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# Kiel Working Paper No. 745

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TRADE INTEGRATION BETWEEN EASTERN AND WESTERN EUROPE: Politics follows the market

by

Daniel Piazolo

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Institut für Weltwirtschaft an der Universität Kiel The Kiel Institute of World Economics

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# **Kiel Working Paper No. 745**

# TRADE INTEGRATION BETWEEN EASTERN AND WESTERN EUROPE: POLITICS FOLLOWS THE MARKET

by

Daniel Piazolo

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May 1996

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## Abstract

This paper examines to what extent Eastern Europe trade reorientation towards the West has been driven by market forces versus policies for regional integration. Hierarchical cluster analysis based on bilateral trade intensity reveals the convergence of regional trade structures to the pre-World-War II pattern. Estimates of the expected trade pattern of Eastern Europe with a gravity model predict continuing rising importance of the EU. Furthermore, the assessment of the welfare implications of preferential access to EU markets shows that beneficial effects of trade expansion are likely to outweigh possible distortions. Hence integration policies follow the facts created by the market.

JEL Classification: F14, F15.

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Key Words: Trade Integration; Eastern Europe; EU Enlargement; Hierarchical Cluster Analysis; Gravity Model

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#### I. The Issue

The transformation of the Central and Eastern European economies has eliminated the preference for intra-COMECON trade and many barriers to trade between Eastern and Western Europe.\* As a result, Central and Eastern European countries (CEECs) have reoriented their foreign trade towards Western Europe. Simultaneously, the institutional integration between the EU and Eastern Europe may also have driven the process of reorientation. The purpose of this research is to investigate whether this process has been primarily driven by market forces or institutional integration. The focus is on the following countries: Bulgaria, the Czech Republic, Hungary, Poland, Romania and the Slovak Republic.

First, I examine the occurred regional regrouping of countries within Europe by using hierarchical cluster analysis and dendrograms (tree diagrams) to identify functional regions characterised by the intensity of bilateral trade. This statistical approach reveals profound changes in trade orientation of the CEECs from East towards the West since 1989 and allows a comparison with trade orientation before World War II.

Second, an estimate of the "normal" regional pattern of trade of the CEECs is determined with a gravity model that expresses bilateral trade as a function of economic size of the countries (as a proxy of trade promoting factors) and the distance between them (as a proxy of trade restricting factors).

Third, different indices are applied to ascertain whether EU membership of the CEECs would have distortionary trade effects. The analysis reveals that trade in-

<sup>\*</sup> This paper on the trade integration between Eastern and Western Europe is part of the project "Perspectives for the Division of Labour between Germany and Eastern Europe". Financial support from the Volkswagen Foundation is gratefully acknowledged. Special thanks are due to Rolf J. Langhammer and Matthias Lücke for helpful suggestions and to Dieter Schumacher from the German Institute of Economic Research in Berlin for providing data on distance between countries used in the gravity model. Angela Husfeld and Michela Rank provided excellent research assistance.

tegration between Eastern and Western Europe has already progressed so far that regional integration due to political reasoning will not cause substantial trade distortions. Politics will only give an institutionalised framework to trade structures created by dynamic market activities. Therefore, it can be concluded that the political plans about the integration of the European nations are only late arrivals to the reality of economic integration based on trade flows.

### II. Trade Reorientation of the CEECs Since 1989

#### 11.1. The Geographical Composition of CEEC Trade

The year 1989 brought the artificial trade isolation of Central and Eastern Europe from Western Europe to an end. Since then, trade barriers have been dismantled (not completely yet) and East-West trade has increased dramatically. There has been a distinct regional shift of the trade of the CEECs to Western Europe as revealed in the trade statistics. This shift is also due to the collapse of trade between the CEECs since the Council for Mutual Economic Assistance (CMEA) disintegrated and the decreasing GNP level during the early period of transformation reduced import demand for goods.

The geographical composition of export flows of the CEECs is listed in Table 1 for three years: 1928 as representative of the pre World War II period, 1989 as representative of the time of the Iron Curtain and 1994 as the most current year with available data.<sup>1</sup> In 1989, the share of the 15 countries of the EU in the total trade of the CEECs was only 23 percent. In the same year the countries of the Eastern bloc were the important purchasers of goods and services of the CEECs, with the Soviet Union as the most important trading partner. This had changed drastically by 1994. The Soviet Union vanished as the main destination of the

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<sup>&</sup>lt;sup>1</sup> The geographical composition of the import flows of the CEECs is generally similar to that of the export flows. Import flows for the three years are presented in Appendix Table 1.

CEECs products. The succeeding 15 republics have attracted only a fraction of the former trade flows. For each Eastern European country, the other CEECs also lost in importance.

As a point of reference for the present trading pattern, a suitable historical trading pattern can shed light on the extent of the occurred changes. The trading pattern of the CEECs before World War II mirrors cultural affinity with the Western European Countries as all CEECs were characterised by market economies. Only the USSR followed a planned economy system. CEEC trade before World War II was subject to many of the same determinants as today: differences in natural resource and factor endowments, production complementarities, cultural and language links and geographical proximity.<sup>2</sup> However, the time before World War II was not distortion-free and a comparison to the eighties and nineties requires caution. In the twenties and thirties, the Soviet Union still suffered from the effects of the civil war and was isolated from the other countries. The borders of the Soviet Union, Poland and Germany have changed in the wake of World War II. Furthermore, the relative strength of Western countries has changed over the decades, most noticeable for the UK and Japan. Given these qualifications, the year 1928 was selected for a snapshot of trading before the Great Depression of 1933.

Table 1 shows that there is an astonishing correlation in the geographical composition of trade of the CEECs between the year 1928 and 1994. In 1994 as in 1928, the 15 countries of the EU accounted for two thirds of the exports of the six CEECs. The extent of the reorientation to the pre World War II pattern varies for

<sup>&</sup>lt;sup>2</sup> Collins and Rodrik (1991) combine trade data from the pre World War II period and a regression on comparator countries to derive an estimation of the potential geographical composition of trade of the CEECs. Some of the following discussion and tables draw on ideas and data from Collins and Rodrik. Laaser and Schrader (1992) also use the inter-war period as a bench-mark case to assess the integration prospects of the Baltic States into the global economic system.

the different Eastern European countries, but the overall conclusion for the CEECs is the same.

#### **11.2.** Reshaping of Functional Regions in Europe

The reorientation of CEEC trade as described in the preceding section has reshaped the regional trading patterns in Europe. In this context, regions are defined to include countries whose trade links to other members of the group are stronger than their links to non-members. In regional science, this is described as the concept of functional regions.<sup>3</sup> Regions matter since their configuration often determines the political decision making. The relative intensity of bilateral merchandise trade reflects the degree of the mutual dependence of the goods markets and can be used as a criterion for the identification of regions.

A suitable measure for trade intensity is the share of country i's exports destined to country j,  $X_{ij} / X_i$ , with  $X_{ij}$  as country i's exports to country j and  $X_i$  as country i's total exports. The trading relationship between two countries is characterised by two values:  $(X_{ij} / X_i)$  and  $(X_{ij} / X_j)$ , of which the minimum is chosen

<sup>&</sup>lt;sup>3</sup> This differs from the concept of a homogenous regions. Areas or countries constitute a homogeneous region if they reveal a high degree of similarity concerning a set of characteristics, like natural resource endowments, climate, topography or GNP per capita. For a discussion of these concepts see Amelung (1992). Different methodologies to measure bilateral and multilateral integration are discussed in Haass and Peschel (1982).

