

Trade, institutions and export specialization

K. Crabbé, M. Beine H. and Vandebussche

Catholic University Leuven

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Abstract

Traditional and new trade theories predict increasing specialization in exports as tariffs are reduced. This paper investigates the empirical link between trade integration, institutions and export specialization. We study the evolution of export specialization in thirteen Central European countries over the period 1989-2000 as a result of decreasing tariffs and institutional reforms. Our results indicate that a reduction in tariffs between EU15 and Central Europe results in increased export specialization in Central Europe. In addition to trade integration, our results show that institutional reforms and in particular enterprise reforms speed up export specialization significantly.

Keywords: trade integration, tariffs, herfindahl index, exports, institutions

JEL classification: F14, F15, R12

address for correspondence:

Karen Crabbé, Catholic University of Leuven, Naamsestraat 69, 3000 Leuven, Ph:

+ 32 (0) 16 32 69 35, F: + 32 (0) 16 32 67 32

email: karen.crabbe@econ.kuleuven.be

1 Introduction

The new economic geography theory described by Krugman (2000) suggests that trade integration leads to agglomeration and specialization of economic activities. Krugman (2000) suggests that adverse sectorial shocks in major fields of activity might exert major economic consequences in terms of aggregate activity, employment and workers' displacement. In other words, the evolution of economic specialization is an important macroeconomic issue since the degree of specialization reflects the exposure of the country (or the region) to important external sectorial shocks.

The process of trade integration between the European union and Central and East European countries (CEECs) during the nineties offers us an unique opportunity to analyze the relationship between trade integration and export specialization. In addition, a growing literature emphasizes the importance of appropriate domestic institutions and policies ((Acemoglu et al. 2005a), (Golub et al. 2006) and (Dollar & Kraay 2003)). Countries with market-friendly policies and strong institutions have stronger economic performances. Therefore, the impact of institutional reforms on export specialization in Central Europe will be studied in this paper as well.

This paper will extend the literature in several ways. In previous studies on trade integration mostly a linear time trend was used to capture the integration process like in (a.o. Hildebrandt & Wörz (2004), Traistaru et al. (2003)). Trefler (2004) and Beine & Coulombe (2007) instead use changes in tariffs to capture trade integration between two industrialized countries, Canada and the United States. We follow this approach when studying trade integration between 13 former transition countries and the EU during the period 1989-2000¹. In addition, the impact of two major institutional reforms on export specialization in these Central European countries will be investigated: enterprise reforms and competition policy reforms. These variables are

¹Poland, Hungary, Czech Republic, Slovenia, Slovakia, Malta, Cyprus, Estonia, Latvia, Lithuania, Bulgaria, Romania and Turkey

measured by indices to capture reforms in legislation, institutions and enforcement. Enterprise reforms indicates to what extent a country has implemented appropriate credit and subsidy policies and bankruptcy legislation, while competition policy reforms measures whether actions are taken to reduce abuse of market power and reduce entry restrictions to most markets. Furthermore, specialization in exports will be measured by a herfindahl index of export specialization as in most studies on industrial specialization. Using a dynamic panel model, we are able to disentangle the effect of changes in tariffs with the EU15 on changes in export specialization in Central Europe in the long- and short-run. This is important because a shock in tariffs can not be expected to have the same immediate and long-run effects.

Our results lead us to conclude that EU15-tariff reductions resulted in significantly more long-run export specialization in Central Europe. Also we find institutional reforms to be highly significant in speeding up export specialization. Although specialization makes countries more vulnerable to the effect of shocks, the effect depends on which sector the country is specialized in (Amable 2000).

The paper is organized as follows. Section 2 reviews the related literature on the relationship between trade integration, institutions and export specialization and section 3 shows some stylized facts. Section 4 explains the methodology, while section 5 describes the data. Section 6 discusses the benchmark results and robustness checks. Finally, section 8 discusses the results and section 9 briefly concludes.

2 Related Literature

2.1 Trade Integration and Export Specialization

Traditional trade theories predict a negative relationship between trade costs and specialization. More particular, trade liberalization has been shown to result in increasing specialization in sectors where a country has a comparative advantage because of differences in technology or factor endowments. On the other hand,

the new economic geography literature focuses on geography and agglomeration as driving forces of specialization patterns. Forces that drive agglomeration are called centripetal forces and use forward and backward linkages. A forward linkage or cost linkage is at stake when firms want to be located close to firms supplying intermediate goods to reduce their production costs. The presence of firms using intermediate goods raises sales of intermediate goods suppliers, this is the backward linkage or demand linkage (De Bruyne 2004). Forces in the opposite direction of agglomeration, dispersion of activities, are centrifugal forces such as factor and product market competition. A region with many firms will have high labor demand and high wages (factor market competition). In addition, this region will have to divide local demand between many firms (product market competition) (Baldwin et al. 1999). Using a model with only geography and agglomeration and no traditional differences in endowments, Baldwin et al. (1999) find that this model predicts increasing regional specialization as trade costs are reduced.

On the empirical side, economists provide evidence of increasing specialization in Western Europe ((Amiti 1999), (Brulhart 1998)) and Central and East Europe. Traistaru et al. (2003) came to the conclusion that economic integration leads to higher regional specialization in 5 Eastern European countries² during the period 1990-1999. Similarly, the study by Hildebrandt & Wörz (2004) shows for 8 Central and East European countries³ greater industrial specialization during the period 1993-2000. One drawback of these studies is usually that economic integration is captured merely by a time trend assuming that trade integration is a linear process. In contrast, Treffer (2004) and Beine & Coulombe (2007) measure trade policy by tariffs. Treffer (2004) provides evidence that a free trade agreement (FTA) between the US and Canada leads to trade creation, increased labor productivity, but reduced employment for manufacturing workers in Canada. Beine & Coulombe (2007) suggest that trade liberalization between Canadian regions and the US resulted in

²Bulgaria, Romania, Hungary, Estonia and Slovenia

³Czech Republic, Estonia, Hungary, Latvia, Lithuania, Poland, Slovak Republic and Slovenia

more regional export specialization for Canada in the short-run, but less regional export specialization in the long-run. The authors show that trade liberalization leads to specialization of activities in a region in the short-run, but better access to suppliers and customers or positive spillovers may trigger other industries to locate in the involved region and induce diversification of economic activities.

While Treffer (2004) and Beine & Coulombe (2007) studied export specialization between two industrialized countries, this paper will apply their method to the trade integration process between the EU15 and 13 transition countries⁴. Therefore, we will also take into account other elements from this transition process such as institutional reforms.

