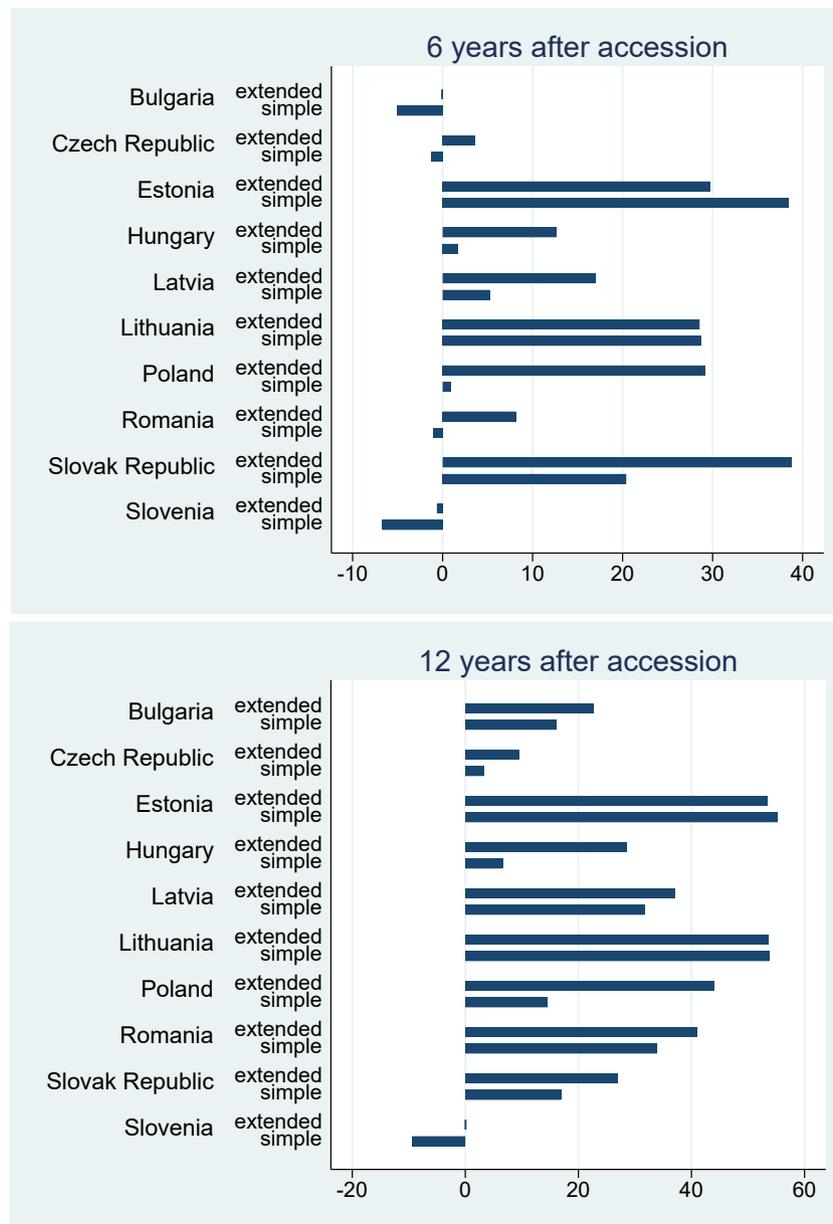
These variables are based on the indexes of the Heritage Foundation and include the tax burden, business freedom, monetary freedom and trade freedom indicators, the choice of which from among the full set of Heritage Foundation indicators is mainly based on data availability and cross-correlations between the indicators. It has to be noted that for the purpose of creation of the counterfactual, all the above indicators are averaged for the period *preceding* the intervention, i.e. EU accession. Unfortunately, pre-1994 data for all of the analysed indicators is not easily available and therefore it is not viable to test for the pre-intervention adjustments in the structure of the economies, i.e. the anticipation effects of EU Accession. It has to be noted that even with such a modest choice of variables, the data sources have significant gaps in data availability, even for developed countries for the pre-2000 periods.

The results show a similar structure of the counterfactual across countries with each of the model types. In the simple model based on the original work of Campos et al. (2014), Australia, Belarus, Korea, Macedonia and Russia and Ukraine are common pool countries in many of the NMS (see Tables A1 and A2 in Appendix). Similarly, Australia, Korea, Macedonia Moldova and Ukraine are also a part of the counterfactual in many analysed cases. Other choices include Albania, Algeria, Brazil, Chile, China, Indonesia, New Zealand and Switzerland. Adding the additional institutional variables in the extended model makes the matching exercise more difficult

for the SCM procedure and therefore the donor pool with non-zero weights becomes more diversified, in particular for Slovakia, where as many as nine comparators are included in the counterfactual as well as Slovenia with eight comparators.