CEECs		Bulgaria	L	Cze	ch Rep./	Slovak I	Rep.		Hungary			Poland			Romania	1	all	6 CEEC	.'s <sup>2</sup>
	1928	1989	1994	1928	1989	19	94	1928	1989	1994	1928	1989	1994	1928	1989	1994	1928	1989	1994
Partner countries						Cz <sup>3</sup>	SL <sup>3</sup>												
Eastern Europe	11.8	75.5	15.9	21.9	59.6	14.5	8.4	34.0	42.7	25.5	18.3	39.1	13.8	22.4	39.6	13.4	21.7	51.3	15.3
Ex Soviet Union	0.0	58.1	11.3	1.3	43.1	6.5	7.2	0.4	28.3	15.1	1.7	25.0	9.3	0.0	30.4	6.6	0.7	37.0	9.3
EU (15) <sup>1</sup>	78.9	8.6	48.3	60.5	20.5	72.6	82.9	59.4	31.5	60.7	73.7	37.2	68.8	65.2	18.4	48.2	67.6	23.2	- 63.6
Germany	27.6	2.3	14.0	26.8	7.8	42.6	43.5	11.9	11.6	28.0	34.7	13.6	35.7	24.9	5.2	16.0	25.2	8.1	30.0
France	6.6	1.0	4.7	1.3	1.6	3.0	4.0	0.8	2.7	3.3	1.7	3.0	4.0	4.0	2.9	5.1	2.9	2.2	4.0
UK	2.6	0.7	3.3	7.0	1.5	3.7	2.7	2.9	1.5	3.1	8.8	5.4	4.5	3.7	1.2	3.2	5.0	2.1	3.4
Italy	11.8	1.6	9.9	3.8	2.2	5.8	11.7	6.6	4.5	8.1	1.9	2.5	5.0	12.8	5.8	13.0	7.4	3.3	8.9
Greece	7.9	0.8	7.1	0.7	0.6	0.8	0.8	0.8	0.8	0.5	0.0	0.4	0.4	4.4	0.4	2.3	2.8	0.6	2.0
Austria	14.5	0.5	1.9	14.7	2.7	8.6	11.6	34.0	5.4	9.9	12.4	3.2	2.2	11.4	0.4	1.6	17.4	2.4	6.0
US	1.3	0.9	7.3	5.6	0.6	2.9	4.5	0.8	2.8	4.0	0.8	2.7	3.4	0.4	2.5	3.1	1.8	1.9	4.2
Asia	0.0	3.5	4.5	2.1	4.4	2.9	0.9	0.4	2.9	1.5	0.8	4.2	3.1	0.0	5.2	6.8	0.7	4.0	3.3
Other	7.9	11.6	13.9	10.0	15.0	7.0	3.2	5.3	20.1	8.3	6.3	16.7	10.8	12.1	34.4	28.5	8.3	19.5	13.6
Eastern Europe: Bulge Asia: Japan, Korea, T <sup>1</sup> EU (15): without Irel	aria, Cze aiwan, C and; - <sup>2</sup> u	ch Repui hina, In nweight	blic, Slo dia, Bun ed avera	vak Repi ma, Sri I ge; - <sup>3</sup> To	iblic, Hu .anka. tal trade	ngary, P for 1994	oland, R exclude	omania,	Ex-Sovi -Slovak	et Unior trade.	and Ex-	Yugosla	via.			,			

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Table 1 — CEECs: Geographical Composition of Exports, 1928, 1989, 1994 (percentage of total)

Sources: Collins and Rodrik (1991) and International Monetary Fund (1995).

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to represent the relationship. A high value means that bilateral trade influences the allocation of resources in both economies (Amelung, 1992).<sup>4</sup>

A hierarchical cluster analysis can be used to identify regions based on the intensity of bilateral trade links. The first step of hierarchical cluster analysis is the calculation of the "similarity matrix" which gives the values of  $(X_{ij} / X_i)$  and  $(X_{ij} / X_j)$ , labelled  $a_{ij}$  and  $a_{ij}$ ; for each pair of countries.

The second step links the countries into "clusters" or "strong components" through a single-linkage algorithm.<sup>5</sup> The procedure starts by linking the countries with the largest  $a_{ij}$  or  $a_{ji}$  value. A threshold t for min $(a_{ij}, a_{ji})$  is progressively reduced and a link between countries is inserted when both values  $a_{ij}$  and  $a_{ji}$  are larger than t. With decreasing t, a cluster of countries will be linked to single countries or other clusters until all countries are united into one cluster. It is important to note that the similarity of groups is determined only by their closest members.

The results of the hierarchical cluster analysis of bilateral trade flows for 1929, 1984 and 1994 are described by Dendrograms (tree diagrams) (Figures 1 to 3). At the x-axis, the magnitude of the threshold value t is depicted. Additionally, the pairs of countries that lead to links between existing clusters are listed below the dendrograms. In 1984, three functional regions could be identified within Europe: First, five members of the Council of Mutual Economic Assistance (East

<sup>&</sup>lt;sup>4</sup> Implicit in this approach is a bias against smaller countries because the export shares are unweighted. Kojima (1964) developed an alternative index by normalising with the share of the importing country world imports. However, this introduces a bias against large countries. Kojima's procedure is set out and applied in the Appendix to facilitate the comparison of different trade indices.

<sup>&</sup>lt;sup>5</sup> In their discussion of cluster analysis techniques, Seleka and Henneberry (1991) explain the different hierarchical clustering algorithm. An alternative to the single-linkage algorithm is applied to the data in the Appendix.



Figure 1: Dendrogram of Functional Regions 1929

4. Germany - USA 5. France - Switzerland

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9. Japan - USA

10. Czechoslovakia - Germany

12. Denmark - Germany 13. Germany - USSR 14. Finland - Sweden 15. Bulgaria - Germany



#### Figure 2: Dendrogram of Functional Regions 1984



#### Figure 3: Dendrogram of Functional Regions 1994

- 2. France United Kingdom
- 3. France- Italy
- 4. Belgium-Lux. France
- 5. France Spain
- 6. Denmark sweden

- 8. Germany Switzerland
- 9. United Kingdom USA
- 10. Finland Sweden
- 11. Ireland United Kingdom
- 12. Austria Hungary

14. Czech Rep. - Poland 15. Austria - Czech Rep. 16. Sweden - United Kingdom 17. Greece - Italy 18. Bulgaria - Romania

Germany, USSR, Czechoslovakia, Bulgaria, Poland and Hungary),<sup>6</sup> second, the four Scandinavian countries (Sweden, Norway, Finland and the EC-member Denmark), third, the core members of the EC (Benelux, the UK, Italy, France and West Germany). Japan, the USA and Canada are linked to the functional bloc of the Western European countries before a link is established between Western and Northern Europe or between Western and Eastern Europe. The USA and Canada are very closely linked and can serve as a point of reference for functional regions in Europe.

The shape of the dendrogram from 1994 shows the effects of the break-down of trade between the Eastern European countries. The functional region of Eastern Europe - clearly apparent in the dendrogram from 1984 - has disintegrated. While the Czech and the Slovak Republic are of course closely linked, these two countries, Poland and Hungary join the extended functional bloc of Western European countries at a low level of economic integration. Russia is first linked to Finland rather than to another CEEC.

The core EU members are still closely integrated, and are linked to Spain, Portugal, Austria, Switzerland, USA, Canada, Japan and Ireland before any of the Eastern European or Scandinavian countries. Sweden, Norway, Finland and Denmark constitute a distinct Scandinavian functional region and are linked to the Western Europe bloc only after the Eastern European countries.

The situation in 1929 broadly resembles that of 1994. A core region consists of France, Belgium-Luxembourg, the Netherlands and Germany, and a larger region includes this core region, Switzerland, Italy, the UK, the USA, Canada and Japan. Austria, Czechoslovakia, Hungary and Romania are linked to this functional

<sup>&</sup>lt;sup>6</sup> The similarity matrix is calculated by dividing the elements of row i of the trade matrix with the total exports of country i given in the last column. The similarity matrix shows therefore the share of bilateral trade in total trade. The trade matrices and similarity matrices for 1984 and 1994 and the similarity matrix for 1929 are supplied in the Appendix Tables. Romania is not part of this functional region and joins in only at a low value of t - representing a weak functional integration - through the linkage with Poland.

region before the Scandinavian countries. In 1929, the Scandinavian functional region included Denmark, Sweden and Norway, but not Finland. Thus, the dendrograms reveal a convergence of the pattern of functional regions within today's Europe to the one which held for Europe before World War II. The dendrogram of 1984 differs through the pronounced existence of a functional region of the Eastern European countries from the dendrograms of 1929 and 1994. Hierarchical cluster analysis therefore exposes the renaissance of the old functional regions within Europe.

#### III. Expected Long-Term Pattern of Trade of the CEECs

The trading pattern of the pre-World War II period provides a useful point of reference for intra-European trade under market economy conditions, but given substantial differences in political mapping between the two periods such comparison should not be overinterpreted. A gravity model – based on current economic data – can better approximate the expected or "normal" pattern of trade of the CEECs once the adjustment problems of the transformation period have been overcome.

#### III.1. Estimates Based on a Gravity Model

The gravity model<sup>7</sup> explains bilateral trade as a function of the "size" of the two countries and "distance". "Size" is reflected in the national product and GNP per capita of both the supplier country and of the destination country and captures

<sup>&</sup>lt;sup>7</sup> The model derives its name from the analogy of trade flows to gravitational forces between objects depending on their mass and the distance between them. Gravity models were developed in the early 1960s as a framework for the empirical analysis of trade phenomena (Tinbergen, 1962; Pöyhönen, 1963; Linnemann, 1966). Although the theoretical foundation of the gravity model were sometimes called into question, its robustness and high explanation power in empirical applications are undisputed (c.f. Deardorff, 1984). Recently, Deardorff (1995) showed that even a simple gravity equation can be derived from standard trade theories. Gravity models have been widely used to test a host of hypotheses and have not lost their attraction over the decades (c.f. Langhammer, 1989; Havrylyshyn and Pritchett, 1991; Gros and Dautrebande, 1992; Winters and Wang, 1994 and Frankel, Stein and Wei, 1995).

supply potential and absorptive capacity. "Distance" captures all factors that restrict (or stimulate) trade by increasing (or reducing) transaction costs of trade between the two countries. Trading restricting factors include transport costs and protectionist measures; trade stimulating factors include regional preference zones, a common border, a common language, cultural similarities and historical links.