2.2 Institutional Reforms and Export Specialization

In addition to the literature on trade integration, there is a growing literature on the importance of institutions for trade. For example, Acemoglu et al. (2005b) show that Western countries with better access to the Atlantic and Atlantic ports had higher growth rates than Eastern European countries. Moreover, they suggest that countries with stronger political institutions, property rights and economic institutions traded more and spurred economic growth. In a more general framework, Acemoglu et al. (2005a) explain that economic institutions shape and stimulate incentives of economic actors to invest, to innovate or organize production. Therefore institutions determine the economic outcome of a country and countries with stronger economic institutions will have a higher growth rate. On the other hand, Dollar & Kraay (2003) argue that trade and institutions have an impact on growth on the long run, but institutions do not matter for growth in the short run. In contrast, Francois & Manchin (2007) find that basic infrastructure and institutional quality matter more than tariffs for exports. Similar, Jansen & Nordas (2004) suggest that countries with better institutions trade more.

⁴Poland, Hungary, Czech Republic, Slovenia, Slovakia, Malta, Cyprus, Estonia, Latvia, Lithuania, Bulgaria, Romania and Turkey

We will study the empirical relation between institutional reforms and export specialization in Central Europe using two measures of institutional reforms: governance and enterprise reforms and competition policy reforms. This has to our knowledge not been addressed in the literature before.

3 Stylized Facts

In this section, we document the trends of the main variables from our regression analysis in section 4.

3.1 Trade Integration

The fall of the Berlin wall in November 1989 gave rise to the transition from a plan-economy to a market-economy in Central and East European countries (CEECs). This process broke down the artificial trading relationships amongst Central European countries. Since trade amongst CEECs accounted for 50 percent of their total export before transition, this collapse is known as one of the primary causes of the output fall. For these countries the key to recovery was the ability to reorient their trade structure to Western countries. Rodrik (1992) observes that export growth to the EU expanded over the period 1990-1996. According to Repkine & Walsh (1999) some products already traded with Western Europe before transition, while other products were sold only into the Soviet Union. These pre-transition EU-products made an easy transition to private ownership and efficient structures. On average the EU15 was the main trading partner of Central Europe during the period 1989-2000 as shown in Figure 1.

Not only directed the CEECs their exports more towards the European Union, but also the European Union allowed tariffs to decrease gradually during that period. Moreover, Rodrik (1992) observes that average tariffs were already low before 1989 relative to countries at similar levels of development. Figure 2 plots the average

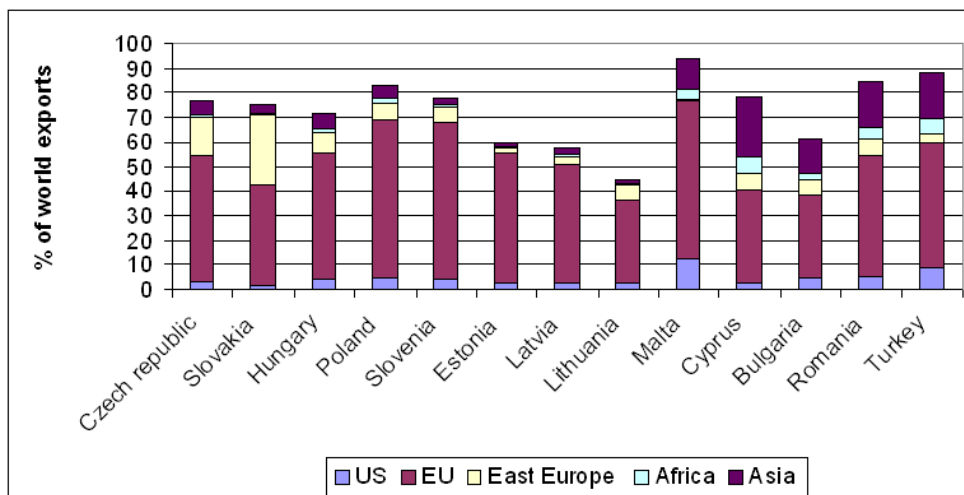


Figure 1: Average export share of the 5 largest trading partners of CEECs (%), 1989-2000

Source: UN (1993, 1997, 2002)

unweighted tariff of the EU15 over time. The average tariff shows two major drops in time, 1994 and 1997.

By 1994 most countries⁵ had signed a Europe agreement with the EU15 which was a bilateral agreement to decrease tariffs. These agreements might explain the first large drop in tariffs in 1994 as illustrated in Figure 2. The second large tariff drop occurred between 1996-1997 and could be explained by the official start of the enlargement process in 1997-1998 when Central Europe adopted the European legislation. One of the chapters of this legislation deals with free movement of goods and establishing a free trade area with the EU15. In May 2004, 10 countries became a EU-member⁶, followed by Bulgaria and Romania in January 2007.

⁵Poland and Hungary were the first to sign the Europe agreement in 1991, Czech Republic, Bulgaria, Romania and Slovakia followed in 1993, Estonia, Latvia and Lithuania signed their Europe agreement in 1995 and finally in 1996 Slovenia signed the Europe agreement. Turkey, Malta and Cyprus signed the association agreement already in 1963, 1970 and 1972 respectively

⁶Cyprus, Malta, Slovakia, Slovenia, Poland, Czech Republic, Hungary, Estonia, Latvia and Lithuania

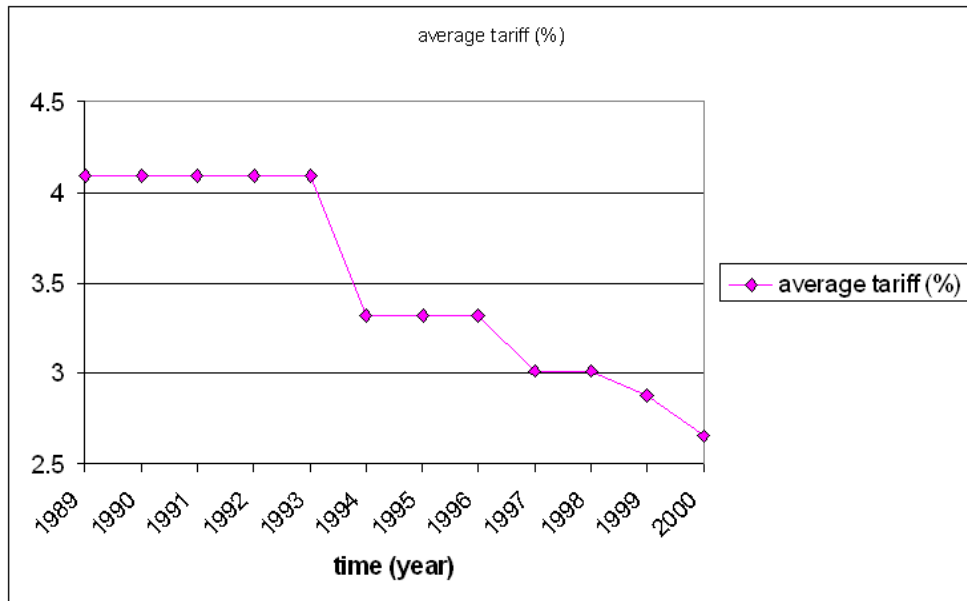


Figure 2: Trade liberalization (%)

