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One size fits all?

Accession to the Internal Market; an Industry Level Assessment of EU Enlargement

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Contents

Abstract

Enlargement of the EU with ten Central and Eastern European Countries is a major item on the EU's policy agenda. Assessing the economic consequences of the accession to the internal market is not obvious. This paper provides a new method to quantify the impact of the accession. The assessment is based on a gravity-equation, estimated for 16 industries. The estimations exploit the fact that the current EU members already operate in a Single Market since 1992. The estimations provide information on the barriers, at the level of industries, that the Single Market program succeeded to remove. This is used to assess the industry-level impact of enlargement, for the current EU members and for the accession countries.

This approach yields different estimates for the impact of accession to the internal market for the different industries and different countries. The impact of accession to the internal market is notably large in Agriculture, Textiles, Trade Services, Transport Equipment, Non-metallic Minerals and Food Processing. Moreover, the aggregate excess trade within the internal market is comparable to what other studies find. The shock of accession to the internal market is plausibly largest for the accession countries. For the current members of the EU the upcoming enlargement likely has the largest impact for Austria, Greece and Germany.

JEL-codes: F0, F15, F17

Keywords: EU-enlargement, gravity equations, non-tariff barriers

1 Introduction[1]

Enlargement with CEECs (Central and Eastern European Countries) is a major item on the EU's policy agenda. EU membership goes beyond abolishment of tariffs[2], participation in the Common Agricultural Policy (CAP) and the European Support Framework (ESF). Full Membership involves real gains by lower trade costs related to a reduction in trade-related risk, mutual recognition of product standards and lower administrative obstacles. I refer to these factors that lower trade costs, and other related mechanisms implemented via the Single Market program, as accession to the internal market. These gains are likely the most important gains still to come as the Europe Agreements already succeeded in liberalizing trade between the EU and the CEECs in manufacturing products.

How to quantify the accession to the internal market is not entirely obvious. As Baldwin et al. (1997, p. 138) argue: "A [.....] difficulty arises in trying to model single market access. The complexity of single market access makes it impossible for us to model it explicitly in a general equilibrium model. The standard solution to this problem is to model single market access crudely as a reduction in the real cost of trade, [.....], we quantify this as a 10% reduction in real costs of all CEEC-EU trade." I emphasize the study by Baldwin et al. (1997) as it received most attention. Others assessing the internal market in an analogous manner are, for example, Keuschnigg and Kohler (2002) who argue that a trade cost reduction of 5% is appropriate to account for the effect of internal market access. These approaches, obviously, have some limitations. First, the number is arbitrary. Second, and more substantial, the number is identical for all countries. This implies that the shock of EU enlargement is restricted to be identical for all equally open countries. Third, the shock is identical for all industries. This is the most troublesome, as it are asymmetric shocks that induce industrial restructuring and thereby political turmoil.

This paper provides an alternative assessment of the CEECs accession to the internal market. The assessment is based on a gravity-equation which overcomes the limitations discussed above. I estimate for 16 industries a gravity model that explains bilateral trade in the industry by distance, income variables and dummies. The dummy indicating whether both countries are EU members provides insight in the impact of the internal market accession. The estimations exploit the fact that the current EU members operate in a Single Market since 1992. Hence the observed trade levels between two EU members relative to trade between two comparable non-EU members contains information on the non-tariff barriers (NTBs) the Single Market program

[1] Comments and discussion by Sjef Ederveen, Harry Garretsen, Henri de Groot, Theo van de Klundert, Arjan Lejour and Ruud de Mooij improved the paper. Research assistance by Arie ten Cate and Nico van Leeuwen is gratefully acknowledged.

[2] The Europe Agreements, to be completely implemented in 2002, already entail abolishment of mutual tariffs.

has succeeded in removing. This is industry specific information on the impact of accession to the internal market.

This approach to the assessment of accession to the internal market gives two major results. First, the shock of accession to the internal market is larger than that commonly employed by general equilibrium modelers (e.g. Baldwin et al., 1997, and Keuschnigg et al., 2002). Second, the impact of the internal market accession is markedly different across industries and countries.

The rest of this paper is organized as follows. Section 2 discusses the gravity model. Section 3 shows the estimation results and discusses the implications for various countries. Section 4 provides extensive robustness analysis. Section 5 concludes. The appendix provides details on the data and a robustness analysis.

