Ireland's Trading Potential with Central and Eastern European Countries: A Gravity Study*

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Abstract: Using a gravity model, we estimate the magnitude of potential trade flows between Ireland and the five CEEC countries which are currently negotiating accession to the EU. We find that Irish exports were already close to their "normal" level in 1994, but that imports from the CEECs were still less than half of their potential size. The value of estimated potential trade corresponds to 0.8 per cent of Irish GNP. The actual share in 1994 was 0.5 per cent. EU enlargement would raise Ireland-CEEC trade to 1.2 per cent of GNP. The short-term scope for trade expansion therefore appears to be modest. Stronger potential for trade growth emerges in the "long-term" scenario, which assumes partial income convergence of the EU and the CEECs. According to our upper-limit estimate in the convergence scenario, the value of Irish trade with the CEECs could reach 8.3 per cent of Irish GNP in 2020.

I INTRODUCTION

It is all but certain that a number of Central and Eastern European countries (CEECs) will join the European Union in the next decade. The EU opened bilateral accession negotiations with six applicant countries in April 1998, and it has declared a strategic aim to embrace an even wider circle of new members in the medium term.

These impending changes will undoubtedly impact significantly on a small

open economy such as Ireland.[1] Enlargement by the six front runner countries Cyprus, Czech Republic, Estonia, Hungary, Poland and Slovenia would swell the EU's population by 17 per cent, but EU GDP would only expand by 2.5 per cent (World Bank, 1997). Yet, the particular features of the applicant countries — proximity to the core EU markets, relatively low labour costs and an educated workforce — could make them formidable competitors for Irish exporters. Conversely, the opening of Central and Eastern European (CEEC) markets, all poised for rapid growth, will boost demand for Irish exports. The magnitude of these forces as well as the net effect are moot points. The issue has been explored in some detail by NESC (1997) and IBEC (1996). These studies reported a small share of the CEECs in Irish trade, accounting for about 1 per cent of total imports and exports, and the recent emergence of pronounced Irish surpluses. Both reports emphasise considerable potential for growth in these trade flows. However, their predictions are not underpinned by rigorous analysis. Our work is a contribution to filling this gap.

We use a gravity model to estimate the "normal" or "potential" volume of trade between Ireland and the CEECs, which can then be compared to observed trade flows. Variants of this methodology have previously been applied in several studies to gauge the potential for trade expansion between the CEECs and the EU as a whole.[2] Country-specific studies have been carried out for Germany (Schumacher, 1997); Spain (Martin and Gual, 1994); and Greece (Dimelis and Gatsios, 1994). The approach has not, however, been applied specifically to trade between the CEECs and Ireland.[3]

The paper is structured as follows. In Section II, we give a brief survey of trade patterns between Ireland and Eastern Europe. Section III discusses the gravity model. The results of our gravity estimation for Irish trade with the CEECs are reported in Section IV. We produce estimates both for the short-to-medium term and for the longer run. The main conclusions are summarised in Section V.

1.   Trade liberalisation does not hinge exclusively on accession of the CEECs. Under the Europe Agreements, tariffs and quotas have been eliminated by the EU. However, some visible obstacles remain in agriculture-related industrial sectors — many of which are the pillars of CEEC comparative advantage — and a host of non-tariff barriers will only be eliminated when the CEECs become fully-fledged participants in the EU's Internal Market (European Commission, 1997).

2.   See Hamilton and Winters (1992); Baldwin (1994); Winters and Wang (1994; Faini and Portes (1995); and Vittas and Mauro (1997).

3.   For a previous gravity analysis of Irish trade flows, see Fitzpatrick (1984).

II PATTERNS OF TRADE BETWEEN THE EU AND THE CEECs

2.1 *CEEC Trade with the EU*

The active dismantling of EU-CEEC trade barriers goes back to the signing of the first Europe Agreements in 1992. In the meantime, such agreements have been signed with ten countries (henceforth referred to as "CEEC-10"): Poland, Hungary, the Czech Republic, Slovenia and Estonia (henceforth referred to as "CEEC-5"), Bulgaria, Latvia, Lithuania, Romania and Slovakia. Under the terms of the Europe Agreements, access for EU goods to CEEC markets was liberalised more slowly than that for CEEC goods to EU markets. However, "sensitive" sectors, including clothing, steel and agriculture, were largely excluded in the early transition years, and the Europe Agreements were therefore criticised for impeding access to EU markets for the most competitive CEEC industries. Even though visible barriers on non-agricultural imports have by now been abolished, a host of non-tariff barriers, ranging from different product standards to inaccessible public procurement markets, continue to impede CEEC exports to the EU (European Commission, 1997).