Our estimates of the potential trade of the CEECs are based on recent work by Schumacher (1995a). Schumacher's coefficient estimates are derived from bilateral trade data among 22 OECD countries and between the 22 OECD countries and 48 additional partner countries.<sup>8</sup> The coefficient estimates are then combined with the explanatory variables of the CEECs to derive the expected "normal" trade flows between the CEECs and all partner countries. Besides GNP and geographical distance, Schumacher's full model includes various regression variables like a shared language, colonial ties, membership of a preference zone and a common border. Schumacher concludes, however, that these variables provide little additional explanatory power. His preferred regression includes only national product, per capita income and geographical distance.

For the exports of OECD countries, the following equation is derived:

$$\ln X_{ij} = -13.07 + 0.92 \ln Y_i + 0.38 \ln \frac{Y_i}{P_i} + 0.79 \ln Y_j + 0.17 \ln \frac{Y_j}{P_j} - 0.89 \ln D_{ij}$$

For the imports of OECD countries, the corresponding equation is:

$$\ln X_{ij} = -13.14 + 1.00 \ln Y_i + 0.18 \ln \frac{Y_i}{P_i} + 1.20 \ln Y_j - 0.24 \ln \frac{Y_j}{P_j} - 0.90 \ln D_{ij}$$

<sup>&</sup>lt;sup>8</sup> The coefficients of the equation are derived with the OLS estimation procedure. To obtain consistent estimates, observations with zero values are replaced by very small figures. Since the data are based on the trade of the OECD countries with partner countries there are only few observations with zero value and the OLS estimation is an appropriate procedure. Apart from the estimates of the coefficients for total trade reported in this section, Schumacher also estimates the coefficients for trade in goods of the manufacturing sector as a whole and of individual branches of the manufacturing sector.

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with:

Exports from country i to country j
GNP of supplier country i
Population of supplier country i
GNP of destination country j
Population of destination country j
Distance in miles between the economic centre of country i and j

All estimated coefficients except for  $Y_i / P_i$  in the import equation are significant at the 99 per cent level.9 They confirm the analogy to the gravitational law of physics: Exports or imports between two countries are larger, the higher their national products and the smaller the distance between them. A higher level of per capita income results also in higher bilateral trade flows (c.f. Schumacher, 1995a). The negative coefficient on Y<sub>i</sub> / P<sub>i</sub> in the import equation may reflect collinearity between total and per capita income (the coefficient on total GNP is greater than unity).

Table 2 reports the resulting estimates of the expected long-term trade pattern of the CEECs. It is important to note that Schumacher's coefficient estimates were derived through a regression analysis of the trade of the OECD countries with other OECD and developing countries. In using these estimates, it is assumed that the trading relationships of the CEECs are determined by the same factors of the OECD countries. Employing these coefficient estimates, long-term equilibrium exports and imports of each CEEC in trade with 84 partner countries

<sup>&</sup>lt;sup>9</sup> For the export equation,  $R^2$  is 0.82 instead of 0.84 for the equation with all variables; for the import equation, it is 0.49 instead of  $R^2 = 0.50$  for the equation with all variables. The regression equation is also applied to individual countries to reflect better the characteristics of a country in the coefficients (Schumacher, 1995a and 1995b). The explanatory power for the regression of the trade of Germany as an individual country is very high on the export  $(R^2 = 0.93)$  and import  $(R^2 = 0.84)$  side. For France as an individual country  $R^2$  numbers 0.83 for the exports and R<sup>2</sup> numbers 0.82 for the imports. Schumacher estimates Germany's potential trade with the CEECs with the results from the regression for the individual country's foreign trade as well as with the regression results for all the OECD countries. The estimated amount of trade of these two approaches leads to roughly similar results for the different CEECs.

are estimated.<sup>10</sup> Table 2 and Appendix Table 2 list total exports and imports for each CEEC and the shares of the main trading partner.

The analysis indicates that we should expect a continuing shift of the CEECs' trade orientation towards the EU. As the summary columns for the 6 CEECs reveal, the expected EU share is on average almost 71 per cent of the total CEEC exports and 72 per cent of total imports (Appendix Table 2). In 1994, the actual share was almost 64 per cent exports and around 60 per cent of the imports. The expected percentage share of Eastern Europe (consisting of the CEECs, the successor states of the Soviet Union and Slovenia) is less than 8 per cent for CEEC exports and less than 5 per cent for imports. In 1994, the actual shares were around 15 per cent for the exports and almost 23 per cent of the imports.

However, some qualifications are necessary. The gravity model predicts an average share of less than 3 per cent of total CEECs' imports for the successor states of the Soviet Union. Considering the present volume of energy imports from the Russian Federation, this value is probably too low. The omission of an important variable (natural resource endowment) inevitably restricts the predictive power of the gravity model.

<sup>&</sup>lt;sup>10</sup> The 84 countries consist of the 70 countries used by Schumacher for his regression estimates, the CEECs, the Baltic Republics, the Russian Federation, Belarus, Ukraine, Kazakstan and Slovenia. The regression was estimated with data on GNP per capita and population for the years 1988 to 1990 taken from the World Bank's Development reports. To capture the actual weight of the countries' GNP, the latest World Bank's GNP figures of the year 1994 from the World Bank Atlas 1996 were adjusted to the price level of 1990 and employed for the estimation of the trading pattern of the CEECs. The inflation adjustment is necessary to maintain the relative weight of GNP and distance on bilateral trade flows. Bikker (1987) stated that a gravity model will exhibit money illusion unless predictions are made at the same prices as used in the estimations. The estimated volumes of trade are subsequently , inflated" from the price level of 1990 to the level of 1994 to facilitate the comparison to the actual trade of 1994. This approach will underestimate the growth of trade potential through increased GNP. The gravity model yields the prediction of strong income effect on trade with elasticities exceeding unity. With increased GNP in the CEECs and the partner countries we should expect an at least proportional increase in the trading potential. The distance between the countries was computed by Schumacher as the shortest line between their commercial centres according to the degrees of latitude and longitude. The data file with the derived distances between the countries was kindly provided by Schumacher.

CEECs	Bu	lgaria	Cze	ch Rep./	Slovak I	Rep.	Hur	ngary	Po	land	Roi	mania	all 6 (	CEECs <sup>1</sup>
	1994	expected	19942	expected	1994 <sup>2</sup>	expected	1994	expected	1994	expected	1 <b>994</b>	expected	1994	expected
Partner countries			(	z	S	L							1	
Eastern Europe	15.9	8.6	14.5	5.5	8.4	7.8	25.5	8.2	13.8	8.2	13.4	8.9	15.3	7.9
Ex Soviet Union	11.3	3.9	6.5	2.3	7.2	2.5	15.1	3.4	9.3	5.2	6.6	4.8	9.3	3.7
					02.0		<0 B	-1	(0.0	(0.0	40.0		<i></i>	
EU (15)	48.4	66,3	72.8	77.2	83.0	75.4	<b>60.</b> 7	71.5	69.2	69.0	48.2	64.3	63.7	70.6
Germany	14.0	16.0	42.6	30.3	43.5	18.9	28.0	19.8	35.7	19.9	16.0	15.8	30.0	20.1
France	4.7	8.8	3.0	9.6	4.0	8.0	3.3	8.9	4.0	9.2	5.1	8.7	4.0	8.9
UK	3.3	6.4	3.7	6.8	2.7	5.6	3.1	6.4	4.5	7.0	3.2	6.4	3.4	6.4
Italy	9.9	12.9	5.8	7.7	11.7	9.0	8.1	10.2	5.0	8.0	13.0	11.1	8.9	9.8
Greece	7.1	2.1	0.8	0.5	0.8	0.6	0.5	0.8	0.4	0.7	2.3	1.9	2.0	1.1
Austria	1.9	4.0	8.6	6.1	11.6	19.5	9.9	9.2	2.2	4.5	1.6	3.8	6.0	7.8
US	7.3	7.4	2.9	4.9	4.5	4.8	4.0	6.0	3.4	6.9	3.1	7.9	4.2	6.3
Asia	5.1	6.5	2.2	3.8	0.5	3.9	1.9	5.0	3.6	5.8	5.7	7.2	3.2	5.4
Other	23.9	11.2	7.0	8.6	3.2	8.1	8.3	9.3	10.8	10.1	28.5	11.7	13.6	9.8
		I		I		I		,		1		1		

#### Table 2 --- "Normal" Geographical Composition of Trade - Exports

Eastern Europe: Bulgaria, Czech Republic, Slovak Republic, Hungary, Poland, Romania, Ex-Soviet Union and Ex-Yugoslavia. Asia: Japan, Pakistan, Bangladesh, India, Sri Lanka, Thailand, Malaysia, Singapore, Indonesia, Philippines, Korea, Hong Kong. <sup>1</sup>Unweighted average. - <sup>2</sup>Total actual trade for 1994 excludes Czech-Slovak trade.

Sources: International Monetary Fund (1995), own calculations.

