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Trade Effects of the East Enlargement in the CEECs

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I hereby declare that this thesis is my own work and that all sources have been acknowledged.

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Abstract

The thesis analyses the effect of the Eastern enlargement on goods flows into four CEECs. In the beginning, the Eastern enlargement and numerous related economic effects are briefly characterised. After that it focuses on trade diversion and trade creation effects, starting with a concise discussion of the traditional customs union theory and followed by the explanation of the choice of the estimation method. A gravity model applied on a panel data set is then used to model the import flows into the EU15 and the Czech Republic, Hungary, Poland and Slovakia. The results showed that a careful choice of the model specification and estimating technique is needed and the model that controlled for four sources of unobserved heterogeneity (time, country pair, importer, and exporter specific characteristics) was chosen. Based on this model's results, we could expect a significant increase of imports from EFTA into these countries but aggregately we should not expect any trade diversion as no further redirecting of import flows from the rest of the world is predicted. Eventually, some of the real trade flow developments (territorial and commodity structures and revealed comparative advantages of selected regions) are described.

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1. Introduction

On 1st May 2004, the unprecedented number of ten countries entered the European Union – Cyprus, Czech Republic, Estonia, Hungary, Latvia, Lithuania, Malta, Poland, Slovakia, and Slovenia – raising the number of EU members to 25. This number was further increased on the 1st January 2007 with the accession of Bulgaria and Romania. The formal accession to the country bloc as a result of a lengthy process of negotiations and harmonization can be viewed as an external shock for the accession countries, having multiple inter-related both political and economic implications and effects. This thesis focuses on the economic dimension of the enlargement and further elaborates particularly on the implications for the external trade of the new member countries, using examples and data of selected Central and Eastern European Countries (CEECs). Its primary goals are to explore what are the main trade-related enlargement effects and whether we could expect some to occur at or after the actual date of entry or whether all had been exploited during the preparation period.

The thesis is organized as follows. In the following section, the history of Eastern enlargement is briefly summarized and the overview of the main related economic effects is provided. Section 3 focuses on the selected effects, namely trade creation and trade diversion, beginning with the explanation of the concept, followed by the model and estimation technique description and concluded with the actual estimation results presentation. Section 4 provides couple of empirical observations on trade developments based on available statistics and section 5 concludes the thesis.

2. The Eastern enlargement

2.1.　　　A brief look into the history

The process of re-integration of CEECs back into the European structures started more or less right after the collapse of central planning and dissolution of Council for Mutual Economic Assistance (COMEA). The starting point of the formal integration was the signing of Europe Agreements (EA), done by majority of countries already in the first half on 1990s[1]. This opened door to the systematic pre-accession talks and what's important from our point of interest, also to the provision of financial assistance to the accession countries for creation of required institutions and support of economic changes[2] and gradual liberalization of trade. Drawing on the EA between European Communities and the Czech Republic[3], the aim was to establish a free trading area within 10 years, while the tariffs on majority of industrial good items originating in the Czech Republic were abolished at the day when the treaty came into force with exceptions for some „sensitive goods"[4], where tariffs or some combination of quotas and tariffs remained with a plan for gradual removal within a few next years. Also the schedule for the elimination of barriers on imports of goods from the

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1 Slovenia was the last country to sign in 1996; on the other hand, Cyprus and Malta, alongside with Turkey, had their so called „Association Agreements" signed already before the mid-1970s.

2 Among the most notable sources of financial aid in the pre-accession period belong programmes Phare, ISPA, SAPARD and some financial tools made available for both incumbent and accession countries such as Socrates

3 Full text available at http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=CELEX:21994A1231(34):EN:HTML (visited on 11.3.2009).

4 The „sensitive goods" in this case included mainly some metal products, heavy chemical products, leather goods, glass products, motor vehicles and furniture.

Communities into the CEECs was included in the EA's, only the plan was less stringent. However, the barriers in agricultural trade remained still relatively high and complicated. Nevertheless, according to the European Commission (2006), these bilateral agreements liberalized about 85 % of trade between the blocs.

Before 1996 most of the countries had officially applied for EU membership and the actual accession negotiations began with the so called „Luxembourg" group of the best-prepared countries (Cyprus, Estonia, Hungary, Poland, the Czech Republic and Slovenia) in March 1998; all other candidate countries except Turkey (so called „Helsinki group") joined the talks in February 2000. After a thorough sector-by-sector evaluation, it was decided that the first 10 countries are ready to join the EU and after signing the Accession Treaty in April 2003 they did so officially on 1st May 2004.

Although the official entry entailed the removal of the remaining trade barriers and application of the EU's common external tariff, the effects stemming from the EU accession still weren't fully exploited. One of the reasons is that incumbent EU members except Ireland, Sweden and the United Kingdom decided to apply transitional periods on free movement of labour from the new member countries for a period of maximum 7 years[5]. Another step towards closer integration was the removal of all border controls as a result of the Schengen Area expansion that happened in nine of the new member countries in

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[5] An overview of varying national measures is available e.g. on the internet site of European Commission - Employment, Social Affairs and Equal Opportunities:
http://ec.europa.eu/social/BlobServlet?docId=119&langId=en (visited on 11.3.2009).

December 2007 for land and sea borders and in March 2008 for airports[6]. This should apart from making travelling more comfortable also enhance cross-border movements of workers. Also importantly, the new members obliged themselves to accept common currency in the future, which should possibly bring about some further economic effects that shall be mentioned, along with others, in the following section.

2.2. Economic effects of the enlargement

Broadly speaking, from the point of view of the accession countries, the barrier-free entry into the relatively big EU market can produce a vast number of inter-related economic effects. It might be useful to classify them – one possible way goes in line e.g. with Baldwin et al. (1997). He distinguishes between ‚allocation' and ‚accumulation' effects. While the earlier enhance economic efficiency by resource reshuffle (typical example are trade effects that we will focus on the most), the latter affect national output and welfare by change in the stock of national resources.

The effects are spread over the whole period starting with the beginning of accession negotiations and shall be fully exploited, as indicated previously, not earlier than a number of years after the actual entry. To complicate the matters even more, as the CEECs economies were facing huge shocks related to the collapse of communism in the beginning of their accession talks in early 1990s, as e.g. Kaminski (2001) notes „...integration-induced effects are impossible to separate from those stemming from dismantling central

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[6] The only omitted new EU member from the enlargement in 2004 is Cyprus that had not filled the entry criteria.

planning…" (op. cit. p. 4). In this thesis, we will concentrate on effects on trade flows – especially expected both qualitative and quantitative boosts and readjustments in trade patterns, which we should elaborate on the most. Nevertheless, we will also briefly mention the enlargement effects on flows of labour and inflow of capital (especially FDIs) to complete the picture and also because all the economic effects are inter-related and in some cases mutually reinforcing.

2.2.1. Labour migration

One of the cornerstone principles of the European common market is the free movement of labour. One of the expected benefits of joining the EU is therefore that the workers from the new member countries will be able, especially after the complete derogation of transitional periods, to search for a job freely in any other member country. This should help both the individual workers as wage levels in their native countries are generally significantly lower comparing to the wage levels in the 'old' EU member countries and the European economy as a whole as these workers could eliminate possible labour market shortages and create overall 'healthy' competitive pressure.

On the other hand, the possibility of free movement of labour creates fear in the incumbent member labour markets (that's actually why there are some transitional periods) and to some extent also in the accession economies. While the earlier fear predominantly of being „over-flooded" by cheap labour from the East, resulting possibly in higher domestic unemployment and downward wage pressures, the latter might fear of a certain „brain-

drain", i.e. of the loss of the educated experts who would leave home for higher salary offers that their domestic economy could not match at its stage of development.

The scenarios outlined in the paragraph above, however, might not be so critical. As noted by Jovanovic (2000) „...experience has shown that labour migration (wars apart) takes place chiefly when labour cannot find employment in its country of origin..." (op. cit. p. 517)[7]. Also Pelkmans (2002) is rather sceptical about fears of big migration flows resulting from virtual opening of the borders. His arguments go in three ways. First, the workers might fear of discrimination, value their current social attachment high and might be willing to wait for a ‚brighter future' of their native lands. Second, the preference of temporary migration, only to build up some capital for better life back at home tends to be very strong. Third, there is a „host country control" principle in force in a sense that any worker will have to be treated basically as a worker from the host country (as for wage and other treatment designed not to be discriminatory), which might completely erase any competitive advantages of the workers coming from the ‚poor' countries.

To conclude this point, we consider worthwhile to cite the „Report on the Functioning of the Transitional Arrangements" (European Commission; 2006b) that was created as the evaluation of the first phase of the transitional arrangements with the intention to better

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[7] According to Eurostat, in the last year preceding the enlargement (2003), the average unemployment rate for EU15 was 7.9 %, while for some of the biggest EU economies it was even higher (Germany 9.3 %, France 9 %, Spain 11.1 %, Italy 8.5 %). On the other hand, for half of the 12 candidate countries, the unemployment rate was below the EU average (ranging from 4.1 % in Cyprus to 7.8 % in the Czech Republic). The unemployment rate was higher by couple of percent in all three Baltic countries, while the highest was in Poland with 19.7 %, Slovakia 17.6 % and Bulgaria 13.7 %. The only countries acceding in 2004 where unemployment was posing a significant problem therefore appear to be Poland and Slovakia.

inform the decisions of the member states about the second phase of the agreements. It can serve us as an empirical assessment of the ‚full' EU entry effect (as for the labour market access) on the labour markets both in the ‚old' and ‚new' member countries. The main findings are quite in line with the assumptions foreshadowed in the previous paragraph. It showed that the labour flows between and within the two blocks are very limited (much less important than immigration from the third countries) and that it is impossible to prove a direct link between the transitional arrangements and labour flows. The report goes further and argues that the „...EU-10 nationals positively contribute in each Member State to overall labour market performance, to sustained economic growth and to the state of public finances..." (op. cit. p. 11). The skill composition of the migrant workers seems to be rather complementary, hence driven rather by supply and demand forces and preventing ‚crowding-out' of the native workers. All in all, the effects of the EU enlargement on the labour migration appear to be relatively small but in their nature positive.

2.2.2. Capital flows

It is out of scope of this thesis to deal with the advantages and disadvantages of the investment (especially FDI) inflows into a relatively less developed economy like a EU-candidate country. Let's here just mention that the benefit is not only the production capacity building capability but FDIs are also a tool for transfer of new technologies and management practices; they can have positive spill-over effects also on the domestic firms especially those that become part of a foreign firm's supply chain. The foreign capital is therefore helping to the economy restructuring and also as Kaminski (2001) notes, „...foreign

firms are more foreign trade-oriented than domestic firms, thus making a relatively larger contribution to reintegration of CEECs into the world economy and especially into the EU..." (op. cit. p. 33).

As we assume that the EU accession or its prospects influence positively the capital flows into the CEECs, FDI and EU membership constitute thence mutually enforcing elements – the prospect of membership encourages FDI inflows and these then contribute to the real integration into the EU. The influence shall happen chiefly in two steps. First, the very promise of EU membership tends to reduce the country's riskiness and enhance its credibility. As noted by Baldwin et al. (1997), „...EU membership greatly constrains arbitrary trade and indirect tax policy changes...locks in well-defined property rights and codifies competition and state-aids policy...assures investors that they can put in and take out money...guarantees that CEEC-produced products have unparalleled access to the EU15 markets..." (op. cit. p. 140). Second, the commitment to join the monetary union in the future should keep the country's inflation within reasonable ranges once a country decides to start fulfilling the Maastricht criteria. This should be another good message for investors, similarly as reduction of exchange rate volatility (initially already after the country enters ERM 2 as another Maastricht condition, eventually totally eliminating it by adopting common currency); this effect is however quite disputable[8]. The reduction of risk premiums

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[8] For instance, Crowley and Lee (2003) found that the volatility-investment relationship differed significantly according to the magnitude of volatility, indicating possible existence of a ‚threshold' at which the volatility begins to hamper the capital flows. On the other hand, Goldberg and Kolstad (1995) conclude that exchange rate volatility might motivate investors to locate the production abroad and Darby et al. (1999) finds situations when the reduction of volatility both does increase investments and does not.

related to both points above should theoretically enhance investments as the required rate of returns (that include risk premiums) would be lower as well.

To conclude the point, it can easily be shown that CEECs have experienced a rise in FDI inflows since the beginning of 1990s.[9] However, as noted in the beginning of this section, it is very difficult to quantify what portion of this inflow can be ascribed to the enhanced credibility and reduced riskiness induced purely by EU membership prospects and what was the natural result of economy-opening after the collapse of central planning, supported by privatisations and also investment incentive schemes.

2.2.3. Trade effects

There are several ways to look at trade effects induced by the preferential trade liberalization or more specifically by EU accession. One of the possible approaches is the distinction between traditional (or perfect competition) effects and new trade theory (imperfect competition) effects. The earlier are predominantly concerned with the cost differences between countries and stem hence primarily from tariff abolition. These effects include so called trade diversion and trade creation and shall be the main focus of the following couple of sections. The latter take into account also market size, economies of scale, competitive effects and product variation. This classification partially overlaps with another view, offered by Breuss (2001) and depicted at Figure 1. He distinguishes between

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[9] For illustration, based on OECD statistics, the sum of investment inward positions for the Czech Republic, Hungary and Poland was in 2004 nearly eight times higher than in 1995 and seventeen times higher than in 1993.

