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Working Paper

Time-Dependent Efficiency of Free Trade Agreements: The Case of Slovenia and the CEFTA Agreement

LICOS Discussion Paper, No. 117

Provided in Cooperation with:

LICOS Centre for Institutions and Economic Performance, KU Leuven

Suggested Citation: Damijan, Joze P.; Masten, Igor (2002) : Time-Dependent Efficiency of Free Trade Agreements: The Case of Slovenia and the CEFTA Agreement, LICOS Discussion Paper, No. 117, Katholieke Universiteit Leuven, LICOS Centre for Transition Economics, Leuven

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LICOS

Centre for Transition Economics

LICOS Discussion Paper

Discussion paper 117/2002

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**TIME-DEPENDENT EFFICIENCY OF FREE TRADE AGREEMENTS:
THE CASE OF SLOVENIA AND THE CEFTA AGREEMENT**

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Suggested running title: Time-dependent Efficiency of Free-Trade Agreements

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ABSTRACT

In international trade literature, there is a common feature that the abolishment of barriers to trade leads to the expansion of trade flows. Most of the empirical studies aiming at simulation of welfare effects of trade liberalization explicitly make use of this direct tariff reduction - trade expansion mechanism. The present paper, on the contrary, explores the time-dependent efficiency of free trade agreements (FTAs) in a panel framework using static and dynamic model specifications. It shows that trade liberalization per se needs time to become efficient and that immediately after the enforcement of the FTA, the autonomous factors (such as domestic demand for particular import goods) are of great importance, since they may or may not stimulate expansion of bilateral trade flows. Using an illustrative case of rapid expansion of Slovenian imports from other Central and Eastern European countries (CEECs) in the period 1993–1998, the paper demonstrates that tariff reductions become effective in the second to third year after enforcement of the FTA. In addition, it is shown that there is a non-linear relationship between tariff reductions and trade expansions since new business connections have to be established.

JEL Classification: F13, F14, F15

Key words: Trade Liberalization, Efficiency of Free-Trade Agreements

TIME-DEPENDENT EFFICIENCY OF FREE TRADE AGREEMENTS: THE CASE OF SLOVENIA AND THE CEFTA AGREEMENT

1. INTRODUCTION

In international trade literature, there is a common feature that the abolishment of barriers to trade leads to the expansion of trade flows. The past four decades of rapid growth of bilateral, regional and world trade flows are usually taken as an evidence of direct effects of extensive trade liberalization under the GATT rounds as well as in the framework of different regional free trade agreements (FTAs). Starting with Harris (1984, 1986) and Deardorff and Stern (1986), all the subsequent studies using computational general equilibrium (CGE) models explicitly made use of this *direct tariff reduction - trade expansion mechanism* in order to simulate the welfare effects of trade liberalization. Furthermore, a number of empirical studies (Smith and Venables 1988; Gasiorek, Smith and Venables 1991, 1992, 1994; Norman 1990; Haaland 1993; etc.) followed the same approach by converting other non-tariff barriers to trade into tariff reduction equivalents and then using these figures to calculate the effects of establishment of the Single European market. However, to our knowledge, there is no evidence on two basic facts regarding this direct tariff reduction - trade expansion mechanism. First, one has to ask how this mechanism works: how “direct” is the relationship between trade liberalization and trade expansion? And second, what is the time path of the mechanism: how long does it take trade liberalization to become effective?

This issue should have been of special interest at the end of the 1980s when the present transition countries opened up and reoriented their trade flows towards the European Union (EU). There is a bulk of studies using the gravity approach aiming at estimating the potential volume of trade expansion (see Baldwin 1994 for a survey). In general, most of these studies predict that the trade of Central and Eastern European countries (CEECs) with Western Europe should expand fivefold compared with the pre-transition trade in order to reach the level estimated by the gravity model. Some of the studies in the mid-1990s suggested that the trade potential between CEECs and the EU has already been exhausted

up to 1995 (Festoc 1996). However, none of the studies paid attention to the factors behind the evident trade expansion. Was it enough to have just removed tariffs and for trade to expand mechanically? What about the autonomous factors such as the latent unsaturated pre-transition demand for western goods? Would not imports of CEECs from the EU also expand without the removal of tariffs, only because the ban on imports of western goods has been lifted?

The aim of the present paper is to shed more light on the above issues. It aims to show that the lifting of barriers needs time to become efficient and that in the meantime the autonomous factors are of great importance, since they may or may not stimulate expansion of bilateral trade flows. An illustrative case of rapid expansion of Slovenian imports from other CEECs in 1990s is used. The paper explores to what extent the expansion of Slovenian imports from other CEECs has been driven by the reduction of import tariffs in the framework of the Central and Eastern European Free Trade Agreement (CEFTA)¹ after 1994, and to what extent it was autonomous and would have occurred regardless of the FTA. In order to do so the impact of tariff reductions and of autonomous factors such as demand and other product specific fixed effects on the expansion of Slovenian imports are estimated. An error components model in a panel framework is used, which enables the control of both the time-dependent effects of trade barrier reduction as well as country and product-specific effects. First, a static model is employed and then there is a switch to the dynamic, partial adjustment model. The latter – via the lagged dependent variable and non-linear time determined effect of tariff rate cuts – enables the capturing of time-dependent effects for establishing new business connections between Slovenian and CEFTA firms, which would give rise to further expansion of bilateral trade flows.

The paper addresses a special case of the FTA. However, the examined pattern of FTA enforcement is general and is relevant also to other transition and developing countries. The main contribution of this paper is that it is the first to address the questions of the time-dependent efficiency of FTAs, and the first to

¹ Members of the CEFTA agreement are the Czech Republic, Hungary, Poland, Slovakia, Slovenia, Romania and Bulgaria.

use an original empirical approach to model the non-linear time determined effect of trade liberalization.

The paper is organized as follows. Section 2 gives a short overview of the volume and the structure of trade as well as the dynamics of trade barriers between Slovenia and CEFTA countries in the period 1992-1999. Section 3 describes the methodology and the data used in the analysis. Section 4 gives an empirical estimation of the impact of the reduction of trade barriers and the impact of changes in domestic demand on the expansion of Slovenian imports from CEFTA countries. Last Section briefly summarizes main findings of the paper.

