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Economic integration and export complexity: the case of Slovakia

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ECONOMIC INTEGRATION AND EXPORT COMPLEXITY: THE CASE OF SLOVAKIA[1]

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Abstract

The goal of the article is to evaluate the impact of the European Union (EU) accession on the complexity of goods in Slovak exports. The traditional theories or trade (Ricardian and Heckscher-Ohlin models) show that such an engagement in economic integration may lead to specialization in the production of either more or less sophisticated goods, depending on the country's technological advancement and factor endowment. At the same time, increased FDI flows may stimulate the engagement of a country in international production chains with ambiguous effects on export complexity. Because it is impossible to a priori predict the effect economic integration may have on the complexity, it is reasonable to verify it empirically. The authors used the Synthetic Control Method (SCM) to compare the observed post-accession levels of exports complexity in Slovakia with the counterfactual values of that country remaining outside of the EU. The obtained results show that the accession led to an increase in complexity of exported goods.

KEYWORDS: economic integration, European Union, international trade, complexity, treatment effect, Synthetic Control Method

JEL CLASSIFICATION: C21, F14, F15

1. Introduction

The international trade theory has evolved in recent years and nowadays focuses on not only aggregate trade but also on myriads of detailed international exchange. One of those details is the composition of the export structure and one of the most intensively studied areas has become the level of complexity of exported goods. There are reasons to believe that countries which specialise in more complex goods grow and develop faster. Trade flows are influenced by many factors, but economic integration is one of the vital elements of creating an

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environment for the international flow of goods. In this paper we assess whether the EU accession has boosted Slovak exports complexity. In other words, we verify the null hypothesis that such a political and economic decision has had no effect on the sophistication of goods exported by Slovakia.

The structure of the paper is as follows. In the second section we present a literature review on export complexity. The third section describes current trends in Slovak export complexity. The fourth section presents the data and the method applied (the Synthetic Control Method – SCM). We describe the obtained results in the fifth section, while in the sixth section we discuss the possible impact of the euro adoption on export complexity. The last section concludes.

2. The Importance of Export Complexity – Literature Review

Economic complexity has been intensively investigated as the potential determinant of growth and development since the seminal paper by Hausmann, Hwang and Rodrik (2007). There are at least two ways complexity can be defined: as technological advancement of the exported goods (Lall, 2000) or as the array of components used in the production process (Hausmann, Hwang and Rodrik, 2007). Both definitions are correlated, since more technologically advanced processes typically necessitate more production stages and more input variety.

Economic complexity has been regarded as having an influence on the growth rate of income per capita. That impact may be especially visible in countries with liberalized trade and not overvalued currencies (Anand, Mishra and Spatafora, 2012). What is more, complexity of goods in exports is linked not only to dynamics of income but also to the level of GDP per capita, as proved by Hidalgo and Hausmann (2009).

The sophistication of exports can also be seen as shock absorber. Koren and Tenreyro (2013) claim that more complex goods can be resistant to supply side shocks. This is because diversification of inputs used in production: more complex products, with larger variety of inputs, depend less on each component. It is also worth mentioning that among a wide range of inputs most of them are substitutes, hence they can be easily replaced after a supply side shock.

The question that arises naturally is how to influence the export complexity. It is proved that such a trade feature depends on the competences available in the country (Hidalgo, and Hausmann, 2009). This means that both technological advancement and significant amount of human capital are needed in the production of complex goods (Anand, Mishra and Spatafora, 2012). It is also reasonable to assume that educational and R&D policies may be of great importance. At the same time, however, one should bear in mind that it is easier to acquire new comparative advantages that are close to the initial pattern of specialization (Hausmann and Klinger, 2007). Some competences are lacking in a particular country, but can be transferred across borders (Hidalgo and Hausmann, 2011). Such a process occurs e.g. within transnational corporations (Costinot, Oldensky and Rauch, 2009). The level of economic complexity also results from institutional quality that enables implementation of more sophisticated production processes (Costinot, 2009), country size, institutional quality and GDP per capita (Hausmann, Hwang and Rodrik. 2007).

Economic integration can influence FDI patterns (Antras and Foley, 2011), the institutional quality (Tang and Wei, 2006; Rodrik, Subramanian and Trebbi, 2002) and specialization patterns (according to country's comparative advantages). Each of those effects of integration may itself be a cause of the change in country's economic complexity. That is why it is worth analysing empirically whether integration leads to higher or lower sophistication of goods produced in a particular country. To the best of our knowledge, such an analysis has not been conducted and our research fills an important research gap. The unit that we chose to investigate thoroughly is Slovakia – a small open economy participating heavily in international production chains and being a member of the EU (since 2004) and the Eurozone (since 2009). The null hypothesis in our study was that the accession to the EU has no significant effect on economic complexity in Slovakia.