‚trade effects' that correspond mainly to the traditional effects and ‚single market effects'
that are closely related to the new trade theory view. We consider the latter effect, along
with another – ‚Euroland participation' in this section as they happen largely through
trade[10].

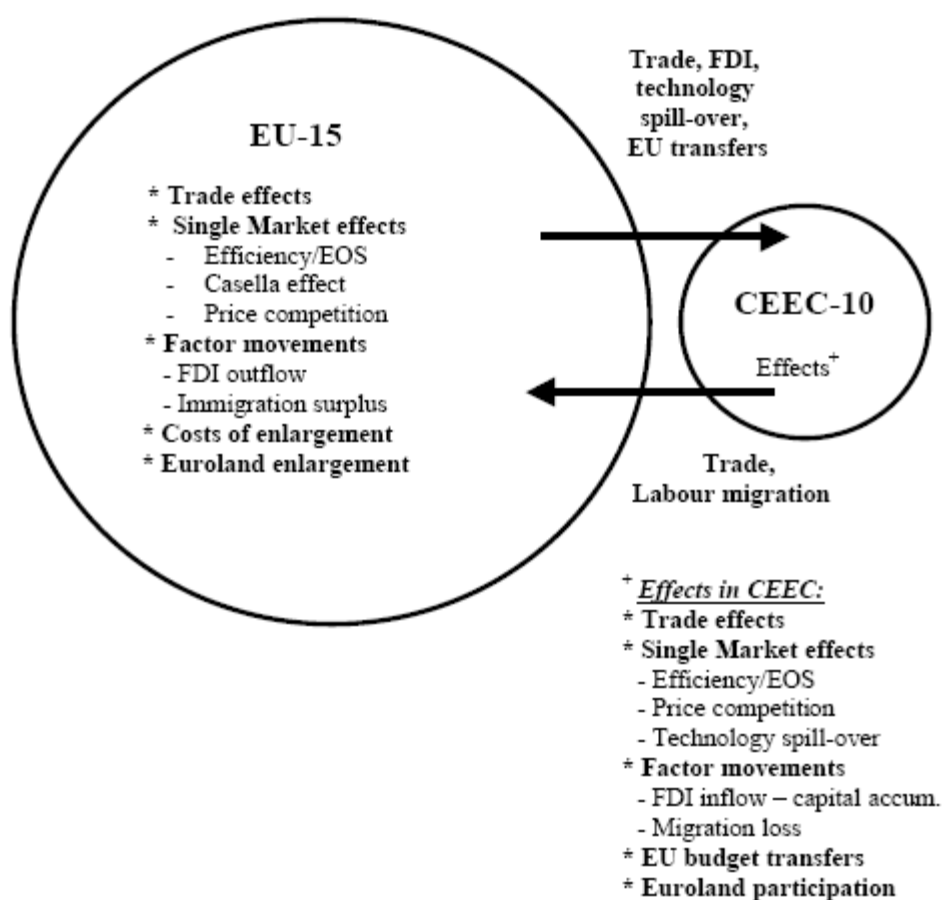### 2.2.3.1. Single market effects

The common underlying assumption for the effects, whose brief explanation shall follow,
is that entering the single market will impose CEEC firms to greater competitive pressures
while at the same time the size of the market they can potentially supply significantly
increases. If we assume that in some markets imperfect competition prevails, the increased
number of competitors should lead to the decrease in their price mark-ups, resulting in
certain welfare gains induced by consumer surplus expansion and producer surplus losses
being offset by increased production (assuming the price doesn't drop bellow their costs).

The other effects are related to the bigger market capacity. Firstly, if in an industry average
costs fall with the scale of production, the possibility to supply bigger market enables firms
to produce with lower unit costs, thus achieving gains based on economies of scale effect.
Another effect of this kind is the increase in the range of varieties available and that are
reasonable to produce because of a bigger number of potential buyers. The enlarged choice

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[10] We have briefly touched upon the effect of common currency on FDI flows in the previous section; to
complete the list of effects, factor movements have also been sketched already and we omit the whole
complex issue of EU budget transfers.

of consumer goods is expected to influence directly and positively consumer welfare while

bigger variety of intermediary goods shall improve efficiency of manufacturers.

Figure 1 – Integration Effects of EU Enlargement

Trade, FDI, technology spill-over, EU transfers

EU-15

* Trade effects
* Single Market effects
  - Efficiency/EOS
  - Casella effect
  - Price competition
* Factor movements
  - FDI outflow
  - Immigration surplus
* Costs of enlargement
* Euroland enlargement

CEEC-10

Effects[+]

Trade, Labour migration

[+] *Effects in CEEC:*
* Trade effects
* Single Market effects
  - Efficiency/EOS
  - Price competition
  - Technology spill-over
* Factor movements
  - FDI inflow – capital accum.
  - Migration loss
* EU budget transfers
* Euroland participation

Source: Breuss (2001).

The above mentioned effects are part of two more general and partially overwhelming

effects. The first has to do with industrial location. It is quite plausible to anticipate that

favourable conditions to trade will in a longer term attract new producers or existing ones from ‚peripheral' regions. As noted by Widgren (2001), the firms' location is affected at least by four factors – demand concentration, comparative advantage, input-output linkages within industries and high non-tariff barriers. As further argued by Haaland et al. (1999), "...while the importance of Heckscher-Ohlin and Ricardo theory should not be ignored when explaining the economic geography of Europe, expenditure localisation clearly dominates the picture..." (op. cit. p. 25). Joining the big European common market, dominated by Germany, should seemingly be the most beneficial for the most proximal regions. This even leads Widgren (2001) to conclude that "...the first explanation of industrial location works against the Northern Dimension and the South East applicant countries and in favour of Central Europe as production shifts towards demand..."[11] (op. cit. p. 17).

The second rather general effect concerns the actual composition and factor content of the trade. The access to the demanding EU markets, tougher competition in the common market, accompanied by impact of foreign FDI and overall catching-up the development levels of the incumbent EU members most likely significantly contribute to the qualitative changes in the nature of CEEC's trade flows, started already after the collapse of the Council for Mutual Economic Assistance CMEA. As concluded by Kaminski (2001), the composition of CEEC trade has been becoming more similar to that of EU with growing content of skilled labour and technology intensive products and higher share of intra-industry trade. The latter

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[11] Widgren (2001) distinguishes between three regions where European integration takes place – Central dimension (dominated by Germany; out of applicants includes Poland, Czech Republic, Slovakia, Hungary and Slovenia), Northern dimension (Nordic countries, northern part of Germany and Poland, the Baltic countries) and South Eastern dimension (Romania and Bulgaria).

can be attributed mainly to the fragmentation of production processes but also to the higher demand for product varieties, already mentioned above. The evidence for the rise of the intra-industry trade shares, based on Grubel-Lloyd indices[12] is provided in Table 1. We can see that all included EU applicant CEEC countries have experienced indisputable increases and that a common share in the EU countries is about 70 %, which has been already reached in some cases.

2.2.3.2. Common currency effects

The effects of common currency adoption on trade belong to the most disputable ones. Theoretically, common currency, albeit possibly bearing macroeconomic costs in some cases, should bring certain microeconomic benefits through removal of currency conversion costs and more importantly, by elimination of risky exchange rate volatility, which should in turn enhance trade. The empirical evidence on the size of the effects and sometimes even on their direction remain however ambiguous. Although already e.g. Kenen and Rodrik (1986) concluded that the real exchange rate volatility has negative impact on trade volumes, in a latter extensive literature survey, Cote (1994) asserts that the evidence on volatility effects is mixed.

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[12] Grubel-Lloyd index for a particular product class i between countries A and B is computed as

$$IIT_{i,AB} = \left[\frac{(X_i + M_i) - |X_i - M_i|}{(X_i + M_i)} \right] \cdot 100$$; reaching value of 100 when export (X) equals import (M) and 0 if there are no exports or imports in the same product class. The overall indices are based on weighted average of IIT_i by the share of i on total trade.

Table 1 – Manufacturing intra-industry trade as a percentage of total manufacturing trade

	1988-91	1992-95	1996-2000	Change
High and increasing intra-industry trade				
Czech Republic	n.a.	66.3	77.4	11.1
Slovak Republic	n.a.	69.8	76.0	6.2
Mexico	62.5	74.4	73.4	10.9
Hungary	54.9	64.3	72.1	17.2
Germany	67.1	72.0	72.0	5.0
United States	63.5	65.3	68.5	5.0
Poland	56.4	61.7	62.6	6.2
Portugal	52.4	56.3	61.3	8.9
High and stable intra-industry trade				
France	75.9	77.6	77.5	1.6
Canada	73.5	74.7	76.2	2.7
Austria	71.8	74.3	74.2	2.4
United Kingdom	70.1	73.1	73.7	3.6
Switzerland	69.8	71.8	72.0	2.2
Belgium/Luxembourg	77.6	77.7	71.4	-6.2
Spain	68.2	72.1	71.2	3.0
Netherlands	69.2	70.4	68.9	-0.3
Sweden	64.2	64.6	66.6	2.4
Denmark	61.6	63.4	64.8	3.2
Italy	61.6	64.0	64.7	3.1
Ireland	58.6	57.2	54.6	-4.0
Finland	53.8	53.2	53.9	0.1
Low and increasing intra-industry trade				
Korea	41.4	50.6	57.5	16.1
Japan	37.6	40.8	47.6	10.0
Low and stable intra-industry trade				
New Zealand	37.2	38.4	40.6	3.4
Turkey	36.7	36.2	40.0	3.3
Norway	40.0	37.5	37.1	-2.9
Greece	42.8	39.5	36.9	-5.9
Australia	28.6	29.8	29.8	1.2
Iceland	19.0	19.1	20.1	1.1

Source: OECD (2002).

The whole new wave of assessing the exchange rate volatility reduction or common currency effects on the volumes of trade was provoked by Rose (2000), who estimated that "...two countries which use the same currency trade much more than comparable countries with their own currencies...[the] estimate is over three times as much..." (op. cit. p. 23). Although

he later corrected the estimated magnitude downwards[13], his estimates still look exaggerated. For instance, according to Pakko and Wall (2001), common currency does even reduce trade; however, their main ambition was to show that also Rose's results might be sensitive to proper specification and selection of the data set. A latter study focusing directly on EMU by Micco et al. (2003) estimates the effect on bilateral trade to amount between 5 and 10 % or between 9 and 20 % when compared to non-EMU country pairs. The authors also found no evidence of related trade diversion. On even less optimistic note, Bun and Klaasen (2006) estimated the euro impact after making some further specification improvements to only 3 %. Nevertheless, although the studies typically significantly vary in the magnitude of the results, majority of them confirm the positive impact of common currency on trade that we might anticipate for the CEEC in the future as well.[14]

Before we proceed further with the next section dealing with the concept and modelling of the trade diversion and trade creation effects, we can take a look at Figure 2, depicting the enlargement effects and their main triggers we touched upon in the previous section. Its ambition is not to be fully exhaustive, yet it tends to be quite illustrative.

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[13] For instance Glick and Rose (2001), using panel data set instead of cross-section data found that currency union 'only' doubles the trade.

[14] For an overview of more than 30 studies accompanied with a meta-regression analysis you can see Rose and Stanley (2005).

Figure 2 – Economic effects of Eastern Enlargement
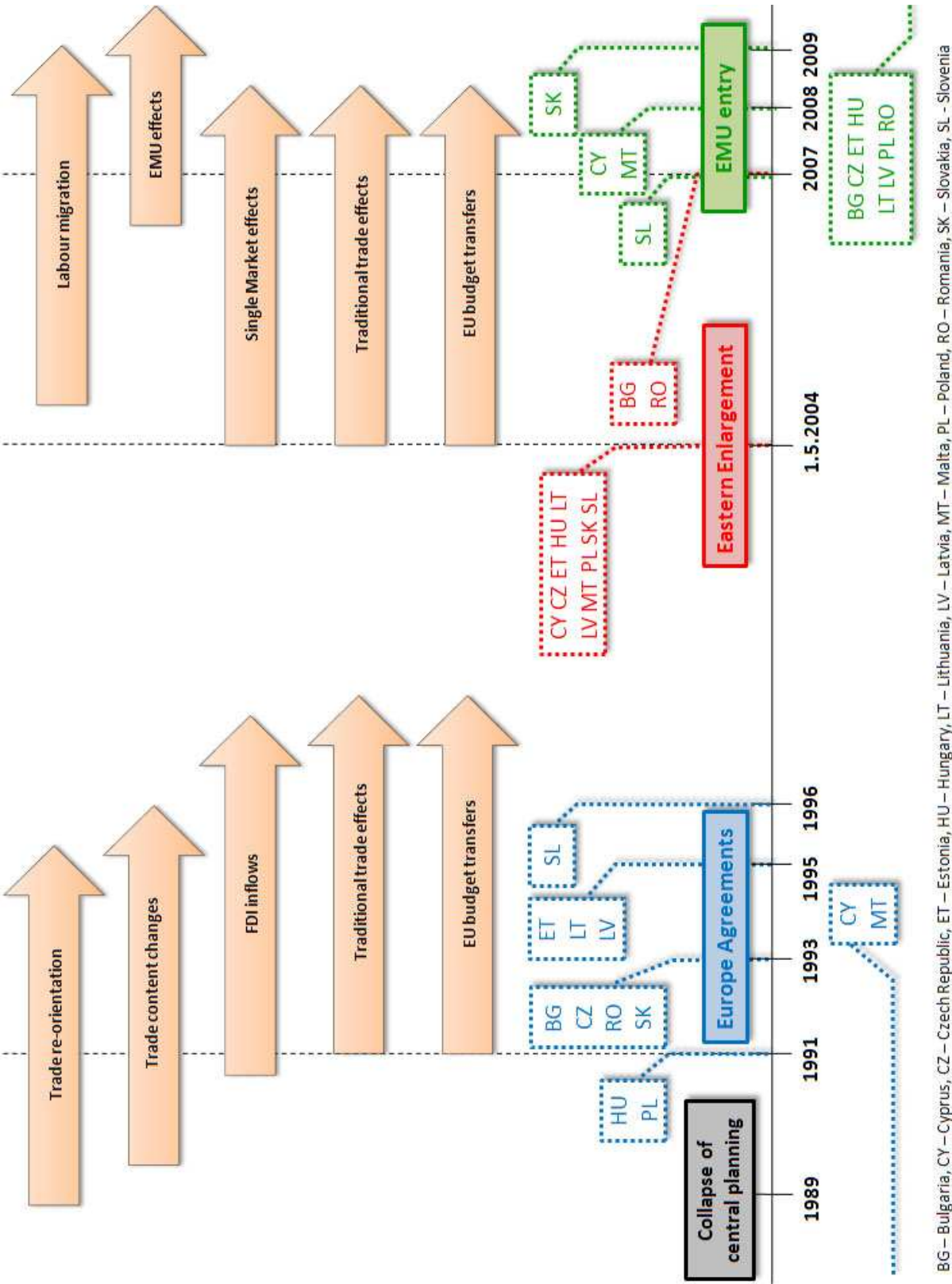
3. Trade creation and trade diversion

Joining the EU means basically entering a preferential trading area, more specifically a customs union, which brings about the question what trade effects will this cause on the new member economies, if any. Specifically, whether we can expect some trade creation or trade diversion in the spirit of Viner (1950).