2 The gravity model

Reminiscent to the law of gravity in physics, the gravity model suggests that the trade flow between two countries depends positively on their size and negatively on the distance between them. In economic terms, trade flows between two countries depend on the importer's demand and the exporters supply and on the cost of trade. The latter is proxied by distance[3] and specific characteristics of the bilateral country relation, like sharing a language or having a common border. The importer's demand and exporter's supply is proxied for by their outputs and per capita incomes.

The early contributions applying the gravity approach (e.g. Tinbergen, 1962), did not provide a theoretical motivation for the model. Nevertheless, the model evolved to becoming the workhorse model of empirical international trade. Helpman and Krugman (1985) show, however, that the basic gravity equation is simply derived from a trade model with differentiated goods. Deardorff (1998), moreover, demonstrates that the gravity equation is consistent with the Heckscher-Ohlin theory of international trade. Though this consistency of the gravity model with different trade models hinders the gravity model's usefulness for model testing and selection, it increases the confidence in its use as a predictor for (potential) trade patterns.

Previous studies on the potential trade between CEECs and the current EU members largely restrict themselves to an economy-wide perspective. Without questioning the value of the insights delivered by the economy-wide perspective, it is evident — given the relative size of the CEECs to the current EU — that an industry-level analysis is required to shed light on potentially painful adjustment problems and promising opportunities.[4]

The gravity model is rarely used on the industry level. Bergstrand (1989) derives a gravity equation for a multi-industry world on that basis of a 2 x 2 x n Heckscher-Ohlin model, where n is the number of countries. The model allows for intra-industry trade. Extensions to a higher industry dimension turn out to be cumbersome (see Bergstrand, 1989). Bergstrand estimates this gravity equation on one-digit SITC industry level data of the 1960s and 1970s: the estimates have the expected signs.

Head and Mayer (2000) *do*, however, employ the gravity model on an industry level. They assess the degree of market fragmentation within the EU. They show that market fragmentation falls over time but not especially so in the industries that were characterised by the Commission's White Paper from 1985 to be hampered by non-tariff barriers. A second result is that intra-EU trade is more hampered in final goods than in intermediate goods.

[3] Hummels (1999) uses actually observed trade cost - expenditures on freight - and explains these by distance. The trade cost - distance elasticity is significantly positive (between 0.22 and 0.46), depending on the mode of transport. Obviously, the cost elasticity of a sea kilometer is lower than that of a kilometer by truck.

[4] I discuss this literature when I evaluate my estimation results.

This paper differs in several respects from Head and Mayer's (2000). Most important, this paper assesses the difference in barriers to trade between within-EU trade and EU/non-EU trade whereas Head and Mayer assess barriers between within-country trade and within-EU trade. Head and Mayer's work sheds light on the 'border-puzzle' whereas this paper is relevant for EU enlargement. A second difference is that I include service industries whereas Head and Mayer restrict themselves to manufacturing industries.

3 Estimation results and discussion

I follow Bergstrand (1989) in estimating the following equation:

$$X_{ijs} = \alpha_s + \beta_{1s} D_{ijs}^{EU} + \beta_{2s} d_{ij} + \gamma_{1s} Y_i + \gamma_{2s} y_i + \gamma_{3s} Y_j + \gamma_{4s} y_j + \sum_d \delta_{ds} D_d + \nu_{1S} T_{ijs}^M + \nu_{2S} T_{ijs}^E + \varepsilon_{ijs} \quad (1)$$

where all variables are defined in logs. X_{ijs} stands for exports from country i to j in industry s, $Y(\gamma)$ is the GDP (per capita) of the exporting and importing countries, d stands for the distance between the capitals of countries i and j, D_d is a set of dummies, and D^{EU} is a dummy that equals unity if i and j are currently members of the EU and else zero. The variable T_{ijs}^M is the import tariff levied by country j on country i exports in industry s and T_{ijs}^E is the export tariff levied by country i on to country j in industry s.[5]

In estimating (1), I use data for 1998 for 16 industries and 27 countries.[6] The economic data are derived from GTAP (see Dimanaran and McDougall, 2002, and CPB, 1999); the distance data are the Great Circle distances between capital cities. Further details about the data are provided in the Appendix. I estimate equation (1) with OLS.