The country we chose has not been at the centre of the debate about the consequences of the EU membership. The literature devoted to the case of Slovakia is scant. Campos, Coricelli and Moretti (2014) used both, SCM and difference-in-differences estimator, to assess the impact of the EU accession on real GDP per capita and labour productivity in member states. According to the result, the economic integration was insignificant for those variables in the case of Slovak Republic. Žúdel and Melioris (2016) also used the SCM, but they were concentrated on the euro adoption. Their results suggest that the elimination of the national currency made Slovakia better off – in 2011 real GDP per capita was 10% higher than in the counterfactual scenario.

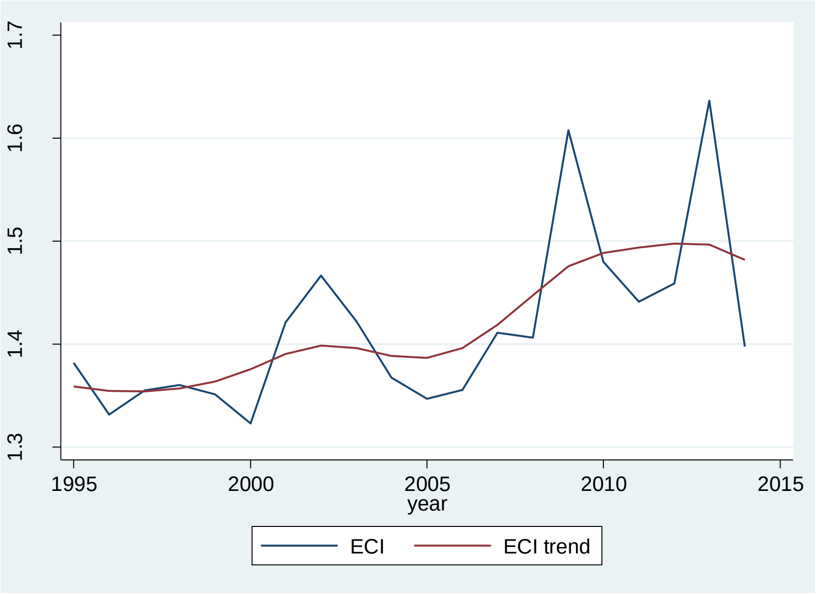
Trade consequences of the integration have become the topic of several papers that focused on the Eurozone membership. Cieślik, Michałek and Michałek (2013) utilized a probit model to assess the determinants of export decisions of firms from Slovakia and Slovenia. They found that the adoption of the euro increased the probability of engagement in export by analysed firms. Cieślik, Michałek and Mycielski (2014) used the panel model for a broad range of countries, including Slovakia. They obtained the results which indicate that the elimination of the national currency had no effects on bilateral trade between a new member and other countries belonging to the Eurozone. The same authors (Cieślik, Michałek and Mycielski, 2012) all presented other results for Slovakia and Slovenia. They applied panel data techniques (fixed effects, random effects and Hausman-Taylor estimators) and found no evidence of trade expansion after the euro adoption.

3. Export Complexity in Slovakia

We used the Economic Complexity Index (ECI) calculated by the Atlas of Economic Complexity (AEC) to describe the sophistication of Slovak exports. That measure resembles another complexity indicator, EXPY, introduced by Hausmann, Hwang and Rodrik (2007). The basic advantages of ECI are: (i) its coverage – it is calculated for 124 countries for a relatively long (1995-2014) period, (ii) its construction – for instance, product ubiquity is based on the number of countries with a comparative advantage in the production of that good and not on its share in world trade (as in EXPY).

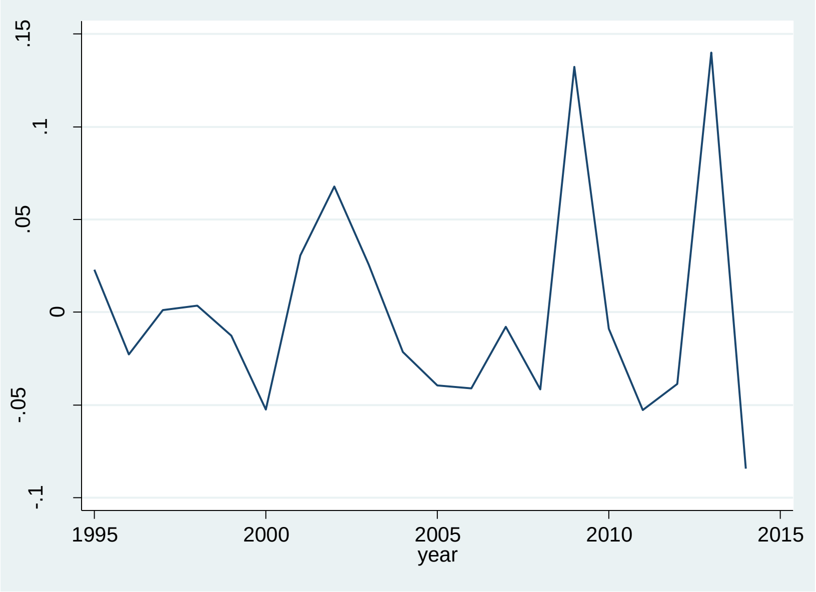
Slovak ECI achieved its lowest level in 2000 (1.323) and the highest (1.636) in 2013. As Figures 1 and 2 present, by decomposing the time series (using Hodrick-Prescott filter with usual parameters for yearly data) it is possible to obtain trend and cyclical component. It can be seen that Slovakia was characterized by general upward trend. However, that trend was interrupted and there were some sub-periods with the decrease in the value of the trend component of ECI (1995-1997, 2003-2005 and 2013-2014). The trend component achieved the highest level in 2012 (1.497). The cyclical component is the difference between actual values and trend. That gap was the highest in 2000 when ECI was 0.121 below the trend. It is worth observing that in 2013 ECI was of its maximum value, while at the same time the trend has started declining. Since the dataset ends in 2014, it is not clear whether is initiated the longer fall. In other words, it remains to be seen whether the decline observed since 2013 will be sustainable.