Generally, mutual removal of tariffs (and other barriers) between the "new" and "old" members[15] could impose the domestic producers in the accession economies a bigger competition, causing the less efficient ones being replaced by more efficient producers in the current EU member states, leading to increased imports – so called trade creation. On the other hand, such a preferential area might be to some extent discriminatory. If so far the domestic market of a new member was "protected" from imports no matter where the imports were coming from (either current EU members or non-members) roughly the same, the importer could freely choose the more efficient source provided they were still (despite subject to tariffs) cheaper than domestic producers. After removing the barriers on imports from the EU and imposing the common community barriers towards the rest of the world, there might be cases of shifts from more efficient sources of import to EU sources as these

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[15] Note that tariffs and quantitative restrictions on majority of goods between the membership candidate countries and the EU were removed already prior to the official entry by establishing a free trade area on 1st January 2001. Some liberalization steps were taken already following the signatures of the so called Europe Agreements in the beginning of 1990s as described in section 2a; the removal of the rest of barriers, same as introducing the common external tariff came into effect on the day of the official entry; therefore the following analysis of expected changes after 2004 is still meaningful.

are now cheaper simply because they are not subject to any barriers – this would be the case of trade diversion.

3.1. The concept of trade creation and trade diversion

The development of customs union theory and the related notions of trade diversion and trade creation is ascribed to Viner (1995), further explained or extended by Meade (1951, 1955), Makower and Morton (1953), Lipsey (1957, 1960), Johnson (1965), Kemp and Wan (1976), and others. The original essence of the idea is captured in Figure 2.

Figure 3 – Trade Creation and Trade Diversion
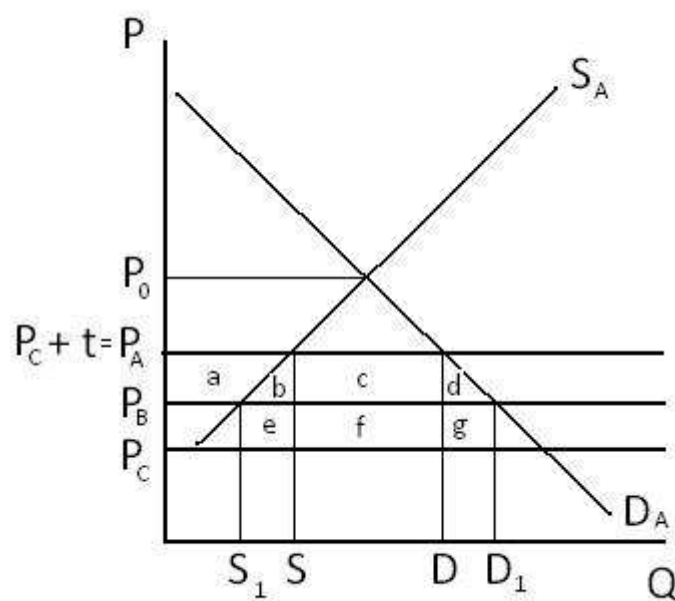
Suppose there are two countries, A and B, forming a customs union, and a country C that should proxy for the rest of the world. In this simple partial equilibrium model, there is one

homogenous good produced and traded, perfect competition prevails, and each country takes the world price as given. As can be seen, C is the most efficient producer of the good as she is able to offer the lowest price. Therefore, before the formation of the customs union, i.e. when imports to A both from B and C are subject to a non-discriminatory tariff t, the good price in A is P_A, the quantity produced in A is S and the difference between D and S is imported from C, yielding the tariff revenue of $c+f$.

After A removes the tariff on good from B during the formation of the customs union, consumers in A will find goods from C still subject to tariff relatively more expensive, the price in A falls to P_B, domestic production to S_1 and imports rise to D_1 minus S_1 (trade creation) but are now supplied by country B – less sufficient supplier (trade diversion)[16]. A simple welfare analysis shows that the "pre-Vinerian" belief of the effect of customs unions as formulated by Lipsey (1960) "…Free trade maximizes welfare; a customs union reduces tariffs and is therefore a movement towards free trade; a customs union will, therefore, *increase* world welfare even if it does not lead to a world-welfare *maximum*…" (op. cit. p. 497), is not quite correct. In our case, the consumers' surplus increases by $a+b+c+d$, producers' surplus decreases by a and the government loses tariff revenue of $c+f$.

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[16] Kemp and Wan (1976) postulate that there is a level of common external tariff that implies no trade diversion. It can be imagined as forming a customs union in two phases – first removing tariffs among all countries and then imposing on the non-union country a common tariff that reduces the level of imports on the pre-union level (this implies some production changes within the union). This would indicate a Pareto improvement as the union countries are better off (eliminating mutual tariffs) and the outsiders are not made worse off. However, as concluded by Richardson (1995), such a result might not be guaranteed solely by the union members setting the "optimal" tariff as, especially in cases when the customs union is significantly large or when the extra-union trade is with a small number of countries, we could expect some kind of strategic behavior from the outsider countries leading to a different reactions to seemingly the same situation as before the formation of the customs union.

Whether the resulting welfare effect is positive or negative is not therefore unambiguous as using our notation it is *b+d-f*, which can be either negative or positive, depending on the size of the partial effects.

Nevertheless, as noted by Hillman (1989), even if the resulting welfare change tended to be zero or even negative, individual consumers would most likely always opt for securing cheaper imports from B. The country's individuals are facing a Prisoner's Dilemma here whether to continue buying from C offering better terms of trade or whether to secure cheaper imports from B. The resulting dominant Nash equilibrium strategy is to secure cheaper imports as in the case they preferred importing from the source offering better terms of trade, part of their income would be a share of the tariff revenue which they perceive as exogenous since it is subject to redistribution (and is the lower, the less individuals adopts the same strategy).

Moreover, it can easily be shown that in such a scenario, forming the customs union is just a second-best solution. Namely, unilateral reduction of tariff to the size (P_B-P_C) would cause the same consumers' and producers' surplus changes but government would instead of losing *c+f* lose only *c* and gain *e+g*, moreover causing no trade diversion. One of the explanations why the worse option might be eventually preferred by the policy makers is suggested by Johnson (1965). He distinguishes between "real product" that he defines as "…total production of privately appropriable goods and services…" (op. cit. p. 257), and "real income" that includes also utility flowing from collective consumption. He further assumes that "…there exists a collective preference for industrial production…" (op. cit. p. 258),

causing individuals are willing to spend resources to boost the volume of industrial production and employment over the level that would be achieved under free trade. Johnson concludes that while subject of standard economic analysis is maximizing the real product, political discussion focuses on the real income maximization. The concern to satisfy the domestic demand by increased volume of cheaper imports might be hence second-order relative to the aim to increase the efficiency and volume of domestic industrial production[17].

So far we have considered only the effects in a one product world. The matters get a bit more complicated if we extend the model to more goods. The crucial question then stands what is the relation between the goods produced in the customs union and those produced in the rest of the world. If these goods are mostly substitutes, we could expect quite a significant trade diversion as these goods will be now despite worse terms of trade relatively easily replaced by goods produced in other union countries. On the other hand, the increased intra-union consumption of goods for which the outsiders' goods are rather complementary could enhance the imports from the rest of the world. We could expect the intra-union consumption to increase due to the elimination of tariffs or additionally, inquiring into the new trade theories and abstracting from the perfect competition, due to restricting the monopoly power and generally increased competition, causing downward pressure on prices.

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[17] It is assumed that each member has a share of the union production guaranteed; therefore protection against the rest of the world is superior to obtaining cheaper imports.

As can be seen also from the previous analysis, it is difficult to make any welfare judgments if we allow for a more complicated setting. However, we should not consider trade creation as clearly welfare-improving and trade diversion as welfare-reducing. As noted for example already by Lipsey (1960), "…when consumption effects are allowed for, the simple conclusions that trade creation is 'good' and trade diversion is 'bad' are no longer valid…" (op. cit. p. 41). He views the trade-diverting customs unions as having two opposite effects – one welfare-reducing of purchasing from a higher cost source and second welfare-enhancing of eliminating the discrepancies between the domestic and international price ratios. By the same token, Baldwin et al. (1997) argues that if the countries eliminate 'frictional' barriers that create no trade rents (not harmonized product standards was the example provided), "…we may observe trade diversion (in the sense of supply switching) that raises national welfare by lowering the cost of imports…" (op. cit. p. 134). Anyway, the welfare effects cannot be estimated by the model we are going to use, therefore we will concentrate exclusively on the size of the trade diversion and trade creation effects.

To summarize, why do we expect there to be a trade diversion in CEECs following their accession into the EU? Although the model presented in this section is very simplistic and relies on strong assumptions, it is plausible to expect that there might be stronger preference for imports from the EU at the expense of the rest of the world as imports from these outsider countries become to some extent discriminated in the sense that only they

are subject to tariffs and other non-tariff barriers[18]. What shall we expect to have an influence on the magnitude of the predicted trade effects? First of all, it is the current volume of trade of the accession economies with the extra-EU countries. If it had been relatively small already before the joining the EU, the overall effect will not be huge either[19]. Second, it is the level of pre-union and common external tariffs. If for example the pre-union tariff (that is now removed in relation to union members) was high and the common external tariff is high too, we might expect this to be quite a big help to the union producers, resulting likely in higher level of trade diversion. On the other hand, if the tariffs are relatively low, the effect should be smaller. Third, it is the relations between industrial structures of the CEECs, current EU members, and the rest of the world, which should be partially reflected also in the first two points. In the ideal case, if the production in the two groups of countries forming the customs union is to a certain extent overlapping, we might expect a significant trade creative effect of resource reallocation into the most efficient uses and provided the rest of the world countries are mostly complementary to both, there should not be much trade diversion. If, on the other hand, for CEECs the imports from the EU and from the rest of the world were in majority of cases substitutable, we could expect a trade diversion in areas where the EU countries appeared to be less efficient producers than

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[18] Although non-tariff barriers, in a broader sense including possibly also psychological factors such as level of trust to partners from countries not applying community legislation (assuming such factors supports the thesis that there might be some changes despite the removal of tariffs took place earlier), are not explicitly included in the model, they could be imagined as having similar effect as tariffs, making imports from outside relatively more expensive; of course with the difference that there is no government revenue related to these barriers.

[19] For example, according to the Czech Statistical Office, the imports from the EU 15 into the Czech Republic reached 61 per cent share already in 1995 and the share of about 60 per cent was maintained also in 2003; the share of EU 25 in 2003 was 71.3 per cent, leaving less than a third for imports from outside the EU.

rest of the world countries, basically no matter the structural relationship between the CEECs and the other groups.[20]

3.2.   The model

Generally, there are two possible ways to identify the trade effects of enlargement. One way is to employ an ex post approach and analyze the development of bilateral trade relations between the new member countries and their partners, trying to reveal how the pattern of trade has changed after the EU entry, it means how it differs from the pre-entry pattern, which countries play bigger role, if any, and at the expense of which countries. However, as the so called Eastern enlargement took place only in 2004, the time series of the post-accession bilateral trade values would be very short, making any meaningful analysis impossible. Therefore, it seems inevitable to estimate the effects ex ante, creating two scenarios – a non-entry and entry scenario, based on the data extracted before 2004, and comparing their results. For building such a scenario, e.g. two specific tools can be used – a general equilibrium model or a gravity model. The later will be used here.