3.2 Institutional Reform

During the nineties, Central Europe made considerable reforms in institutions and policies. Due to data availability, we use two measures for institutional reforms, enterprise reforms and competition policy reforms, to verify to what extent institutional reforms in addition to trade integration matter for export specialization. Figure 3 suggests that during the period of our analysis, both types of institutional reforms show a clear positive trend. But we also observe that for the whole period, enterprise reforms were stronger than competition policy reforms and in addition the variable enterprise reforms shows more variation than competition policy reforms.

3.3 Export Specialization

In Figure 4 we show the evolution of the average export specialization for the 13 Central European countries over time. We measure export specialization by an herfindahl index on exports which will be explained in more detail in section 5.

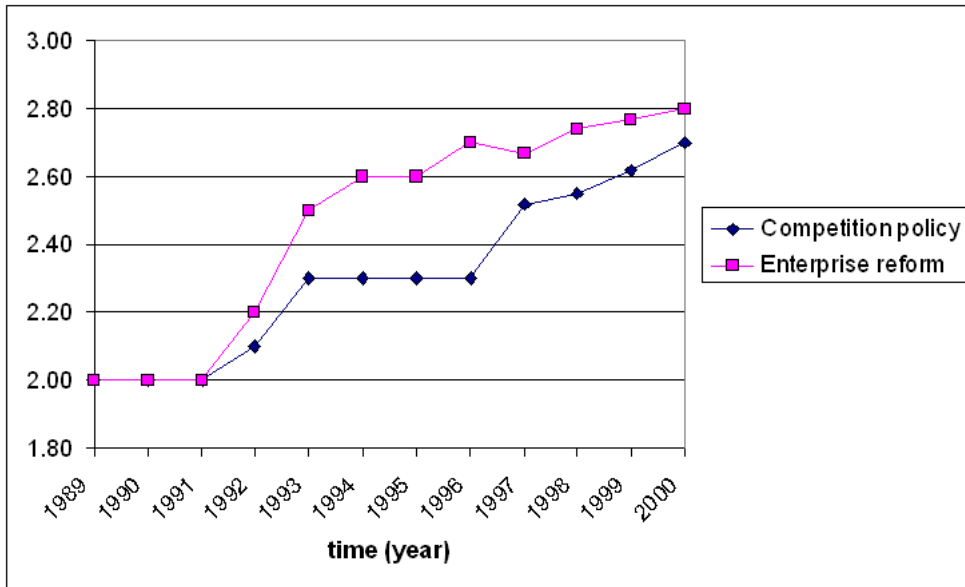


Figure 3: Average institutional reforms for all CEECs

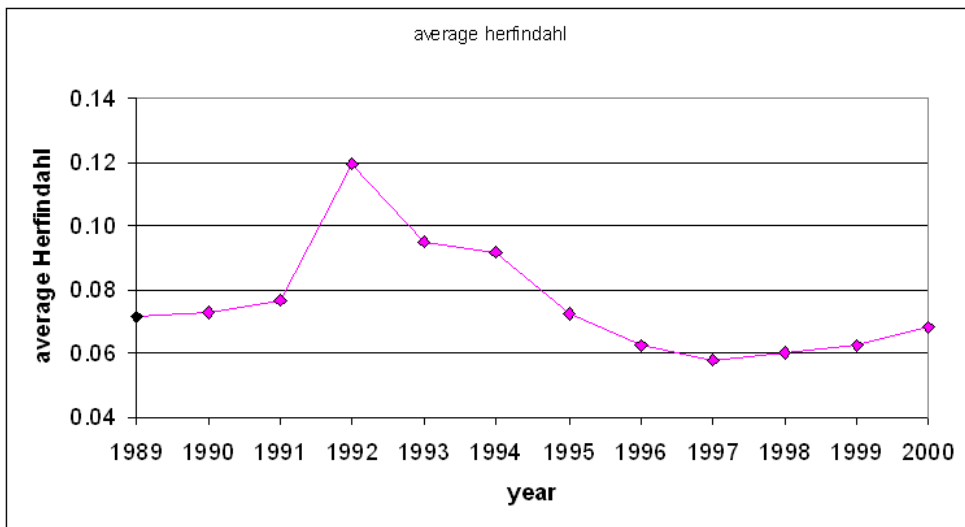


Figure 4: Average export specialization for all CEECs

Data for Estonia, Latvia, Lithuania and Slovenia is only available from 1992 onwards. Data for Slovakia is available since 1993.

The index lies between 0 and 1. The interpretation is as follows: a higher value of the index refers to more export specialization, whereas a herfindahl index closer to zero points out more export diversification. Figure 4 seems to indicate that export specialization is not a monotonic process. The figure illustrates that in the early nineties average export specialization increased sharply, probably because countries started to exploit their natural resources after transition. After 1992, export specialization decreases which could indicate that the CEECs started exporting in more and new sectors. While after 1997, export specialization increases again, suggesting that the number of sectors the countries are exporting in, went down.

4 Methodology

In order to investigate the relationship between trade integration and export specialization, we build on the approach proposed by Beine & Coulombe (2007) which relies on the estimation of a dynamic panel model:

$$\Delta \log(\text{Exp spec}_{i,t}) = \alpha_i + \delta_t + \phi_1 \log(\text{Exp spec}_{i,t-1}) + \phi_2 \log(\text{tariff}_{j,t-1}) \quad (1)$$

$$+ \phi_3 \Delta \log(\text{tariff}_{j,t}) + \phi_4 I_{i,t} + \phi_5' Z_{i,t} + \epsilon_{i,t} \quad (2)$$

where i is a Central or East European country in a certain year t . $\text{Exp spec}_{i,t}$ is export specialization measured by a Herfindahl based on annual sectoral trade flows from Central Europe to the EU15. Country fixed effects, α_i , control for unobserved country-specific effects and δ_t are time dummies controlling for a common shock. $\text{Tariff}_{j,t}$ are the tariffs from the EU15 (j) on exports from a Central and Eastern European country i . This measure is based on sectoral tariffs and aggregated to the country level. $I_{i,t}$ captures the level of a country's institutional reforms, $Z_{i,t}$ is a vector of other control variables such as business cycles and $\epsilon_{i,t}$ is an error term. The definition of the variables will be clarified in more detail in section 5.