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Another qualification concerns the relative GNP level among the countries. The estimates for the potential volume of trade are biased downwards due to the presently depressed levels of the GNP of the CEECs during the transformation period. Schumacher (1995a) accounts for the high skill level of CEEC population by increasing their GNP threefold, based on a regression of per capita income on human capital in market economies. The adjustment of per capita GNP to reflect expected income convergence especially affects the relative importance of trade among the CEECs. We use three different scenarios to gauge the trade impact of the CEECs' expected catching up in per capita income.

Scenario I assumes that the GNP of the Eastern European countries doubles whereas the GNP of all other countries remains constant. Under this assumption, the average share of CEEC exports to Eastern Europe is 14 per cent compared to 8 per cent under the assumption of current GNP levels. The 15 countries of the EU attract 64 per cent rather than 69 per cent of CEEC exports. In Scenario II the GNP of the Eastern European countries is tripled whereas the GNP of all other countries is kept constant. In the final Scenario III, the GNP of the Eastern European countries is tripled, the GNP of the developing countries is doubled, and the GNP of the developed countries remains constant. Scenario III models the hypothesis of the global convergence. Scenarios II and III lead to very similar shares of different regions in CEEC exports: Eastern Europe accounts for roughly 19 per cent, and the EU for 57 per cent (Scenario III) to 60 per cent (Scenario II).

These experiments with different relative GNPs indicate that the EU will also maintain its predominant position in trade of the CEECs in the case of a "rapid catching up" of the CEECs and of the developing countries. A trebling of the GNP requires a growth rate of 6 per cent for almost 20 years. If EU countries continue to grow at a moderate rate of 2 per cent, say, then even higher growth rates are required for the CEECs to close the income gap.

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Other recent studies also use gravity models to estimate the potential volume and pattern of trade between Eastern and Western Europe (Havrylyshyn and Pritchett, 1991; Gros and Dautrebande, 1992; Winters and Wang, 1994). Regardless of the selection of comparator countries and base years, these studies support our finding that the EU will play a predominant role in CEEC trade in the long run.

#### III.2. A Special Role for Trade With Germany?

One puzzling finding of the analysis in the preceding section is that the share of Germany in CEECs exports in 1994 was substantially larger than predicted by the gravity model. It has been suggested that special cultural and historical links between the CEECs and Germany might have led to lower transaction and information costs for partners of these countries.

Herrmann et al. (1982) analyse the different types of communication costs and the effects on international trade. Following the approach of Herrmann et al., the special German position may be explained by comparatively low communication costs. Communication costs in this context consist of the costs related to all the activities required to send and receive information needed about products, companies and markets in order to sell goods. A company that wants to export its product to a foreign market needs information about the characteristics and preferences of the target group as well as about the level competition and supply structure in the country. This set of information has to include knowledge about commercial customs, cultural norms and personal value systems. A high level of cultural affinity between the home country of the exporter and the target country will lead to lower communication costs.

It is difficult to identify communication costs that are substantially lower in trade between the CEEC and Germany than in trade between the CEECs and other West European countries. One possible candidate would be language barri-

ers. German was the only "Western" language that could be learnt and practised freely in Eastern Europe before 1989 because the German Democratic Republic was a socialist country. However, no evidence is detected in a recent survey of Hungarian exporters of manufactures (Szalavetz and Lücke, 1996). Similarly, special links between East German and CEEC enterprises had been severed by 1991 and cannot have contributed to the prominent role of trade with Germany in recent years.

At least in part, the prominent position of Germany may be explained by Germany serving as a country of first destination for CEEC exports ultimately destined for other EU countries. Circumstancial evidence of such export marketing patterns has been found in the survey of Szalavetz and Lücke (1996). With intra-EU trade fully liberalised, the distinction may have become blurred and the figures of exports to the entire EU should well represent the actual exports to the EU.

# IV. Trade Effects of EU Membership for the CEECs

The preceding sections have demonstrated that the reorientation of CEEC trade towards Western Europe is largely due to the elimination of politically motivated barriers to East-West trade and of the preference for trade among CMEA member countries under the central planning system. This suggests that CEEC trade reorientation is essentially market-driven and represents a return to normalcy.

However, from a very early stage, market-driven trade reorientation has been complemented by trade policy measures that promoted regional integration between the European Union and the CEECs. The Europe Agreements between the EU and the CEECs have provided a framework for a progressive liberalisation of industrial imports from the CEECs with the long-term option of EU membership. The integration of the CEECs into a regional trading bloc of the size of the EU may well influence their trade flows both with EU members and non-members. Customs union theory assesses the world welfare effects of a regional bloc in terms of trade creation (through efficiency gains inside the bloc) and trade diversion (efficiency loss through displacing efficient external suppliers). Besides the static effects of economic integration that are analysed with the standard customs union theory, dynamic effects may represent additional gains for the member countries (c.f. Hine, 1994). Dynamic effects are defined as changes in the growth rate following the removal of trade barriers and are based on intensified competition and economies of scale. However, empirical verifications and a framework for the quantification of these effects are still missing. Nevertheless, the analysis based on the static effects can act as suitable proxy for all effects of integration.

Several indicators have been suggested to assess whether countries constitute a so-called "natural" regional grouping where trade diversion is likely to be low compared with trade creation. A very rough, but simple and widely used rule of thumb relates to the share of intraregional trade in the bloc's total trade prior to integration. Following Krugman (1991a, 1991b) a group of countries with a large share of intra-bloc trade (often referred to as a share of at least 50 per cent) is called a "natural" free trade area. The six CEECs trade on average around 60 per cent of their exports and imports with the EU. From the perspective of the CEECs, these countries are part of the natural grouping with the EU. However, this rough rule of thumb is fairly vague and cannot be used from the perspective of the EU, since the CEEC share of EU trade is less than five per cent.

#### .IV.1. Complementarity of Trade Structure

The expectations of the CEECs about the benefits of joining the EU rest on the hope for increased export and employment opportunities through secure unrestricted access to a large market.<sup>11</sup> These hopes can only be fulfilled if the

<sup>&</sup>lt;sup>11</sup> Further economic benefits of EU membership like the increased attractiveness to foreign investors (like in the case of Spain in the second half of the eighties) are set out in Baldwin (1995).

CEECs offer a competitive supply in goods facing an income-elastic demand in the EU. Furthermore, commodity complementarity between CEEC and EU supply would ensure that both groups gain from the regional arrangement and that protectionist vested interests can be contained. Therefore, a measure of trade complementarity can provide some indication about the odds of successful integration.

Michaely (1996) proposes the index

$$C_{jk} = 1 - (\sum |m_{ik} - x_{ij}|) / 2$$
  
with  $x_{ij}$  as the share of good i in total exports of country j  
and  $m_{ik}$  as the share of good i in total imports of country k

The index is zero when goods exported by country j are not imported by country k. The index is one when the commodity shares in country k's imports correspond exactly to those in country j exports. The higher the index, the more likely is an envisaged regional trading arrangement to accomplish the stimulation of trade between the members. The index builds on the assumption that existing trade barriers do not heavily distort the structure of trade between the countries. Otherwise the index cannot yield a reasonable indication of the likelihood of successful integration. A further caveat is necessary for the case of a small country with a limited range of traded goods. If this country can sell all its exports under more favourable terms to a large partner country, a regional free trade agreement might be successful even though the structure of the exports of the small country does not fit well the structure of the imports of the larger country.

The index has been calculated for Bulgaria, the Czech Republic, Hungary, Poland and the Slovak Republic in relation to the EU for 1990 through 1994.<sup>12</sup> For each bilateral relationship, two index values have been computed: one for the complementarity of the exports of each CEEC with EU imports (Table 3) and the

<sup>&</sup>lt;sup>12</sup> Due to lack of suitable data the Michaely index could not be calculated for Romania.

other for the complementarity of the imports of each CEEC with EU exports (Table 4). The index values for CEEC exports and EU imports remain relatively stable over the years except for Bulgaria with a slightly decreasing value. The index values for CEEC imports and the EU exports increase gradually over the years (from an already high level). With progressing transformation, the CEECs increasingly demands sophisticated capital goods as exported by the EU.

It is interesting to compare the Eastern integration into the EU with other regional integration schemes. Michaely (1996) calculated the index for several proposed agreements like the extension of NAFTA to the rest of Latin America (AFTA) and Asia Pacific Economic Co-operation (APEC) as well as for existing successful and unsuccessful arrangements at the time when they were formed. The index values in Table 5 show a marked difference between successful and unsuccessful trading agreements. The six founding members of the EEC had an average trade complementarity index of 0.53, and the free trade area between Canada and the USA an value even of 0.64. By contrast, unsuccessful arrangements had much lower values, such as for LAFTA (0.22) and the Andean pact (Bolivia, Colombia, Ecuador, Peru and Venezuela) 0.07.

The corresponding average value for the Eastern enlargement of the EU is the order of 0.61 (as the average of 0.51 for the trade complementarity of CEECs exports and EU imports and of 0.71 for the trade complementarity of EU exports and CEECs imports).