Generally, the gravity models try to explain the bilateral trade flows on the basis of factors in the country of origin and factors in the country of destination (mainly the size of the

---

[20] Note that the model we are going to use for the estimation of trade effects does not enable us to distinguish between the decrease of imports from the third countries caused by the elimination of the barriers towards EU and a decrease caused by possible adopting a higher common external tariff. However, as noted by Urban (2001), in the case of the Czech Republic, the average level of tariffs on industrial products was in 2000 nearly identical with those of the EU (4.1 per cent and 3.7 per cent). Assuming similar situation in other observed CEECs, although there were cases both when the pre-union tariff was higher and lower than the EU one, in line with his conclusions we do not expect the accepting of the common external tariff to have the crucial effect on import flows.

countries expressed by GDP), and further trade-enhancing or trade-inhibiting factors (e.g. distance, common border, common language, structural and size similarity etc.). The authorship of gravity models is ascribed to independent works of Tinbergen (1962) and Pöyhönen (1963) and since then they have become a popular tool for estimating international trade flows. However, as noted by Oguledo and MacPhee (1994), "...despite its widespread empirical use, the gravity equation has been a model in search of a theory…" (op. cit. p. 110). These authors also provide a literature survey on the issue and also an overview of different forms of the gravity equation. Nowadays, we have already several theoretical justifications for the gravity model. One is rooted in physical laws of gravitation; another is based on the general equilibrium model and countries´ goods demand and supply functions; the third is based on a probability model and the most recent approach is based on developing microeconomic foundations. Among authors who most contributed to the theoretical justification of the gravity model how we understand it today belong e.g. Anderson (1979), Bergstrand (1985 and extended in 1989, 1990) or Deardoff (1995). Moreover, Feenstra et al. (1998) show that the ability to derive the gravity equation does not depend on whether we work with differentiated or homogenous goods. A review of the usefulness of the gravity model in analyzing regionalism effects can be found in Greenaway and Milner (2002). They conclude that "…gravity modelling is most appropriately deployed to investigate the (impact) trade effects of regionalism…" (op. cit. p. 11). An interesting meta-analysis of estimating the effects of preferential trade agreements using gravity models can be found in Cipollina and Salvatici (2006).

Our gravity model estimations will be based on panel data, because as argued e.g. by Cheng and Wall (2005), "…standard cross-sectional methods yield biased results because they do not control for heterogeneous trading relationships…" (op. cit. page 50). Cheng and Wall argue that although the estimates based on (even pooled) cross-section data yield high goodness-of-fit ratios (R^2), their econometric properties are not so good. This could be solved by controlling for the heterogeneity, which is enabled by using a panel data technique. Moreover, this is just one of the advantages related to using the cross-section time series, as showed by Baltagi (2005; pp. 4-7).

A panel data regression looks typically as follows:

$$y_{i,t} = \alpha + \beta X_{i,t} + u_{i,t} \quad i = 1,...,N \; t = 1,...,T$$

In such a model, the disturbances consist of:

$$u_{i,t} = \mu_i + \upsilon_{i,t}$$

Where μ_i could be interpreted in our case as a time-invariant individual country (or country pair) effect and includes all unobserved effects like cultural and language proximity, historical ties, transport and other trade costs in case of country pair effects or effects influencing general openness to trade of a country (political situation, customs law, technological level etc.) in case of individual country effects.

The basic distinction between two main econometric approaches we could consequently follow depends on whether we decide to treat the μ_i as a fixed parameter – the fixed effects

model (FEM), or as a stochastic variable – the random effects model (REM), while $\upsilon_{i,t}$ is supposed to be stochastic in both cases. Unlike for example in Papazoglou et al. (2006), in this thesis we will prefer the approach assuming these effects as fixed. In favour of this choice, Baltagi (2005) notes "…random effects model is an appropriate specification if we are drawing N individuals randomly from a large population…" (op. cit. p. 14), which is clearly not our case as we focus on EU countries and some of their main trading partners. Moreover, as pointed out by Gujarati (2003), "…If it is assumed that μ_i and the X's are uncorrelated, REM may be appropriate, whereas if μ_i and the X's are correlated, FEM may be appropriate…" (op. cit. p. 650)[21]. In our case, however, some of the unobserved effects might be correlated with explanatory variables as it can be likely that for instance economic policy attitudes towards a country might be related to the country's size (either in terms of population or GDP). Our choice should be further supported by a more analytical tool – Hausman specification test. It is based on testing whether there is a systematic difference between FE and RE estimators, taking use of the fact that unlike the RE estimates, the FE estimates are consistent even in the presence of the correlation between explanatory variables and unobservable effects. Revealing a systematic difference between FE and RE estimators would indicate that such a correlation might be present and REM is thence inappropriate.[22] Moreover, estimating the specific effects separately might enable us to identify possible differences between the "old" and new member countries regarding their

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[21] With respect to the original text, some notation was changed here – Gujarati (2003) is using "ECM" (error components model) instead of "REM" in this case and also ε_i instead of μ_i to denote the individual effect

[22] For a more elaborate discussion about Hausman's specification test see e.g. Baltagi (2005; pages 66-74).

individual trade openness and relations towards other countries, which might be useful in constructing the non-entry and entry scenarios.

As for the gravity model specification, the correct econometric representation according to Matyas (1997) should take the form of a triple-indexed model:

$$\text{(1)} \quad \ln EXP_{ijt} = \alpha_i + \gamma_j + \lambda_t + \beta_1 \ln Y_{it} + \beta_2 \ln Y_{jt} + \beta_3 DISTANCE_{ij} + \ldots + u_{ijt}$$

with three specific effects - α_i for source country, γ_j for target country and λ_t for time (business cycle). The source country and the target country effects control for all time-invariant characteristics of the individual countries which are not accounted for by the other explanatory variables. The time effect controls for fluctuations over time that are common to all observed countries.

Nevertheless, Egger and Pfaffermayr (2003) argue and show on an example of 11 APEC countries that "...with the inclusion of only the main effect, the projection of bilateral trade relations may be misleading and give imprecise "forecasts" with unnecessary large confidence intervals...", and claim that "...the proper specification includes the three main effects and additionally accounts for time invariant bilateral interactions..." (op. cit. 573). These bilateral interaction terms can be interpreted as any time-invariant bilateral influences that affect the deviations from the prediction of a country pair's volume of trade based on individual country effects and characteristics. Also Cheng and Wall (2005) conclude that such a model is basically just a restricted version of a more general model, the one that captures

the bilateral heterogeneity. Using the similar notation as in the previous Matyas' case, a properly specified model should thence look as follows:

$$\ln EXP_{ijt} = \alpha_i + \gamma_j + \lambda_t + \delta_{ij} + \beta_1 \ln Y_{it} + \beta_2 \ln Y_{jt} + ... + u_{ijt}$$
(2)

Note that comparing with the original model, the term for distance is no longer included. This is so because it becomes basically a part of the bilateral interaction term (similar as other factors fixed over time usually accounted for in gravity models like common border, common language or history etc.). One might be worried that by using the bilateral interaction term we are losing the information about the influence of these factors, like for instance Egger (2002) or Lee and Park (2005). However, as noted by Cheng and Wall (2005), we could easily estimate the effects of these variables by regressing them on the country-pair effects obtained from the previous regression. Moreover, as also mentioned by Cheng and Wall (2005), the inclusion of the bilateral interaction terms helps us solve the troubles commonly related with measuring the specific bilateral factors. It is for example disputable what is the best measure of distance between two countries when the most commonly used – the distance between their capitals – looks somehow misleading in case of big countries, also, the distance over land might have different effect on the volume of trade than an overseas distance. Similarly, even common language is not easy to judge. Even in some European countries, there are more languages than one spoken (Belgium, Switzerland) and it is not obvious whether this automatically enhances trade with all the countries that speak the same languages. In addition, the boundary between common language can be a bit blurred as e.g. Czech and Slovak languages are very close and could be probably considered

as a common language, proper determination would thence require studying in detail the differences between languages. This is all solved by the inclusion of the bilateral interaction country-pair terms that account for all the observable and unobservable bilateral factors. As remarked by Cheng and Wall (2005), "...it is in this sense that fixed-effects modeling is a result of ignorance: We do not have a good idea which variables are responsible for the heterogeneity bias, so we simply allow each trading pair to have its own dummy variable..." (op. cit. p. 54). As noted before, if we however find use in revealing the effects of different variables on the heterogeneity, we can try to make a second stage of the regression using the residuals or estimated effects as dependent variables[23].

In the light of the previous and with respect to the purpose of this thesis, we begin with a model of the following most general specification:

$$
\ln IMP_{ijt} = \beta_0 + \beta_1 \ln Y_{it} + \beta_2 \ln Y_{jt} + \beta_3 \ln POP_{it} + \beta_4 \ln POP_{jt} + \beta_9 LIND_{ij} +
$$
(3)
$$
+ \alpha_i + \gamma_j + \lambda_t + \delta_{ij} + u_{ijt}
$$

i = 1,...,N (number of EU countries), j = 1,...,N+M (all countries included), t = 1,...,T

- IMP$_{ij}$ is the value of import to country i from country j

- Y is the value of real GDP

- POP is population of a country

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[23] However as noted e.g. by Egger (2002), purely from econometric point of view, predictions based on examining the residuals are inappropriate as "...proper specification should always result in white-noise residuals..." (op. cit. p. 306).

- LIND is a term included to test for the Linder hypothesis[24] and is calculated as

$$LIND_{ij} = 1 - (\frac{GDPpc_i}{GDPpc_i + GDPpc_j})^2 - (\frac{GDPpc_j}{GDPpc_i + GDPpc_j})^2$$ where GDPpc is the value

of real GDP per capita; apparently the maximum value of the term in case of the

equality of the GDP per capita is 0.5

- α_i stands for individual importing country effects

- γ_j stands for individual exporting country effects

- λ_t stands for business cycle or time effects

- δ_{ij} stands for country pair effects

- u_{ijt} is the stochastic error term

A priori, we expect positive signs for coefficients β_1 and β_2 - similarly as for example

Bergstrand (1989) or Egger and Pfaffermayr (2003), higher GDP should represent higher

export supply as well as import demand. However, the situation with β_3 and β_4 is not

ambiguous. As noted by Oguledo and MacPhee (1994), "…population size might be trade-

enhancing as well as trade-inhibiting…" (op. cit. p. 114). They see bigger population as having

possibly two opposing effects – one of larger resource endowment and self-sufficiency

(trade-inhibiting), the other of bigger labour division and thence production of bigger variety

of goods (trade-enhancing). In their survey of gravity model studies, majority of them found

a negative impact of population size with the exception of Brada and Mendez (1983).

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[24] The essence of the idea is that the bilateral goods trade should be inversely related to the difference
between GDP per capita of the two countries, as argued by Linder (1961).

Nevertheless, in a similar later study, Brada and Mendez (1985) found a negative coefficient on the population of exporting country and a positive coefficient on the population of importing country. Their explanation is that larger countries are less dependent on trade while their production satisfies a greater proportion of domestic demand and on the other hand, the bigger the population of the importing country, the larger diversity of production and thus imports are able to compete on more production process stages and moreover, the bigger the market, the better compensation for foreign exporters for their costs of gathering information about the market and establishing the distribution networks.

For coefficient β_9 we expect a positive sign since the closer the values of GDP per capita in two respective countries are, the higher is the Linder term (the closer to 0.5). The intuition is that consumers in countries with similar level of development, for which GDP per capita is a proxy, have also similar tastes, enabling producers in the home country better satisfy also consumers in the foreign country. In addition, a similar level of development could also foster the intra-industry trade in producer goods.

A high level of α_i would signalize that the importing country is open to trade, relative to its size and population and other countries in the sample. Similarly, a high level of γ_j indicates that the country is a relatively successful exporter. Matyas (1997) notes that "...when both of these effects are large for most of the countries within a trading bloc relative to the other countries outside the bloc (and are statistically significant), this can be duly interpreted as a significant trading bloc effect..." (op. cit. p. 366). However, drawing any conclusion about regionalism effects based on these coefficients might be problematic, as noted by Egger

(2004): "…regional trading blocs are changing over time, so that the country-specific variables capture only a part of this effect…", (op. cit. p. 152). This is not the case of our sample as during the observed period there were no new EU-entrants. However, he further notes that as these variables describe the trade propensities with respect to all other countries in the sample, they are unable to capture the deviations originating purely from special bilateral relations resulting possibly from regional agreements.

The levels of λ_t will describe partially the overall economic situation in the respective years. Lower values will indicate relative slow-downs and vice versa. If we find continuously rising values of these coefficient over the observed years, it might signalize a trend towards deepening trade relations or globalization.

Estimated values of δ_{ij} will help us identify which country pairs have relatively "excessive" or "sub-optimal" trade relations with respect to their size, population and other factors controlled for by the other variables. As these bilateral effect terms include also distance, their absolute value has not a very clear meaning. They might be, however, very informative if we compare values of these coefficients among similarly situated countries (for example central or northern Europe). We might expect a relatively higher trading intensity e.g. between the United Kingdom and the United States or between CEFTA countries.

3.3. The estimation results

For the estimations, the data on bilateral imports were taken from OECD Statistics and are expressed in current USD. The data on population were taken from Penn World Table, same

as the data on GDP expressing real gross domestic product in current USD. Distances are great circle distances between capital cities extracted from a file collected by K. S. Gleditsch from University of Essex[25]. The data cover period 1995-2004 and as for geographical coverage, there are 14 "old" EU members[26] and 4 countries out of the CEECs group – Czech Republic, Hungary, Poland, and Slovakia included as both importing and exporting countries plus additional 22 non-member countries exporting to the EU, altogether forming 702 trading pairs[27]. All equations are estimated using Intercooled Stata 9.