Results

The results are reported in table 3.1. An asterisk indicates significance at a 5% confidence interval. Before turning to the EU-dummies, I take a closer look at the other parameters. The distance variable is negative and significant in all industries. The size of the estimated coefficient is, however, notably lower for service sectors. This indicates that, if the service sector's products are tradeable, distance matter less; a result that is intuitively clear once one thinks about financial services for example. Export levies do seem to reduce exports. That import taxes are in most cases insignificant (the only exceptions are Raw Materials and Financial Services) can possibly be explained by the fact that import tariffs tend to be a response to "excessively" high imports. It is, however, not possible to test for this explanation.

The exporter- and importer-income coefficients are estimated precisely and are all positive. Eyeballing at these coefficients for a moment learns that all, but four, are less than unity. This implies that trade rises less than proportionally with size. Or, saying the same thing in a more familiar way: small countries tend to be more open. The exporter's per-capita income term relates to the capital intensity of production. Without wanting to dwell on these results, some high-tech sectors (e.g. Electronic Equipment, Machinery and Equipment) do appear with a positive and significant sign, whereas the labour-intensive industries (Textiles and Leather;

[5] As many tariff rates are zero, I use: $T_{ijs}^M \equiv \log(1 + t_{ijs}^M)$.

[6] Some 'countries' are aggregates of countries, the accompanying choices for the distance variable are made explicit in the appendix.

Trade Services) have negative signs. Thus, rich countries are more likely high-tech producers. The significant negative signs for importer per-capita income for Agriculture, Raw Materials, Food Processing and Textiles and Leather indicate that these are necessities in the consumption basket. The positive signs for importer per-capita income indicate that the Fabricated Metals, Transport Equipment and Transport and Communication sectors produce the only luxuries in the 'imported' consumption basket. The adjacency dummy is significant and positive for all non-service sectors except for Electronic Equipment. This indicates that sharing a common border lowers trade costs.

Table 3.1 Estimations Results[a]

	Dummy EU	Distance	Export Levies	Import Tax	Exporter Income	Exporter Income p.c.	Importer Income	Importer Income p. c.	Dummy Adjacency	R-square
Agriculture	1.25*	-0.65*	4.95*	1.46*	0.88*	-0.58*	0.95*	-0.30*	1.02*	0.67
Raw Materials	-0.10	-0.68*	-38.32*	-10.64	1.10*	-0.84*	0.92*	-0.26*	1.05*	0.51
Food Processing	0.66*	-0.59*	1.33	0.06	0.67*	0.00	0.94*	-0.28*	0.85*	0.70
Textiles and Leather	0.85*	-0.79*	3.79	-1.68	0.86*	-0.56*	0.86*	-0.27*	0.59*	0.77
Non metallic Minerals	0.73*	-0.96*	-7.84*	6.83*	0.92*	-0.06	0.92*	-0.02	0.87*	0.82
Energy-intensive Products	0.13	-0.84*	-8.62*	-3.73*	0.88*	0.08*	0.86*	-0.29*	0.71*	0.82
Other Manufacturing	0.08	-0.86*	-28.05*	-2.96	0.91*	0.04	0.91*	-0.10	0.80*	0.78
Metals	-0.10	-1.25*	-10.21	-1.78	0.97*	-0.18*	1.07*	-0.03	0.67*	0.70
Fabricated Metal Products	0.44*	-0.99*	-28.04*	7.30*	0.96*	0.13*	0.88*	0.08	1.00*	0.82
Machinery and Equipment	0.31*	-0.82*	-25.14*	5.08*	0.97*	0.44*	0.86*	-0.05	0.70*	0.80
Electronic Equipment	0.58*	-0.86*	-15.93	1.36	1.12*	0.36*	0.92*	-0.14	0.08	0.69
Transport Equipment	0.66*	-0.93*	8.70	5.91*	1.17*	0.25*	0.96*	0.14	0.61*	0.75
Trade Services	0.76*	-0.13*	14.51*	-0.59	0.83*	-0.10*	0.83*	-0.08*	-0.16	0.83
Transport and Communication	0.03	-0.05*	46.48*	11.06	0.83*	0.00	0.91*	0.14*	0.00	0.93
Financial Services	-0.14	-0.24*	-38.72*	-36.76*	0.86*	-0.13*	0.86*	-0.19*	-0.28	0.77
Other Services	0.27*	-0.23*	-12.55*	5.79	0.84*	-0.03	0.80*	-0.06	0.07	0.88

[a] A constant is included in the regressions but not reported here. The number of observations for each industry is 702.
An asterisk indicates significance at a 5% confidence interval. Standard errors are not provided to save space (these are available upon request).