Table 1 charts the recent developments in the CEECs' share in EU *imports*. In all cases, CEEC shares have grown substantially, expanding by between 9 per cent (Slovenia) and 217 per cent (Estonia) over the 1993-1996 period. However, the rapid expansion of CEEC exports to the EU was from a very low base. In 1996, CEEC-10 exports still accounted for less than 10 per cent of EU imports. Table 2 shows that EU *exports* to the CEECs have increased less rapidly than corresponding imports. However, in absolute terms, the EU has continued to export more goods and services to the CEECs than it imports from them. The net outcome is a strong positive trade balance for the EU in its trade with Eastern Europe.

Table 1: *Share of CEEC Imports in Total EU Imports*[*]

| Partner Country | Share in Total Extra-EU Imports (%) | | | | | Percentage Increase |
	1992	1993	1994	1995	1996	1993-1996
Czech Republic	n.a.	1.19	1.23	1.65	1.68	41
Estonia	0.06	0.06	0.05	0.16	0.19	217
Hungary	1.06	1.04	1.17	1.39	1.52	46
Poland	1.72	1.82	1.95	2.25	2.11	16
Slovenia	0.34	0.67	0.66	0.78	0.73	9
CEEC-5	*n.a.*	*4.78*	*5.06*	*6.23*	*6.23*	*30*
CEEC-10	*3.97*	*5.97*	*6.51*	*8.15*	*8.11*	*36*

*imports from non-EU countries only.
Source: Eurostat Comext database.

Table 2: *Share of the CEECs in Total EU Exports*[*]

| Partner Country | Share in Total Extra-EU Imports (%) | | | | | Percentage Increase |
	1992	*1993*	*1994*	*1995*	*1996*	*1993-1996*
Czech Republic	n.a.	1.50	1.46	2.05	2.24	49
Estonia	0.08	0.10	0.06	0.24	0.27	170
Hungary	1.28	1.37	1.54	1.53	1.60	17
Poland	2.24	2.36	2.33	2.65	3.18	35
Slovenia	0.34	0.77	0.70	0.91	0.86	12
CEEC-5	*n.a.*	*6.10*	*6.09*	*7.38*	*8.15*	*34*
CEEC-10	*n.a.*	*7.50*	*7.55*	*9.31*	*10.18*	*36*

*exports to non-EU countries only.
Source: Eurostat Comext database.

Our data show that, in the early 1990s, trade between the EU and the CEECs has flourished. This might suggest that EU exports have not been adversely affected by delayed access to East European markets under the terms of the Europe Agreements, and that CEECs were able to exploit new exporting opportunities in the EU. However, there is empirical evidence that the safeguard provisions of the Europe Agreements have been effective in holding back CEEC exports in "sensitive" products (Vittas and Mauro, 1997). Full integration of CEECs into the EU's internal market is therefore poised to generate further growth in trade volumes. This paper aims to quantify such expectations for Ireland.

2.2 *CEEC Trade with Ireland*

Ireland's trade exposure to the CEECs is lower than the EU average. Tables 3 and 4 show that the CEEC-5 (and even the CEEC-10) account for less than 1 per cent of the total value of Irish trade, including trade with EU countries.[4] In the 1993-95 period, the share of the CEEC-5 in Irish *imports* remained roughly stable. In contrast, Irish *exports* to those countries rose significantly over the same period, from 0.4 to 0.8 per cent of total exports. Early opportunities for enhanced trade between the CEECs and Ireland therefore appear to have been grasped more successfully by Irish business. The upshot is a substantial and growing surplus in Ireland's trade with CEECs, accounting for over 2 per cent