Table 2 summarizes estimation results of six various specifications of the equation (3). Some of them are its nested versions, the estimation results of the unrestricted version are in the variables displayed identical to those of specification (E). The specification that do not include fixed bilateral effect term are augmented by supplementary variables – logarithm of distance between capital, adjacency dummy that equals one if the countries share a common border (land or naval) and zero otherwise, common language dummy that equals one if the countries speak the same language and zero otherwise. Furthermore, we included variables that are commonly used to identify the potential trade creation or trade

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[25] Data on distances between capitals were downloaded from http://privatewww.essex.ac.uk/~ksg/data-5.html (visited in September 2007).

[26] Belgium and Luxembourg are treated as one country.

[27] See Appendix I for complete list of countries included. Some of the missing data were extra- or interpolated.

Table 2 - Estimates of various specifications of the gravity model equation (3)

	(A)	(B)	(C)	(D)	(E)	(F)
	IMPORT	IMPORT	IMPORT	IMPORT	IMPORT	IMPORT
Imp. population	-.1848689***	.0372375	-.5095979***	-5.122448***	-6.380766***	-4.698926***
	(.034962)	(.0256719)	(.0614575)	(.5343716)	(.5479776)	(1.17217)
Exp. population	-.4248656***	-.2957491***	-.4439841***	-1.675604***	-1.849978***	-1.721621**
	(.0253087)	(.0205423)	(.0510979)	(.3077217)	(.3019088)	(.5509412)
Importer´s GDP	1.127344***	.9320261***	1.503798***	1.588884***	2.127967***	1.339835***
	(.0331766)	(.0232522)	(.0598069)	(.0834766)	(.1240518)	(.3051978)
Exporter´s GDP	1.371292***	1.235268***	1.405559***	.7461582***	.9568344***	.8990591***
	(.0247338)	(.0196411)	(.0517362)	(.0769164)	(.1006302)	(.1809892)
Linder term	2.324808***	3.055806***	2.824773***	1.890114**	.38463	.9205716***
	(.232205)	(.1823044)	(.3644009)	(.6121465)	(.6353146)	(.2716659)
Log of distance	-.7089564***	-.6930102***	-.7483236***			-.9591337***
	(.0156855)	(.012449)	(.0221515)			(.0297407)
Adjacency DV	.514441***	.554186***	.4894579***			.2468787***
	(.0367504)	(.03469)	(.0484466)			(.0433192)
Language DV	.5482793***	.6892299***	.8254499***			.5939528***
	(.052586)	(.0499645)	(.0689833)			(.0530223)
Intra-EU DV	.457589***	.7528145***	.557946***			.8911193***
	(.0286387)	(.0237895)	(.0395915)			(.0830608)
EU-extra DV	-.1741703***	-.0074025	-.0850871			.031978
	(.0374027)	(.0274194)	(.0541928)			(.5349825)
CEECs - extra DV	-.6909399***	-.9601152***	-.6764571***			-.6531257
	(.0492665)	(.0441693)	(.0795888)			(.5414052)
λ - 1996			-.0111931		.0102439	.0373356
			(.0099512)		(.0217283)	(.0411881)
λ - 1997			-.0809055***		-.0525334**	.0106246
			(.0147532)		(.023091)	(.0485701)
λ - 1998			-.0906174***		-.0649404**	.0311891
			(.018575)		(.0263814)	(.0574233)
λ - 1999			-.1957829***		-.1696705***	-.0394108
			(.0223137)		(.0313469)	(.0696784)
λ - 2000			-.2727912***		-.2312545***	-.0579391
			(.0267207)		(.039476)	(.0869626)
λ - 2001			-.3412652***		-.2921954***	-.0865797
			(.0299964)		(.0448449)	(.099738)
λ - 2002			-.3951595***		-.3234686***	-.0889256
			(.0330433)		(.0509227)	(.1129303)
λ - 2003			-.3167338***		-.2157515***	.0471246
			(.0362678)		(.0567299)	(.1265688)
λ - 2004			-.2883152***		-.1565027**	.1387429
			(.0401025)		(.0633695)	(.1421955)
Observations	7020	7020	7020	7020	7020	7020

Notes: Heteroskedascity robust standard errors in parentheses. Significance levels: * 10 per cent; ** 5 per cent; *** 1 per cent. Regression methods: (A) Pooled cross-section OLS; (B) FGLS with heteroskedastic panel-corrected standard errors and panel-specific AR(1); (C) Prais-Winsten with heteroskedastic panel-corrected standard errors and panel-specific AR(1) with fixed time effects; (D) Fixed effects (within) regression with fixed bilateral effects; (E) LSDV with fixed time and bilateral effects; (F) LSDV with exporter, importer, and time effects.

diversion.[28] We included a dummy variable for intra-EU trade that equals one if the exporter is an "old" EU member, Norway, Switzerland or Iceland and the importer is an "old" EU member and zero otherwise, a dummy for extra-EU trade that equals one if the importer is an "old" EU member and the exporter is not member of the EU, neither EFTA and zero otherwise and a dummy for extra-CEECs trade that equals one if the importer is an EU-accession country and the exporter is not from EFTA and zero otherwise[29]. Generally, the models fit the data pretty well, yielding about 90 per cent of the goodness-of-fit ratios[30].

As shown, except one estimated coefficient, in all specifications, the four main effects have basically the a priori expected signs and are statistically significant. Population of both exporting and importing country has negative effect, which is in line with majority of previous studies (see before), while an increase of the importing or exporting country's GDP increases also import. In the case of the importing country it is in five out of six cases even higher than one, indicating that on average, 1 per cent increase in the country's GDP yields more than 1 per cent increase in the import flow into the country, keeping other variables

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[28] See Greenaway and Millner (2002).

[29] One should be however cautious with drawing any conclusions based on such dummy variables estimates. Polak (1996) showed that inclusion of these dummies might be problematic if there is an absolute distance measure included. He showed that there is a "…downward bias for far-away countries and an upward bias for close-in countries…" (op. cit. p. 538) that is instead of becoming part of the residuals coming into the integration dummy. This issue is further elaborated by Matyas (1997) who argues that applications using dummies in a restricted version of his model are mis-specified. Some of our estimations are however using the unrestricted model or we are comparing two dummies that might suffer from the same bias.

[30] The R-squared for specification (D) is by Stata computed in a different way, basically subtracting the effects of groups (country pairs). Following the normal formulas, the R-squared would be about 98 per cent.

constant. On the other hand, looking at the fixed effects estimates, the similar we were not able to predict for the GDP of exporting countries, which means we have not revealed the existence of the so called home market effect[31].

In majority of specifications, the coefficient on Linder term was strongly positive and significant, indicating that countries with closer levels of GDP per capita do indeed trade more with each other. Nevertheless, as we can see in column (E), this result is quite sensitive to the choice of specification. Namely, if we control for time effects and unobserved country pair effects, the estimated coefficient becomes statistically insignificant. The positive result in the other specifications might be caused by the special non-random selection of our country sample that includes important number of non-EU countries with lower levels of GDP per capita exporting relatively less to the EU together with EU countries that have relatively higher and similar GDP per capita and their mutual trade is very important. As a result of this, if we do not control for all the other effects, it might seem that it is the level of GDP per capita, not for example EU membership, distance or cultural proximity that plays the role.

Fully in line with our expectations, distance has negative effect on imports. The respective coefficient in all specification where it is reported is strongly significant and lies between minus 0.7 and minus 1. It means that on average, a country will import more than 70

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[31] The logic behind this phenomenon is basically that in the presence of increasing returns to scale and transport costs, production tends to be concentrated in one place to realize the increasing returns and located closer to bigger markets to economize on the transport costs. For a formal justification see Krugman (1980). Drawing any conclusions about the presence of home market effect would however need a more elabourate analysis; see for example Feenstra et al. (1998).

per cent less from a country that is twice as far as another country than from the closer country.

Also not surprisingly, the facts that the countries share a common border or speak the same language enhance trade. More specifically, common border tends to increase the value of imports on average about between 28 per cent (specification F) and 74 per cent (B) and countries that speak the same language trade on average by between 73 per cent (A) and 128 per cent (C) more, ceteris paribus[32].

Let us now look at the estimated coefficients λ_t, capturing the time effect common for all observed country pairs. Note that one year had to be dropped to avoid collinearity and for convenience it was the first year of the observation – 1995. Similarly in all three specifications where the fixed time effect was included, the effect of the year 1996 is not significantly different from the effect of the previous year. However, the estimated coefficients on the following years using specifications (C) and (E) indicate significant negative impact of the situation in these years on the import flows into the EU countries. As for the magnitude of these effects, it seems to be continuously rising (the pro-trade environment is getting worse) with culmination in 2002 followed by the beginning of the return to the original level. Note that this does not mean that the overall imports to the EU were declining since 1995; the imports would be on a continuous decrease if all the other effects – especially GDP and population levels in both exporting and exporting countries remained unchanged relative to the original year, which is apparently not the case and

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[32] The change is computed as $100*(e^{DV}-1)$; formula suggested by Halvorsen and Palmquist (1980).

neither the data on imports show it. Nevertheless, again, the results seem to be sensitive to the choice of specification as in (F) none of the estimated year effect is significantly different from the effect of 1995. However, this specification can be considered essentially a nested version of (E) as there are no bilateral interaction terms included (only exporter, importer and time), hence we can consider trading environment in the second half of 1990s and in the beginning of the 21st century in the sample countries not quite favourable.

Before we proceed with evaluating the possible trade diversion effects of the EU entry on the CEE countries included in the sample, there is a comment needed on which specification are most feasible to use. As noted in the preceding section, using standard cross-section estimates as in (A) is not suitable as it does not allow controlling for any heterogeneity, yielding biased results. The choice between the remaining five depends on whether we decide to treat the unobserved heterogeneity effects as fixed or not. As noted before, from theoretical grounds and with respect to the sample selection method, we will emphasize the fixed effects approach – columns (D) to (F). Also the result of the Hausman specification test applied between model of the specification (E) and its random effects counterpart suggest treating the unobserved effects as fixed[33]. However, we will report the random effect predictions as well as these are commonly used even in similar studies (for example Papazoglou et al. (2006)).

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[33] The respective $\chi^2(14)$ was 140.45, enabling us to reject the null hypothesis of no systematic difference between estimators at any conventional level of significance.

Another important question is whether we should use a three-way (exporter, importer, time) fixed-effects model, as suggested by Matyas (1997) – like in (F) where it is augmented by the "integration" dummies – or a two-way fixed-effects (country pair and time) model suggested e.g. by Wall (1999) – specification (E) - or whether a combination of both like one used e.g. by Egger and Pfaffermayr (2003) would be the most suitable – the estimation results identical to those of (E). While the Matyas´ model has been rejected in the previous text, the third model seems to be the most complex and all four groups of fixed effects are jointly statistically significant[34]. Nevertheless, there seem to be some problems with collinearity in our sample, resulting in quite a few variables dropped from the estimation. Moreover, the values of the estimated main coefficients are identical for this "combined" and the two-way model, suggesting the explanatory power is the same, and by omitting the importer end exporter fixed effects (in fact assuming they are random) and estimating thence (E), we should do no harm to the accuracy of the estimates.

Now we will try to predict and possibly quantify the trade creating and especially the trade diverting effects of the Eastern enlargement which we have the main interest in. We will do it in several ways. First, just for illustration, we will estimate the exporter and importer effects in the spirit of Matyas, using essentially the model (F) dropping the dummies. We will try to reveal a systematic difference between the individual country effects of the "old" EU members and the CEECs, indicating that there might be a space for changing the trading

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[34] The results of the respective F-tests are as follows: year – $F_{(9, 6304)} = 42.60$; exporter – $F_{(38, 6304)} = 357.79$; importer – $F_{(16, 6304)} = 99.45$, country pair – $F_{(647, 6304)} = 243.77$. All enable us to reject the null hypothesis of joint insignificance of these coefficients at any conventional level of significance.

patterns. Second, we will evaluate the meaning of the "integration" dummies as reported in Table 2 for models that do not include fixed bilateral effects. Third, we will try to estimate the effects of integration in models that assumed the fixed bilateral dimension by adding the second stage to the original regression and running a regression on residuals or estimated bilateral terms.

Table 3 summarizes results of the estimation of the individual fixed importing and exporting country effects. Note that Austria was dropped from the estimation to avoid collinearity therefore all results are relative to this country. As can be seen, all the fixed importer effects reported in the left panel of the table are statistically significant, the highest import propensities towards the rest of the countries in the sample belong to the biggest European economies – Germany, Great Britain, Italy, and France; on the other side, the estimates for Finland, Denmark, Slovakia and Ireland yield the lowest values. From the perspective of what we are most interested in here, we can hardly find any systematic difference between the new member countries and the rest of the sample as both groups of countries can be found basically spread over the imaginary rankings.

The situation is, however, a bit different when we look at the estimates of the export propensities. Although not all coefficients are significantly different to the reference one, from those that were, we can observe a similar story on the top of the rankings with Germany, Italy, France and Great Britain having the highest propensities and from our point of interest more interestingly, the bottom of the rankings belongs to Slovakia, Lithuania and Slovenia – all are accession economies. This might indicate that the exporting intensity of

these countries towards the countries in the sample is still not on the level common in the EU and assuming the convergence of the new member trading patterns to the patterns of the "old" members, this might signalize a space for an increase of exports from these countries into the EU and its biggest trading partners.