2. DYNAMICS OF TRADE AND TRADE BARRIERS BETWEEN SLOVENIA AND CEFTA COUNTRIES

2.1. PATTERN OF TRADE EXPANSION IN COUNTRIES IN TRANSITION

The opening-up of transition countries first led to a collapse of trade among former members of the CMEA market (Hamilton and Winters 1992; Baldwin 1994). The collapse of the CMEA market was followed by an extensive expansion of trade with Western countries, in particular with the EU, with the trade pattern that corresponds to the comparative advantage (Halpern 1995; Hoekman and Djankov 1997; and Freudenberg 1998). Most studies analyzing the expansion of trade, however, discovered different patterns of trade reorientation. Only advanced CEECs were able to expand trade with the West by increasing not only the value but above all the share of exports to the West. For other transition countries (least advanced CEECs and the successor countries of the former Soviet Union (FSU)), this adjustment of trade is still to be completed. For advanced CEECs, it has been mainly argued that this trade expansion with the West has been due to the reorientation of products previously sold on CMEA markets. Brenton and Gros (1997) found some limited evidence in favor of this thesis. In contrast, Jackson and Repkine (1997) discovered similar clustering of exports to the EU at 5-digit SITC between 1988 and 1996. Thus, as already noted by Rodrik (1994), the reorientation of products previously sold in CMEA market to the EU market was not a prominent feature of the transition period. Furthermore, Repkine and Walsh (1999) explicitly show that the recovery in individual sectors'

output is explained by the increasing importance of inherited EU-oriented production over time, while formerly CMEA-oriented sectors did not recover yet. Slovenia is the only successor country of the former Yugoslav republics that succeeded in following the pattern of trade reorientation of the advanced CEECs². As noted by Wyzan (1999), in spite of the common legacy Slovenia performed much better in the transition relative to other former Yugoslav republics. The main reasons for Slovenia's success certainly lie in its better initial conditions (higher level of development, higher degree of trade openness, inherited trade dependence on EU countries, etc.), and in its more favorable political situation (e.g. staying out of the Balkan wars, no trade embargo, no blockage of neighboring countries). However, one should also consider the explicit efforts of the Slovenian government to create a favorable climate for economic recovery via the almost complete liberalization of foreign trade. After the break-up of former Yugoslavia and the loss of most of the domestic market, Slovenia embarked on an intensive drive to reorient its trade. In accordance with theoretical considerations (Cooper and Massell 1965), which also found lately an important empirical confirmation in Vamvakidis' (1998) study - that broad liberalization is better than joining a single regional free-trade area - Slovenia followed a diversified pattern of trade liberalization. In addition to the Cooperation and Europe Agreements with the EU, Slovenia was rapidly entering into FTAs with EFTA and CEFTA member states as well as with other European countries. Thus, up to now, Slovenia has signed FTAs with 32 European countries, which accounted for 86 per cent of total Slovenian foreign trade in 1999. Having in mind that Slovenia is also a member of the WTO, it is clear that Slovenian foreign trade is almost completely liberalized.

2.2. DYNAMICS AND STRUCTURE OF BILATERAL TRADE WITH CEFTA COUNTRIES

The results of Slovenia's search for new markets can also be seen in the rapid expansion of trade with CEFTA countries. The volume of trade with most

² Furthermore, in this respect, Slovenia is the most successful transition country, since its export propensity to the EU is the highest among the first-round transition candidates for EU accession.

countries more than tripled in the period from 1992 to 1999: total exports to CEFTA countries grew by an absolute 144% and imports grew by 147%. In comparison, it must be noted that total Slovenian exports in the same period grew by 36% and imports by 73%, whereas exports to the EU grew by 46% and imports by 107%.

Insert Table 1

The exceptional dynamics of growth of bilateral trade with CEFTA countries is also reflected in the calculated average annual growth rates during this period, which by far exceed average growth rates of total Slovenian trade and trade with the EU. Average growth rate of exports to all CEFTA countries is twice the growth rate of exports to the EU and triple the growth rate of total exports. Obviously, the most likely reasons for this growth are the initially low level of bilateral trade and rapid elimination of trade barriers with CEFTA countries within the framework of FTAs. However, it is believed that an even more important reason might be the efforts of Slovenian firms to compensate the loss of the former Yugoslav market with the markets of CEFTA countries. With the imposition of barriers on trade with the former Yugoslav republics³ and the near complete suspension of bilateral trade which followed,⁴ Slovenia redirected its demand for the necessary inputs, deficient raw materials and agricultural products to the cost-effective markets of CEFTA countries. The same is true for exports – after the break-up of Yugoslavia and the suspension of bilateral trade, domestic firms have desperately needed new export markets for their large-scale production facilities.

Insert Table 2

As a result of rapidly increasing bilateral trade, CEFTA countries' share in total Slovenian exports in the period 1992-1999 increased from 3.6% to 6.7%, and their share in total imports increased from 5% to 7.7%. It is interesting to note, that the

³ Starting in 1989, the former Yugoslav single market began to fall apart due to impositions of some quasi import taxes between republics. After the official break-up of Yugoslavia in 1991, additional barriers on bilateral trade were created followed by war in Croatia and Bosnia, and the trade embargo against Serbia and Montenegro.

⁴ Slovenia's sales to other republics of the former Yugoslavia decreased in only two years from \$6.662 million in 1990 to only \$1.508 million in 1992.

shares of individual CEFTA countries' trade in total trade increased nearly equally. In relative terms, Hungary's share experienced the slowest growth, both in exports (increasing from 1.1% to 1.6%) and in imports (decreasing from 2.6% to 2.5%), whereas – with the exception of the Czech Republic - the other CEFTA countries' shares more than doubled.