	1990	1991	1992	1993	1994	1990-1994 average
Bulgaria	0.49	0.44	0.45	0.43	0.42	0.45
Hungary	0.56	0.54	0.55	0.55	0.54	0.55
Poland	0.49	0.45	0.46	0.47	0.48	0.47
Czechoslovakia	0.53	0.56	0.58			0.56
Czech Rep.				0.57	0.60	0.59
Slovak Rep.				0.47	0.46	0.46
CEEC average	0.52	0.50	0.51	0.50	0.50	0.50

Table 3 - Trade Complementarity Index: Exports of the CEECs, Imports of the EU

Source: Own calculations.

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Table 4 - Trade Complementarity Index: Imports of the CEECs, Exports of the EU

	1990	1991	1992	1993	1994	1990-1994 average
Bulgaria	0.66	0.65	0.68	0.68	0.69	0.67
Hungary	0.72	0.75	0.77	0.79	0.77	0.76
Poland	0.68	0.71	0.73	0.74	0.75	0.77
Czechoslovakia	0.62	0.68	0.72			0.68
Czech Rep.				0.73	0.77	0.75
Slovak Rep.				0.72	0.73	0.72
CEEC average	0.67	0.70	0.72	0.73	0.74	0.71

Source: Own calculations.

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#### Table 5 - Trade Complementarity Indices for Selected Trade Arrangements

Trading arrangement	Index	Trading arrangement	Index
Successful arrangements		Recent arrangements	
EEC (6)	0.53	NAFTA	0.56
Canada-US FTA	0.64	Mercosur	0.29
Unsuccessful arrangements		Potential arrangements	
LAFTA	0.22	Americas "AFTA" (NAFTA+5) <sup>a</sup>	0.31
Andean Pact	0.07	Asia-Pacific "APEC" (17)	0.35
		Sub-Saharan Africa (20)	0.09
<sup>a</sup> The Americas' free trade area is Chile, Colombia, and Venezuela.	proxied by NAF1	A plus the next five biggest economies, A	rgentina, Brazil

Source: Michaely (1996).

Thus, the complementarity of the commodity composition of CEECs and EU trade is broadly comparable to the original EEC of 6 and the Canada-US free trade area. However, there is the possibility of indices to be biased upwards due to data problems since the trade statistics from important partner countries (like the republics of the former USSR) are not included in the used COMTRADE database. On the other hand, unrestricted access to the large EU market will allow the CEECs to market their limited range of export products under more favourable conditions than today. On balance, therefore, the accession of the CEECs to the EU will provide opportunities for trade expansion and will benefit both the CEECs and the EU.

#### IV.2. Is CEEC-EU Integration Harmful for Third Countries?

The commodity composition of trade prior to integration has also been used to define a "natural" regional grouping differently as Krugman does (Kreinin and Plummer, 1994). If the composition of trade remains largely unchanged after integrating, the new economic bloc is a "natural" one. The composition of trade is expected to remain unchanged if the ranking of a country's industries by revealed comparative advantage (RCA) in trade with members of the proposed economic bloc (which would tend to increase because of its preferential status) does not differ substantially from the ranking of RCA in trade with all partners. This would support the view of bloc formation which is not trade-diverting.

This analysis is applied here from the perspective of the CEECs.<sup>13</sup> RCA indices are calculated for 260 commodity groups at the three-digit level of the Standard

<sup>&</sup>lt;sup>13</sup> This approach could be also applied for the existing EU countries to analyse the effects of an eastern enlargement of the EU on their comparative advantage. However, the method of Kreinin and Plummer is appropriate for the analysis of whether joining a regional bloc would distort the comparative advantage of a country. Due to the small size of each of the CEECs compared to the existing EU bloc, there will be only a relative modest influence of the CEECs on the issue, whether the enlarged EU will be "natural" from the perspective of a present EU member-country.

International Trade Classification (SITC).<sup>14</sup> For each CEEC, commodity groups are ranked, first by their RCA values in trade with all partners, and second by their RCA values with respect to the regional bloc that would include the CEECs and the EU. It is assumed that the ranking of the industries by their export performance indicates their ranking by the country's comparative advantage. If the RCA ranking in regional trade differs substantially from that in total trade, bloc formation is expected to lead to trade diversion.

Revealed comparative advantage is defined as:

$$RCA_{1} = \frac{\frac{X_{ij}}{X_{j}}}{\frac{X_{iw}}{X_{w}}} = \frac{\frac{exports of commodity i by country j}{total exports by country j}}{\frac{world exports of commodity i}{total world exports}}$$

with respect to all trading partners, and as

$$RCA_{2} = \frac{\frac{X_{ij-ie}(EU+CEECs)}{X_{j-ie}(EU+CEECs)}}{\frac{X_{ij-ie}(EU+CEECs)}{X_{ie}(EU+CEECs)-ie}} = \frac{exports of commodity i by country j into (EU + CEECs)}{total exports by country j into (EU + CEECs)}$$
$$\frac{exports of commodity i by country j into (EU + CEECs)}{(EU + CEECs) exports of commodity i into (EU + CEECs)}$$
$$\frac{exports of commodity i by country j into (EU + CEECs)}{total (EU + CEECs) exports into (EU + CEECs)}$$

with respect to the proposed regional grouping, consisting of the EU and the

CEEC.An RCA<sub>1</sub> of unity implies that the share of a commodity in a country's total exports equals the share of the commodity in total world exports. An RCA<sub>1</sub> above 1 states that the commodity has a higher proportion in a country's export than in its world exports and suggests that the country has a comparative advantage in this product. In the following, the proposed regional bloc consisting of the present 15 EU countries and the CEECs is termed "EUplus". An RCA<sub>2</sub> above unity implies that this commodity accounts for a larger share in the country's exports to EUplus than in the exports to all the member countries of EUplus together.

<sup>&</sup>lt;sup>14</sup> Kreinin and Plummer developed this approach for the analysis of "natural" economic blocs within Asia. The calculations for the RCA values in trade with all partners are based on the 106 countries of the COMTRADE database.

The similarity between the commodity rankings in terms of  $RCA_1$  and  $RCA_2$  is measured by the Spearman rank correlation coefficient (Table 6). The coefficients have been calculated for the years 1990 to 1994, with only modest fluctuations in the results. All CEECs have correlation coefficients above 0.65 and Bulgaria, Poland and the Slovak Republic even above 0.75, well in excess of the critical value of 0.5 suggested by Kreinin and Plummer. Hence, commodity composition of intraregional trade, which would be privileged, does not differ substantially from that of total trade. Therefore, regional integration benefiting intra-group trade is unlikely to lead to substantial distortions. In this sense, Bulgaria, the Czech Republic, Hungary, Poland and the Slovak Republic and the present 15 countries of the EU constitute a natural grouping.

 Table 6
 Spearman Rank Correlations Coefficients for the CEECs Between RCAs Relative to Total World and Relative to an Extended EU

	Bulgaria	Czechoslovakia		Hungary	Poland
1990	0.80	0.78		0.78	0.77
1991	0.82	0.77		0.77	0.80
1 <b>992</b>	0.76	0.67		0.70	0.76
	Bulgaria	Czech Rep.	Slovak Rep.	Hungary	Poland
1993	0.76	0.72	0.78	0.70	0.75
1004	0 79	0.68	0.82	0.72	0.76

Source: Own calculations.

#### V. Conclusions

As a consequence of their economic transformation, the CEECs have substantially redirected their foreign trade from Central and Western Europe towards Western Europe and specially the EU. Judging by the intensity of their bilateral trade flows, Hungary, Poland, the Czech Republic and the Slovak Republic are already part of the economic region of Western Europe. Estimates of the expected "normal" trade patterns of the CEECs under market economy conditions suggest that the EU may become even more important, especially to Bulgaria and Romania whose reforms lag behind the other four CEECs.<sup>15</sup>

Policies for integration between the EU and the CEECs have started with the Europe agreements providing a framework for stepwise liberalisation and are ultimately directed towards EU membership. Our analysis has found that third countries' trade has little to fear from full EU liberalisation of CEECs-EU trade.

The high share of intra-regional trade in total trade, the complementarity of trade structures in terms of CEEC exports (imports) with the EU imports (exports) and the conformity between the RCA structure of trade with the EU on the one hand and the world on the other suggest the existence of a "natural" trading partnership including the EU and the CEECs. In this sense, integration policies follow the facts created by the market. Although the factual economic integration is less impressive for Bulgaria and Romania, the intensity of trade links makes Hungary, Poland, the Czech Republic and the Slovak Republic already "natural" trading partners of the EU.

<sup>&</sup>lt;sup>15</sup> The tasks ahead for the individual CEECs (as well as the tasks accomplished) are discussed in Aldcroft and Morewood (1995). The authors set out how Romania still suffers from the handicap of having had the most centralised economy in Eastern Europe and how Bulgaria still has to manage the shift from energy-intensive industries to a more diversified and productive economy.

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#### VII. Appendix

The results of the analysis presented in Section II.2. on the Reshaping of Functional Regions in Europe depend on the index applied to derive the similarity matrix and on the algorithm used to link the countries in the cluster analysis. This Appendix discusses alternatives to the approaches employed in the main body of this paper.