The results of the country performance 6 years and 12 years after EU accession are presented in Figure 1. It is quite apparent that while the gains from accession are on average large, they are not completely universal. In particular, for countries that entered the EU with a relatively high level of economic development, including decent infrastructure, the gains are rather small. This is the case of the Czech Republic and Slovenia. This is consistent with the earlier findings by Hagemeyer and Mučková (2019) that show substantial convergence across the countries in the CEE. Moreover, the gains from the EU membership seem to be long-lasting and increase over time; for many of the analysed countries they have at least doubled between the 6th year and 12th year after accession (the results for 15 years after accession for the 2004 accession countries are presented in Figure A3 in Appendix). For 5 of the 10 analysed countries, the difference in *levels* of GDP per capita against the counterfactual is at least 30%.

It is also worth noting that for the countries with the highest gains, the choice of the model does not have a high bearing on the results, in particular where long-term analysis is taken into account. Where it does matter are the countries where gains are modest



**Figure 1.** New Member States GDP per capita versus the counterfactual 6 years and 12 years after accession.

(Czech Republic, Slovenia and Bulgaria), with the extended model showing on average larger gains, which results from the procedure picking up more developed countries for the counterfactual in the case of Czech Republic and Slovenia and giving a relatively higher wage to countries with lower Heritage scores in the case of Bulgaria (e.g. Ukraine and Russia).

## 6 Conclusions

The paper analyses the economic implications of Eastern Enlargement of the EU for the NMS. The

estimation of effects of the integration with the EU was carried out as a comparative case study using SCM. Unlike in other studies, we complement the matching structural variables with the institutional ones to increase the comparability of the treated countries to the synthetic counterfactual.

We measure the effects of EU integration on the level of GDP per capita. We make two alternative choices of variables used for creation of the synthetic counterfactual. The first alternative includes structural variables such as the population growth, share of industry in total value added, share of agriculture in total value added, share of investment

in GDP, the level of real GDP and secondary and tertiary schooling indicators. The second extended version of the model also includes several institutional variables related to the level of economic freedom in the country (tax burden, business freedom, monetary freedom and trade freedom indicators).

We analyse the country performance 6 years and 12 years after the EU accession. The gains from accession are on average large, but not completely universal. In particular, for countries that entered the EU with a relatively high level of economic development, including decent infrastructure, the gains are rather small. This is the case of the Czech Republic as well as Slovenia. Moreover, the gains from the EU membership seem to be long-lasting and increase over time; for many of the analysed countries they have at least doubled between the 6th year and 12th year after accession. For 5 of the 10 analysed countries the difference in *levels* of GDP per capita against the counterfactual is at least 30%.

The welfare gains calculated are more differentiated by individual countries and larger – especially in the long run – in comparison to Campos et. al. (2019) –partially due to a longer horizon of the study and accumulation of additional benefits over time. We also show that the size of the observed GDP differentials is quite sensitive to the choice of variables in the SCM procedure; in particular that in many cases the obtained weights are heavily concentrated towards single countries. However, it is also worth noting that for the countries with the highest gains, the choice of the model does not have a high bearing on the results. Where it does matter are countries where the gains are modest (Czech Republic, Slovenia and Bulgaria), with the extended model showing on average larger gains. For these countries these results should be interpreted with caution and treated as a range of possible outcomes rather than a particular level, highlighting the uncertainty of the gains.