Figure 1. ECI and its trend – Slovakia, 1995-2014



Source: Authors' calculation

Figure 2. The cyclical component of ECI – Slovakia, 1995-2014



Source: Authors' calculation

Our timeframe may be split into two sub-periods – before and after the EU accession (see Table 1 and 2). One may notice that ECI (both the aggregate value and trend) was much more stable the pre-accession time. Since 2004, the ECI standard deviation has doubled (and the volatility of the trend has increased even more).

Table 1. ECI in Slovakia – descriptive statistics

Period	1995-2014 (the whole sample)	1995-2003 (before the EU accession)	2004-2014 (after the EU accession)
Mean	1.416	1.379	1.446
Standard deviation	0.084	0.048	0.097
Coefficient of variation	5.93%	3.47%	6.68%

Source: Authors' calculation

Table 2. The trend component of ECI in Slovakia – descriptive statistics

Period	1995-2014 (the whole sample)	1995-2003 (before the EU accession)	2004-2014 (after the EU accession)
Mean	1.416	1.372	1.452
Standard deviation	0.054	0.019	0.046
Coefficient of variation	3.82%	1.35%	3.17%

Source: Authors' calculation

The increase in ECI after the EU accession should not be treated as the indication that the single currency led to such a change. Much more scrutinized Much more scrutinised analysis is needed to assess the impact of that decision on exports complexity. Having that in mind, we utilised the SCM as the analytical tool.

4. Data and Methodology

4.1. The Description of the Data

In our research we focus on export complexity (measured with ECI) as the outcome variable. To avoid erratic cyclical effects, we focused on the ECI trend, which was obtained by smoothening the data with the standard annual Hodrick-Prescott filter.

We mainly utilised a set of covariates based on an influential paper by Hausmann, Hwang and Rodrik (2007). We have also introduced a more technical approach, using pre-treatment values of the outcome variable (ECI trend) as a covariate. Table 3 presents the full set.

Table 3. Set of covariates used in the research

Covariate	Source of data
Population	Penn World Table 9.0 (Feenstra, Inklaar, Timmer, 2015)
Real GDP per capita	
Human Capital Index	
Area	CEPII GeoDist Database (Mayer, Zignago, 2011)
Rule of Law Index	Worldwide Governance Indicators
Pre-treatment ECI (trend) values	Atlas of Economic Complexity

Source: Authors' elaboration

Since the research was conducted with the SCM approach, a proper set of covariates should withstand the conditions for that method. These were presented by Campos, Coricelli and Moretti (2014). Firstly, the covariates should determine the changes of outcome variable. In case of our data, that condition is proved true by Hausmann, Hwang and Rodrik (2007). Secondly, the covariates' capability of anticipating treatment should be minimal. Population and area were mostly resistant to treatment. Human Capital Index is mainly based on educational components, which were also highly independent from the treatment. Rule of Law Index might have been affected by Slovakia's pursuit to EU membership, however, social and political changes in Slovakia had a clear direction towards higher institutional quality since the systemic transformation, thus their trend should not be treated as a result of EU accession negotiations. GDP per capita is probably the most influenced by the expectations about EU membership, however it seems unwise to exclude such a major macroeconomic parameter from the fitting process.

Moreover, there are requirements towards the so called donor pool – a sample of countries used as reference points in the SCM approach (Campos, Coricelli and Moretti, 2014). Firstly, the countries in the donor pool should not be affected by the treatment – directly or indirectly. Secondly, the treated country should not be an outlier or an extreme case in comparison to the used countries. In other words, the donor pool should generate a sort of convex hull around the treatment country. Considering these, we chose 10 non-European countries (Australia, Canada, Chile, Israel, Japan, Korea, Mexico, New Zealand, Turkey, USA) and two European but non-EU member-states (Norway, Switzerland). The temporal scope of our research was 1995-2014 and it was limited by the ECI data availability.