#### VII.1. An Alternative Trade Index

The so-called "actual trade intensity index" was developed by Kojima (1964). The index is defined as the share of country i's exports destined to country j relative to the share of country j's imports in total world imports net of country's i imports. The actual trade intensity index is expressed as:

$$I_{ij} = (X_{ij} / X_i) / [M_j / (M_w - M_i)]$$

with  $X_{ij}$  as country i's exports to country j,  $X_i$  as country i's total exports and  $M_i$ ,  $M_j$ ,  $M_w$  as the imports of countries i and j and of the world. Kojima's index has the advantage of correcting for the size of country j. A certain ratio of  $X_{ij}$  to  $X_i$  renders a higher index value, the smaller the share of country j in world import.

However, this approach distorts the extent of economic integration through trade intensity. For example, Kojima's index would indicate that Germany and Liechtenstein are highly integrated. While it is true that the performance of the German economy determines the economic well-being of Liechtenstein, the reverse is not true. Both economies are not integrated to the extent that the factor allocation in one country affects the factor allocation of the other one *and vice versa*. The interlinkage through factor allocation is an important criterion for economic integration, though it leads to a bias against smaller countries. The values  $(X_{ij} / X_j)$  and  $(X_{ij} / X_j)$  as used in the text are more appropriate criteria for eco-

nomic integration to ensure that bilateral trade influences the allocation of resources in both economies.

Nevertheless, Kojima's actual trade intensity index has been applied to the trade data of 1984 and 1994 to examine how the findings of Section II.2. depend on the measure of trade intensity. With the actual trade intensity index, new similarity matrices have been calculated from the trade matrices for the years 1984 and 1994. The resulting dendrogram of functional regions for 1984 (Appendix Figure 1) displays the Eastern Bloc and the Scandinavian bloc clearly. However, no functional regions seem to exist that includes mainly countries of the European Community. There are pairs of Western European countries like Ireland and the UK, Greece and Italy, Portugal and Spain. The difference between the two indices is most clearly disclosed in the performance of the country pair USA-Canada. The dendrogram based on the values  $(X_{ij} / X_i)$  and  $(X_{ij} / X_j)$  of 1984 shows the USA and Canada linked as a functional region at a very early stage of the cluster analysis. By contrast, Kojima's actual trade intensity index leads to a country pair USA - Canada at a later stage, indicating a comparatively weaker functional region. The actual trade intensity index adjusts for the size of the trading partner, but introduces a bias against large countries: Once a country's share in world trade is large, it cannot achieve such a high Iii value in trade with another country like a country could with a small share in world trade.

The comparison of the dendrograms based on the actual trade intensity index of 1984 and 1994 (Appendix Figure 2) is also characterised by the bias against large countries. The countries of the EU with their large share in world trade join functional regions relatively late compared to the smaller economies of the CEECs.

The dendrogram for 1994 still identifies a Scandinavian region, but the Eastern European region has disintegrated. While these results are broadly in accordance with those in the main body of the test, with the Kojima index, there is no clearly defined West European region any longer.



#### Appendix Figure 1: Dendrogram of Functional Regions 1984 - Actual Trade Intensity Index

#### The following countries are united as strong components:

1. Czechoslovakia - USSR 2. East Germany - USSR 3. Hungary - USSR 4. Poland - USSR 5. Denmark - Sweden 6. Norway - Sweden 7. Finland- USSR 8. Poland - Romania 9. Austria - West Germany 10. Austria - Hungary 11. Belgium-Lux. - France 12. West Germany - Netherlands 13. France - Italy 14. France - Spain 15. Sweden - United Kingdom 16. Japan - USA 17. United Kingdom - USA



#### Appendix Figure 2: Dendrogram of Functional Regions 1994 - Actual Trade Intensity Index

#### VII.2. An Alternative Hierarchical Clustering Technique

In the single-linkage algorithm, groups of countries are linked according to the closest group members (Seleka and Henneberry, 1991). Alternatively, it is possible to view a group of countries as one entity and to recalculate the trading shares. This approach corresponds to the centroid method used in cluster analysis (Norusis, 1990, pp 361-362). The similarity between two clusters is defined on the basis of the similarity between the means of the relevant variables in the two clusters. The disadvantage of the centroid method lies in the possibility that the value representing the similarity at which clusters are combined can actually increase from one step to the next. Since clusters merged at later stages are more dissimilar than those merged at early stages, this is an undesirable property.

For the derivation of each country's share of the exports of a newly created cluster, the intra-bloc trade is subtracted from the sum of the exports of the countries. This centroid method has been employed for the trade data for 1984 and 1994 in combination with the values  $(X_{ij} / X_j)$  and  $(X_{ij} / X_j)$  and with Kojima's actual trade intensity index. If no correction is made for the size of clusters, the centroid method leads quickly to very large entities that draw in country by country. Therefore, the centroid approach requires an adjustment like that suggested by Kojima. The resulting dendrograms are reported in the following Appendix figures. Corresponding to the specified disadvantage of the centroid method, the threshold values for connecting clusters did not continuously decrease, but increase for some steps. For the purpose of graphical representation, a lower threshold value than in the previous step was substituted in these cases. For 1984 as well as 1994, the dendrograms demonstrate the existence of an "Eastern Bloc". However, the bloc had changed some of its members and the intensity of intra-bloc trade had declined by 1994. The Czech and Slovak Republics are integrated into the functional regions of Western Europe in 1994. This exercise shows that the selection of the cluster algorithm have an impact upon the analysis, but that the conclusions from the hierarchical cluster analysis in the main part of this paper are largely unaffected.

#### Appendix Figure 3: Dendrogram of Functional Regions 1984 - Centroid Method - Actual Trade Intensity Index





#### **Appendix Figure 4:** Dendrogram of Functional Regions 1994 - Centroid Method - Actual Trade Intensity Index

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CEECs		Bulgaria		Cz	ch Rep./	Slovak I	Rep.		Hungary			Poland			Romania	L	ali	6 CEEC	∑s²
	1928	1989	1994	1928	1989	19	94	1928	1989	1994	1928	1989	1994	1928	1989	1994	1928	1989	1994
Partner countries						Cz <sup>3</sup>	SL <sup>3</sup>												
Fastern Europe	20.9	68.9	29.8	17.7	62.2	17.4	22.9	40.5	38.5	29.9	10.2	39.6	13.9	25.7	51.2	23.0	23.0	52.1	22.5
Ex Soviet Union	0.0	57.4	24.7	1.0	45.6	12.0	21.0	0.3	24.3	23.1	1.1	26.1	9.8	0.6	36.0	17.7	0.6	37.9	18.0
EU (15) <sup>1</sup>	70.9	15.8	45.3	63.5	18.5	73.4	72.1	48.9	39.8	56.2	63.2	34.7	64.9	62.5	8.4	47.3	61.8	23.4	59.5
Germany	20.9	6.7	14.2	38.7	8.6	40.4	35.8	19.6	18.3	23.6	27.0	12.9	27.5	23.6	3.2	17.7	25.9	9.9	26.5
France	8.1	1.3	3.0	4.3	1.4	4.9	3.6	2.5	2.5	3.1	7.5	2.4	4.5	4.5	1.4	5.0	5.4	1.8	4.(
UK	10.5	1.2	2.8	4,4	1.3	4.2	2.0	2.8	1.9	2.4	9.4	3.9	5.3	9.4	0.6	3.1	7.3	1.8	3.3
Italy	15.1	2.3	6.7	3.3	1.6	6.2	10.8	3.9	3.7	7.0	2.5	3.1	8.4	7.6	0.9	11.7	6.5	2.3	8.5
Greece	1.2	0.4	8.6	0.3	0.2	0.2	0.6	0.6	0.2	0.2	0.2	0.2	0.3	0.6	0.5	1.2	0.6	0.3	1.9
Austria	8.1	1.3	2.5	7.4	2.0	8.5	11.2	16.2	6.9	10.5	6.6	4.5	2.6	11.5	0.4	2.7	10.0	3.0	6.3
US	2.3	1.5	2.4	5.9	0.3	2.1	1.2	3.6	1.6	1.8	14.0	1.8	3.9	5.4	1.6	6.4	6.3	1.4	3.0
Asia	0.0	2.2	1.7	2.9	3.6	2.1	0.7	1.4	3.1	5.1	3.5	5.0	5.3	0.6	5.0	2.6	1.7	3.8	2.9
Other	5.8	11.5	20.9	9.9	15.4	5.0	3.1	5.6	17.0	7.0	9.2	19.0	12.0	5.7	33.9	20.7	7.3	19.4	11.4

Eastern Europe: Bulgaria, Czech Republic, Slovak Republic, Hungary, Poland, Romania, Ex-Soviet Union and Ex-Yugoslavia Asia: Japan, Korea, Taiwan, China, India, Burma, Sri Lanka.

<sup>1</sup>EU (15): without Ireland. - <sup>2</sup>Unweighted average. - <sup>3</sup>Total trade for 1994 excludes Czech-Slovak trade.

Sources: Collins and Rodrik (1991) and International Monetary Fund (1995).