Now, turn to the EU dummies. In ten out of sixteen industries, the dummy has a positive and significant coefficient. Hence, in these sectors, bilateral trade between two countries is higher if these countries are both members of the EU. The dummies thus measure how important the internal market is in removing regulatory barriers that otherwise impede trade. Intuitively clear — think about the CAP — the dummies for both Agriculture and Food Processing are among

the largest. The dummy for Raw Materials is negative but insignificant; this may be due to oil being intensively traded between EU members and non-members alike. Textiles has a high and significant dummy. For Metals and Machinery and Equipment the EU dummy is insignificant. In the service sectors the dummies are low and/or insignificant (an exception is Trade Services). The explanation is that the internal market has not progressed much so that EU membership does not lead to more intense trade patterns (EC, 2002).

Robustness

The estimates are robust to changes in the specification. In the appendix I present three different specifications. First, I leave out the observation for the Rest of the World, as this is common in the literature; the results are insensitive for this change. Second, for the same reason I remove the bilateral tax rates as independent variables. This leaves the results for the EU dummies unaltered. Third, I report on an estimation where I replace the exporter's GDP by the exporting sector's value added. This is motivated by the notion that the exporter's sectoral value added is likely a superior proxy for the country's supply potential. The estimated EU dummies for Raw Materials, Metals and Transport and Communication turn significant and positive. Hence, once there is an alternative control for supply (possibilities) intra-EU trade exceeds the 'normal' level also in these industries.

Magnitude and discussion

How to interpret these numbers? For industries with an insignificant dummy, I assume that accession to the internal market has no impact on trade. For other sectors, the dummy is used to calculate the potential trade increase. In particular, I assume that EU membership implies that the dummy would change from zero to one for bilateral trade patterns between an EU and the CEECs. Thus, potential trade can be calculated as $\exp(\beta s)$, where βs denotes the estimated coefficient for the EU dummy in (1). To illustrate, the coefficient for the EU dummy in Food Processing is equal to 0.66 so that the potential trade is $e^{0.66} \approx 1.94$, i.e. twice as high as the actual trade between CEECs and EU members. The potential trade increase is therefore 94%. The potential trade increases are reported in table 3.2.

Table 3.2 The potential trade increase by accession to the internal market

	Potential trade increase %		Potential trade increase %
Agriculture	249	Fabricated Metal Products	56
Raw Materials	0	Machinery and Equipment	37
Food Processing	94	Electronic Equipment	79
Textiles and Leather	134	Transport Equipment	94
Non metallic Minerals	107	Trade Services	113
Energy-intensive Products	0	Transport and Communication	0
Other Manufacturing	0	Financial Services	0
Metals	0	Other Services	31

Aggregating the sectoral dummies (with the export specialisation pattern as weights) learns that trade between two EU countries exceeds trade between two comparable countries with 33 to 73%, depending on the specialization pattern (see the first column in table 3.3).

Table 3.3 also shows the aggregate potential trade increase due to the CEECs accession to the internal market (the second column). These calculations are based on the estimated dummies only.[7] These numbers are calculated by weighting the potential trade increases per industry with the relevant trade flows. Austria, Greece and Germany experience the largest trade expansion, albeit for different reasons. Germany and Austria trade intensively with the CEECs already, whereas for Greece the export pattern is such that they are specialised in industries where the trade expansion is large. For the accession countries trade with the EU is relatively much more important than vice versa. Therefore the potential trade expansion in the CEECs is a multiple of that in the selected EU countries. Table 3.3 hence emphasizes that the industry-level focus learns that the macro-economic shock differs for different countries.

[7] Alternatively one could use the whole gravity equation and translate the trade increase into an GDP increase and the GDP increase again into a trade increase etc. To do that in a sensible manner, a fully specified general equilibrium model is required; something that is clearly beyond the scope of this paper.