4.   These are percentages of *total* Irish trade, and can therefore not be compared directly to those reported in Tables 1 and 2, which are scaled to *extra-EU* trade. However, even if we calculate Ireland-CEEC trade as a share of Irish trade with non-EU countries, Irish trade exposure to the CEECs turns out significantly lower than the EU average. For instance, in 1995 Irish exports to (imports from) the CEEC-5 accounted for 3.0 (1.0) per cent of Irish extra-EU trade, which compares to EU averages of 7.3 (6.3) per cent.

of the total Irish trade surplus in 1995 (NESC, 1997). The Irish trade experience is in marked contrast to that of the EU as a whole, which has witnessed a stronger growth in imports from CEECs than in exports to those countries.

Table 3: *Irish Imports from CEECs*

| | 1993 | | 1994 | | 1995 | |
Partner	£'000*	%#	£'000*	%#	£'000*	%#
Czech Republic	8,757	0.06	16,356	0.09	20,561	0.10
Estonia	78	0.00	69	0.00	1,850	0.01
Hungary	4,681	0.03	7,048	0.04	12,586	0.06
Poland	51,328	0.34	53,375	0.31	45,221	0.22
Slovenia	5,904	0.04	4,976	0.03	5,076	0.02
CEEC-5	*70,748*	*0.47*	*81,824*	*0.48*	*85,294*	*0.42*
CEEC-10	*82,053*	*0.55*	*96,482*	*0.56*	*104,636*	*0.52*

Source: CSO. *current prices, #per centage of total imports.

Table 4: *Irish Exports to CEECs*

| | 1993 | | 1994 | | 1995 | |
Partner	£'000*	%#	£'000*	%#	£'000*	%#
Czech Republic	23,758	0.12	37,934	0.17	67,692	0.25
Estonia	926	0.00	2,539	0.01	5,876	0.02
Hungary	16,657	0.08	27,440	0.12	44,277	0.16
Poland	33,377	0.17	41,649	0.18	85,657	0.31
Slovenia	4,520	0.02	5,335	0.02	10,566	0.04
CEEC-5	*79,238*	*0.39*	*114,897*	*0.50*	*214,068*	*0.78*
CEEC-10	*85,705*	*0.43*	*126,225*	*0.55*	*253,854*	*0.93*

Source: CSO. *current prices, #per centage of total exports.

Given that Irish trade volumes with the CEECs are still comparatively small, and that Irish exports have grown substantially faster than CEEC exports, one might be tempted to conclude that there is pent-up export supply from CEECs which could exercise substantial competitive pressure on the Irish economy once the CEECs' access to the EU market has been further liberalised, and once these countries have established more effective export and marketing policies. It is this question of "potential" trade volumes that we now investigate more carefully.

III THE GRAVITY MODEL

3.1 *The Gravity Model and Eastern European Trade*

The post-war economic isolation of the CEECs, their distorted pricing structures and their recent transition from central planning to a market economy make it difficult to estimate, on the basis of extrapolation from historical patterns, the level of trade which is likely to prevail between EU countries and CEECs after full economic liberalisation.[5] For this reason, a method of estimation other than one based on historical trade patterns needs to be applied.

The gravity model provides a cross-section alternative to intertemporal extrapolation. Using this approach, trade is estimated as a function of a number of basic determinants among a reference group of countries which are assumed to exhibit "normal" trade relations. Parameter estimates based on the reference group are applied to the countries whose potential trade flows are of interest. The actual trade volumes of these countries can then be compared to the trade volumes predicted by the model.