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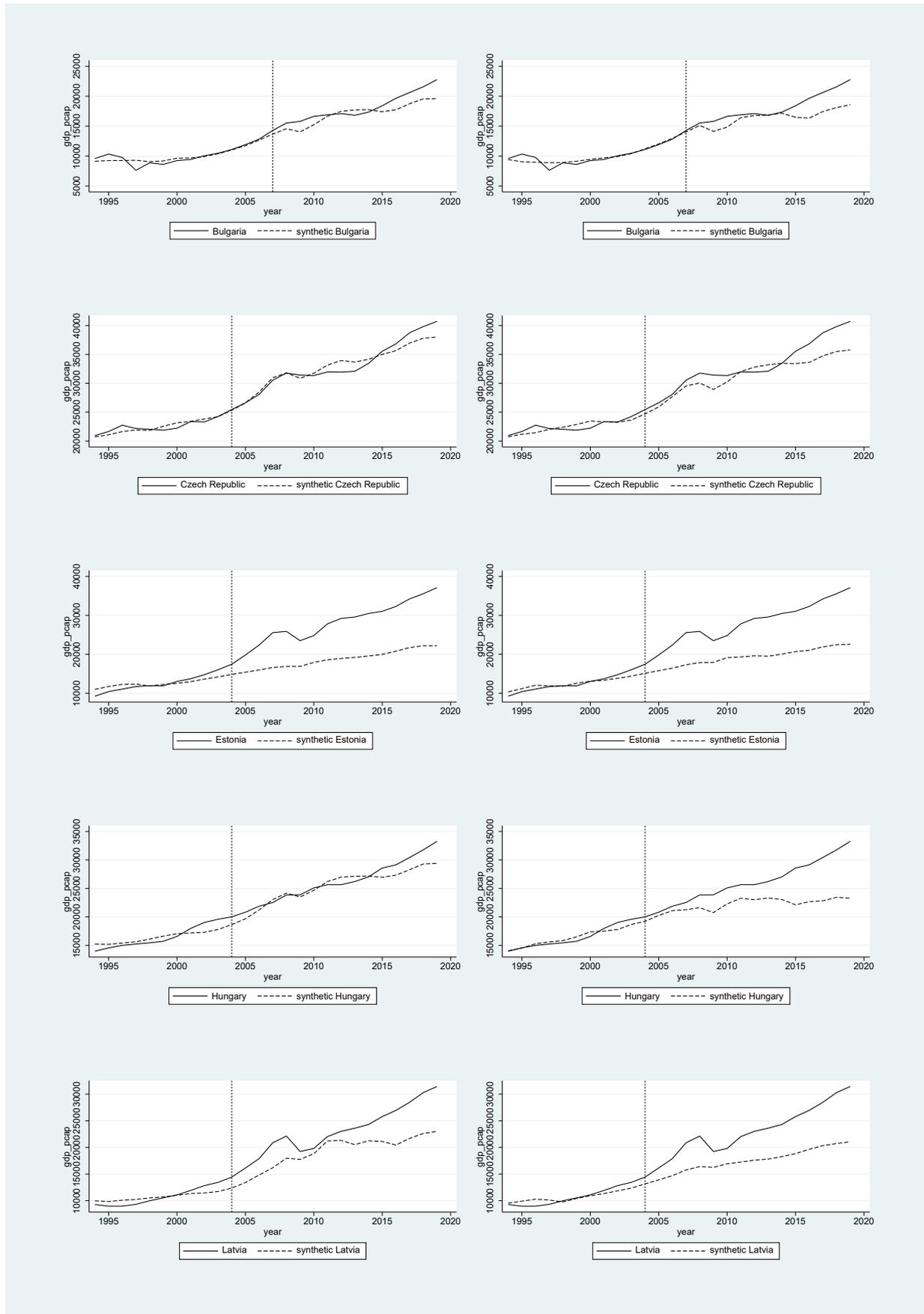
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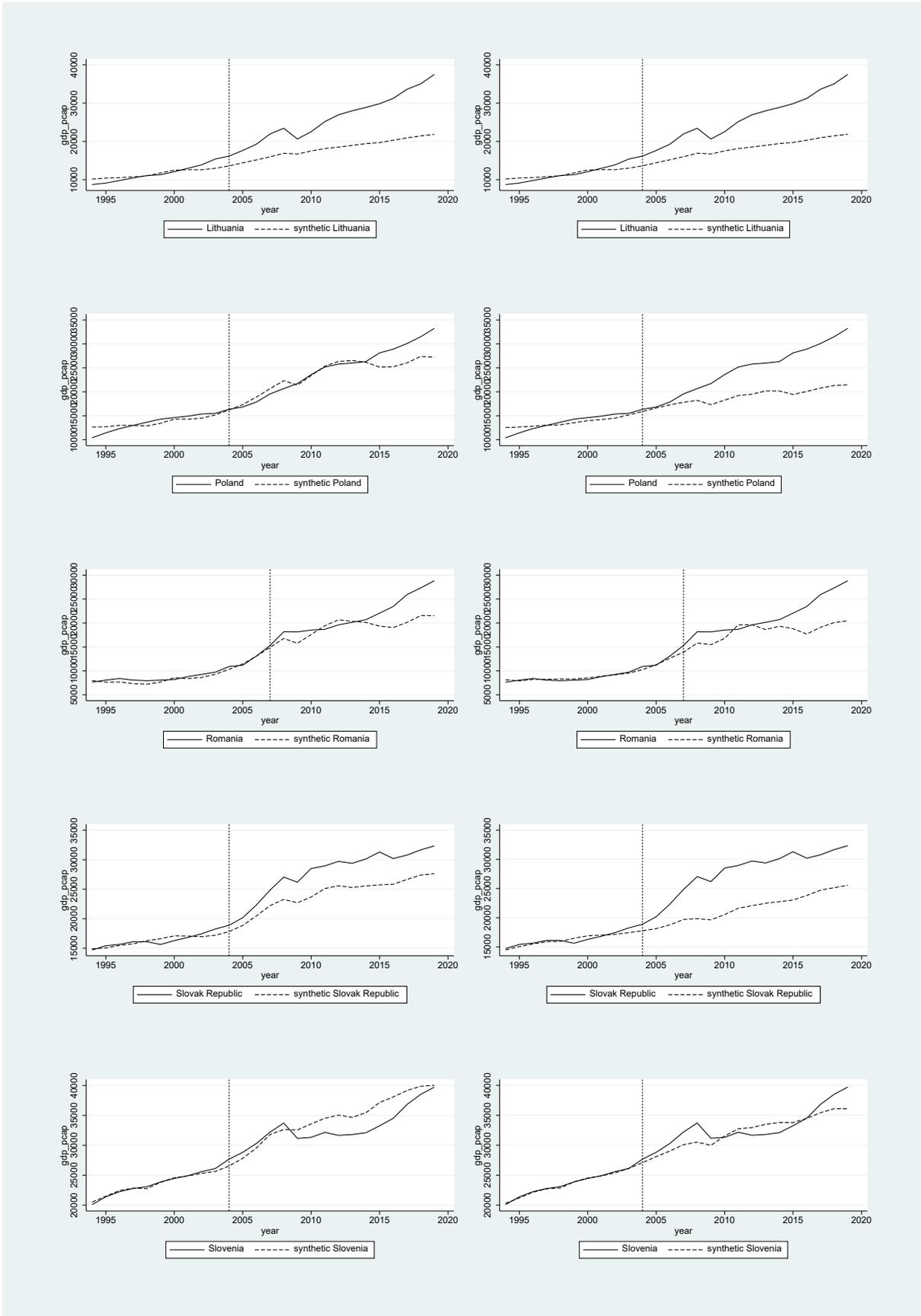
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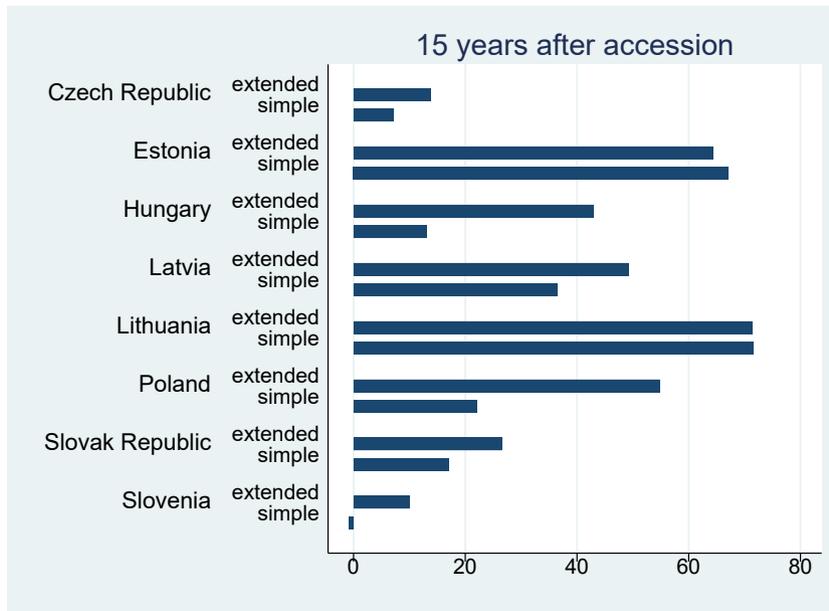




**Figure A1.** New Member States GDP per capita versus the counterfactual (simple model – left, extended model – right)



**Figure A2.** New Member States GDP per capita versus the counterfactual (continued, simple model – left, extended model – right)



**Figure A3.** New Member States GDP per capita versus the counterfactual 15 years after accession