4.2. Methodology

We implemented the SCM, which was developed by Abadie, Diamond and Hainmueller (2010) to model shock responses in panel data. It is restricted to continuous shocks (which means that once they occur, they remain unchanged for the rest of the sample period) specific for just one unit. This makes SCM suitable to evaluate the effects of a standing policy decision in a particular country. These restrictions are strong and make usage of SCM limited, however, in cases that meet the preconditions, SCM allows a very complex response to a shock and in fact it proves to be a generalised version of the difference in difference approach, which is often used for panel data estimations.

Let us assume, that we observe J+1 units (e.g. countries, enumerated from 0 to J) in T periods (e.g. years) and that unit zero (in our case - Slovakia) was a subject to some kind of treatment (e.g. political decision, such as EU accession) in period T_0. In such a case, units 1,…,J are the donor pool and the effects of treatment are observed for unit zero during periods T_0,…,T, while they remain unobserved in periods 0,…,T_0-1.

Now let Y_{it} be the observed variable (ECI in our research) which might have two outcomes:

- Y_{it}^N – neutral outcome, without the effect of treatment;
- Y_{it}^I – interfered outcome, which includes the effects of treatment.

Let D_{it} be a binary function and Δ_{it} be a difference of two potential outcomes for country i in period t. The initial conditions of our model could be summarised as follows:

(1) $i = 0,1, \dots , J \quad \wedge \quad t = 1,2, \dots , T_0, \dots , T$

(2) $Y_{it} = Y_{it}^N + \Delta_{it} D_{it}$

(3) $\Delta_{it} = Y_{it}^I - Y_{it}^N$

(4) $D_{it} = \begin{cases} 1 \; if \; i = 0 \; and \; t = T_0, \dots , T \\ 0 \; otherwise \end{cases}$

The idea behind SCM is that it is enough to estimate the neutral outcome after introducing treatment with a factor model based on pre-treatment data, while considering actual outcome values as interfered. Thus, Δ_{it} is the actual measure of the treatment effect.

The factor model for neutral outcome is generally composed as follows.

(5) $Y_{it}^N = \delta_t + Z_i \theta_t + \lambda_t \mu_i + \epsilon_{it}$

Such a shock response model considers:

- covariates (Z_i) with time-varying parameters (θ_t);
- an unobserved, common, time-varying factor (δ_t);
- heterogeneous responses to multiple unobserved factors ($\lambda_t \mu_i$);
- error term (ε_{it}).

Let us note, that should we consider λ_t constant, (5) becomes a standard equation for the difference in difference model, which proves that SCM is more general in its domain.

SCM uses pre-treatment information about outcome variable values and covariate characteristics of the treated country and the donor pool to create a synthetic counterfactual treated unit as a linear combination of the donor pool units. Since the donor pool is expected to form a convex hull of the treated country, we want the weights of the linear combination to be nonnegative and summing to 1 (Fremeth, Holburn and Richter, 2013).

Let us define a family of linear functions of the pre-treatment outcomes: Y_i^k, k=1,…,m. An ideal set of weights W* should be able to produce characteristics of treated country as linear combinations of characteristics of the donor pool countries and pre-treatment outcome functions for the treated country as linear combinations of analogous functions for the donor pool countries. Therefore W* should be expressed as:

$$(6) \quad W^* = \left(w_1^*, \dots, w_J^*\right): \ \sum_{i=1}^{J} w_i^* Z_i = Z_0 \quad \wedge \quad \forall_{k=1,\dots,m} \sum_{i=1}^{J} w_i^* Y_i^k = Y_0^k$$

With boundary condition:

$$(7) \quad w_1^*, \dots, w_J^* \geq 0 \quad \wedge \quad \sum_{i=1}^{J} w_i^* = 1$$

If finding W* that would meet all the restrictions in condition (6) was possible, we would obtain an approximately unbiased estimator of the Δ_{0t}:

$$(8) \quad \hat{\Delta}_{0t} = Y_{0t} - \sum_{i=1}^{J} w_i^* Y_{it}\,, \ \ t = T_0, \dots, T$$

In reality it is virtually impossible to find such a perfect set of weights. However, Abadie, Diamond and Hainmueller (2010) argue, that the demands towards W* can be weakened. It is enough to take a vector of characteristics of the treated country $X_0 = (Z_0, Y_0^1, \dots, Y_0^m)'$ and the matrix X_J of the analogous characteristics of the donor pool countries. Estimator (8) holds if we choose W* that, sustaining boundary condition (7), solves an optimization problem:

$$(9) \quad \widehat{W} = min\,||X_0 - X_J W||$$

Problem (9) uses the generalised idea of distance. To receive a more operational expression, we could state the optimization problem (9) with a quadratic form:

$$(10) \ \widehat{W} = min\{(X_0 - X_J W)' V (X_0 - X_J W)\}$$

V is a symmetric, positive, semi-definite matrix. It is interpreted as a measure of the relative importance of the characteristics included in the X_0 vector and X_J matrix (Campos, Coricelli and Moretti, 2014). Theoretically, the choice of V is arbitrary. Nevertheless, a standard approach suggests choosing V that minimises the mean squared error in the pre-treatment period.