In the following step we will evaluate the "integration" dummies. Although this approach has several limitations (see footnote 29), it is widely used. The estimates used for this analysis stem from the models of specifications (A), (B), (C) and (F). As can be seen from Table 1, the "intra-EU" dummy is under all specifications always highly statistically significant and positive, indicating that a pair of countries in which both are members of the European economic area is trading on average more than an identical pair that is outside the flows captured by the dummies included here. Or alternatively, as interpreted sometimes, a country entering the EU should "automatically" see an increase in imports from the EU countries – there should be a trade creation of a certain magnitude. More specifically, our models of different specifications show that there should be an increase between 58 per cent (specification A) and striking 144 per cent (F). Our cautiousness here should be at least twofold. Firstly, the "predicted" increase in trade should not be ascribed purely to the fact of the existence of the EU. The question we can always ask is whether these countries trade so much with each other because they formed an economic community or they decided to put certain preferences on the trade with particular partners because their mutual trade was big enough to play vital role for their economies.

Table 3 – Estimated individual importer and exporter effects

Individual Importer Effects		Individual Exporter Effects	
α - Belux	2.101952***	γ - Belux	1.269343***
	(.2973453)		(.1616141)
α - Czech Republic	.8377231**	γ - Czech Republic	.0082132
	(.3769454)		(.1765315)
α - Germany	10.18238***	γ - Germany	4.439273***
	(2.391597)		(1.280188)
α - Denmark	-1.524886***	γ - Denmark	-.3311616
	(.4373825)		(.2397897)
α - Spain	7.191561***	γ - Spain	2.934157***
	(1.71024)		(.8887489)
α - Finland	-1.455423***	γ - Finland	.3284917
	(.441836)		(.2595828)
α - France	8.46352***	γ - France	3.407645**
	(2.054981)		(1.098555)
α - Great Britain	8.594409***	γ - Great Britain	3.311216**
	(2.046003)		(1.092539)
α - Greece	1.626951***	γ - Greece	-.2097919
	(.4323949)		(.1907465)
α - Hungary	1.168221**	γ - Hungary	.2572468
	(.4253399)		(.1889598)
α - Ireland	-2.81995***	γ - Ireland	-.0643168
	(.7605233)		(.4051299)
α - Italy	8.522928***	γ - Italy	3.618946***
	(2.041187)		(1.081523)
α - Netherlands	3.416565***	γ - Lithuania	-2.152517***
	(.6954372)		(.5145848)
α - Poland	6.653288***	γ - Netherlands	1.909372***
	(1.786596)		(.3734422)
α - Portugal	1.363984***	γ - Poland	2.056086**
	(.3292706)		(.8574174)
α - Slovakia	-1.826442***	γ - Portugal	.6456174***
	(.4054373)		(.1522811)
α - Sweden	.7451069***	γ - Slovakia	-1.197463***
	(.1197881)		(.3180325)
		γ - Slovenia	-2.768213***
			(.8102842)
		γ - Sweden	1.06988***

Notes: Heteroskedascity robust standard errors in parentheses. Significance levels: * 10 per cent; ** 5 per cent; *** 1 per cent. Regression method: LSDV with fixed time, importer and exporter effects; the dependent variable is the log of import, the others explanatory were GDPs and populations of both countries, the Linder term and the log of distance between capitals.

Secondly, and to some extent partially relative to the previous point, when evaluating the effect of an EU entry on the imports of a country from the Union, what we must know first is the situation of the accession economies and their pre-entry import propensity from the EU. It could well happen that if we estimated the value of a dummy capturing the imports of the accession country from the EU, we could find that this direction of imports is already forming a positive deviation from the country´s "normal" imports and the resulting trade creation effects would be smaller or even zero. This might happen because if only a dummy capturing the intra-EU imports is introduced, the reference group (for which the dummy equals zero) is not only the trade flow from the EU into an accession economy (relation between these two we are primarily interested in and want to draw conclusion to), but also trade flows from non-members into the EU, from non-members into the accession economies and from accession economies to accession economies[35].

Having realized this, we can now come to the evaluation of the estimated "EU-extra" propensity, it means how much the fact that the exporter is outside of the European economic area affects the imports of the EU members from such countries. Out of the four specifications reported in Table 1 that offered us the estimates of these effects already in the first step, only the first (and as judged before, the least feasible) estimated this effect to

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[35] The dummy capturing the imports of the CEECs from the "old" EU members is omitted here purely from econometric reasons as the linear combination of the dummies capturing the imports of "old" members from "old" members and "old" members from non-members with the dummies on imports of the CEECs from "old" members and CEECs from non-members would be nearly perfectly collinear with intercept, creating difficulties with estimations. The reference group here therefore includes all trade flows except those within the "old" EU and imports from non-members captured by dummies.

be statistically different from zero and as one would expect, negative – the fact that the exporter is not an EU member neither an accession country should cause a 16 per cent drop of imports into an EU country. Overall, however, we could think that the EU entry will have no effect on the entrants' imports from the non-EU countries as within EU the other models we able to reveal no systematic discrimination towards these countries (except they are not treated in the same way as other EU members); the change into the non-EU-to-EU trade pattern should have no effect. Nevertheless, the picture changes when we look at the CEECs' propensities towards the "outsiders"[36]. In three out of four specifications, the dummy on imports of CEECs from these countries was negative and highly statistically significant, suggesting that the CEE countries represented in our sample import on average between 49 to 62 per cent less from countries that are not members of EU than if the importer was an EU member[37]. If we assume that the new members will once accept the EU trading patterns or at least will change them less than theirs will be changed by them, we could based on our estimations, maybe quite surprisingly, expect a general rise of imports from non-member countries[38].

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[36] Note that this does not show that the inclusion of the CEECs-extra dummy is so vital - without it the estimated value of the EU-extra coefficient would be totally different (probably slightly positive); we however consider inclusion of both a more precise specification.

[37] This predicted drop is relative to a reference group that was however the same also for imports of the "old" EU members from non-members, the comparison makes therefore sense.

[38] Note that here we do not take into account any time pattern of the trade effects. Further investigation that goes beyond the scope of this thesis would be needed to predict over what time period the differences between the "old" and "new" member countries would be eliminated. However, we do not expect it to be done in a big jump as such trade effects can be results not only of eliminating the internal tariffs and imposing a common external one but of a broader range of reasons that might include elimination of "invisible" (also

Now, in the final step we will use probably the most correct approach and will estimate the following equation to get a better picture about the differences between the trade relations of the EU members and the accession economies:

$$(4)\ \hat{\delta}_{ij} = \beta_0 + \beta_1 DIST + \beta_2 DVADJ + \beta_3 DVLANG + \beta_{4,5} DVINT + \alpha_i + \gamma_j + u_{ij}$$

Where $\hat{\delta}_{ij}$ stands for fixed-effect country-pair terms obtained through the estimation of (E), DIST stands for log of distances between capitals, DVADJ is the adjacency dummy, DVLANG is a dummy capturing the common language effect, and DVINT stand for a pair of dummies that will be used specifically to capture the effects of enlargement. It will be dummies capturing the intra-EU imports and imports of the new members from EU under specification (G), and dummies capturing the exports of non-members into EU members and into the new members in (H)[39] of the Table 3. In line with the previous regressions we expect distance to have a negative effect and both adjacency (common border) and common language to have a positive effect on the level of the bilateral term. For the first pair of the "integration dummies" we expect the effect of the intra-EU trade to be higher than the effect of the fact that the imports come from the EU into an accession economy if there is a certain trade creation to be expected. Similarly, for the second pair, if we wish to consider our previous estimates robust, the effect of the imports from outside the Union into it should be less negatively deviating than the imports from outside into the CEECs, leading us to the same

psychological) barriers or possible changes in the location of production related to easier movement of mobile factors of production etc.

[39] From the reasons mentioned before in the footnote 35 we do not consider estimating both effects in one model feasible.

conclusion as in the previous method – hence there should be on average no trade diversion but inversely, the imports from non-member countries should tend to rise in order to reach the EU level.

The results of the estimation of (4) are reported in Table 4. All the estimated coefficients are statistically significant and have the a priori expected signs. Overall, the models fit the data well, yielding nearly 99 per cent goodness-of-fit ratios, which is however enhanced by the inclusion of numerous dummies. Also the Ramsey´s RESET test for correct specification confirmed that both models are correctly specified.[40] We can see that there is a difference between the estimated values of coefficients that are common for both specifications (G) and (H). However, the choice of specification doesn't change the "direction" of the effects neither the magnitude is drastic. Comparing with our previous estimates reported in Table 1, both the effect of a common language (86 to 87 per cent) and adjacency (33 to 42 per cent) fall to the imaginary intervals bordered by our previous estimation results. The estimated effect of the distance is in both cases for some reason higher than in our previous estimates.

We are however most interested in the "integration" dummies. In (G) the difference between the estimated value of the dummy capturing imports into the "old" EU and the dummy capturing imports into the new members is statistically significant; nevertheless, the same we cannot say about the second case (H).[41] Based on these estimations that we

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[40] The test statistic values for (G) and (H) were $F(3, 638)$ 1.56 and 1.51 respectively, not enabling us to reject the null hypothesis of no omitted variables at any conventional level of significance.

[41] The value of the respective test statistic testing that EU-EU DV equals EU-CEECs DV was $F(1, 641) = 10.42$, enabling us to reject the null hypothesis about the equality of these coefficients at the 5 per cent level of

consider the least parsimonious as we controlled for all possible sources of unobserved

heterogeneity – time and bilateral fixed-effects in the first step and exporter and importer

Table 4 – Estimation of the effects influencing the size of the bilateral fixed terms

	(G)	(H)
	Fixed country-pair effect	
Log of distance	-.9858201***	-.978004***
	(-0.0917568)	(-0.094556)
Language DV	.6261151***	.6197229***
	(-0.1870629)	(-0.1872358)
Adjacency DV	.2850883**	.3502056**
	(-0.1363086)	(-0.1388741)
EU-EU DV	4.685943***	
	(-0.1959548)	
EU-CEECs DV	4.297333***	
	(-0.2301906)	
Extra-EU DV		-1.245374***
		(-0.2605235)
Extra-CEECs DV		-1.280745***
		(-0.2847384)
Observations	702	702
R-sq	0.989	0.988
Adj. R-sq	0.988	0.987

Notes: Heteroskedascity robust standard errors in parentheses. Significance levels: * 10 per cent; ** 5 per cent;

*** 1 per cent. Regression method was OLS.

fixed-effects in the second stage, the predicted trade creation in the CEECs resulting from

joining the EU yields on average about 47 per cent.

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significance. On the other hand, the $F_{(1, 641)}$ testing the equality of Extra-EU DV and Extra-CEECs DV was just
0.07, leading to the non-rejection of the null hypothesis.

On the other side, we were not able to prove any significant expected trade diversion. Just for the information, the model predicted a statistically insignificant increase of imports from the rest of the world of the magnitude of 3.6 per cent.[42]

4. What statistics tell us?

In the following section we will briefly take a look at the OECD trade statistics, trying to reveal the main patterns and difference in the development of CEECs' and EU15 imports[43], both from geographical and commodity point of view, to see whether we can find some support for what was said in the previous sections. Eventually, we will try to take a different look at the trade creation and trade diversion, using revealed comparative advantages.

4.1. Territorial structure

Table 5 is displaying the shares of various countries or country blocs on total imports of "Visegrad four" (V4) and EU15 in the years 1992 to 2006, where available. When we compare the two parts of the table, we can come to couple of obvious conclusions.

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[42] Although, as noted before, the post-accession time series are too short to be able to indentify a possible change of the trading pattern, we can take a look at the data from 2005 just to see whether we cannot reveal a striking contradictory tendency. Taking again the example of the Czech Republic (using data of the Czech Statistical Office), except developing economies, whose exports into the Czech Republic dropped by 6 per cent, all other groups registered a growth, with the biggest increments of 34.1 and 44 per cent belonging to the European transition economies and Commonwealth of Independent States respectively. Although the growth of imports from EU25 was relatively low, yielding only 3.4 per cent, generally we could conclude that these results do not go in the absolutely opposite direction to our estimates.

[43] As the source of statistics is OECD, the subsequent analysis will be concerned mainly with the new members who are at the same time also members of the OECD – so called "Visegrad four" (V4; Czech Republic, Hungary, Poland, Slovakia).