The gravity model considers three fundamental determinants of trade: (1) export supply, captured by income and income per capita of the exporting country (2) import demand, captured by income and income per capita of the importing country, and (3) transaction costs, captured by geographical distance and variables representing policy and cultural barriers to trade. Since its inception by Tinbergen (1962), this model has become a popular method of analysis due to its parsimony and to its empirical robustness. Work by Anderson (1979) and Bergstrand (1985) served to place this at first purely empirical model on a solid theoretical footing. In its essence, the gravity equation can be interpreted as a reduced-form version of the core model underlying the "new trade theory", characterised by horizontally differentiated goods, plant-level scale economies and consumer preference for variety.[6] This theoretical underpinning is more appropriate for the explanation of manufactures trade than for resource-driven trade in primary goods. Particularly in terms of export supply, the proxy used in gravity studies (GDP or GNP) is an unsatisfactory explanation of trade volumes in primary goods. It might therefore be argued that applying the gravity equation to total trade volumes is misleading. The common line of defence is that the bulk of intra-European trade is in manufactured goods, and that resource endowments across European countries are quite similar in a world-wide comparison (Baldwin, 1994). In addition, it has been shown that the gravity prediction can also be generated in a Ricardian framework (Eaton and Kortum, 1997) and in a setting with complete specialisation in homogeneous goods (Deardorff, 1998; Haveman and Hummels, 1996).

5. One way of avoiding this problem has been applied by Collins and Rodrik (1991). They used trade data from pre-communist years (the 1920s) to estimate potential East-West trade volumes.

6. See Helpman and Krugman (1985, Ch. 8).

3.2 *Estimation of the Reference Model*

The equation used in our analysis takes the form:

$$\ln \text{EXP}_{ij} = \beta_0 \text{CONST} + \beta_1 \ln \text{GNP}_i + \beta_2 \ln \text{GNP}_j + \beta_3 \ln \text{GNPCAP}_i$$
$$+ \beta_4 \ln \text{GNPCAP}_j + \beta_5 \ln \text{DIST}_{ij} + \beta_6 \ln \text{REM}_j + \beta_7 \text{LANG}_{ij} \quad (1)$$
$$+ \beta_8 \text{ADJ}_{ij} + \beta_9 \text{EU}_{ij} + \varepsilon$$

where
EXP_{ij}	=	value of exports from country i to country j
GNP_m	=	GNP of country m = [i,j]
GNPCAP_m	=	GNP per capita of country m
DIST_{ij}	=	Distance between country i and country j
REM_j	=	Remoteness of country j
LANG_{ij}	=	Language dummy
ADJ_{ij}	=	Adjacency dummy
EU_{ij}	=	EU dummy

Following Ekholm *et al.* (1996), this equation is estimated for a reference sample of 24 countries.[7] Thirteen of these countries are members of the OECD and the remaining eleven are classified as "outward oriented developing". By basing our estimates on a sample of countries which includes developing countries, the model avoids producing results which are characteristic solely of trade flows between industrialised countries.[8] The costs of trade relative to distance may be lower between rich industrialised countries due to high standards of infrastructure. The determinants of trade volumes are also likely to differ, since the share of intra-industry trade tends to increase in line with income per capita. However, the inclusion of developing countries can also lead to problems due to the fact that developing country trade is more likely to be affected by idiosyncratic policy distortions. For this reason, we only include countries which have been classified as having outward oriented trade strategies by Greenaway and Nam (1988).

All data in the sample refer to 1994. We will thereby capture the CEECs' trade structure well into the transition process, and we are not as affected as earlier studies by the statistical complications arising from proximity to the extraordinary conditions of central planning and its immediate aftermath. Our

7.   Austria, Belgium-Luxembourg, Brazil, Canada, Chile, Finland, France, Germany, Hong-Kong, Israel, Italy, Japan, Malaysia, Netherlands, Norway, South Korea, Singapore, Sweden, Thailand, Tunisia, Turkey, United Kingdom, United States and Uruguay.

8.   According to the World Bank (1997), the CEEC-10 belong to the "middle income" group of countries, whose average per capita GNP is $2520 (1994 prices). Three of the ten (the Czech Republic, Hungary and Slovenia) belong to the "upper middle income" group of countries which has an average per capita GNP of $4,640. This compares with an average per capita GNP of $23,420 for "high income" economies, which include Ireland ($13,530) and all other EU countries except for Greece.

trade data are taken from the Direction of Trade Statistics (IMF, 1996). Import data were used in preference to export data, as countries tend to be more vigilant in recording import statistics. Trade flows recorded as zero were omitted.[9] Distance is measured as the geographic distance between the economic centres of the exporting and importing countries.[10] The remoteness indicator REM is the average of a country's distances to its trade partners, weighted by those partners' GNPs. This variable was included in order to avoid potential mis-specification as suggested by Polak (1996) and applied by Feenstra *et al.* (1998). Income data at current market prices were taken from the World Bank's World Development Indicators.