This model is estimated with OLS⁷ and Newey-West robust standard errors of parameter estimates to take into account serial correlation and heteroscedasticity. The dynamic feature of the model is important because it disentangles the short-run from the long-run effects of trade integration. The short-run is captured by ϕ_3 while the long run is given by $-\frac{\phi_2}{\phi_1}$. The decomposition of the effect of trade integration between a short- and a long-run component is important since a shock in tariffs can have an immediate effect, but export adjustments in response to a shock in tariffs will also show up after some time.

5 Data

In equation (1) the degree of export specialization (Exp spec.) is a function of trade weighted tariffs (tariff), institutional reforms (I) and other control variables (Z), business cycles and alternatives for the tariff variable. This section gives an overview of the data and variables.

5.1 Export Specialization

A common measure for export specialization in the literature is the herfindahl index on exports (Sapir 1996)⁸. The evolution of the herfindahl index of export specialization might reveal to what extent a given country is becoming more specialized or diversified, regardless of how the economic structures of other countries are evolving.

⁷GMM is not used since the time series are too short to instrument the variables by 2 or more lags.

⁸We investigate here the degree of the so-called absolute specialization, i.e. the extent to what a given country or region is specialized in a limited number of activities. This concept of specialization directly relates to the concept of risk exposure. This contrast with relative specialization which measures to what extent the export or production structure differs from those of the other (contingent) countries or regions. The latter notion of specialization is often measured by the K-spec index and might be used as an indicator of heterogeneity of export or production structures within a given geographical area.

The herfindahl is computed for each country i and each year t as the sum of squared export shares over all industries within one country.

$$Exp. spec._{i,t} = \sum_{k=1}^J (s_{i,t}^k)^2 \quad (3)$$

$$where s_{i,t}^k = exports_{i,t}^k / \sum_{k=1}^J exports_{i,t}^k$$

A higher index indicates that the country exports in a smaller range of sectors and hence is more specialized. To construct the herfindahl indices, yearly export flows from 13 individual countries of Central and East Europe to the European Union on the 8-digit HS classification⁹ product level were collected from *Eurostat*¹⁰ for the period 1989-2000¹¹¹². Using a correspondence key, the data was translated to the 4-digit NACE industry level¹³ (250 sectors). Note that we study only trade flows to and tariffs from the EU15 since they are the main trading partner of the CEECs as illustrated in Figure 1.

5.2 Trade Integration

In contrast to previous studies on trade integration, we will not use time dummies, but rather tariffs to measure trade integration. We use yearly tariffs of the EU15 on the HS 8-digit product level from the *Haveman database*. These data are available from 1989 until 2000. Only the preferential rates of a product for the individual Central and East European countries was used but when this was not available, we used the MFN (most favored nations) rates. Not all tariffs were available for all years and all products¹⁴, therefore we replaced the missing tariff at time t with the

⁹The Harmonized system (HS) is a classification system we use at the 8-digit product level

¹⁰The Eurostat trade statistics is a high quality database containing annual data on trade flows to and from Central and East European countries.

¹¹For Estonia, Latvia, Lithuania and Slovenia data was available from 1992 onwards and for Slovakia from 1993 onwards.

¹²Note that we collected trade data for all sectors, not only the manufacturing sector

¹³NACE is a European classification system.

¹⁴Only the years 1996, 1998, 1999 and 2000 were available for most products.

tariff value at $t + 1$ ¹⁵.

The sectoral tariffs τ^k of the EU15 on exports from Central and East European countries are aggregated to the country level using the export share of the industry in total export as weights w_i^k :

$$tariff_{ji,t} = \sum_{k=1}^J w_{i,t}^k \tau_t^k \quad (4)$$

with weight $w_i^k = exports_k^i / \sum_{k=1}^J exports_k^i$

In section 6 regression results using different weights will be illustrated to test the robustness of the trade weighted tariff measure. Furthermore, two alternative measures for tariffs are used: trade liberalization and price liberalization. These variables from the EBRD reports¹⁶ indicate to what extent a country has price or export restrictions (see appendix 11).

5.3 Institutional reforms

The transition process implied a drastic institutional change in Central Europe. Since Acemoglu et al. (2005a) suggest a causal relation between institutions and economic performance, institutional reforms will be our third variable of interest. Data were collected from the *EBRD* on 2 indicators of institutional reforms: enterprise reforms and competition policy reforms. These transition indicators reflect the judgement of the EBRD about country-specific progress in enterprise and competition policy reforms. Each country gets a score between 1 and 4.33 where 1 represents little or no change from a centrally planned market and 4.33 indicates that the standards of an industrialized market economy are implemented. The scores are based on the classification system in Table 1.

¹⁵Estimations where we replaced the missing tariff at time t with the tariff value of time $t - 1$ did not change results

¹⁶not available for Malta, Cyprus and Turkey

Table 1: Institutional reforms

score	enterprise reforms
1	if there are soft budget constraints (lax credit and subsidy policies weakening financial discipline at the enterprise level) and few other reforms are made to promote corporate governance.
2	if there is a moderately tight credit and subsidy policy, but weak enforcement of bankruptcy legislation and little action taken to strengthen competition and corporate governance.
3	if significant and sustained actions are taken to harden budget constraints (tight credit and subsidy policy) and to promote corporate governance effectively.
4	if substantial improvement is made in corporate governance and significant new investment at the enterprise level.
4.33	if there are standards and performance typical of advanced industrial economies: effective corporate control exercised through domestic financial institutions and markets, fostering market-driven restructuring.
score	competition policy reforms
1	if there are no competition legislation and institutions.
2	if competition legislation and institutions are set up and there is some reduction of entry restrictions or enforcement action on dominant firms.
3	if some enforcement actions are taken to reduce abuse of market power and to promote a competitive environment.
4	if significant enforcement actions are taken to reduce abuse of market power and to promote a competitive environment.
4.33	if there are standards and performance norms typical of advanced industrial economies: effective enforcement of competition policy; unrestricted entry to most markets.