CEECs	Bul	garia	Cze	ch Rep./	Slovak I	Rep.	Hur	ngary	Ро	land	Ror	nania	all 6 C	EECs1
	1994	expected	1994 <sup>2</sup>	expected	1994 <sup>2</sup>	expected	1994	expected	1994	expected	1994	expected	1994	expected
Partner countries				z	S	SL								
Eastern Europe	29.8	5.2	17.4	3.2	22.9	4.8	29.9	4.9	13.9	5.0	23.0	5.5	22.8	4.8
Ex Soviet Union	24.7	2.8	12.0	1.6	21.0	1.8	23.1	2.4	9.8	3.5	17.7	3.4	18.0	2.6
EU (15)	45.3	67.7	73.7	79.1	72.1	76.7	56.4	73.1	65.3	70.1	47.4	65.4	60.0	72.0
Germany	14.2	19.7	40.4	36.3	35.8	24.1	23.6	24.6	27.5	24.4	17.7	19.5	26.5	24.8
France	3.0	9.8	4.9	10.5	3.6	9.2	3.1	10.1	4.5	10.3	5.0	9.7	4.0	10.0
UK	2.8	6.7	4.2	7.0	2.0	6.2	2.4	6.9	5.3	7.5	3.1	6.8	3.3	6.8
Italy	6.7	13.9	6.2	8.0	10.8	10.0	7.0	11.1	8.4	8.5	11.7	12.0	8.5	10.6
Greece	8.6	1.3	0.2	0.3	0.6	0.4	0.2	0.5	0.3	0.4	1.2	1.2	1.9	0.7
Austria	2.5	3.0	8.5	4.5	11.2	15.5	10.5	7.0	2.6	3.4	2.7	2.9	6.3	6.0
US	2.4	11.4	2.1	7.3	1.2	7.7	1.8	9.3	3.9	10.6	6.4	12.2	3.0	9.7
Asia	2.4	8.5	1.8	4.8	0.5	5.3	3.6	6.5	5.7	7.6	2.6	9.3	2.7	7.0
Other	20.9	7.2	5.0	5.6	3.1	5.5	7.0	6.2	12.0	6.7	20.7	7.6	11.4	6.5

Appendix Table 2 --- "Normal" Geographical Composition of Trade - Imports

Eastern Europe: Bulgaria, Czech Republic, Slovak Republic, Hungary, Poland, Romania, Ex-Soviet Union and Ex-Yugoslavia. Asia: Japan, Pakistan, Bangladesh, India, Sri Lanka, Thailand, Malaysia, Singapore, Indonesia, Philippines, Korea, Hong Kong. <sup>1</sup>Unweighted average. - <sup>2</sup>Total actual trade for 1994 excludes Czech-Slovak trade.

Sources: International Monetary Fund (1995); own calculations.

All CEECs Partner countries	1994	Expected Conventional	Expected Scenario I	Expected Scenario II	Expected Scenario III
Eastern Europe	15.3	7.9	14.2	19.6	18.7
Ex Soviet Union	9.3	3.7	6.7	9.2	8.7
EU (15)	63.7	68.6	63.8	59.8	56.9
Germany	30.0	20.1	18.8	17.6	16.8
France	4.0	8.9	8.3	7.7	7.4
United Kingdom	3.4	6.4	6.0	5.6	5.3
Italy	8.9	9.8	9.1	8.5	8.1
Greece	2.0	1.1	1.0	1.0	0.9
Austria	6.0	7.8	7.3	6.8	6.5
US	4.2	6.3	5.9	5.5	5.2
Asia	3.2	5.4	5.0	4.7	5.1
Other	13.6	11.9	11.1	10.4	14.1
Eastern Europe: Bul	garia, Czec	h Republic, Slova	k Republic, Hun	igary, Poland, Ro	mania, Ex-

Appendix Table 3 --- Simulation of Different GNP Scenarios - Exports

Soviet Union and Ex-Yugoslavia.

Asia: Japan, Pakistan, Bangladesh, India, Sri Lanka, Thailand, Malaysia, Singapore, Indonesia, Philippines, Korea, Hong Kong.

Conventional: See Table 2.

Scenario I: GNP of the Eastern European Countries is doubled.

Scenario II: GNP of the Eastern European countries is tripled.

Scenario III: GNP of the Eastern European countries is tripled and GNP of the developing countries is doubled.

Sources: International Monetary Fund (1995); own calculations.

All CEECs Partner countries	1994	Expected Conventional	Expected Scenario I	Expected Scenario II	Expected Scenario III
Eastern Europe	22.8	4.8	10.2	15.5	14.8
Ex Soviet Union	18.0	2.6	5.5	8.4	8.0
EU (15)	60.0	70.0	66.1	62.2	59.5
Germany	26.5	24.8	23.4	22.1	21.1
France	4.0	10.0	9.4	8.8	8.4
United Kingdom	3.3	6.8	6.5	6.1	5.8
Italy	8.5	10.6	10.0	9.4	8.9
Greece	1.9	0.7	0.7	0.6	0.6
Austria	6.3	6.0	5.7	5.4	5.2
US	3.0	9.7	9.2	8.6	8.2
Asia	2.7	7.0	6.6	6.2	6.7
Other	13.4	8.5	8.0	7.5	10.8

Appendix Table 4 — Simulation of Different GNP Scenarios - Imports

Eastern Europe: Bulgaria, Czech Republic, Slovak Republic, Hungary, Poland, Romania, Ex-Soviet Union and Ex-Yugoslavia.

Asia: Japan, Pakistan, Bangladesh, India, Sri Lanka, Thailand, Malaysia, Singapore, Indonesia, Philippines, Korea, Hong Kong.

Conventional: See Appendix Table 2.

Scenario I: GNP of the Eastern European Countries is doubled.

Scenario II: GNP of the Eastern European countries is tripled.

Scenario III: GNP of the Eastern European countries is tripled and GNP of the developing countries is doubled.

Sources: International Monetary Fund (1995); own calculations.

Exporter/ Importer	USA	CDN	Japan	A	B/ LUX	DK	FIN	F	D	GR	IRL.	I	NL	N	Р	E	Γ́s	Сн	UK	BG	cz	GDR	н	PL	RO	USSR	Total Exports
USA	0	46524	23575	375	5301	605	350	6037	9084	456	1355	4375	7554	859	961	2561	1542	2563	12210	44	58	137	88	318	249	3284	223976
Canada	6000	4784	4394	400	1243	022	504	1022	2209	701	749	400	1913	404	154	642	1008	1000	4665	*2	41	144	- 11 61	29	10	1003	90272
Japan	60.29	4200	144	422	1347	933	120	400	4676	(91	240	1491	1012	140	29	227	1008	1000	400.0	114	172	133	246	167	10	2010	16700
Austria Dataism	04/	127	104	0	200	100	150	009	4070	74	32	1401	307	140	20	237	290	1000	007	114	1/5	344	343	101	30	/0/	13/39
Deuguan-	3139	294	430	436	0	473	217	9551	10236	257	194	2663	7219	354	177	451	712	1397	5134	47	58	73	77	86	49	548	51893
Demonstr	1550	148	454	130	271	٥	312	700	2565	106	88	673	531	1010	18	147	3811	207	2053	12	34	32	37	62	6	117	16000
Violend	1002	113	173	00	100	550	512	533	1206	75	76	25	478	613	29	00	1653	168	1613	22	51	67	47	20	š	2576	12471
France	7536	990	1029	695	8015	718	376	333	13727	807	435	10171	4443	721	654	3054	1228	3632	7389	104	114	212	146	275	155	1050	07566
Germany	16421	1519	2432	8566	12000	3529	1670	21579	0	1743	744	13263	14815	1922	774	3100	4561	9112	14261	470	734	2256	961	828	314	3800	173990
Greece	404	28	56	48	85	33	17	406	946	0	- 11	661	163	4	15	29	31	40	298	42	22	14	25	13	38	125	4816
ireland	938	163	165	53	415	73	50	807	978	41	ō	301	676	87	24	117	147	108	3323	2	3	3	7	10	2	22	9642
Italy	7947	804	841	1656	2125	555	346	10291	11824	1260	195	0	2108	356	361	1154	768	2981	4944	137	119	131	203	200	93	1581	74564
Netherlands	3315	339	382	574	9095	967	372	6857	19567	595	315	3661	0	538	300	638	1165	1038	6238	42	81	89	111	170	43	303	65677
Norway	969	108	267	82	170	669	274	638	3126	39	29	293	1377	0	77	65	1868	131	6893	6	20	13	14	27	8	76	18886
Portugal	456	45	47	53	172	84	73	646	713	16	26	223	308	87	0	232	185	128	799	5	4	5	4	2	11	55	5200
Spain	2252	229	369	106	598	153	84	3538	2260	140	93	1406	1240	100	560	0	211	413	2137	44	32	60	33	35	21	358	23508
Sweden	3342	384	423	339	1087	2438	1687	1475	3404	111	185	1051	1314	2704	91	335	0	482	3004	52	65	98	75	155	20	282	29378
Switzerland	2542	236	850	1007	627	311	203	2140	5055	161	73	1901	687	210	159	507	515	0	2071	121	110	63	130	109	26	200	25851
United	13702	1573	1239	427	4072	1591	905	9395	9874	469	4526	3815	8183	1295	515	1756	3857	2085	0	74	104	125	133	227	95	976	93880
Kingdom															_				_								/
Bulgaria	28	5	60	30	17	4	4	50	137	46	1	73	20	1	2	36	11	19	21	0	484	680	104	227	174	6921	9776
Czechoslovakia	73	48	45	438	63	56	45	141	837	40	- 11	163	136	23	14	26	69	166	189	478	0	1518	854	1221	297	7449	17153
E. Germany	152	24	39	115	120	164	61	236	2726	83	9	104	143	168	20	75	314	43	240	691	1769	0	469	668	411	9092	19108
Hungary	228	25	35	431	39	33	40	143	039	38		281	101	10	0	116	01	192	128	123	444	506	276	300	125	2581	8563
Poland	25/	40	49	249	<b>99</b>	157	185	292	1042	42	21	281	191	43	2	115	212	147	9/8	203	03/	339	3/6	270	324	344/	11750
Komania	277	40	1026	020	1495	412	2082	2016	(33	717	47	1000	1094	150	57	410	56 404	249	1714	7545	231	43/	£04 6324	319	2226	1029	12040
U.S.S.K.	3//		1035	938	1483	412	2783	2013	2209	/1/	47	2098	1780	139	, וכ	410	094	008	1/10	1343	0121	9217	3324	/4/8	2225		91020
Total Imports	346181	75932	135939	19756	55278	16722	12783	105057	1.56838	9729	9675	85364	62314	13856	7 <b>96</b> 1	28750	26413	29811	105449	11712	15255	18515	11749	14855	11163	66624	1374635