Slovenia's exports to CEFTA countries consist almost exclusively of manufacturing products, as the combined exports of the agricultural products and food (section A and industry DA) account for only 2.3% of total exports. With a 40% share, chemical products (and within this industry, mainly pharmaceuticals) represent the biggest part of exports of industrial products, followed by the metal industry's products, machinery, paper, and electrical and optical equipment. CEFTA countries represent an important sales market for some industries (in particular for oil derivatives, chemical products, paper, rubber and plastic products, and metal products). In these industries, shares of exports of individual products in total industry's exports significantly exceed the share total of exports to CEFTA countries in total Slovenian exports. The structure of exports to individual CEFTA countries does not differ substantially from the structure of total exports to CEFTA countries.

The structure of Slovenian imports from CEFTA countries differs significantly from the structure of exports, especially by the relatively high share of imports of agricultural and food products (nearly 20% in total), chemicals, iron and steel as well as unprocessed wood. The significance of CEFTA countries' markets as a purchasing market for Slovenian manufacturing is evident from the fact that 27% of all imported agricultural and food products originate from CEFTA countries. The situation is similar for the acquisition of iron and steel (16% of all imported iron and steel is purchased in CEFTA countries). Of similar significance is wood, followed by certain mineral nonmetals, chemicals, etc.

Insert Table 3

The structure of imports from individual CEFTA countries differs slightly among them. Especially notable are Hungary and Romania, from which there are the least industrial imports (only about 60% and 75% of imports, respectively, consist of non-food products). Hungary accounts for approximately 80% of total

Slovenian imports of agricultural and food products from CEFTA countries. From a global perspective, Hungary represents more than 20% of all Slovenian imports of agricultural and food products. The Czech Republic and Slovakia export mostly iron and steel to Slovenia (more than 40% of their exports) and in addition to this, Slovakia exports chemical raw materials (16%) and the Czech Republic exports cars (11%). The largest part of Polish exports to Slovenia is chemical raw materials (24%) followed by iron and steel (15%).

2.3. DYNAMICS OF TRADE BARRIERS

To denote trade barriers in this analysis, the paper uses data exclusively on actually paid import duties, including paid customs duties, variable import levies and other import taxes. In the general sense, of course, trade barriers have a wider meaning, as they also encompass untariffed import quotas and other forms of non-tariff barriers (rules on domestic content and the origin of goods, voluntary export restraints, phytosanitary regulations, technical standards, public procurement rules, etc.), but these cannot be expressed quantitatively.

Table 4 gives a disaggregated insight (according to NACE, Rev. 1) into the reduction of actual import duties paid for Slovenian imports from four of the CEFTA countries for the period 1992-1998. The table clearly shows that Slovenia's general liberalization of foreign trade and the implementation of FTAs with CEFTA countries have resulted in a substantial decrease of import duties for industrial products (with the exception of food products) from these countries. In 1998, the average import duty for the import of most industrial products from CEFTA countries was equal to or close to zero, which points toward completely liberalized import of industrial products from CEFTA countries. Especially notable are the Czech Republic and Slovakia, with which trade in industrial products has already been completely liberalized.

Insert Table 4

The liberalization of trade for agricultural and food products has been significantly slower. With the coming into force of additional protocol no. 6 (in 1998), these two sectors have also experienced more rapid reduction of import

duties. However, most of the effects will only become apparent after the year 2000.

3. THE MODEL AND DATA

3.1. THE MODEL

We gathered data for a large number of cross-sectional units over seven years (1992-1998) and we want to fully exploit the information this panel data bears and design a proper error-components model. Panel data analysis has many advantages in comparison with conducting merely cross-section (or time-series) analysis (Hsiao 1986). The first and obvious advantage is a larger number of data points, which increases the degrees of freedom, reduces the collinearity among explanatory variables and therefore improves the efficiency of econometric estimates. Second, panel data enable us to analyze a number of important economic questions that cannot be addressed using cross-sectional or time-series data sets. In our example, panel data will allow us to capture the relationships between the levels of variables over the entire time period and to identify the role of the overall business cycle. Furthermore, panel data will enable us to disentangle time invariant country and product-specific effects.

We model expansion of Slovenian imports from individual CEFTA countries (dependent variable) with changes in import duties on imports from these countries and changes in domestic demand for individual products (all variables in logs). In order to do so, we first employ a static model and then switch to the dynamic, partial adjustment model. The choice of the latter is natural since we want to describe the process of trade reorientation as a process of transition between two trade regimes:⁵ from an initial protectionistic regime, when trade was on a low level, to a liberalized one. We include a lagged dependent variable to the right-hand side of the equation because we assume that it took some time to establish new business connections between Slovenian and CEFTA firms, and the equilibrium level of trade that corresponds to lower tariffs could not be achieved

⁵ Another important reason for the choice of a dynamic model is also the nature of process generating imports itself. Because of high correlations between imports in subsequent periods, it is important to model imports as an autoregression process. Short time series unfortunately disables us to take into account potential problems with nonstationarity of data.

within one year. We do believe that the elimination of mutual trade barriers has an important effect on expansion of bilateral trade flows in the long run, while in the short run, there are other autonomous factors that give rise to a slower or faster trade expansion. The most important autonomous factor (in relation to tariff reductions) is, of course, domestic demand, which can be effectively expressed in terms of domestic consumption. In the case of strong domestic demand for a certain deficient product, imports of this product will increase despite large trade barriers. Likewise, there will be no increase in imports of this product when domestic consumption is saturated, except in cases where a change of trade barriers with an individual trading partner significantly affects the competitiveness of importing this product from that country, compared to other trading partners. Of course, changes in trade flows are also affected by other factors, which are tied to the characteristics of a certain product – most importantly, whether these are homogenous or differentiated products as well as the quality of the products in relation to their price. The latter factors can be empirically accounted for using the panel framework, especially the fixed effects model.