Source: EBRD reports

Note: the EBRD indicators are not available for Malta, Cyprus and Turkey.

Where the enterprise reforms indicator focuses on reducing production subsidies, introducing effective bankruptcy procedures at the enterprise level, the competition policy reforms indicator concentrates on facilitating market entry and combating the abuse of market dominance by monopolies. The average score on enterprise reforms for all countries is 3, indicating that on average actions are taken to tighten credit and subsidy policies and introducing effective bankruptcy procedures. The average score on competition policy for all countries for the period 1989-2000 is lower, namely 2. This means that on average a competition legislation and institution has been set up, but there is no effective enforcement of reducing entry restrictions and abuse of dominant firms.

A disadvantage of these indicators is that for some countries the variable does not vary much over time. Secondly, the reforms indicators reflect the assessments of EBRD country economists using the general criteria in Table 1.

5.4 Other control Variables

First, to control for business cycles in individual Central and East European countries and the EU15, GDP data (*EBRD reports, IMF database*) are decomposed in a growth trend and a cyclical component, the business cycle, with the Hodrick-Prescott filter.¹⁷

Secondly, the economic freedom index reports an index for hidden import barriers (HIB) other than published tariffs and quotas¹⁸. Since correlation between the hidden import barriers index and our variable for trade weighted tariffs is low (correlation = 0.0136), this variable can be included complementary to the tariff variable. This will allow us to control for other tariffs, non-tariff barriers or quotas that are

¹⁷Maravall & del Rio (2001) and Pedersen (2001) suggest that the smoothing parameter of the filter should be between 6 and 14 for annual data. Higher values produce smoother results. In this analysis, we will use a value of 7 for the smoothing parameter. Results with a smooth value of 14 are not reported here, but are similar.

¹⁸HIB is only available for the years 1990, 1995 and 2000 on a country-level

not captured by the tariff variable.

6 Results

Table 2 reports the main OLS estimation results of regression (1). Column (1) shows the results of a regression with tariffs, control variables for the business cycle, country and time fixed effects. Since the year dummies are not significant and do not change the result, they will not be included anymore in the following regressions¹⁹. Regressions (2) and (3) report the institutional reforms variables enterprise reforms and competition policy reforms separately²⁰ and reduce the analysis to 10 countries since the institutional reforms variables are not available for Malta, Cyprus and Turkey. The regressions in columns (4), (5) and (6) in Table 2 deal with possible econometric problems. First, since the weights of the tariff variable could be endogeneously correlated with the herfindahl index of exports, regression (4) uses constant weights (average export share over the period 1989-2000) in the tariff variable. The disadvantage of this constant weight is the loss of variation over time. Therefore, column (5) in Table 2 uses the weight of the tariff variable lagged by 1 period. Finally, the lagged export specialization variable could be correlated with the country fixed effects. Regression (6) uses therefore the second lag of the export specialization variable.

We find very robust results in favor of a long-run relationship between trade integration and export specialization ($-\phi_2/\phi_1$)²¹. The long-run relationship is negative, suggesting that the decrease in tariffs has led to more export specialization in Central Europe. This result supports trade theories suggesting that trade integration leads to a long-run concentration of activities across regions and across sectors. Fur-

¹⁹This is important because it suggests that our results are not driven by time trends common to all countries.

²⁰The correlation between the enterprise reforms and competition policy reforms variables is too high to include these variables in 1 regression (0.72).

²¹Using a delta test, the ratio ($-\phi_2/\phi_1$) is significantly different from zero (p-value = 0.0006).

Table 2: Impact on export specialization for Central Europe

	(1)	(2)	(3)	(4)	(5)	(6)
<i>Constant</i>	-1.4*** (0.47)	-0.74* (0.44)	-1.02* (0.55)	-0.84* (0.51)	-0.4 (0.64)	-1.22*** (0.47)
$\log(\text{Exp spec}_{i,t-1})$	-0.41*** (0.08)	-0.44*** (0.08)	-0.39*** (0.08)	-0.35*** (0.07)	-0.56*** (0.1)	-0.39*** (0.11)
$\log(\text{tariff}_{i,t-1})$	-0.49*** (0.15)	-0.58** (0.28)	-0.23 (0.25)	-0.41*** (0.16)	-0.84*** (0.33)	-0.32* (0.17)
$\Delta\log(\text{tariff}_{i,t})$	-0.21* (0.12)	-0.13 (0.11)	-0.14 (0.10)	0.13 (0.18)	-0.04 (0.08)	-0.06 (0.15)
nat. business cycle	1.47e-06 (1.74e-06)	6.17e-07 (1.38e-06)	-8.21e-07 (1.80e-06)	-1.64e-07 (1.31e-06)	4.12e-06 (2.80e-06)	6.15e-07 (1.61e-06)
EU business cycle	0.001*** (.0006)	-0.0001 (0.0005)	-0.0001 (.0005)	.0006 (.0005)	-0.0003 (0.0004)	0.001 (0.001)
enterprise reforms	-	0.28*** (0.10)	-	-	-	-
competition policy	-	-	0.15 (0.09)	-	-	-
time dummies	yes	-	-	-	-	-
country fixed effects	yes	yes	yes	yes	yes	yes
<i>obs</i>	121	91	91	121	81	109
<i>p value(F - stat)</i>	0.00	0.00	0.00	0.00	0.00	0.02
<i>R</i> ²	0.40	0.4	0.35	0.58	0.46	0.31

Robust standard errors of estimates are in parentheses. All models include country fixed effects and time dummies are only included in regression (1). Regression (2) and regression (3) only take into account 10 countries since data on institutional reforms was not available for Malta, Cyprus and Turkey. In column (4) the regression uses constant export shares as weights for the tariff variable and in column (5) the weights of the tariff variable are lagged by 1 period. Regression (6) lags the level of export specialization with 2 periods instead of 1. note:***, ** and * denote significance level of estimates at respectively 10, 5 and 1 percent levels.

thermore, this result holds in all columns of Table 2, indicating that the long-run effect is robust to including institutional reforms variables, different weights of the tariff variable and instrumenting the lagged dependent variable. In the short-run, trade integration has no significant influence on export specialization (coefficient ϕ_3 is not significant).

Regarding the institutional reforms, the estimation results of Table 2 indicate that enterprise reforms have a positive and significant effect on export specialization. This implies that an increase of 1 unit in enterprise reforms, leads to an increase of 28% in export specialization. In contrast, competition policy reforms have no significant effect on export specialization. This might indicate that stricter credit and bankruptcy laws and therefore inducing restructures on a firm level, matters more for export specialization than reducing dominant firms.