Table 3.3 Excess trade within the EU and trade expansion due to enlargement

	Excess trade	Trade expansion
Austria	43.9	4.2
Greece	73.2	3.6
Germany	50.3	3.5
Italy	55.0	2.7
Spain	65.2	1.4
Denmark	55.1	1.4
The Netherlands	55.1	1.3
Finland	33.7	1.2
France	54.8	1.2
Sweden	41.6	1.2
Luxembourg	45.6	0.9
Belgium	44.8	0.9
Great Britain	44.0	0.8
Ireland	50.2	0.6
Portugal	67.9	0.4
	Potential excess trade	
Hungary	63.8	47.0
Poland	47.1	33.0
Rest CEEC	49.2	35.2

Trade between two EU countries exceeds trade between two comparable countries with 33 to 73%, depending on the specialization pattern. Is this 'large'?

The numbers found by others estimating the intra-EU excess trade on an aggregate level are comparable to those obtained here. Frankel and Wei (1993), for example, examine bilateral trade patterns throughout the world and find that intra-EU trade exceeds 'normal' trade with 55 percent.[8] To give another example, Frankel, Stein and Wei (1997) find for this number: 36 percent. To interpret the estimated dummies as the effect of the internal market accession, some confidence that they are indeed measuring this and not something else is helpful. Indeed, a skeptic would argue that it are the historical ties between European Countries that explain the above normal trade. Others will argue that free trade is the driving force behind the above-normal trade intensities within preferential trade areas. Hence, they will argue that accession to the internal market will not affect the CEECs nor the current members any further. To invalidate the latter skeptic's argument I exclude the formal trade barriers in the gravity model in one of the sensitivity analysis in the appendix (this leaves the results qualitatively unaffected). To refuse the 'cultural-ties' claim is more complicated as it requires a long time-series perspective. On the industry level the data are not readily available from the 1940 or 1950s

[8] Fidrmuc and Fidrmuc (2000) confirm such a consensus finding. Soloaga and Winters (2001), exceptionally, find a negative effect.

onward. However, some revealing results are available from the aggregate studies. Eichengreen and Irwin (1998) control for the role of history by introducing lagged trade as an explanatory variable in the gravity model. For assessing the effect of EEC membership, in the late 1950s, early 1960s, controlling for lagged pre-WW II trade is relevant.[9] EEC membership turns out not to have a significant above-normal trade effect until 1964.

Bayoumi and Eichengreen (1997) circumvent the difficulty of separating 'other' factors that enhance trade (intimate historic ties, a common language or cultural commonality) from EU membership, by estimating the gravity equation in first differences.[10] They find that trade begins to expand at an 'above normal' rate between members of the EU (or EEC, EC) around the formation of the EC and not substantially before. An analogous pattern is found around the first and second enlargement. For the founding 6 EU members a 64% above normal trade growth is found whereas an analogous number is found for the first enlargement. The numbers for Greece's accession and the Iberian enlargement are also large, but trade growth had not returned to 'normal' by the end the sample period (1992).[11] Therefore, the picture for that enlargement is not yet complete.[12]

An alternative way of putting the results in perspective is to examine how restrictive borders are in general for trade. For example, a typical Canadian province trades 22 times more with another Canadian province than with a comparable neighbouring US state (see McCallum, 1995 and Helliwell, 1996).[13] For countries that are more different than Canada and the US, a border is likely to matter even more. This suggests that a reduction in trade cost by joining the EU (a removal of economic borders) may have substantial effects on bilateral trade. Moreover, our estimates may still provide a lower bound on the trade effects because joining the EMU is a logical next step for the CEECs.[14] Frankel and Rose (2000) find that joining a free trade area triples(!) trade and that joining a currency union triples trade once more! Though their study uses a broader sample of countries and, hence, is not entirely comparable, these results are suggestive.

[9] This turns out to boil down to controlling for former colonial ties.

[10] This procedure that avoids unobserved heterogeinity to bias the results moreover overcomes the problem that physical distance need not be a good proxy for economic distance.

[11] The trade diversion associated with the intra-EU trade increase is less than 25% according to Bayoumi and Eichengreen.