The results of our benchmark regression are presented in Table 5. Reassuringly, the typical empirical success of the gravity specification is manifested in a good fit; with an adjusted R^2 of 0.76, and a standard error of the regression equal to less than half the standard deviation, and less than one-sixth the mean, of the regressand. All coefficients have the expected signs, plausible magnitudes and are statistically significant at the 1 per cent confidence level, except of the EU variable which is significant at 5 per cent.[11]

Table 5: *Gravity Model Coefficient Estimates*

Explanatory Variable	Coefficient	t-statistic[*]
GNPex	0.729	21.508
GNPim	0.669	18.830
GNPCAPex	0.302	4.670
GNPCAPim	0.402	7.218
DIST	-0.374	-4.041
EU	0.531	2.550
LANG	0.708	3.536
ADJ	1.424	4.881
REM	0.807	3.673
CONST	-15.431	-14.662

Note: No. of observations: 537; adj. R^2 = 0.76; standard error of the regression = 1.08.
[*]Heteroskedasticity-consistent t-values (White adjusted).

9. The problem with zero observations is that they are undefined in the log specification of the gravity equation. Strictly taken, this is therefore a truncated data set, and a Tobit estimation technique would be warranted. However, it has been shown in several studies that the point estimates are not affected significantly by the estimation method used, and OLS has become the standard technique in the literature (see, e.g., Baldwin, 1994). Furthermore, the number of zero observation in our sample is small (15 out of 552, i.e. less than 3 per cent).

10. Distance data relate to the shortest geographical distance between countries' prinicipal cities. They are taken from Nilsson (1997).

11. Note that the size of the coefficient on distance (-0.4) is considerably smaller than that typically found in earlier studies (–0.7). Given that our data are more recent than those used in the previous studies, this is likely to reflect the erosion of spatial trade costs in global trade flows.

In Table 6, we compare the trade volumes predicted on the basis of the gravity coefficients with actual flows for 1994 for the reference group. It appears that Ireland is "under-trading" with most of the countries in the reference sample. Actual exports are only slightly smaller than predicted exports, but on the import side, predicted trade values are more than 50 per cent larger than actual values. This difference between exports and imports is particularly pronounced for Irish trade with continental EU countries. The ratio of projected Irish exports over actual exports is smaller than unity for all of these countries. Conversely, this ratio exceeds unity for imports from all continental EU members, except for the Nordic countries and the Netherlands. It is also striking that Irish trade with the UK, albeit still accounting for the largest share, is below the predicted "normal" level. It can be hypothesised that these trade patterns are to some

Table 6: *Projected Irish Trade with the Reference Group (1994 US$ mn)*

Partner Country	Actual Exports	Projected Exports	Export Ratio	Actual Imports	Projected Imports	Import Ratio
Austria	271	221	0.82	105	227	2.16
Belgium-						
Luxembourg	1,454	556	0.38	351	582	1.66
Brazil	63	157	2.50	97	210	2.16
Canada	352	747	2.12	134	834	6.23
Chile	36	38	1.05	6	43	7.22
Finland	172	116	0.67	148	116	0.79
France	2,747	1,846	0.67	1,133	2,132	1.88
Germany	3,979	2,051	0.52	1,895	2,409	1.27
Hong Kong	73	278	3.81	146	282	1.93
Israel	105	85	0.81	40	87	2.18
Italy	1,563	1,137	0.73	654	1,322	2.02
Japan	1,415	1,628	1.15	1,507	1,938	1.29
Malaysia	285	44	0.15	325	51	0.16
Netherlands	1,305	474	0.36	796	507	0.64
Norway	322	183	0.57	436	180	0.41
Singapore	194	200	1.03	298	237	3.08
South Korea	0	184	n.a.	77	178	0.60
Sweden	426	237	0.56	385	245	0.64
Thailand	42	61	1.45	45	77	1.71
Tunisia	9	15	1.62	10	17	1.67
Turkey	96	68	0.70	40	86	2.15
UK	8,239	14,765	1.79	9,552	17,235	1.80
United States	2,953	4,295	1.45	4,265	5,462	1.28
Uruguay	3	18	6.16	1	19	19.18
Total	*26,101*	*29,402*	*1.13*	*22,445*	*34,476*	*1.54*