3.1.1. The Static Model

In algebraic notation, we can describe the sequence of equations that we estimate as follows. The basic equation that we gradually alter later on is the following:

$$IM_{it} = a_i + b_1 T_{it} + b_2 C_{it} + \varepsilon_{it}, \quad (1)$$

where all variables are in logs and IM represents imports, T tariff rates and C domestic consumption of product i in time period t . a_i represents cross-section specific country and product effects. First, we treat these effects as common across all cross-section units and estimate the equation as if there were no cross-section specific effects (see results for pooled OLS equation in Table 5). We do this in order to emphasize the importance of cross-section specific effects, which are accounted for in the second estimated equation (see right panel of Table 5). When estimating this equation, we have used the least-square dummy variable (LSDV) procedure, where we first subtracted group means from each individual value of

each variable and then applied the generalized least-squares (GLS) procedure to this transformed equation. We used this procedure because we treat cross-section specific effects as fixed and not as random. The choice between a fixed effects (FEM) and a random effects (REM) estimator is crucial at this point of the analysis. Fixed effects are in general due to omitted variables that are specific to cross-sectional units or to time periods (Hsiao 1986). In our case, these fixed effects may be due to some specific characteristics of products, such as special quality of inputs, etc. Another reason for choosing the FEM is that we do not model imports from randomly selected countries and from randomly selected production items but from a predetermined selection of countries and from an exhaustive sample of production items. The third argument for a FEM model is of pure statistical reasons. There is theoretical evidence of inconsistency of a REM estimator in the case of the dynamic model (Hsiao 1986), which is our final and most important model.

To find out the exact time pattern of effects of trade liberalization with individual CEFTA countries, we estimate (1) in the form with included time dummies:

$$IM_{it} = a_i + a_{1t}Y_t + b_1T_{it} + b_2C_{it} + b_{3t}Y_t * T_{it} + b_{4t}Y_t * C_{it} + \varepsilon_{it}, \quad (2)$$

where Y_t is a time dummy, with $t = 0, \dots, 5$ and Y_0 (year before an FTA has been enforced) has been chosen as a reference year. Coefficients a_{1t} indicate shifts in the intercept while coefficients b_{3t} and b_{4t} enable us to control for time varying changes in the slope of tariff and consumption parameters, respectively.

3.1.2. The Dynamic Model

To estimate a dynamic model, we use the following specification:

$$IM_{it} = a_i + \lambda IM_{it-1} + b_1F(t)T_{it} + b_2C_{it} + \varepsilon_{it}, \quad (3)$$

where we use λ to estimate the long-run equilibrium effect of tariff rate cuts and changes in domestic consumption. A lagged dependent variable at the right-hand side of the equation adds an important complication to the analysis. Ordinary least-squares (OLS) estimates are inconsistent for finite T , owing to the presence of fixed effects. Elimination of fixed effects from the equation, when applying the

LSDV method, leads to violation of the orthogonality condition between regressors and residuals, hence causing inconsistency of the OLS estimator. Hence we cannot use the LSDV method, but we deal with the problem using instrumental variables (for an exposition of the method, refer to Amemiya and MacCurdy 1986; and Baltagi 1995).⁶ First, we difference the equation in order to eliminate fixed effects; then we use appropriately lagged levels of imports, tariff rates and consumption as instruments. Consistent estimates of our coefficients were finally obtained using the general method of moments (GMM) estimation procedure.

The most important feature of equation (3) is $F(t)$, a function of time that describes the evolution of tariff rate coefficient through time - from the first year when trade liberalization started to the last year when trade was completely liberalized. Heuristically, and as confirmed with the estimation of (2), the tariff rate coefficient should follow a certain time path. The coefficient is expected to be very low at first (first year of FTA enforcement), then starts to increase rapidly as newly established business connections enable enterprises to profit on tariff rate cuts. Finally, the coefficient decreases in the last year of the analysis, since changes in tariff rates were then almost negligible. A very good candidate function that conveniently utilizes our five effective time periods available in the estimation of the dynamic model was the standardized normal curve. We therefore take values from this curve from point -3 (as time index for the 93/94 difference) to point 1 (as time index for the 97/98 difference). Thus, $F(t)$ can be represented as:

$$F(t) = (2\pi)^{-1/2} \cdot e^{-1/2 \cdot t^2}; \quad t = -3, \dots, 1 \text{ (0 for Poland)} \quad (4)$$

We do not include the $F(t)$ function in front of the demand coefficient, since its inclusion results in significant worsening of the results. This confirms that the demand coefficient did not follow a similar time-dependent path and that it was constant throughout the period.

⁶ For an alternative solution see also Holz-Eakin, Newey, and Rosen (1998); Arellano and Bover (1990); Arellano and Bond (1991); and Keane and Runkle (1992).

3.2. Data

Imports and domestic consumption are measured in billion SIT, while import duties are calculated ad valorem - as a ratio of actual import duties paid to the value of imports of each product item (in percent).

We dispose with the data on Slovenia's foreign trade at the highest possible disaggregated level, which are accompanied by Slovenian statistics at the level of the Combined Nomenclature of Tariffs (CN). Basically, this nomenclature contains over 10,000 production items, but Slovenia's trade with individual CEFTA member countries only involves about 800 to 2,500 production items. As far as foreign trade data are concerned, econometric analysis would thus be possible on a sample of the indicated size, depending on the selected country. The problem limiting the size of the sample is the consumption variable, which is defined as the sum of domestic production and of imports of a specific product, minus the exports of that product in the selected time period. Production statistics are not even nearly as disaggregated as the CN. Data on Slovenian industrial production are available at the 3-digit NACE level. When these data are adjusted for the appropriate foreign trade flows with the appropriate partner country, we get a sample of 90 import items (according to 3-digit NACE code) per each country and per each year. Further balancing of the sample, where we excluded all cross-sectional units with incomplete time series of data, led to a balanced sample ranging from 43 product items for Slovakia up to 72 items for the Czech Republic.

The second problem of sample limitation is related to the selection of the time period, which depends on the date of enforcement of the FTA with the individual CEFTA country. With the Czech Republic and Slovakia, the FTA came into force on January 1, 1994; with Hungary, on July 1, 1994; and with Poland, on January 1, 1995. Hence, for the Czech Republic, Slovakia and Hungary year, 1993 and for Poland, year 1994 have been taken as the initial years before the FTA came into force. We have chosen 1997 for the Czech Republic and Slovakia and 1998 for other countries as the final year of the elimination of trade barriers. Data for 1992 were utilized as instruments in the estimation of the dynamic model. Therefore,

we have differently sized data sets for each of the selected countries (number of observations for each country varies between 294 and 518).