Table 5 - Import shares and value indices by country blocs in V4 and EU 15

V4	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	I_06_93*	I_06_97**
EU15	57.8%	55.8%	54.0%	54.6%	58.6%	53.5%	55.5%	57.0%	54.5%	53.9%	53.1%	51.9%	53.0%	50.6%	47.4%	656%	300%
EU25	-	-	-	-	-	-	-	-	-	-	-	-	-	67.3%	64.6%	-	-
V4	-	8.9%	7.9%	8.6%	8.4%	9.9%	9.1%	8.7%	8.7%	9.1%	9.4%	9.8%	10.3%	10.7%	11.2%	737%	375%
CIS	13.5%	13.0%	10.6%	10.7%	10.0%	9.7%	7.3%	7.3%	10.5%	9.6%	8.7%	8.5%	8.4%	10.1%	9.9%	490%	341%
China	0.7%	0.8%	1.1%	1.3%	1.6%	1.8%	2.0%	2.3%	2.8%	3.7%	4.8%	5.4%	4.7%	5.7%	3.9%	4090%	1139%
ETE	0.9%	0.3%	0.2%	0.2%	0.3%	0.3%	0.3%	0.2%	0.2%	0.2%	0.2%	0.2%	0.3%	0.3%	0.4%	741%	438%
NAFTA	3.5%	4.4%	3.3%	3.5%	4.3%	4.4%	4.2%	4.1%	4.5%	4.0%	3.7%	3.2%	2.6%	2.5%	2.4%	384%	176%
ASEAN	1.1%	0.9%	1.0%	1.1%	1.3%	1.6%	1.9%	2.0%	2.3%	2.6%	3.0%	2.7%	2.2%	1.9%	1.8%	1342%	372%
MERCOSUR	0.8%	0.6%	0.7%	0.7%	0.9%	0.8%	0.7%	0.6%	0.6%	0.7%	0.5%	0.5%	0.6%	0.5%	0.5%	573%	213%
OPEC	1.9%	1.1%	0.8%	0.7%	0.6%	0.5%	0.5%	0.5%	0.5%	0.5%	0.5%	0.5%	0.4%	0.4%	0.4%	264%	263%
SAARC	0.4%	0.4%	0.4%	0.4%	0.4%	0.4%	0.4%	0.4%	0.3%	0.3%	0.4%	0.4%	0.4%	0.4%	0.4%	649%	367%

EU15	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	I_06_97**
V4	-	-	-	5.8%	5.9%	6.2%	7.1%	7.4%	7.1%	8.2%	9.2%	10.0%	9.6%	8.6%	9.1%	380%
CIS	-	-	-	4.1%	4.0%	4.0%	3.3%	3.6%	4.5%	4.7%	5.1%	5.4%	6.2%	7.0%	7.6%	484%
China	-	-	-	4.8%	5.2%	5.6%	5.9%	6.3%	6.8%	7.3%	8.3%	9.6%	10.6%	11.2%	11.6%	537%
ETE	-	-	-	0.5%	0.5%	0.5%	0.6%	0.5%	0.4%	0.5%	0.5%	0.6%	0.6%	0.6%	0.6%	267%
NAFTA	-	-	-	21.3%	21.3%	22.6%	23.5%	22.7%	21.5%	21.3%	19.8%	17.3%	15.7%	15.9%	14.6%	165%
ASEAN	-	-	-	6.2%	6.5%	6.7%	7.2%	6.8%	6.3%	6.0%	6.3%	6.1%	5.9%	5.2%	5.0%	189%
MERCOSUR	-	-	-	3.0%	2.8%	2.8%	2.7%	2.6%	2.5%	2.7%	2.7%	2.7%	2.6%	2.6%	2.6%	242%
OPEC	-	-	-	7.0%	7.5%	7.4%	5.5%	6.0%	7.9%	7.1%	6.5%	6.9%	7.0%	8.4%	8.2%	284%
SAARC	-	-	-	2.2%	2.3%	2.2%	2.2%	2.0%	2.0%	2.0%	2.1%	2.2%	2.2%	2.1%	2.1%	244%

Source: OECD and own calculations

* Import value index 2006/1993; total index 673 %; excludes Slovakia

** Import value index 2006/1997; total index for V4 332 %, for EU15 256 %

The European Union has been a dominant source of imports for V4 already since the beginning of the displayed period, i.e. since shortly after the central planning ended. Still, the Commonwealth of Independent States (CIS) is still forming a relatively more important trading partner to the V4 than to the EU. On the other hand, V4 countries seemingly "under-trade" with other country blocs such as NAFTA or ASEAN; also Chinese economy constitutes more important source of imports for the EU than for the V4 and the comparison of OPEC's shares clearly shows who are suppliers of oil and gas in the two respective blocs.

The last two columns in the table contain import value indices and should tell us something about development of the import structure over time. For the V4 countries, the overall value of the index relating years 2006 and 1993 is 673 %, i.e. that the value of total imports has risen between the years nearly seven times. It is interesting to compute ratios of similar individual country bloc indices and the overall index. Values bigger than one indicate gains in the import shares, values lower than one indicate the opposite. Quite interestingly, EU15 did not gain, which we could expect based on trade creation theory. The result seems to be influenced by a bit worse recent years, marked by slightly rising co-operation within the V4 bloc and the expansion of Chinese exports. Other blocs that appeared more successful are ASEAN and European transition economies (ETE)[44], while the other blocs lost a bit.

The last column contains the same index, this time calculated for both V4 and EU15, based on the years 2006 and 1997. The overall value index was higher for V4, indicating higher rise

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[44] ETE include Albania, Bosnia and Herzegovina, Croatia, Serbia and Montenegro, Macedonia and in the earlier years Yugoslavia.

of imports. The picture for V4 remains pretty much the same, only CIS imports have risen a bit faster than the overall volume of imports this time, similarly as imports from SAARC[45], whose share however remains still negligible. Anyway, it is interesting to compare the V4 indices with those calculated for EU15. The biggest differences emerged for CIS, where EU15 experienced significantly higher rise of imports, and ASEAN with China where the rise of imports was higher for V4. This is quite in line with our initial observations as the shares of imports from these regions differed the most between EU15 and V4, indicating possible trade pattern convergence tendencies.

4.2. Commodity structure

Table 6 contains import and export shares of 10 commodity groups by Standard International Trade Classification (SITC) on total imports and exports of V4 and EU15. On the import side, the biggest differences between V4 and EU15 structure in earlier observed years could be found in categories 5 (chemicals) and 6 (manufactured goods), where V4 countries tended to import on average relatively more than EU15 and in categories 2 (crude materials) and 8 (miscellaneous manufactured articles), where V4 used to import on average relatively less than EU15. We can explore the value indices to see whether there have been some convergence tendencies in this respect, possibly related to the integration process as a result of unifying trade conditions and customer needs.

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[45] SAARC stands for South Asian Association for Regional Cooperation and its members are Bangladesh, Bhutan, India, Maldives, Nepal, Pakistan and Sri Lanka.

Table 6 – Commodity structure and value indices of imports and exports in V4 and EU15

Imports

SITC group	V4					EU15		
	1993	1999	2005	I_0305_9395[a]	I_0305_9799[b]	1999	2005	I_0305_9799[b]
0: Food and live animals	7.4%	4.5%	4.5%	230%	178%	5.8%	4.5%	136%
1: Beverages and tobacco	0.8%	0.7%	0.6%	220%	150%	0.6%	0.5%	144%
2: Crude materials, inedible, except fuels	4.3%	2.9%	2.6%	218%	175%	4.8%	3.6%	125%
3: Mineral fuels, lubricants and related materials	12.3%	7.3%	10.0%	311%	247%	10.0%	18.2%	277%
4: Animal and vegetable oils, fats and waxes	0.4%	0.3%	0.2%	214%	141%	0.4%	0.4%	157%
5: Chemicals and related products, n.e.s.	12.6%	12.3%	11.4%	340%	203%	7.7%	7.7%	179%
6: Manufactured goods	17.7%	19.7%	18.4%	380%	206%	12.5%	10.9%	155%
7: Machinery and transport equipment	33.5%	41.7%	39.9%	513%	223%	40.2%	34.1%	163%
8: Miscellaneous manufactured articles	10.7%	10.4%	9.0%	336%	194%	17.1%	13.8%	154%
9: Commodities and transactions, n.e.s.	0.3%	0.1%	3.4%	3887%	3470%	2.9%	6.3%	200%

Exports

SITC group	V4					EU15		
	1993	1999	2005	I_0305_9395[c]	I_0305_9799[b]	1999	2005	I_0305_9799[d]
0: Food and live animals	10.4%	5.9%	5.7%	242%	194%	4.1%	3.2%	130%
1: Beverages and tobacco	1.4%	0.6%	0.5%	146%	145%	1.7%	1.6%	154%
2: Crude materials, inedible, except fuels	5.7%	3.0%	2.2%	187%	192%	1.9%	1.6%	149%
3: Mineral fuels, lubricants and related materials	7.0%	3.4%	4.0%	233%	253%	2.2%	3.5%	262%
4: Animal and vegetable oils, fats and waxes	0.4%	0.2%	0.1%	153%	114%	0.3%	0.3%	122%
5: Chemicals and related products, n.e.s.	9.0%	6.7%	6.7%	313%	219%	15.2%	13.9%	177%
6: Manufactured goods	25.3%	21.8%	19.3%	320%	220%	15.2%	13.3%	152%
7: Machinery and transport equipment	23.6%	42.7%	47.8%	911%	317%	48.3%	46.0%	159%
8: Miscellaneous manufactured articles	16.4%	15.6%	11.5%	315%	195%	13.3%	10.2%	145%
9: Commodities and transactions, n.e.s.	0.7%	0.1%	2.4%	2533%	5422%	2.5%	6.5%	226%

Source: OECD and own calculations
a - import value index (average 2003-05)/(average 1993-95); overall index value 391 %; exludes Slovakia
b - import value index (average 2003-05)/(average(1997-99); oveall index value for V4 214 %, for EU15 175 %
c - export value index (average 2003-05)/(average 1993-95); overall index value 439 %; exludes Slovakia
d - export value index (average 2003-05)/(average(1997-99); oveall index value for V4 254 %, for EU15 169 %

Based on both indices (a "shorter" comparing imports in the last three years with years 1997-1999 and a "longer" comparing latest imports with imports from years 1993-1995), the fastest growing and the only commodity group whose growth exceeded growth of total import in the whole period was group 7 (machinery and transport equipments)[46]. Also group 3 (mineral fuels) recorded in the shorter, more recent, period an above-average rise, reflecting mainly rising oil prices. Relatively lowest increments can be attributed to groups 1 (beverages and tobacco) and 4 (animal and vegetable oils). Looking at EU15, the highest rise was experienced in group 3, while the lowest in group 2; we can observe some convergence in group 0 (food and live animals) though.

On the side of exports, the picture is somewhat different. Roughly speaking, the V4 countries tended to export relatively more of lower value added goods – commodities in groups 0, 2, 3, and 6, while they lacked in exports of more sophisticated products from groups 7 and 5. Looking at the development indices and more recent share comparisons, some areas show signs of EU pattern convergence and/or shift to higher levels of export production, while for some the situation has not changed much. Of course, we do not expect all countries of the single market to become all alike because there will always be differences at least in the respect of factor endowments; however, as we have already argued, with demand factors being the main drivers of industrial location, the expectations of some structural convergence is to some extent well founded. Over the years, the share of group 7

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[46] We don't take into consideration extremely rising group 9 (commodities and transactions not elsewhere specified), whose growth has probably mainly to do with development of new products that do not fit to any other SITC category and in the latest years with not finished process of statistical sharpening.

commodities on export basically reached EU levels and commodities from groups 2 and 3 registered under-average growth rates; group 3 was at the same time on a strong rise in the EU15, further pushing the levels closer. On the other hand, the share of groups 5 and 0 still remains relatively significantly smaller and bigger respectively, the latter especially due to strong role of the agricultural sector in Poland.

Overall, despite some discrepancies (historically stronger ties to other countries in CEE or CIS region while virtually none existing to more distant blocs; relatively stronger position of agriculture in some countries etc.) we could also observe some level of growing similarity of CEECs to the more developed EU countries. Nevertheless, as noted in the beginning of this thesis, it is very difficult to disentangle the effects caused by integration process from effects caused by "natural" restructuring and trade reorientation.

4.3.   Development of RCA's in imports from selected regions

Tables 7 and 8 contain calculations of revealed comparative advantages (RCA) by ITCS commodity groups for V4 imports from ASEAN, CIS and China relative to the imports from the EU15[47]. The calculations were done separately for sums of imports in the pre-accession years 1997-1999 and the post-accession years 2004-2006 and we concentrate only on the commodity groups in which these regions performed relatively better than the EU15, i.e. whose RCA exceeded 1. We could then compare the values of RCA in earlier years with those

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[47] The formula used here: $RCA_t = \dfrac{M_{ij}/M_{iEU}}{\sum M_j / \sum M_{EU}}$, where M stands for imports, i stands for commodity group, j for country or country bloc. This corresponds to RCA_2 in Utkulu and Seymens (2004).

from the latter years to see whether there was any relative 'weakening' or 'strengthening' of the third country comparative position, possibly caused by the EU entry as it happened in between those two periods for which the RCA were computed. The drop in the RCA value by itself does not however mean that we are most likely dealing with the trade diversion effect as the drop could be caused by other external factors (e.g. domestic economic situation). In such cases, however, it would probably be reflected also in the RCA calculated for other group than V4. In our analysis, we will roughly approximate trade diversion by situation in which e.g. the RCA of V4 imports from ASEAN relative to the EU15 drops and at the same time the RCA of EU15 imports from ASEAN relative to total imports remains the same or increases; analogously, trade creation would be indicated by the situation in which the RCA of V4 imports from ASEAN relative to EU15 increases, while the RCA of EU15 imports from ASEAN relative to total imports remains the same or decreases.

For ASEAN, we were able to reveal comparative advantages in 27 significant enough commodity groups at least in one of the two observed periods. These are mostly fishery and agricultural products, clothing and footwear but also some 'more sophisticated' goods such as electrical appliances. In 17 groups, the development between pre-accession years and post-accession years was negative, in 11 cases even different from that in the EU15, thence indicating possible trade diversion.