7 Robustness checks

In order to assess the robustness of our regression results in Table 2, Table 3 reports some extended analyses.

First, the sample is reduced to the period 1994-2000 in column (1). This robustness check excludes influences from a possible prohibitive tariff in the beginning of transition and the heavily restructuring period in the first years of transition. In Column (2), the regression is only estimated for the EU10 to test whether Turkey, Bulgaria and Romania, who have a different EU-accession path, influenced the results. The results in Table 3 show that the long-run effect of tariffs on export specialization holds in both cases.

Furthermore, an extra control variable for tariffs is included (HIB) in column (3). This variable measures the non-published import barriers and quota's. Since the HIB variable is not significant, this implies that the tariff variable captures most of the trade integration process between Central and Eastern Europe and the EU15²².

²²Other authors tried to proxy non-tariff barriers by a frequency index but failed to find signifi-

Finally, when the tariff variable is replaced by an index of trade liberalization (column (4)) and an index of price liberalization (column (5)), both variables show up positive and significant in the regressions. This indicates that more trade or price liberalization leads to more export specialization.

cance (Amiti & Konings (2005) and Mayer & Zignago (2005))

Table 3: Robustness check

	(1)	(2)	(3)	(4)	(5)
<i>Constant</i>	-1.56** (0.67)	-0.98** (0.5)	-0.96 (6.65)	-1.17*** (0.42)	-1.18*** (0.37)
<i>log(Exp spec._{i,t-1})</i>	-0.47*** (0.1)	-0.45*** (0.09)	-0.45*** (0.08)	-0.36*** (0.09)	-0.38*** (0.09)
<i>log(tariff_{i,t-1})</i>	-0.55** (0.26)	-0.63*** (0.17)	-0.54*** (0.16)	-	-
<i>Δlog(tariff_{i,t})</i>	-0.19* (0.11)	-0.21* (0.13)	-0.18 (0.12)	-	-
nat. business cycle	-9.64e-07 (2.19e-06)	5.25e-06*** (1.69e-06)	1.72e-06 (1.90e-06)	5.36e-07 (1.29e-06)	7.99e-07 (1.28e-06)
EU business cycle	0.002* (0.0008)	0.002*** (0.001)	0.001 (0.001)	-0.0004 (0.0004)	-0.0005 (0.0004)
hidden import barriers	-	-	-0.04 (0.87)	-	-
trade liberalization	-	-	-	0.09* (0.05)	-
price liberalization	-	-	-	-	0.12*** (0.05)
country fixed effects	yes	yes	yes	yes	yes
<i>obs</i>	87	88	114	91	91
<i>p value(F – stat)</i>	0.00	0.00	0.00	0.00	0.00
<i>R²</i>	0.41	0.41	0.38	0.58	0.37

Robust standard errors of estimates are in parentheses. All models include country fixed effects, but are not reported to save place. Regression (1) does not include the years 1989-1993, while regression (2) uses only the EU10 (not Turkey, Bulgaria and Romania). Regression (3) includes a variable for hidden import barriers and the regressions in column (4) and (5) replace the tariff variable by an indicator of trade and price liberalization respectively. note: ***, ** and * denote significance level of estimates at respectively 10, 5 and 1 percent levels.

8 Discussion of results

A recent study by Francois & Manchin (2007) examines the role of institutions, infrastructure and tariffs in explaining why some countries trade and others do not. The authors show that basic infrastructure (communications and transport) and institutional quality matter more than tariffs for exports. This paper studied the impact of tariffs and institutional reforms on export specialization. Our results show that tariff reductions and enterprise reforms stimulate export specialization in 13 Central and East European countries. Moreover, we find that tariffs and enterprise reforms are equally important for export specialization²³.

Although export specialization makes countries more vulnerable to sector specific shocks (Krugman 2000), specialization is not necessarily a bad consequence of trade integration. The literature has shown that some sectors as the technology sector and other high skill intensive sectors can cope better with sector specific shocks and have a higher growth potential than low skill sectors ((Amable 2000), (Pedersen 2001), (Koren & Tenreyro 2004) and (Golub et al. 2006)). A first glance at the sectors in Central Europe in Figure 5, shows that all countries except Latvia and Romania²⁴ increased their export share in the manufacturing sector at the expense of exports in the agriculture and mining sector.

9 Conclusion

This paper studies whether the trade integration process in the course of the nineties between the EU15 and Central Europe has led to more export specialization in Central Europe. In addition, the impact of institutional reforms, enterprise reforms

²³A test based on the R^2 of the models shows that tariffs explain 5.8% of the model and enterprise reforms explain 6.4% of the model.

²⁴Romania increased its export share in the manufacturing sector and decreased its export share in both the agriculture and mining sectors. Latvia increased sharply its export share in the agricultural sector.