4. RESULTS

4.1. The Static model

Table 5 reports the estimation results of the static model (1) using pooled OLS and FEM estimators. The left panel of the table gives the estimates using a pooled OLS estimator, which does not control for cross-section specific effects. All the coefficients for tariffs and demand have the correct sign and are statistically significant at high levels. These results confirm that tariff cuts have led to an expansion of Slovenian imports from CEFTA countries. However, since coefficients can be interpreted as elasticities, it is evident that the impact of autonomous factors (demand) on imports is on average 4-5 times larger than the impact of tariff cuts. In addition, comparison of estimated elasticities between individual countries reveals two important implications. First, the most *tariff-reduction-driven* is the expansion of imports from Slovakia and Poland, countries from which Slovenia imports the least (about 2-3 times less than from Hungary and the Czech Republic). Second, the most *demand-driven* is the expansion of imports from Hungary and the Czech Republic, countries that represent 75 percent of total Slovenian imports from four CEFTA countries. Therefore, the results strongly confirm the importance of autonomous factors for expansion of imports after the enforcement of CEFTA.

Insert Table 5

The right panel of the table reports estimated coefficients using a FEM estimator. The last column (representing F-statistics for the test of presence of fixed effects) indicates the presence of important fixed effects described above. All F-statistics are significant at a negligible level, which assures us that controlling for fixed effects is a correct procedure when estimating our import equation. After controlling for fixed effects, we obtained unbiased estimates of coefficients in our model. Comparison of results between pooled OLS and FEM estimators reveals that it was especially the demand variable that suffered from product-specific fixed effects. While the coefficients for tariff reductions remain relatively stable in terms of power and significance, the coefficients for demand lose power and significance. Significance for the demand variable is in all cases expectedly lower

since a large portion of imports variation is now due to omitted variables contained in fixed effects.

Insert Table 6

Particularly interesting are estimation results of the model (2) represented in Table 6. In this specification of the model, time dummies have been added to the static fixed effects model (1) presented above. Taking a year before an FTA has been enforced as a base year, it shows the development of tariff and demand coefficients through subsequent years. The coefficients reported in fields labeled with tariff and demand show the impact of tariff rate and demand changes in the base year for a particular country and for CEFTA as a whole. In the lower panel of the table, in fields labeled Tariffs1 to Tariffs5 and Demand1 to Demand5, are reported coefficients for variables which we obtained by multiplying tariff rate and demand variable with a particular time dummy. Estimated coefficients therefore represent the difference between tariff (or demand) effects in a particular year and the base year. Adding them up yields total influence in a particular year.

Insert Figure 1 and 2

Development of tariff and demand coefficients is shown in Figure 1 and Figure 2, respectively. The time pattern of the tariff rate coefficient is very interesting. Except for Slovakia (which also holds the smallest share in Slovenia's imports from CEFTA countries), we can observe that after gradual strengthening of impact of tariff rate cuts (following the initiation of trade liberalization), this effect diminishes as year 5 after the enforcement of the FTA, when trade was completely liberalized, approaches. With the demand coefficient, on the other hand, we observe gradual decreasing of its value throughout the period. These two figures tend to confirm our initial expectations in a very simple manner. At the beginning of the operation of the FTA, there are autonomous factors that are very important for trade expansion. In subsequent years, as business connections strengthen, the impact of tariff rate cuts increases, but decreases in the last year when only changes in demand occurred since trade was almost completely liberalized. The pattern we have described is very important for the comparison with estimates of the dynamic model that follow.

4.2. Dynamic model

In addition to the static model presented in the previous section, we estimate also a dynamic model (3) with the impact of tariff reductions modeled as time function in (4). As we have already mentioned, modeling imports as an AR(1) process will give us a clearer picture of the magnitude of impacts of tariff and domestic demand because of high serial correlation between time observations. The time pattern described above could be better accounted for in this setting only for this reason. Estimation of a partial adjustment model is furthermore quite logical if we consider the establishment of a free trade area as a transition process that was, from the Slovenian point of view, initiated by the collapse of the former Yugoslav market, which was the most important export and import market for Slovenian enterprises. The collapse meant that trade reorientation became a necessary condition for many enterprises to survive. A dynamic model would thus enable us to capture the effect of establishing new business connections in CEFTA countries. This means that the whole effect of tariff rate cuts and increased demand cannot be realized in only one period. In addition to this, we expect this effect not to be constant over time. As business ties strengthen, this effect should become larger, but after some point in time, should also decrease when international trade is nearly completely liberalized. As we have mentioned before, we model this varying effect of tariff rate cuts with the inclusion of the $F(t)$ component in front of the tariff coefficient in the estimated equation.

Insert Table 7

Looking at the results of the GMM estimation procedure (see Table 7), we can see that they confirm our predictions about a partial adjustment process. With the exception of Slovakia, equations exhibit quite favorable levels of goodness of fit.⁷ A lagged dependent variable now accounts for a large portion of imports variation. This means that every influence of 1 percent decrease in tariff rates or 1 percent increase in domestic demand does not come into effect in one year only,

⁷ Note that estimated determination coefficients are not directly comparable between different models we have estimated. Reported determination coefficients correspond to the transformed equation we have used in a particular estimation. No transformation was needed for estimation of a pooled OLS model; group means were subtracted when estimating FEM and the equation was differenced before applying the GMM for the dynamic model.

but it takes more years to asymptotically approach the equilibrium level of imports. Long-run elasticities are in this context two to three times higher (depending on a particular country) than short-run elasticities.⁸ Keeping in mind that in this setting some of the changes in imports are due to past changes of imports (caused by past changes in tariff rates and domestic demand), it is normal to find the demand coefficient smaller in absolute terms in the dynamic model compared to two static ones. One must not be misled by the increase in values of tariff coefficients. One has to take into account the influence of the $F(t)$ component in the equation and multiply the new tariff rate coefficient with appropriate values along this curve. It is very important that the estimated coefficient, which changes non-linearly according to $F(t)$, is highly significant, thus confirming the gradually increasing effects of tariff rate cuts. We did not expect the demand coefficient to follow a similar pattern. This was also confirmed when estimating the model. Inserting $F(t)$ also in front of the demand coefficient resulted in the estimated demand coefficient no longer being significantly different from zero. Domestic demand can be considered, together with product and country specific effects, as an autonomous factor, and these results confirm its role of the dominant driving force behind trade expansion in the early stages of the FTA operation.