[12] Soloaga and Winters (2001) find a negative impact of EU membership on the trade level but confirm the Bayoumi and Eichengreen (1997) result that the trend in intra-EU trade is upward till the end of their sample period (1996).

[13] I am aware that a growing number of studies, trying to explain the trade border effect, qualify the finding by Mc Callum (1995); see for example Anderson and Van Wincoop (2001), Head and Ries (2001), Head and Mayer (2002). These qualifications reduce the puzzle, but still leave the border barriers substantial.

[14] This is not meant to say anything about the likeliness or desirability of such a step.

Implications for modelling

The estimated parameter for the EU dummy can be translated into tariff equivalents. To obtain the tariff equivalents, however, one needs to make an assumption about the elasticity of substitution between varieties of different countries.[15] To avoid the notoriously difficult discussion on the size of the elasticity of substitution we use Hummels' (1999) estimate of 4.8 for 1-digit industries which is in the upper range of those commonly used in general equilibrium modelling. Lower estimates imply higher tariff equivalents as a trade reduction due to a tariff is lower if the trade-price elasticity is lower. The tariffs are reported in table 3.4 and range from zero for insignificant estimates up to thirty percent for Agriculture.

Table 3.4 Ad valorem tariff-equivalent

	Ad valorem tariff-equivalent		Ad valorem tariff-equivalent
Agriculture	30	Fabricated Metal Products	10
Raw Materials	0	Machinery and Equipment	7
Food Processing	15	Electronic Equipment	13
Textiles and Leather	19	Transport Equipment	15
Non metallic Minerals	16	Trade Services	17
Energy-intensive Products	0	Transport and Communication	0
Other Manufacturing	0	Financial Services	0
Metals	0	Other Services	6

Comparing these tariff equivalents to the numbers used by Baldwin et al. (1997) and Keuschnigg et al. (2002), who model accession to the internal market as a reduction in real trade costs of 10% and 5% respectively learns two things. First, I find *ad valorem* tariffs (thus percentages of unit values) up to 30% in some industries; this boils down to a potential real trade cost gain of over 8% of *the value of trade*.[16] To be clear this is considerably more than the reduction of 10% of *the value of trade costs*. In that sense, the numbers found here are large and they imply that the accession to the internal market still promises considerable trade increases. Second, I find considerable differences across different industries whereas Baldwin et al. (1997) and Keuschnigg et al. (2002), assume identical gains across industries from accession to the internal market.

[15] Deriving the estimated equation from an explicit (Armington) trade model learns that the estimated dummy is actually measuring the elasticity of substitution (ε) and the internal-market effect together ($\beta_{1,S}\varepsilon \ln D^{EU}$). See for an explicit derivation, for example, Anderson and Van Wincoop (2001).

[16] I arrive at 8% by weighting the *ad valorem* tariff with the pattern of trade; in this particular case I arbitrarily used the imports of Germany. This number depends on the relevant trade pattern (so again one size does not fit all).

4 Comparison with count information on NTBs

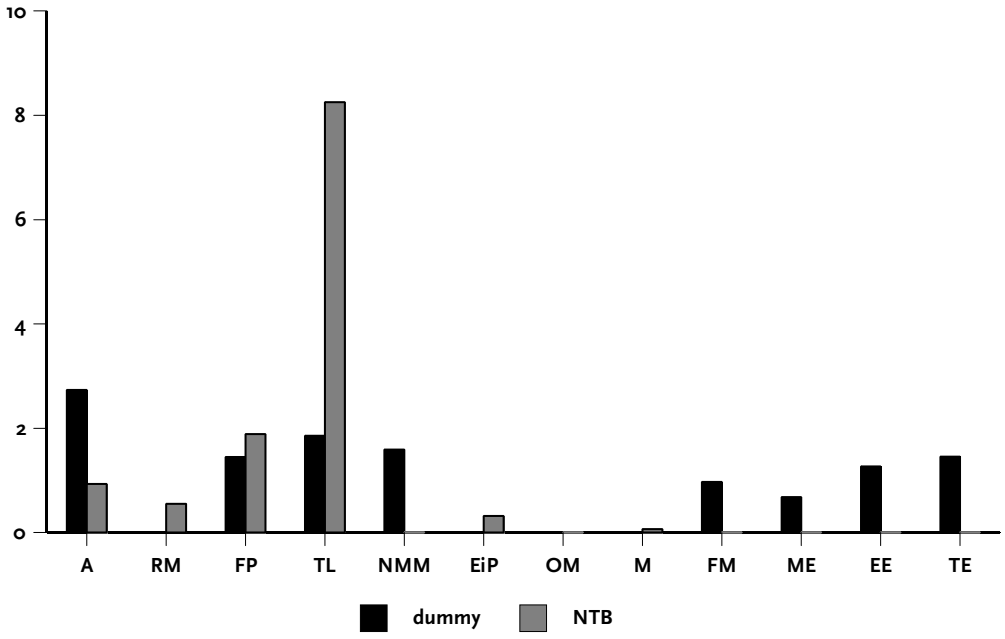
An alternative method for modelling industry-specific accession to the internal market is to use the available direct, albeit imperfect, evidence on the prevalence of NTBs (see for example Keuschnigg et al., 2001). In this section I compare the estimated trade barriers with the direct evidence and argue that the estimation is superior as it takes into account all matters related to the internal market.