5. Results

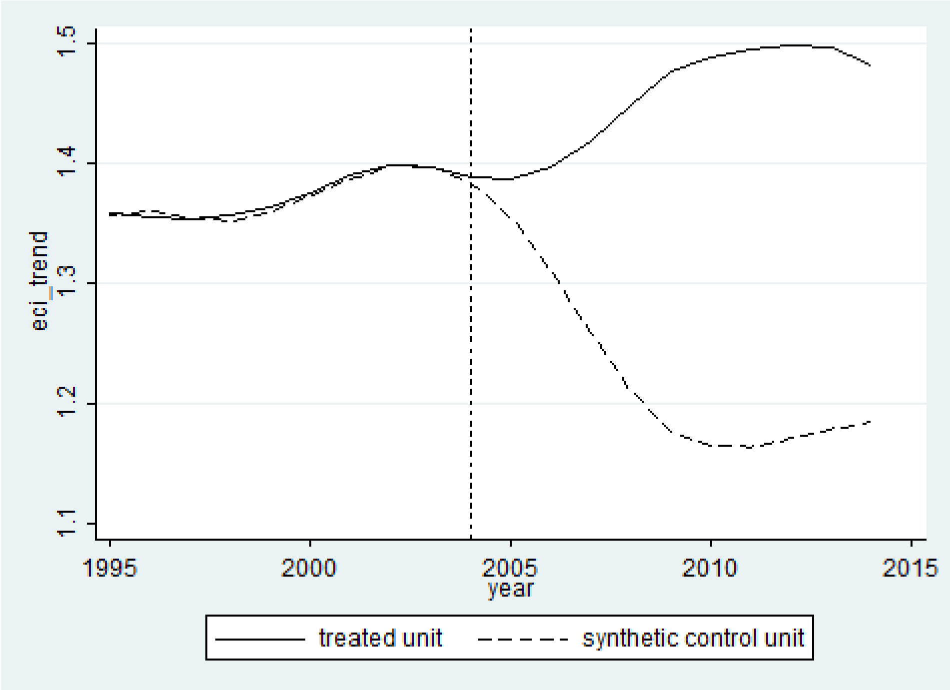
5.1. Basic Results

We applied SCM using ‘Synth’ package for STATA. As described in Section 4.1, our choice of covariates was inspired by Hausmann, Hwang and Rodrik (2007), who pointed crucial factors affecting complexity to be:

- natural/geographic potential (represented by area);
- size and quality of labour force (represented by population and the Human Capital Index);
- quality of institutional environment for business (represented by the Rule of Law Index);
- country’s level of development (represented by real GDP per capita as a basic measure of welfare).

In our basic estimation we have used those covariates. However, to increase the fit between synthetic and actual Slovakia before EU accession, we have also controlled for matching the outcome variable values in specific years of the pre-treatment period. Choosing too many pre-treatment outcome values in this procedure is said to cause a loss of statistical significance by other covariates. If these covariates are in fact important explanatory factors for the outcome variable (which is the observed case), the result might be a bias of the estimated counterfactual in the post-treatment period (Kaul, Klößner, Pfeifer, Schieler, 2016). On the other hand, using a full set of the pre-treatment outcome values should result in the best possible matching before the policy implementation. Therefore, we used both options to compare inferences. Figures 3 and 4 present the obtained results.

Figure 3. SCM results with EU accession as the treatment and pre-treatment covariates based on Hausmann, Hwang and Rodrik (2007)



Root Mean Squared Prediction Error (RMSPE): 0.0031524
RMSPE as a percentage of mean outcome value: 0.23%

Unit weights (only non-zero):

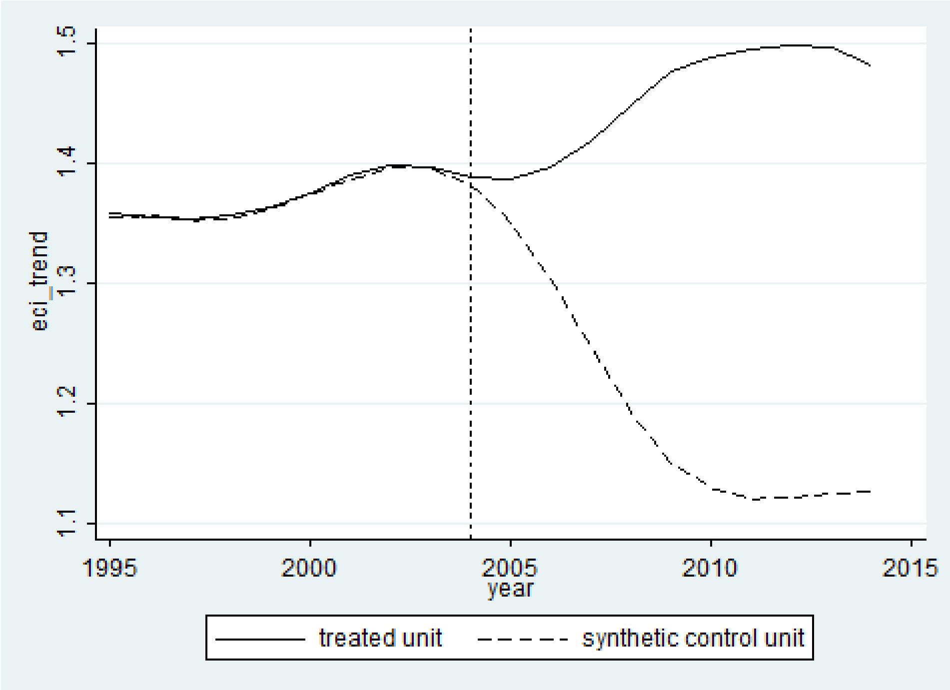
Unit	Weight
Australia	0.026
Chile	0.154
Japan	0.298
South Korea	0.049
Mexico	0.472