Looking at the results, we can also confirm the division between the Czech Republic and Hungary (representing 75% of imports from CEFTA) as relatively more demand-driven imports, on the one hand, and Slovakia and Poland as more tariff-reduction driven, on the other hand. From the equation for Poland, we can conclude that imports from Poland were the most tariff-reduction driven, because of by far the largest tariff rate coefficient. This equation has also a very good fit. We also add here Slovakia because the trade pattern with this country is also very different from that observed for Hungary, the Czech Republic and CEFTA as a whole. Its coefficient of lagged dependent variable is by far the smallest (but still significant), which implies the smallest determination of imports by past imports and relatively increases the importance of the other two factors.

⁸ Except in the equation for Slovakia.

5. CONCLUSIONS

In this paper we explored the time-dependent efficiency of FTAs. We showed that trade liberalization per se needs time to become efficient and that immediately after the enforcement of the FTA, autonomous factors are of great importance for the expansion of bilateral trade flows. Using an illustrative case of rapid expansion of Slovenian imports from other CEECs in the period 1993-1998 we explore to what extent the expansion of imports is driven by the reduction of import tariffs according to CEFTA agreement and to what extent it is autonomous. We therefore used both static and dynamic approaches in the panel framework.

The results of the static model showed that - even after controlling for product specific fixed effects - the impact of autonomous factors (such as domestic demand pattern) on the expansion of Slovenian imports from CEFTA countries is on average four times larger than the impact of tariff reductions. In addition, we checked for time patterns of the impact of both the tariff reductions variable and the demand variable. The results demonstrate that tariff reductions become effective in the second to third year after enforcement of the CEFTA, while for the demand variable, there is a clear indication of the immediate impact on the expansion of imports and of a decreasing tendency thereafter. This finding explicitly confirms our thesis that immediately after enforcement of the FTA, there will be an expansion of imports of already significant import products, while for the other products, some time is needed for new business connections to establish.

In the dynamic model, we used an error-components model, which enabled us to capture the time-dependent effects of establishing new business connections and to take into account the autoregressive nature of trade flows. In this framework, we explicitly modeled the time-determined effect of tariff rate cuts on new trade links using a standardized normal curve. The results confirm our observations in the static models. Current trade pattern is predetermined by previous trade patterns (lagged imports). However, with time, new business connections are promoted through a decrease of trade barriers, which gives rise to increasing

influence of tariff rate cuts on further expansion of bilateral trade flows. This time pattern could not be observed in the influence of domestic demand.

Regarding the efficiency of the CEFTA agreement, our analysis revealed that the deciding impact on sizeable expansion of Slovenian imports from CEFTA countries had the autonomous reorientation of Slovenian trade due to the break-up of the former Yugoslav market. The liberalization of trade – with a certain time lag needed for new business connections to establish – only served to increase the cost-effectiveness of the trade reorientation.

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Tables and Figures to be included into text

Table 1: Geographical structure of total Slovenian foreign trade in the period 1992–1999 (in percent)

EXPORTS

Country	1992	1993	1994	1995	1996	1997	1998	1999
EU	60.9	63.8	66.2	67.8	65.0	63.6	65.5	66.9
Hungary	1.1	1.5	1.4	1.3	1.3	1.4	1.6	1.6
Czech Republic ¹	1.4	0.8	1.2	1.6	1.8	1.8	1.7	1.7
Slovakia		0.4	0.4	0.6	0.7	0.7	0.8	0.7
Poland	1.0	1.5	1.4	1.3	1.7	1.9	2.0	2.2
Romania	0.1	0.3	0.2	0.3	0.3	0.3	0.5	0.5
CEFTA total	3.6	4.5	4.7	5.1	5.7	6.0	6.5	6.7

IMPORTS

Country	1992	1993	1994	1995	1996	1997	1998	1999
EU	57.8	64.4	68.2	68.0	67.5	67.4	69.4	69.1
Hungary	2.6	2.6	2.7	2.9	2.5	3.1	2.4	2.5
Czech Republic ¹	2.0	1.7	2.5	2.7	2.5	2.5	2.6	2.9
Slovakia		0.4	0.8	0.9	1.0	1.1	0.9	0.9
Poland	0.3	0.2	0.3	0.4	0.5	0.6	0.8	1.1
Romania	0.2	0.3	0.3	0.4	0.3	0.2	0.5	0.4
CEFTA total	5.0	5.3	6.7	7.2	6.8	7.5	7.2	7.7

Source: Statistical Office of the Republic of Slovenia (SURS); authors' calculations.

¹ Data for Czechoslovakia in 1992.

Table 2: Average annual rates of growth for trade between Slovenia and CEFTA countries in the period 1992-1998 (in percent).

Country	Exports	Imports
Hungary	11.9	10.0
Czech Republic	15.7	17.5
Slovakia	24.6	33.6
Poland	17.8	31.8
Romania	47.1	49.9
CEFTA total	16.3	17.6
EU	7.1	13.4
Total trade	5.7	10.0

Source: SURS; authors' calculations.

Table 3: Structure of Slovenia's foreign trade with CEFTA countries in 1998 (in percent).