The OECD (1997) reports an indicator of the pervasiveness of various NTBs. The indicator I use here is the frequency ratio of the importing country. This ratio indicates the share of the products in a sector ("the proportion of tariff lines") affected by a NTB. The importing country is the EU. The NTBs covered are for example quantitative restrictions (among others: voluntary export restraints and non-automatic licencing) and price-control measures (antidumping actions and voluntary price restrictions). Before turning to the results let me discuss some of the serious limitations of the data: (1) there is no information for the services sectors; (2) an NTB is counted if there is one for one exporting country, so the NTBs need not be relevant for the accession countries; (3) technical barriers to trade are not included in the NTB frequency ratios.

Figure 4.1 shows the estimated dummies and the NTB frequency ratios on a normalised scale (the average dummy is one and the average frequency ratio is one).[17]

[17] The abbreviations in the figure have the following meaning: Agriculture (A), Raw Materials (RM), Food Processing (FP), Textiles and Leather (TL), Non metallic Minerals (NMM), Energy-intensive Products (EiP), Other Manufacturing (OM), Metals (M), Fabricated Metal Products (FM), Machinery and Equipment (ME), Electronic Equipment (EE) and Transport Equipment (TE).

Figure 1 Dummies versus direct evidence



The highest estimated barriers to trade — the EU dummies in Agriculture (A), Food Processing (FP) and Textiles (TL) — confirm the direct evidence on NTBs. The positive EU dummy in Non Metallic Minerals (NMM) is clearly different from the NTB frequency ratio, that is zero. The capital-goods or high-tech sectors — Fabricated Metal Products (FM), Machinery and Equipment (ME), Electronic Equipment (EE), Transport Equipment (TE) — do not have a counterpart in the direct evidence. This is likely due to the omission in the OECD data that technical regulations are left out. They are likely to be important in these industries.

Besides these differences and the fact that the OECD data have limitations discussed above it is likely that accession to the internal market is 'more' than circumventing NTBs; risk and uncertainty is likely reduced, time-delays of passing customs are likely reduced etc. All these aspects are captured in the estimation and not in the OECD data.

5 Conclusions

This paper estimated gravity equations on an industry level and yields two major results.

First, estimating gravity equations on an industry level yields different estimates for the impact of accession to the internal market for the different industries and different countries. The impact of accession to the internal market is notably large in Agriculture, Textiles, Trade Services, Transport Equipment, Non-metallic Minerals and Food Processing. Moreover, the aggregate excess trade within the internal market is comparable to what other studies find. The parameters of the estimated gravity equations have the expected signs and are mostly statistically significant. The estimated EU dummies are robust to changes in specifications. The shock of accession to the internal market is plausibly largest for the accession countries. For the current members of the EU the upcoming enlargement likely has the largest impact for Austria, Greece and Germany.

Second, accession to the internal market entails likely much more than a small reduction of trade costs. The implicit tariffs (actually equivalents of tariffs) that will be removed by accession to the internal market range up to 30 percent !

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Appendix

Data

The estimation results presented in Section 3 make use of three data-sets.
The first is the GTAP 5 database for the economic variables as bilateral exports, national income, industry production and tariffs. Second, to proxy trade cost I use distance data. I use the Great Circle distance between capital cities. Third, I use population data from the UN.