Predictor balance:

	Actual	Synthetic
Area (avg. 1995-2003)	10.80	13.73
Population (avg. 1995-2003)	5.38	90.12
GDP p.c. (avg. 1995-2003)	13546.65	20160.36
Human Capital Index (avg. 1995-2003)	3.27	2.79
Rule of Law Index (avg. 1995-2003)	0.22	0.39
ECI trend (1995)	1.36	1.36
ECI trend (1997)	1.35	1.35
ECI trend (2002)	1.40	1.40
ECI trend (2003)	1.40	1.40

Source: Authors' calculation

Figure 4. SCM results with EU accession as the treatment and pre-treatment values of outcome variable used as a covariate



Root Mean Squared Prediction Error (RMSPE): 0.0017393
RMSPE as a percentage of mean outcome value: 0.13%

Unit weights (only non-zero):

Unit	Weight
Australia	0.108
Japan	0.173
Mexico	0.553
USA	0.165

Predictor balance:

	Actual	Synthetic
ECI trend (1995)	1.36	1.35
ECI trend (1996)	1.35	1.36
ECI trend (1997)	1.35	1.35
ECI trend (1998)	1.36	1.35
ECI trend (1999)	1.36	1.36
ECI trend (2000)	1.38	1.37
ECI trend (2001)	1.39	1.39
ECI trend (2002)	1.40	1.40
ECI trend (2003)	1.40	1.40

Source: Authors' calculation

General results for both approaches are identical. The trend of ECI had a turn in 2002 and both estimations predict, that synthetic Slovakia maintains a downwards trend until 2010's, when the fall would stop. However, actual Slovakia underwent a rebound just after accessing

EU and its ECI strongly increased, reaching the level of near 1.5 (cyclical component excluded) at its maximum in 2012. It proves that entering EU facilitated Slovakia's economic development and transition of its export profile to a bundle of more complex goods. The effect was strong enough to cause a change of existing trend. What is more, the induced growth of ECI was not even stopped by the outbreak of the world financial crisis, though, one can observe a slowdown starting in 2009.

As predicted, estimation with full pre-treatment ECI values probably leads to a minor bias, since, even though the results are very close to the Hausmann, Hwang and Rodrik (2007) variant, the decline of synthetic ECI is deeper and slightly longer. Moreover, the downturn was followed by stabilisation of ECI on relatively low levels in 2010's, while in the estimation based on Hausmann, Hwang and Rodrik (2007) the rebound brings a rise of synthetic ECI value to almost 1.2. Furthermore, SCM procedure with a full set of pre-treatment ECI values as covariates resulted with smaller prediction errors and generally better fit in the pre-treatment sub-period.

The basic estimation, presented on Figure 3, was also characterised by low RMSPE, however, not all of the covariates were well represented. It is especially worth noticing that synthetic Slovakia was more heavily populated and had significantly higher GDP per capita. These misfits were probably caused by the fact, that Slovakia is a rather small country and, in fact, for most donor pools consisting of countries with available data on economic complexity it would be an outlier in that aspect.