Table 7 – Revealed comparative advantages of ASEAN and CIS relative to EU15 by ITCS

ASEAN

COMMODITY GROUP	RCA$_{t1}$	RCA$_{t2}$	Δ	TE
03: Fish & crustacean, mollusc & other aquatic invertebrate	1.15	3.72	+	
09: Coffee, tea, matú & spices.	76.56	15.28	-	*
10: Cereals.	10.37	1.80	-	
15: Animal/veg fats & oils & their cleavage products; etc	7.26	2.50	-	*
16: Prep of meat, fish or crustaceans, molluscs etc	12.83	5.71	-	*
18: Cocoa and cocoa preparations.	2.35	0.24	-	*
20: Prep of vegetable, fruit, nuts or other parts of plants	3.31	2.52	-	*
21: Miscellaneous edible preparations.	2.11	0.68	-	*
24: Tobacco and manufactured tobacco substitutes.	1.77	0.30	-	*
40: Rubber and articles thereof.	4.16	3.28	-	*
42: Articles of leather; saddlery/harness; travel goods etc	2.61	0.93	-	
44: Wood and articles of wood; wood charcoal.	1.26	0.99	-	
46: Manufactures of straw, esparto/other plaiting mat; etc	73.14	40.58	-	*
54: Man-made filaments.	2.07	1.79	-	
55: Man-made staple fibres.	0.98	1.01	+	**
61: Art of apparel & clothing access, knitted or crocheted.	1.82	3.30	+	
62: Art of apparel & clothing access, not knitted/crocheted	3.88	4.33	+	**
64: Footwear, gaiters and the like; parts of such articles.	4.73	8.96	+	
65: Headgear and parts thereof.	1.21	1.72	+	
71: Natural/cultured pearls, prec stones & metals, coin etc	1.11	1.97	+	**
80: Tin and articles thereof.	29.94	24.67	-	*
84: Nuclear reactors, boilers, mchy & mech appliance; parts	1.24	1.24	+	**
85: Electrical mchy equip parts thereof; sound recorder etc	2.38	3.14	+	
89: Ships, boats and floating structures.	0.00	4.00	+	
91: Clocks and watches and parts thereof.	3.14	0.94	-	
92: Musical instruments; parts and access of such articles	4.78	2.30	-	*
95: Toys, games & sports requisites; parts & access thereof	1.47	0.83	-	

CIS

COMMODITY GROUP	RCA$_{t1}$	RCA$_{t2}$	Δ	TE
03: Fish & crustacean, mollusc & other aquatic invertebrate	6.12	1.53	-	
10: Cereals.	2.21	0.25	-	*
14: Vegetable plaiting materials; vegetable products nes	2.35	0.02	-	
25: Salt; sulphur; earth & ston; plastering mat; lime & cem	3.02	1.83	-	
26: ores, slag and ash.	124.35	110.11	-	**
27: Mineral fuels, oils & product of their distillation; etc	38.21	43.08	+	**
28: Inorg chem; compds of prec met, radioact elements etc	1.61	2.55	+	**
29: organic chemicals.	1.12	1.17	+	**
31: Fertilizers.	14.99	11.16	-	
44: Wood and articles of wood; wood charcoal.	1.27	1.46	+	**
47: Pulp of wood/of other fibrous cellulosic mat; waste etc	6.08	2.05	-	
52: Cotton.	4.48	0.82	-	
72: Iron and steel.	0.58	1.14	+	**
75: Nickel and articles thereof.	2.29	4.19	+	**
76: Aluminium and articles thereof.	3.36	1.34	-	
79: Zinc and articles thereof.	0.94	1.21	+	**
88: Aircraft, spacecraft, and parts thereof.	1.81	0.73	-	
93: Arms and ammunition; parts and accessories thereof.	4.06	0.34	-	

t1 - average over 1997-1999
t2 - average over 2004-2006
Δ - difference between RCA in t1 and t2
TE - assumed trade effect: * trade diversion; ** trade creation
- imports below 5 million USD and from commodity group 99 excluded

Source: OECD and own calculations

Table 8 - Revealed comparative advantages of China relative to EU15 by ITCS

CHINA				
COMMODITY GROUP	RCA$_{t1}$	RCA$_{t2}$	Δ	TE
03: Fish & crustacean, mollusc & other aquatic invertebrate	9.63	5.16	-	
05: Products of animal origin, nes or included.	26.19	7.63	-	*
07: Edible vegetables and certain roots and tubers.	2.49	0.61	-	
09: Coffee, tea, matű and spices.	5.82	0.84	-	*
12: oil seed, oleagi fruits; miscell grain, seed, fruit etc	4.96	1.69	-	
20: Prep of vegetable, fruit, nuts or other parts of plants	4.81	1.75	-	
25: Salt; sulphur; earth & ston; plastering mat; lime & cem	4.00	0.91	-	
26: ores, slag and ash.	12.54	0.81	-	
28: Inorgn chem; compds of prec met, radioact elements etc	3.75	0.92	-	
29: organic chemicals.	2.19	0.86	-	
36: Explosives; pyrotechnic prod; matches; pyrop alloy; etc	46.44	5.88	-	*
42: Articles of leather; saddlery/harness; travel goods etc	28.72	8.47	-	*
46: Manufactures of straw, esparto/other plaiting mat; etc	91.45	34.56	-	*
54: Man-made filaments.	0.38	1.21	+	**
61: Art of apparel & clothing access, knitted or crocheted.	5.79	5.11	-	
62: Art of apparel & clothing access, not knitted/crocheted	9.30	9.12	-	
63: other made up textile articles; sets; worn clothing etc	1.93	2.56	+	
64: Footwear, gaiters and the like; parts of such articles.	11.50	6.73	-	
65: Headgear and parts thereof.	11.72	8.11	-	
66: Umbrellas, walking-sticks, seat-sticks, whips, etc	27.38	11.94	-	
67: Prepr feathers & down; arti flower; articles human hair	340.71	86.83	-	
69: Ceramic products.	0.91	1.53	+	**
71: Natural/cultured pearls, prec stones & metals, coin etc	0.84	1.29	+	**
80: Tin and articles thereof.	24.62	1.39	-	
81: other base metals; cermets; articles thereof.	2.40	1.58	-	
82: Tool, implement, cutlery, spoon & fork, of base met etc	3.86	1.67	-	
84: Nuclear reactors, boilers, mchy & mech appliance; parts	0.81	1.34	+	**
85: Electrical mchy equip parts thereof; sound recorder etc	1.32	2.69	+	**
89: Ships, boats and floating structures.	0.65	1.52	+	**
90: optical, photo, cine, meas, checking, precision, etc	1.55	1.09	-	
91: Clocks and watches and parts thereof.	20.10	6.05	-	
92: Musical instruments; parts and access of such articles	11.75	5.80	-	
94: Furniture; bedding, mattress, matt support, cushion etc	0.92	1.66	+	**
95: Toys, games & sports requisites; parts & access thereof	25.11	7.28	-	*
96: Miscellaneous manufactured articles.	3.51	2.98	-	

Source: OECD and own calculations

Among the negatively affected goods belong predominantly agricultural products, which is not very surprising because market with agricultural products has been traditionally relatively strictly protected in the EU. At the same time, there were 4 groups where the RCA got relatively stronger despite negative development in the EU15, hence indicating possible

trade creation – man-made fibres, some textile products, metals, machinery and appliances. Also not surprisingly, some of these belong to groups that are mentioned by Klemesova (2008) as experiencing biggest drops in tariff rates in the Czech Republic (therefore also for their customs union partner Slovakia). Any trade creations related to external tariff reductions in non-agricultural sector would not be surprising for Poland either as in total majority of cases the EU tariffs were lower than Polish duties[48].

Looking at CIS, we get a different picture on the nature of trade. RCA's were identified in 18 groups, mostly in those containing minerals, chemicals and various metals and products manufactured of them. 11 commodity groups registered a decrease in the value of the RCA, however only one could be labelled as trade diversion following our logic and it is again an agricultural product group - cereals. On the other hand, all 7 groups in which the situation improved, did so contrary to the EU experience and could be therefore marked as trade creation. Also in couple of these cases (metals and metal products, chemicals), we could possibly attribute part of the 'success' to lower tariff rates.

The situation of China is somewhat specific. Not only has the Chinese economy been rapidly growing over the past couple of years, the country also entered WTO in 2001 and this all contributed to big expansion of Chinese exports also to V4[49]. Using the same metrics as for ASEAN and CIS in the previous paragraphs, China seems to have RCA in 35 commodity groups, stretching from agricultural products over some ores, chemicals and textile products

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[48] See for example Fidrmuc et al. (1999).

[49] Based on the same OECD data, while the total volume of V4 imports between the two observed periods increased roughly 2.5 times, the Chinese imports rose nearly 7 times.

to machinery and appliances. We were however able to identify an increase of the comparative advantage only in 8 cases; out of them 7 could be labelled as trade creation cases, among them e.g. precious metals, furniture, various machinery and appliance. So where is the expected inflow of Chinese imports? It is right there – the groups 84 and 85 covering big portion of all machinery, electrical appliances and their components constituted in the second observed period nearly two thirds of total imports to V4 from China, while in the first period it was only about 40 per cent. On the other hand, 6 possible trade diversion cases emerged in some agricultural product groups, leather goods, explosives and toys (the last two possibly due to more stringent EU market regulations).

5. Conclusions

We discussed effects of the Eastern enlargement on trade flows of the selected CEE countries. The changes in the volume and structure of the trade had been observable already couple of years before the very moment of EU entry, partially due to abandonment of central planning and collapse of CMEA as results of natural market force corrections and economic catching-up, and partially by the nature of the integration process that entailed enhanced credibility for foreign investors and gradual phasing out of the trade barriers already since the beginning of the association talks. On the other hand, we might still expect some more trade effects to come in relation with the common currency adoption, to which all the new members obliged themselves. The magnitude of these effects remain however ambiguous.

We analyzed possible trade effects in CEECs resulting from their accession into the EU using gravity model on goods trade flow data of the Czech Republic, Hungary, Poland, and Slovakia. Although the gravity modelling is a relatively old and quite simplistic tool, it is still widely used especially for estimation of migration and trade flows, including effects related to regionalism. The estimation results appeared to be quite sensitive to the choice of specification. Eventually, we argued for using panel data estimation with fixed bilateral and time effects. After controlling for individual country effects in the second step, where we tried to identify the composition of the estimated bilateral effects, we were able to estimate the effects of the EU membership. We revealed an expected increase of imports from the EU into these countries of the order of tens of per cent over an uncertain time horizon (trade

creation) but we were not able to identify any fall of imports from countries outside European Economic Area (trade diversion); the estimated effect of EU membership on the level of such imports was even slightly positive but insignificant. Therefore we do not expect any significant trade diversion in the countries following their entry into the EU. This result is not very surprising in the light of what was said before – especially that the major part of trade liberalization between CEECs and EU as the main source of possible trade creation or trade diversion effects took place already in the years before the actual entry and EU constituted dominant trade partner for these countries well prior the Eastern enlargement. The picture might be, however, a bit different if we took a case of countries that had not been so dominantly tied to the bloc they were entering already prior the actual accession, such as the case of Baltic countries, for which especially Russia still plays a big role in economic relations. Comparing with some of the similar studies, our results are basically in line with those of Wilhelmsson (2006), who predicts significant trade creation but only limited trade diversion as a result of the enlargement process; Papazoglou et al. (2006) were able to identify both trade creation and trade diversion effect with the latter of a smaller magnitude.

In the final section we analyzed the existing data to see whether we can find some support for our theoretical hypotheses. As for the territorial structure of imports, the selected CEECs still trade a bit more with CIS and less with more distant country blocs; on the other hand, there have been some signs of decreasing differences. What the data did not show, was the expected increase in imports from EU; the post-accession time series are however still too short. Regarding the commodity structure, some signs of convergence could be found rather

on the side of exports with decreasing export shares of SITC groups 0 (food and live animals), 3 (crude materials), 6 (manufactured goods) and 8 (miscellaneous manufactured articles), while group 7 (machinery and transport equipment) reached the EU levels.

Having explored the computed revealed comparative advantages for imports from ASEAN, CIS and China over imports from EU, we found some signs of possible trade diversion among others in industries where the level of protection increased – mainly agricultural products – and some indications of trade creation in industries, where the tariffs decreased – metal products, machinery and appliances. Nevertheless, same as in the previous case, for a more thorough analysis of the post-accession trends we need to wait for longer time series. Moreover, in the light of the ongoing worldwide financial crisis characterised by discontinuous development of number of economic variables, it might be questionable how the world trading system will look like in the post-crisis era and whether the recent determinants of trade will remain in place and with the same power.

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Appendix I – List of countries used for the gravity modelling

Australia

Austria

Belgium and Luxembourg

Bulgaria

Brazil

Canada

China

Croatia

Czech Republic

Denmark

Egypt

Finland

France

Germany

Great Britain

Greece

Hungary

Iceland

India

Ireland

Italy

Japan

Lithuania

Mexico

Netherlands

New Zealand

Norway

Poland

Portugal

Romania

Russia

Slovakia

Slovenia

South Korea

Sweden

Switzerland

Turkey

Ukraine

United States of America

Appendix II – List of abbreviations

CEECs   Central and Eastern European Countries

CEFTA   Central European Free Trade Agreement

CMEA   Council for Mutual Economic Assistance

EA   Europe Agreement

EFTA   European Free Trade Association

EMU   European Monetary Union

ERM 2   European Exchange Rate Mechanism

ETE   European transition economies

EU15   European Union before the Eastern enlargement

FDI   Foreign direct investment

FEM   Fixed effects model

FGLS   Feasible generalized least squares

GDP   Gross domestic product

ITCS   International trade by commodities statistics

LSDV   Least square dummy variable

OECD   Organization for Economic Co-operation and Development

OLS   Ordinary least squares

REM   Random effects model

USD   United States dollar

WTO   World Trade Organisation