The countries I distinguish in the sample are: Hungary, Poland, rest CEEC, Russia, Germany, France, United Kingdom, Netherlands, Austria, Denmark, Finland, Greece, Ireland, Italy, Portugal, Spain, Sweden, Belgium, Luxembourg, Switzerland, rest EFTA, Canada, USA, Japan, Australia, New Zealand and rest of the World.

Due to the fact that some of the countries in the sample are not actual countries but combinations of countries (rest CEECs, rest EFTA and rest World) I made some ad hoc choices for the distance variable. For the capital of rest CEEC I used the capital of Czechoslovakia, for rest EFTA the capital of Norway and for the rest of the world the capital of Kenya. Admittedly, these choices are blunt, therefore I explicitly check the robustness of my results for the inclusion of the rest of the World (which is more than changing the capital). Different choices for the other two ad hoc choices turned out to be harmless. Finally, our distance data do not distinguish between Luxembourg and Belgium. I therefore assumed distances between their capitals and other capitals identical. I only adjusted the distance between the capital of Luxembourg and Belgium (source: www.anwb.nl).

Robustness

The table below presents the results for three additional specifications. To save space, I only show the EU- dummies for the different specifications (the results are available upon request from the author). The first column repeats the results from the main text. In the second column I leave out the rest of the world and hence estimate the equation for 26 countries. The qualitative results are analogously.

In the third column I remove the formal bi-lateral trade barriers as independent variables as including these is not standard practice in the literature that estimates aggregate gravity equations. Comparing these again with the first column reveals again that the qualitative differences are minor. Only the dummy for Energy-intensive Products turns significant. If import barriers are more important than export subsidies (an assumption that is not valid for Agriculture and Food Processing), one would expect the dummies in column (III) to be larger than those in column (I). Intuitively, the EU dummy would pick up the fact intra-EU trade is not

hampered by import barriers whereas trade between the EU and non-members is reduced by tariffs. This expectation is only confirmed for half of the sectors. I conclude from the minor differences between column (I) and (III) that Single Market accession is indeed something that goes beyond reducing formal tariff barriers!

In the last column I report on an estimation where I replaced the exporter's GDP by the exporting sector's value added. This is motivated by the notion that the exporter's sectoral value added is likely a superior proxy for the country's supply potential. Industries where specific factors are important (think of industries that rely on natural resources as Agriculture and Raw Materials and the like) are expected to show a much better fit. Though not depicted in the table, it is indeed Raw Materials that show the largest improvement in the fit. Three industries show a decline where Financial Services is most notable. Turning to the estimated dummies, it is Raw Materials, Metals and Transport and Communication that draw attention. The dummies in these industries turn significant and positive. What is intuition for this result? Once I 'properly', though ad hoc, control for supply (possibilities) intra-EU trade exceeds the 'normal' level.

Table A.1 Robustness Analysis. EU Dummies from 4 specifications [a]

	Main Text (I)	Without Rest of the World (II)	Excluding Tariffs (III)	Export industry value added (IV)
Agriculture	1.25*	1.09*	1.01*	1.01*
Raw Materials	-0.10	-0.26	0.00	0.84*
Food Processing	0.66*	0.43*	0.71*	0.75*
Textiles and Leather	0.85*	0.83*	0.95*	0.61*
Non metallic Minerals	0.73*	0.71*	0.53*	0.52*
Energy-intensive Products	0.13	0.06	0.26*	0.06
Other Manufacturing	0.08	0.07	0.19	0.02
Metals	-0.10	-0.15	-0.05	0.56*
Fabricated Metal Products	0.44*	0.39*	0.26*	0.30*
Machinery and Equipment	0.31*	0.28*	0.21*	0.50*
Electronic Equipment	0.58*	0.61*	0.55*	0.28*
Transport Equipment	0.66*	0.61*	0.42*	0.96*
Trade Services	0.76*	0.69*	0.77*	0.80*
Transport and Communication	0.03	0.02	0.04	0.18*
Financial Services	-0.14	-0.15	-0.12	-0.15
Other Services	0.27*	0.22*	0.27*	0.24*

[a] An asterisk indicates significance at a 5% confidence interval.