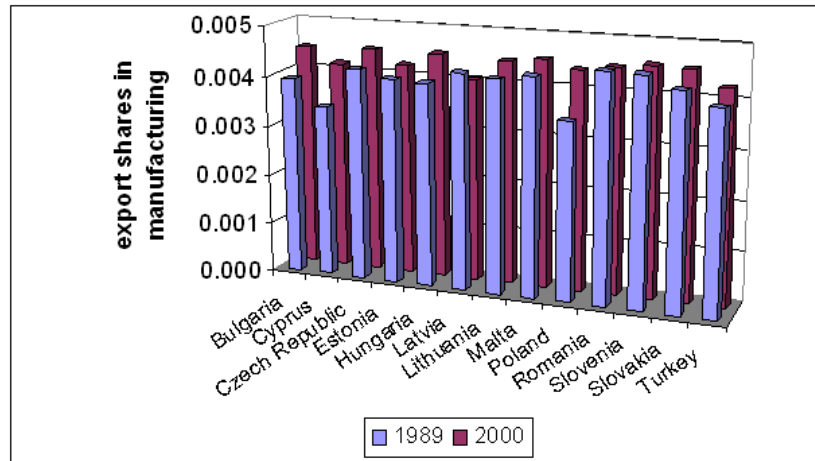


Figure 5: Average export share in manufacturing sector for all CEECs

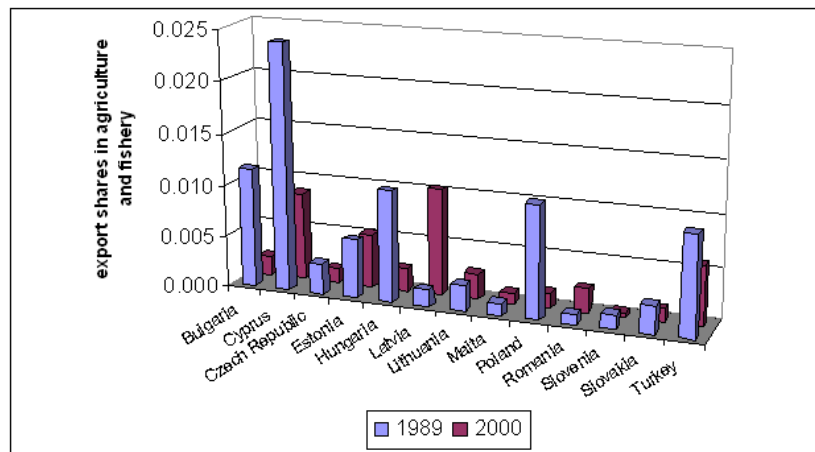


Figure 6: Average export share in agriculture sector for all CEECs

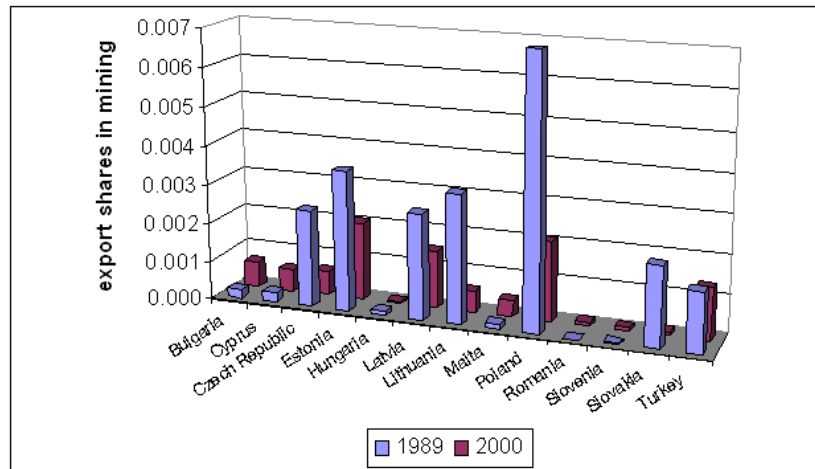


Figure 7: Average export share in mining sector for all CEECs

and competition policy reforms, on export specialization in Central Europe was analyzed as well. We use a herfindahl index of export specialization to measure whether a country is exporting in a small or a wide range of sectors and EU15-tariffs to capture trade integration in a dynamic panel model. Our results lead us to conclude that trade integration and enterprise reforms significantly stimulate export specialization.

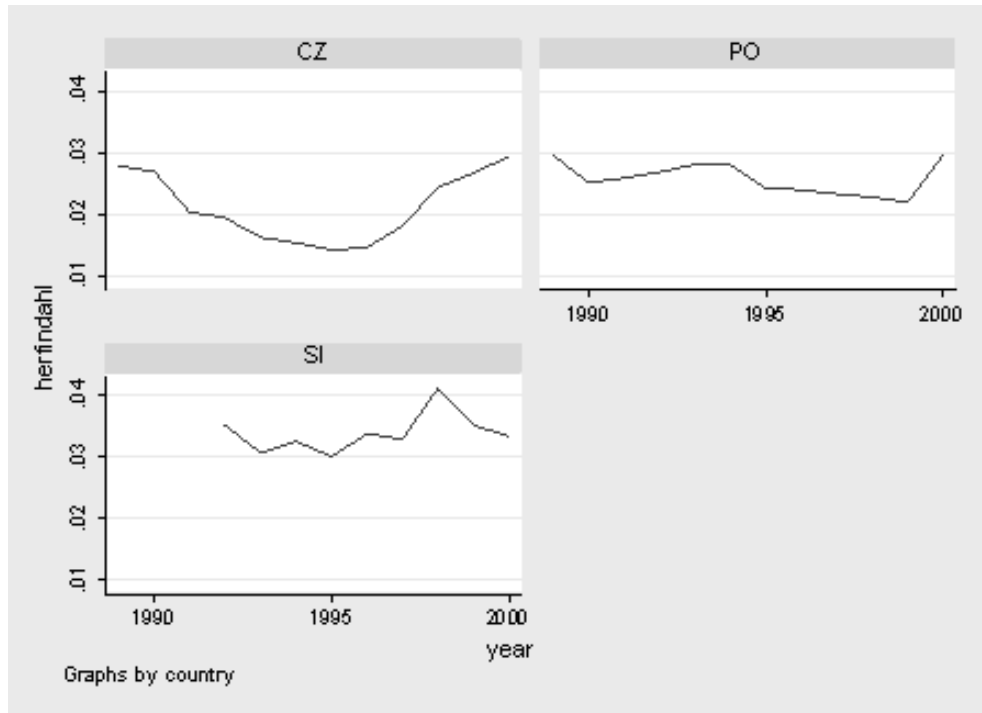
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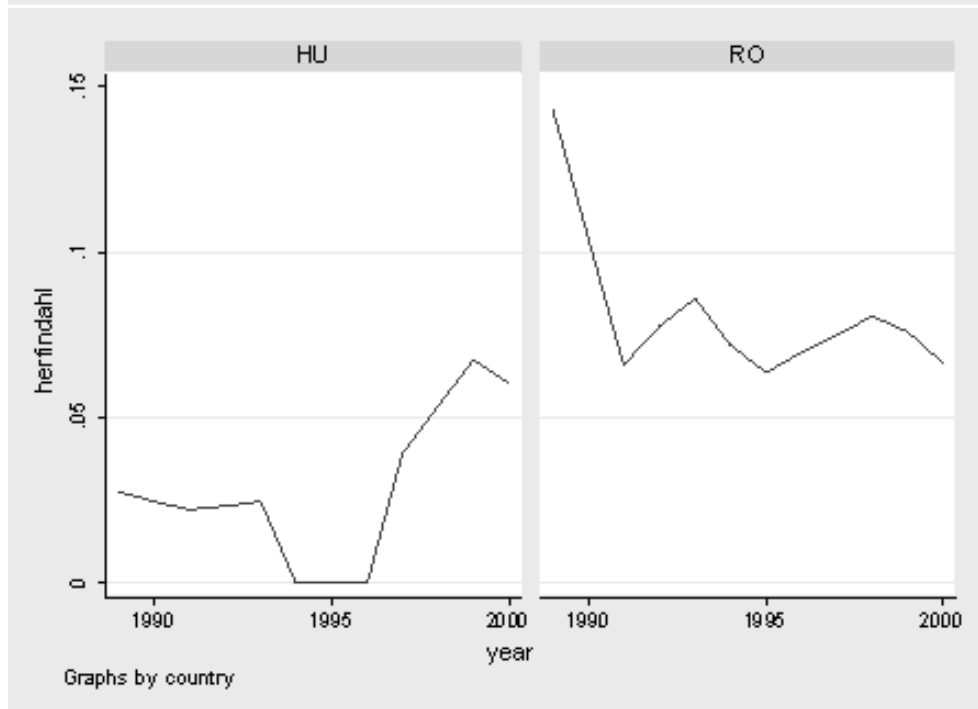
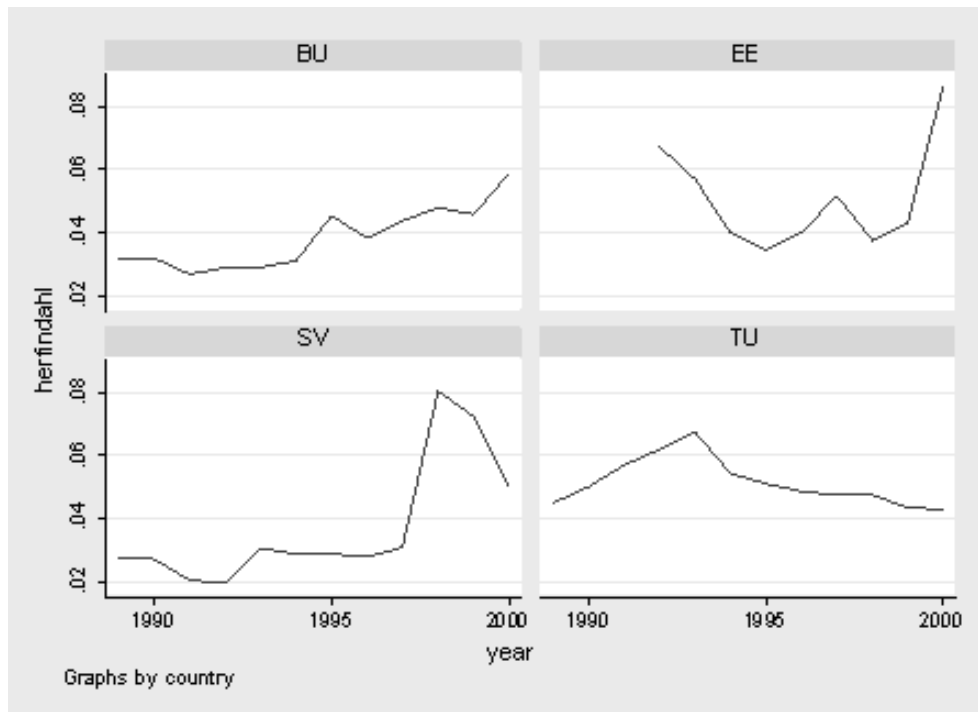
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10 Appendix A