NACE	Area and industry	Share of sector as % of total exports to CEFTA	Share of CEFTA as % of total exports of sector	Share of sector as % of total imports from CEFTA	Share of CEFTA as % of total imports of sector
A	AGRICULTURE, HUNTING AND FORESTRY	0.38	3.55	6.08	11.28
B	FISHING	0.00	0.00	0.00	0.26
C	MINING	0.12	11.75	1.09	7.31
D	FOOD PROCESSING INDUSTRY	99.50	5.74	92.83	6.77
DA	Food, beverages, animal feed, tobacco	1.94	2.82	13.16	16.09
DB	Textiles and textile products	3.76	2.05	3.95	3.26
DC	Leather and leather products	0.73	1.70	0.40	1.80
DD	Wood and wood products	0.68	0.89	2.07	10.88
DE	Paper, cardboard, publishing and printing	9.02	10.05	3.82	6.73
DF	Coke, oil derivatives, nuclear fuels	1.48	27.71	8.18	9.61
DG	Chemicals, chemical products and artificial fibers	39.41	21.07	12.95	7.52
DH	Rubber and plastic products	5.06	6.83	2.37	4.99
DI	Other non-metal mineral products	2.56	4.85	3.14	9.48
DJ	Metals and metal products	12.82	6.57	27.31	16.44
DK	Machines and devices	10.97	5.02	4.61	3.32
DL	Electrical and optical equipment	7.59	3.84	3.63	2.11
DM	Vehicles and watercraft	1.44	0.64	5.30	2.38
DN	Furniture and other products	2.04	1.76	1.92	6.02

Source: SURS; authors' calculations.

Table 4: Average import duties paid¹ for imports from CEFTA countries in 1992 and 1998 (in percent).

NACE	Hungary		Czech Republic		Slovakia		Poland	
	1992	1998	1992	1998	1992	1998	1992	1998
A	6.59	8.74	14.31	2.33	14.31	10.46	8.92	8.87
B		0.00	17.79	0.06	17.79	0.01		0.00
C	3.28	0.03	2.50	0.05	2.50	0.12	1.47	0.02
D	9.67	3.30	9.11	0.23	9.11	0.31	5.21	0.89
DA	16.37	15.60	13.00	5.01	13.00	8.66	6.34	9.34
DB	5.23	2.30	10.65	0.15	10.65	0.28	6.31	1.86
DC	4.26	0.45	5.60	2.29	5.60	0.78	1.00	0.69
DD	1.60	0.72	1.49	0.03	1.49	0.02	1.00	0.25
DE	6.54	1.02	3.71	0.08	3.71	0.22	7.53	0.19
DF	6.80	0.13	9.69	0.10	9.69	0.00	5.61	0.00
DG	7.84	0.15	4.74	0.12	4.74	0.07	1.61	0.06
DH	9.71	0.24	14.77	0.14	14.77	0.18	24.65	0.23
DI	9.16	0.83	12.94	0.10	12.94	0.08	9.63	0.27
DJ	2.26	0.05	5.76	0.04	5.76	0.02	4.21	0.51
DK	13.72	0.47	10.55	0.24	10.55	0.11	15.77	0.26
DL	11.12	0.79	7.16	0.37	7.16	0.60	5.55	0.30
DM	2.07	1.41	25.01	0.13	25.01	0.14	21.78	4.73
DN	13.62	1.19	12.70	0.62	12.70	0.23	0.78	0.43

Source: SURS; authors' calculations.

¹ The average import duty paid includes customs duties, variable import levies and other import taxes.

Table 5: Results of panel data analysis of Slovenian imports from CEFTA countries – static model

		POOLED OLS				FIXED EFFECTS				No. of obser.
		Const	Tariffs	Demand	Adj. R ²	Tariffs	Demand	Adj. R ²	F-test ¹	
POOLED CEFTA	coeff.	<u>-5.159</u>	<u>-0.172</u>	<u>0.826</u>	0.251	<u>-0.134</u>	<u>0.622</u>	0.252	11.32	1,646
	t-stat	-49.2	-10.55	20.55		-10.45	9.16		0.00	
HUNGARY	coeff.	<u>-5.418</u>	<u>-0.151</u>	<u>1.024</u>	0.279	<u>-0.124</u>	<u>0.952</u>	0.282	9.31	504
	t-stat	-27.83	-4.30	13.56		-4.30	6.77		0.00	
CZECH REPUBLIC	coeff.	<u>-4.772</u>	<u>-0.158</u>	<u>0.857</u>	0.330	<u>-0.166</u>	<u>0.502</u>	0.314	16.92	518
	t-stat	-31.83	-6.15	14.34		-8.52	5.21		0.00	
SLOVAKIA	coeff.	<u>-4.803</u>	<u>-0.193</u>	<u>0.550</u>	0.179	<u>-0.080</u>	0.205	0.185	13.19	294
	t-stat	-17.48	-5.47	5.47		-3.24	1.42		0.00	
POLAND	coeff.	<u>-5.970</u>	<u>-0.213</u>	<u>0.854</u>	0.294	<u>-0.188</u>	<u>0.721</u>	0.298	6.20	330
	t-stat	24.50	-6.43	9.38		-6.11	4.08		0.00	

¹ F-test for the presence of fixed effects. The box below the F-statistic gives the underlying significance.

Note:

Underline – means that the coefficient is statistically different from zero at 1% level.

Italic – means that the coefficient is statistically different from zero at 5% level.

Underline - means that the coefficient is statistically different from zero at 10% level.

Table 6: Time pattern of trade liberalization - impact of tariff reductions and demand increases