extent a result of the domination of Irish trade statistics by the activities of overseas multinational firms, who use Ireland as an assembly and export base to serve the whole EU market.[12] Our results support the opinion of those who predict that the potential for a further re-orientation of Irish business away from the UK market is limited (Gallagher and McAleese, 1994).

IV PROJECTING IRISH TRADE WITH THE CEECs

Using the parameter estimates produced by the gravity equation, we compare the "normal" trade volumes predicted by the model for Ireland-CEEC trade with actual trade volumes. Our exercise is carried out in the first instance for a "short-run" scenario, where incomes are held constant at 1994 levels. It is then repeated for a "long-run" scenario, in which EU and CEEC per-capita incomes are assumed to have partially converged.

4.1 *"Short-Run" Projections*

Our first exercise is to apply actual 1994 GNP and population values for the CEECs and Ireland, and estimate "normal" trade flows by inserting these figures into Equation (1). This gives us an indication of trade volumes which would have prevailed between Ireland and the CEECs, had the latter been fully market-oriented economies with liberalised trade régimes, but without EU membership.

As can be seen from Table 7, Irish *exports* to the CEECs are on average already close to predicted levels. The outliers are Hungary, where projected Irish exports are 69 per cent above actual levels, and Poland, where projected exports are 37 per cent below the actual value for 1994.

Table 7: *"Short-Run" Ratios of Projected over Actual Values of Irish Trade with the CEECs*

Partner	Exports	Imports
Czech Republic	0.85	1.73
Estonia	0.83	n.a.[*]
Hungary	1.69	7.86
Poland	0.63	1.40
Slovenia	1.25	4.48
CEEC-5 (Total)	*0.92*	*2.30*
CEEC-10 (Total)	*1.11*	*2.47*

[*]Irish imports from Estonia were recorded as zero.

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12. Some caution should be exercised in the analysis of these data, as they are likely to be distorted by the transfer-pricing practices of multinationals. To our knowledge, no attempt at quantifying the effects of these practices has yet been undertaken.

Irish *imports* from the CEECs were below "normal" levels in all cases. For the CEEC-10 as a whole, predicted Irish imports are two-and-a-half times as large as actual imports. The fact that the projected/actual ratio of Irish *imports* exceeds that of *exports* is a consequence of the current Irish trade surpluses with the CEECs. Our results clearly indicate that there is considerable scope for an increase in Irish imports from the CEECs, even without EU enlargement, and in spite of the growth of these trade flows in the early 1990s we reported in Tables 1 to 4.

The next step in our exercise is to insert a value of 1 for the EU dummy, hence to simulate the "short-run" effects of immediate EU enlargement on Irish trade with the frontrunner applicants, the CEEC-5. Table 8 reports the results. Given the parameter estimates from our reference sample, EU membership increases predicted trade flows by 70.1 per cent for any country pair.[13] Hence, the projected value of Irish trade with the CEEC-5 would increase by over two-thirds its "normal" value again, if EU enlargement were immediate. This increase affects Irish exports and imports symmetrically.