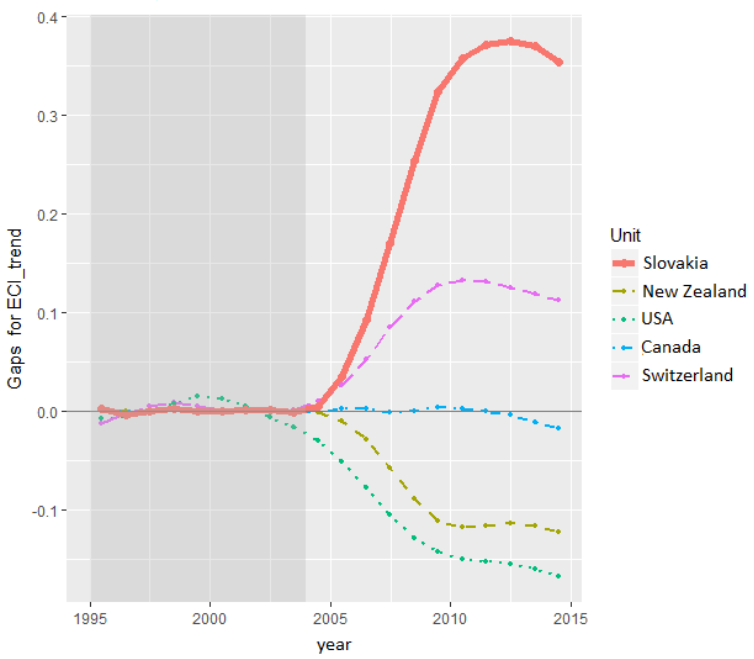
SCM allows to observe that EU accession enabled Slovakia to stimulate its export's complexity. Unfortunately, the procedure does not explain the mechanism behind such a development. It could only be reasonably speculated, that ECI might have grown thanks to EU funds being used to finance numerous enterprises, with emphasis on innovative solutions, which are associated with more complex goods. Another reason could be an increased access to the markets of Western Europe, which meant more sophisticated demand and greater interest in more advanced, more complex goods.

5.2. Robustness

In order to check the robustness of obtained results we used the placebo test described by Abadie, Diamond and Hainmueller (2010). That method applies SCM to every unit that belongs to the donor pool. Such a procedure resembles a permutation test. The treated unit (Slovakia) must be excluded from the donor pool and the remaining units form a new donor pool that is used in the way that each unit is seen as if the intervention occurred. The null hypothesis, that the intervention had no effect, is verified by the examination of the differences between outcome and synthetic values. In our study the null hypothesis indicates that the EU accession had no impact on the complexity of exports in Slovakia. If the gaps between estimated treatment effects and placebo effects were small, that hypothesis would be proved right.

The results of the placebo test are presented on Figure 5. Red bold line shows ECI (HP-filtered) gaps for Slovakia, while the other lines reflect the gaps for placebo units. MSCMT package in R, described in detail by Becker and Klößner (2017), was used to conduct the placebo test. We included only those placebo units that had a relatively good fit in years 1995-2003 by exclusion of those control units that had pre-treatment RMSPE of more than 10 times the Slovak pre-treatment RMSPE.

Figure 5. Placebo test results for the EU accession effects on Slovak ECI



Source: Authors’ calculation

As Figure 5 illustrates, the gaps for Slovakia stood out significantly – they were different from the gaps for placebo units. The only other placebo unit with positive gaps was Switzerland, but those gaps were much smaller. Other placebo units had rather negative gaps (gaps for Canada were close to zero for the majority of the post-2004 timeframe, but at the end of post-treatment period they became negative). The results of the placebo test indicate that the positive impact of the EU accession on Slovak ECI was robust.

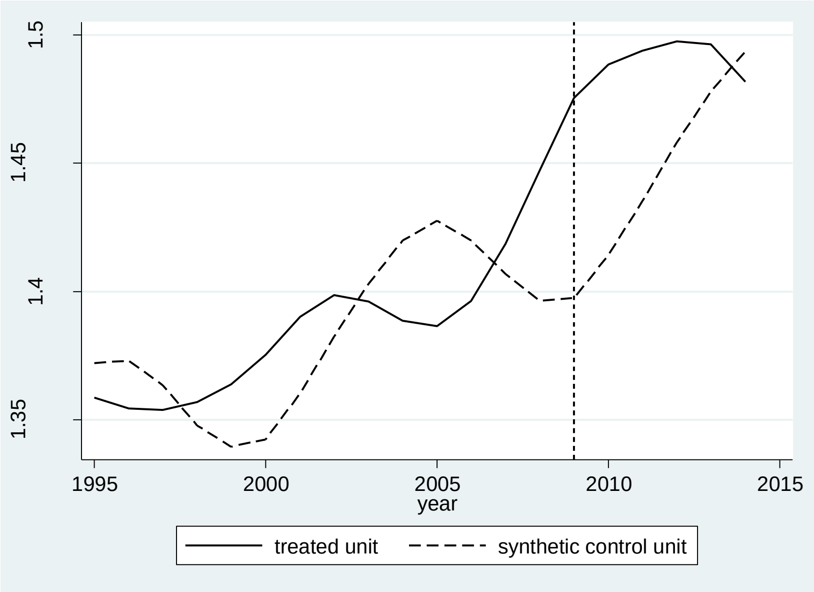
6. The euro effect

The monetary integration and the formation of a currency area may be seen as a more advanced form of economic integration with significant trade consequences. Lack of conversion costs should translate into higher price transparency, while lack of exchange rate risk should lead to higher price predictability. The ultimate result should be an increase in trade between integrating countries. Many studies confirm that the formation of the Eurozone has led to expansion of trade between member countries (Micco, Ordoñez and Stein, 2003; De Nardis and Vicarelli, 2003; Santos Silva and Tenreyro, 2006; Berger and Nitsch, 2008; Glick and Rose, 2016), although the so called euro trade effect is seen as not as big as it was expected to be[2].