Variable	Pooled CEFTA		Hungary		Czech Republic		Slovakia		Poland	
	Coeff.	t-stat	Coeff.	t-stat	Coeff.	t-stat	Coeff.	t-stat	Coeff.	t-stat
Const.	<u>0.004</u>	17.69	<u>0.001</u>	13.45	<u>0.015</u>	6.05	<i>0.113</i>	2.08	<u>0.002</u>	9.95
Tariffs	<i>-0.196</i>	-2.27	-0.005	-0.04	<u>-0.458</u>	-1.93	<i>-1.437</i>	-4.28	<u>-0.248</u>	-1.88
Demand	<u>0.845</u>	7.79	<u>1.298</u>	6.58	<u>0.785</u>	4.67	0.251	0.84	<u>0.854</u>	3.84
Y1	1.143	0.32	1.321	0.40	0.692	0.45	<i>0.042</i>	2.46	1.059	0.06
Y2	1.369	0.74	<u>3.777</u>	1.86	0.602	0.62	<i>0.071</i>	1.95	0.824	0.23
Y3	<i>2.686</i>	2.29	<u>11.750</u>	3.43	0.722	0.39	<u>0.080</u>	1.93	3.057	1.30
Y4	<u>3.103</u>	2.66	<u>10.130</u>	3.20	0.900	0.13	<u>0.016</u>	3.04	<i>7.277</i>	2.40
Y5	<u>7.072</u>	4.47	<u>27.701</u>	4.79	1.209	0.23	0.165	1.43	-	-
Tariffs1	-0.060	-1.28	<i>0.301</i>	1.95	-0.114	-1.31	<i>-0.593</i>	-2.13	-0.381	-0.59
Tariffs2	-0.104	-0.91	-0.059	-0.29	-0.297	-0.60	<i>-0.438</i>	-2.43	-0.061	-1.26
Tariffs3	-0.100	-1.02	<i>-0.449</i>	-2.48	<u>-0.059</u>	-1.62	<u>-0.151</u>	-3.71	-0.118	-0.88
Tariffs4	-0.116	-0.85	-0.167	-1.06	<u>-0.046</u>	-1.68	<u>-0.291</u>	-3.30	-0.111	-0.91
Tariffs5	<u>-0.036</u>	-1.68	0.030	-0.24	-0.097	-1.47	<u>-0.155</u>	-3.71	-	-
Demand1	0.800	0.30	0.950	1.26	0.771	0.06	0.772	1.26	1.027	0.56
Demand2	0.848	0.02	0.924	1.37	0.866	0.35	0.795	1.35	1.002	0.48
Demand3	0.698	0.97	<u>0.786</u>	1.85	0.826	0.17	0.507	0.63	0.730	0.41
Demand4	0.699	0.99	<u>0.793</u>	1.83	0.800	0.07	<u>1.036</u>	1.90	0.513	1.20
Demand5	<i>0.496</i>	2.36	<u>0.518</u>	3.02	0.696	0.40	0.206	0.12	-	-

Note:

Bold underline – means that the coefficient is statistically different from zero at 1% level.

Bold italic – means that the coefficient is statistically different from zero at 5% level.

Underline - means that the coefficient is statistically different from zero at 10% level.

Table 7: Results of panel data analysis of Slovenian imports from CEFTA countries – dynamic model¹⁹

		FIXED EFFECTS (dynamic model)				No. of obser.
		Lagged imports	Tariffs	Demand	Adj. R ²	
POOLED CEFTA	coeff.	<u>0.71</u>	<u>-0.209</u>	<i>0.192</i>	0.72	1,153
	t-stat	14.24	-2.74	2.1		
HUNGARY	coeff.	<u>0.67</u>	-0.113	0.141	0.53	360
	t-stat	8.96	-0.87	1.02		
CZECH REPUBLIC	coeff.	<u>0.49</u>	<u>-0.291</u>	<i>0.330</i>	0.35	370
	t-stat	4.46	-2.54	2.11		
SLOVAKIA	coeff.	<u>0.096</u>	<u>-0.279</u>	<i>0.287</i>	0.12	203
	t-stat	1.20	-2.84	2.24		
POLAND	coeff.	<u>0.66</u>	<u>-0.518</u>	0.042	0.65	220
	t-stat	6.85	-2.47	0.30		

Note:

Bold underline – means that the coefficient is statistically different from zero at 1% level.

Bold italic – means that the coefficient is statistically different from zero at 5% level.

Underline - means that the coefficient is statistically different from zero at 10% level.

¹ The estimated equation was as follows: $IM_{it} = a_i + \lambda IM_{it-1} + b_1 F(t) T_{it} + b_2 C_{it} + \varepsilon_{it}$. This means that one has to multiply the tariff rate coefficient in the table with the corresponding value of $F(t)$ function described above in order to get the values of tariff rate coefficients for each individual year.

⁹ Estimated equation was as following: $IM_{it} = a_i + \lambda IM_{it-1} + b_1 F(t) T_{it} + b_2 C_{it} + e_{it}$. This means that one has to multiply the tariff rate coefficient in the table with the corresponding value of $F(t)$ function described above in order to get the values of tariff rate coefficients for each individual year respectively.

Figure 1: Time pattern of liberalization effects - impact of tariff reductions

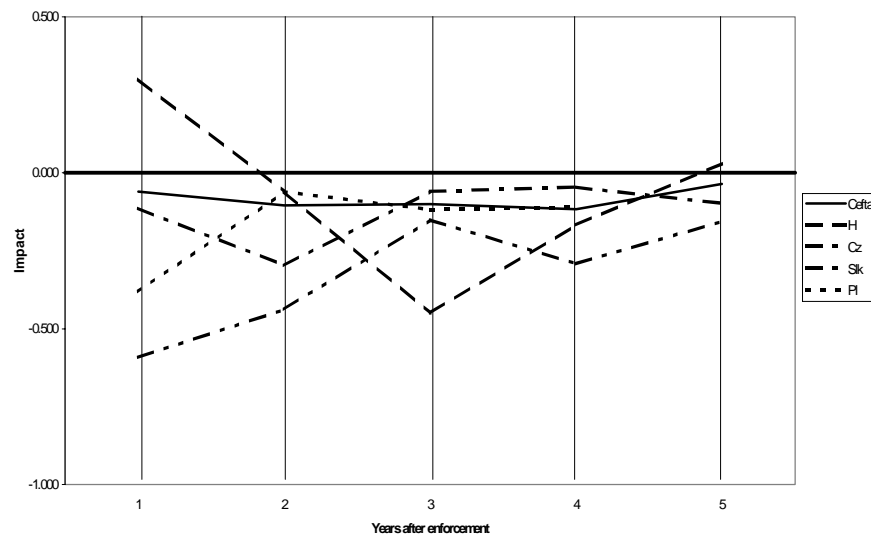


Figure 2: Time pattern of liberalization effects - impact of demand