Table 8: *"Short-Run" Projections of Ireland-CEEC-5 Trade, with and without EU Enlargement (1994 US$ mn)*

Partner	IMPORTS			EXPORTS		
	Actual	*Pred.*	*Pred. with enlargement*	*Actual*	*Pred.*	*Pred. with enlargement*
Czech Republic	21	36	62	38	32	55
Estonia	0	7	11	8	7	11
Hungary	7	55	94	29	49	84
Poland	48	67	115	87	54	93
Slovenia	5	22	38	18	23	38
CEEC-5	*81*	*187*	*320*	*180*	*165*	*281*

So far we have compared potential "short-run" changes in Irish trade volumes with the CEEC-5 relative to base-year trade volumes. In this respect the scope for trade growth looks very large. However, it might be more meaningful to look at bilateral trade volumes relative to total Irish trade and relative to Irish GNP. This is done in Table 9. We find that even the high predicted short-run growth rates in these trade flows will not result in significant effects for Ireland in macroeconomic terms. This is due, of course, to the small current size of Ireland-CEEC-5 trade relative to the total Irish economy. For instance, even if Irish

13. This is obtained by taking the antilog of the coefficient estimate for the EU dummy in Table 5: $\exp(0.531) = 1.701$.

trade volumes with the CEEC-5 were to shoot up to their "natural" levels, and the EU were enlarged in the immediate future, our model predicts that the value of Ireland-CEEC-5 trade would merely increase from 0.5 to 1.3 per cent of Irish GNP.

Table 9: *Potential Trade with CEEC-5, Scaled by Total Irish Exports, Imports and GNP (1994 levels)*

	Imports from CEEC-5 (% of total imports)	Exports to CEEC-5 (% of total exports)	Total Trade with CEEC-5 (% Irish GNP)
Actual Trade	0.3	0.6	0.5
Predicted Trade:			
no EU enlargement	0.7	0.5	0.8
with EU enlargement	1.2	0.9	1.2

4.2 *"Long-Run" Projections*

The previous section conveys no insights on the trade effects of changes in relative income levels of the CEECs and Ireland. However, it is likely that, in the medium to long term, CEEC incomes will to some extent catch up with those of the EU. We therefore model a "long-run" scenario with partial income convergence. Following Baldwin (1994), we hypothesise that the CEECs' per capita income levels will catch up with the average of Greek and Portuguese per capita GNP by the year 2020, except for Slovenia, which is assumed to attain Austrian income levels.[14] Future growth rates for the relevant EU countries are extrapolations from 1985-94 averages.[15] In order to attain the hypothesised degree of income convergence, the CEEC-5 would have to exhibit annual rates of growth of between 5.8 and 7.8 per cent (see Table 10).

In reality, CEEC growth rates are rather unlikely to reach the levels underlying our projections, given historical trends in countries with comparable income levels. The potential exports and imports predicted on foot of this convergence scenario should therefore be seen as upper-bound estimates.

Table 11 shows the values of predicted trade in 2020 under our partial convergence scenario both in nominal terms and as percentage of Irish GNP.

14. For the purpose of this analysis, population is held constant. Therefore GNP per capita and GNP grow at the same rate. Experiments were done with convergence in the years 2010 and 2015 but in each case the implied growth rates were unrealistically high.

15. 1. 9 per cent for Austria, 1.3 per cent for Greece, 5.0 per cent for Ireland and 4.0 per cent for Portugal (World Bank, 1997).

Table 10: *Implied Growth Rates of CEEC-5, Assuming Partial Income Convergence*

Country	Implied Growth Rate (%)	Actual Annual Growth 1990-1995[*] (%)
Czech Republic	6.6	−2.6
Estonia	7.1	−9.2
Hungary	5.8	−1.0
Poland	7.8	2.4
Slovenia	7.0	n.a.

[*]World Bank (1997). For explanations, see text.

We divide our scenario into a situation with EU enlargement and one without. In 1994, the potential volumes of trade with the EU frontrunners accounted for between 0.8 and 1.2 per cent of Irish GNP. Estimated trade volumes in the "long-run" scenario, however, account for up to 8.3 per cent of Irish GNP. On the basis of these simulations, the EU frontrunner countries could clearly account for significantly larger proportions of Irish exports and imports than they currently do. It is apparent that the main potential for larger trade volumes stems from economic growth in the CEECs, and not from EU enlargement.