Intuitively, the euro adoption should affect not only aggregate trade, but also export complexity. That is because such a process strengthens the mechanism through which trade liberalization (or, broadly, economic integration) affects sophistication of goods in exports. However, the empirical analysis for Slovakia is problematic. Slovakia entered the Eurozone in 2009, but after more than 3 years of engagement in European Rate Mechanism II (ERM II). That is why strong anticipation effects may be observed and the application of SCM would lead to doubtful results. Figures 6 and 7 are the illustration of that problem. It should also be added that it is hard to achieve a good fit for the pre-euro period in Slovakia even when all pre-treatment outcome variables are used as covariates.

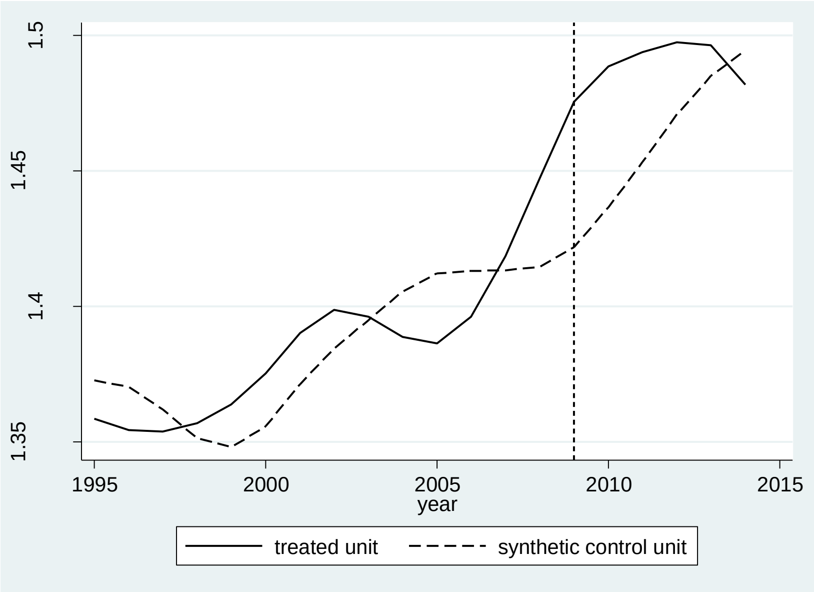
[2] Rose (2000) estimated that currency areas (those that existed before the formation of the eurozone) increase trade between member countries by 200%, an order of magnitude much higher than it later occurred after the introduction of the euro.

Figure 6. SCM results with euro adoption as the treatment and pre-treatment covariates based on Hausmann, Hwang and Rodrik (2007)



Source: Authors' calculation

Figure 7. SCM results with euro adoption as the treatment and pre-treatment values of outcome variable used as a covariate



Source: Authors' calculation

Žúdel and Melioris (2016) suggest that Slovakia joined ERM II unexpectedly in November, 2015, since the next trading day was characterized by strong appreciation of the domestic currency. That is why it is reasonable to change the year of treatment (euro adoption) from 2009 to 2005 or, better, 2006. However, since Slovakia entered the EU in 2004, it would mean that two important processes (EU entry and euro adoption) strongly overlap and it would be hard to disentangle the impact each of them has on the export complexity.

At the same time, we think of the euro adoption as of a factor that at least did not help Slovakia boost its export sophistication (or even diminished it). The gaps between outcome and synthetic values were increasing after Slovakia has become the EU member and before the elimination of national currency. After the euro adoption those gaps have stabilised. It may be due to the composition of Slovakian exports and peculiar circumstances (global financial crisis). Slovakia is strongly dependent on exports of vehicles and car equipment – those goods are seen as postponable, since after the income shock customers may cease to buy them, postponing purchases. Slovakia entered the Eurozone in times of significant financial turbulences and its heavy dependence on automotive industry without the possibility to depreciate the currency meant that this relatively sophisticated sector shrunk.

7. Summary and Conclusion

The aim of the article was to assess the effects of the EU accession on the complexity of Slovak exports. The research utilized SCM, which enabled us to build a counterfactual scenario in which Slovakia had not entered the EU. As the results indicate, Slovak export complexity has been much higher since the accession, when one compares it with the counterfactual synthetic values. We also found that the euro adoption might have some influence on export sophistication in Slovakia. However, due to the fact that both EU accession and entry into the Eurozone significantly overlap, we urge the readers to remain careful when drawing conclusions.

We also want to highlight that our results show only the magnitude of the effect of the EU membership on export complexity without pointing any mechanism generating it. The question whether economic integration led to higher export complexity in Slovakia through specialization, change in FDI patterns, technological upgrading or any other channel is still open and may be both interesting and important area of future research.

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