11 Appendix B

As an alternative for the tariff variable, two EBRD indicators on trade and price liberalization are used. These indicators lie between 1 and 4.33 according to their achievement in reforms. The classification system for the trade liberalization and price liberalization reforms are as follows:

Table 4: Trade liberalization

score	Trade liberalization reforms
1	if there are widespread import and/or export controls or very limited legitimate access to foreign exchange.
2	if there is some liberalization of import and/or export controls; almost full current account convertibility in principle, but with a foreign exchange regime that is not fully transparent (possibly with multiple exchange rates).
3	if almost all quantitative and administrative import and export restrictions are removed and there is almost full current account convertibility.
4	if all quantitative and administrative import and export restrictions are removed (apart from agriculture) and all significant export tariffs; insignificant direct involvement in exports and imports by ministries and state-owned trading companies; no major non-uniformity of customs duties for non-agricultural goods and services; full and current account convertibility.
4.33	if there are standards and performance norms of advanced industrial economies: removal of most tariff barriers; membership in WTO.

Table 5: Price liberalization

score	Price liberalization reforms
1	if most prices are formally controlled by the government.
2	if there is some lifting of price administration; state procurement at non-market prices for the majority of product categories.
3	if significant progress has been made on price liberalization, but state procurement at non-market prices remains substantial.
4	if there is comprehensive price liberalization; state procurement at non-market prices largely phased out; only a small number of administered prices remain.

Source: EBRD; Note: EBRD indicators are not available for Malta, Cyprus and Turkey.

12 Appendix C

Table 6 reports the correlation matrix for all variables of the empirical model.

Table 6: Correlation matrix

	$\Delta \log$ (<i>Exp spec</i>)	$\log(\textit{Exp spec})_{t-1}$	$\log \textit{tariff}_{t-1}$	$\Delta \log$ (<i>tariff</i>)	bus. cycle	EU-bus. cycle	HIB	comp. policy ref.	enterp. ref.	price lib.	trade lib.
$\Delta \log(\textit{Exp spec.})$	1	-0.31	-0.11	-0.24	-0.05	-0.07	-0.04	0.18	0.15	0.16	0.16
$\log(\textit{Export spec.})_{t-1}$	-0.31	1	0.48	0.23	0.03	-0.14	-0.18	-0.57	-0.48	-0.03	-0.28
$\log(\textit{tariff})_{t-1}$	-0.11	0.48	1	-0.05	0.09	-0.04	0.01	-0.82	-0.68	-0.27	-0.29
$\Delta \log(\textit{tariff})$	-0.24	0.23	-0.05	1	-0.07	0.07	0.07	-0.08	-0.12	-0.03	-0.13
business cycle	-0.05	0.03	0.09	-0.07	1	0.08	0.004	0.08	-0.1	-0.18	0.0001
EU-business cycle	-0.07	-0.14	-0.04	0.07	0.08	1	0.88	0.05	0.06	0.03	-0.02
HIB	-0.04	-0.18	0.01	0.07	0.005	0.88	1	-0.002	0.09	0.06	0.05
competition	0.18	-0.57	-0.82	-0.08	0.08	0.05	-0.002	1	0.72	0.4	0.54
policy reform											
enterprise reforms	0.15	-0.48	-0.68	-0.13	-0.1	0.06	0.09	0.72	1	0.47	0.57
price liberalization	0.22	-0.03	-0.27	-0.03	-0.18	0.03	0.06	0.4	0.47	1	0.46
trade liberalization	0.16	-0.28	-0.29	-0.13	0.0001	-0.02	0.05	0.54	0.57	0.46	1