Table 11: *"Long-Run" Trade Potential*

Partner	Exports, 2020		Imports, 2020		Total Trade, 2020		Total Trade, 1994	
	No Enlargement	With Enlargement	No Enlargement	With Enlargement	No Enlargement	With Enlargement	No Enlargement	With Enlargement
	1994 US$ mn				% of Irish GNP			
Czech Republic	708	1,204	787	1,339	0.87	1.48	0.14	0.24
Estonia	166	282	164	279	0.19	0.33	0.03	0.04
Hungary	874	1,486	972	1,653	1.08	1.83	0.21	0.37
Poland	1,633	2,778	1,964	3342	2.09	3.09	0.25	0.43
Slovenia	550	936	535	910	0.63	1.07	0.09	0.16
CEEC-5	*3,931*	*6,686*	*4,422*	*7,523*	*4.86*	*8.27*	*0.73*	*1.24*

V SUMMARY AND CONCLUSIONS

We have estimated the magnitude of potential trade flows between Ireland and the five CEEC countries currently negotiating accession to the EU. These

trade flows have grown strongly in the early 1990s, particularly on the side of Irish exports to the CEECs, but they still accounted for less than 1 per cent of total Irish trade in 1995.

Using elasticity estimates generated by a gravity model for a 24-country reference sample on data for 1994, we compute predicted trade volumes for three scenarios: (i) "normal" trade relations, as exhibited by the reference sample, *ceteris paribus*, (ii) "normal" trade volumes with added assumption that the EU is enlarged to comprise the CEECs, and (iii) a "long-term" scenario assuming partial income convergence between the CEECs and the EU.

We find that Irish export volumes are close to their "normal" level, but that Irish imports from the CEECs were still less than half of their "normal" size in 1994. However, the estimated magnitudes are small in macroeconomic terms. Total Ireland-CEEC trade accounted for 0.5 per cent of Irish GNP in 1994. The "normal" level would have corresponded to 0.8 per cent of GNP. EU enlargement would boost these trade flows by an additional 70 per cent, raising the volume of Ireland-CEEC trade to 1.3 per cent of GNP. By far the strongest potential for trade growth emerges in the "long-term" scenario, which assumes that CEEC incomes converge with some low-income EU countries. According to our upper-limit estimate in the convergence scenario, the value of Irish trade with the CEECs could reach 8.3 per cent of Irish GNP in 2020.

Our simulations suggest that the trade effects of EU enlargement on the Irish economy will be relatively modest. Significant trade-induced protectionist pressures against enlargement are, therefore, unlikely to emerge in Ireland, even though future trade expansion is likely to materialise mainly in the form of a rise in the value of Irish imports from the CEECs. The main scope for trade expansion stems from successful economic transition in the CEECs and the resulting income catch-up with the EU. Of course, trade liberalisation, trade expansion and income convergence are causally linked in reality and not as neatly separable as in our study. A more sophisticated analysis, allowing for positive growth effects of enlargement, might approximate our upper-bound, "long-term" predictions.

Some caution needs to be applied to the interpretation of our results. Four main limitations have to be borne in mind. First, our methodology does not disaggregate trade flows by sectors. This is of particular importance for agricultural trade, which accounts for a substantial proportion of Ireland-CEEC trade, and to which the gravity model is not as well suited as to trade in manufactured goods. The scope for sectoral disaggregation in future work is evident. Second, we have to be careful in the normative interpretation of our results. The rate of increase in trade volumes correlates positively with factor-market adjustment costs as well as with the conventional gains from trade. Our analysis does not permit inferences on the magnitude of these welfare effects. A

study of intra-industry trade between Ireland and the CEECs could shed light on the likely adjustment pressures induced by further trade expansion (see, Brülhart and Hine, 1999; and Thom and McDowell, 1999). Third, one of the main concerns of Irish exporters is that competition from CEECs might reduce their profits on EU markets — a classical trade-creation scenario, but with negative welfare effects from an Irish perspective. However, the gravity approach used in this paper does not allow an analysis of competition effects in third-country markets, and it thus cannot elucidate one of the key issues of concern to Irish exporters. Finally, our study is restricted to trade effects, and thereby does not cover some central items on the agenda of enlargement negotiations, such as the consequences for Ireland of induced reforms of the EU's agricultural and regional policies, or the impact on Ireland's relative attractiveness as a destination for foreign investment.

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