Appendix Table 5 - Trade Matrix (million of US \$) 1984

Source: IMF, Direction of Trade Statistics Yearbook 1990. - UN, International Trade Statistics Yearbook 1988.

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Appendix	Table 6 -	- Trade I	Matrix (	(million of	(US \$)	1994
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Appendix	Table (	5 — Tr	ade Ma	utrix (n	nillion	of US	\$) 199	4								<i>,</i> *											
Exporter/ Importer	USA	CDN	Japan	A	B/ LUX	DK	FIN	F	D	GR	IRL	I	NL	N	P	Е	s	СН	UK	BG	cz	SK	H	PL	RO	former USSR	Total Exports
USA Canada Japan Austria Belgium- Luxembourg Demnark Finland France Germsary Greece Ireland Italy Netherlands Norway Portugal Spain Sweitzerland United Kingdom Bulgaria Czech Rep. Slovak Rep. Slovak Rep.	0 133112 118693 1593 6238 2184 2132 16365 33516 4211 2813 14730 5715 2223 916 3614 4905 218 4904 4905 218 305 128 128 128 128 128 128 128 128	114255 0 5906 278 468 212 199 1635 2717 60 0 0 329 1742 574 1151 121 424 679 481 2929 27 38 6 31	53481 6857 0702 1550 1640 619 4568 9965 119 1149 4052 1540 658 135 991 1634 2732 4591 21 87 8 8 90	1373 144 1248 0 1453 422 308 2539 24538 164 249 4667 1728 140 196 610 851 2522 1589 57 906 331 1081	11172 924 3796 848 0 718 667 2021 2081 268 1248 5658 1248 5658 1248 5658 1248 5658 1248 5658 1248 3004 1747 10544 39 158 34 195	1215 61 856 385 1086 0 1015 2047 7705 17 184 1592 2104 1628 407 467 4228 755 2501 21 96 620 44	1069 83 992 234 576 950 0 814 3337 51 211 758 875 1032 185 2521 2921 397 2005 13 752 2925	13631 881 5261 2048 18126 2173 1499 0 50510 451 2784 24824 14109 2794 2572 1475 56464 19100 142 3115 115 155	19237 1518 1518 17784 17175 20235 8880 39910 0 0 17700 0 4293 36082 37884 4280 3270 109910 4293 36082 37884 4280 3270 10991 4280 3270 10993 4280 3270 10993 4280 3270 10993 4280 3270 10993 4293 4293 4203 44777 1237 3061	830 47 604 206 774 302 170 1676 3462 0 175 3400 1342 78 80 681 353 410 1304 213 87 23 55	3416 96 1684 97 381 191 136 1435 1898 20 0 663 820 0 663 820 0 663 820 0 419 87 320 410 274 9581 1 18 8 2 2 2 2	7196 871 3357 3656 7232 1576 887 21874 31674 1222 1376 0 6947 990 587 6744 2312 5233 9649 296 609 334 885	1359i 828 8507 1341 12111 1577 1517 10802 31432 193 1565 5432 0 0 2971 890 3016 3232 1897 13487 77 271 18487 77 243	1269 448 1356 251 6366 970 3696 970 3696 34 315 778 1092 0 179 250 0 179 250 0 179 250 6 4596 353 3084 6 455 3 24	1054 64 759 210 827 215 155 33559 17 22559 1046 305 5719 280 470 1769 6 8 6 11	4645 250 2103 963 2800 721 685 16699 13433 150 741 8914 3465 472 2558 0174 1404 7347 51 1222 455 147	2520 132 1488 628 1635 22673 9500 81 542 1730 2267 3215 436 561 0 9992 5134 14 118 39 126	5608 802 2262 2864 2339 759 449 22957 86 579 22957 8659 7164 2510 214 329 884 1182 0 3770 3770 111 132 37 7	26833 2208 12734 1425 93247 3056 23059 33455 4655 23059 2041 6018 6209 4676 0 98 388 78 338 78 333	110 5 200 116 600 288 411 142 663 3988 312 1500 6 8 8 26 300 69 132 0 0 456 300 69 132	297 25 125 1179 311 148 164 677 5590 46 859 437 49 8 108 206 309 575 12 00 2091 98	43 4 10 395 46 385 47 128 1265 21 1 380 95 3 3 4 4 25 32 76 72 72 76 72 72 58	309 16 264 1764 351 114 224 512 3952 42 3952 42 3952 42 3952 42 3952 42 3952 42 3952 42 3952 42 240 240 240 240 240 14 1764 44 1764 44 1764 1764 1764 1764	625 31 118 528 492 570 492 57 6420 55 7 6420 55 7 6420 55 7 6420 55 7 1771 1100 334 6 346 597 349 1079 1079	337 32 29 132 79 34 21 345 1247 80 4 4 57 100 4 50 141 93 195 59 466 29 160	3565 146 1370 8389 661 2539 1688 10238 220 207 2832 1718 194 73 367 899 500 1478 338 693 208 1678	512521 165380 397008 45216 108235 41417 29659 235505 419312 8347 31340 189805 156580 34695 17542 73296 61292 66278 204491 2994 14304 65596
Poland Romania former USSR	594 193 4283	64 39 251	38 53 2338	380 97 919	428 104 1536	550 9 422	301 4 2496	689 316 1650	6150 988 6821	66 141 363	65 2 1256	856 798 3752	218 2719	114 11 291	27 3 86	56 348	443 34 1198	46 3808	783 200 4100	45 103 1172	456 76 1576	n.a. 8 742	184 161 1198	0 14 1766	32 0 730	1597 410 0	17042 6152 70012
Total Imports	689215	151304	275236	55343	139873	34878	23214	229344	373172	22041	25764	167699	143599	27309	26630	92511	51725	64074	226793	5168	14729	6826	14318	21383	6562	86239	

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Source: IMF, Direction of Trade Statistics Yearbook 1995.

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Exporter/ Importer	USA	CDN	Japan	A	B/ LUX	DK	FIN	F	D	GR	I	NL	N	E	S	СН	UK	BG	cz	H	PL.	RO	U.S.S.R.
				01		10	0.2	<u> </u>	70	0.7	2.0		<u>ــــــــــــــــــــــــــــــــــــ</u>	1.6		0.7	16.2		01		0.2		
USA	0.0	18.1	4.9	0.1	2.2	1.0	0.3	5.1	1.0	0.5	3.0	2.4	0.4	1.0	1.1	0.2	10.2	0.1	0.1	0.0	0.5	0.2	1.0
Canada	44.5	0.0	3.2	0.0	2.0	0.5	0.1	1.4	2.1	0.5	1.1	1.0	0.4	0.4	0.4	0.1	24.5	0.1	0.1	0.0	0.0	0.0	. 0.3
Japan	42.5	1.3	0.0	0.1	0.1	0.0	0.0	4.1	0.0	0.0	0.3	0.3	0.0	0.1	0.0	0.0	2.9	0.0	0.0	0.0	0.0	0.0	0.8
Austria	3.5	0.3	0.3	0.0	0.6	0.6	0.2	5.5	10.5	0.7	9.6	1.4	0.5	0.4	1.1	5.7	4.5	1.0	13.5	7.5	4.8	5.1	2.8
Belgam- Luxembourg	6.8	1.2	1.1	0.4	0.0	1.1	0.3	12.6	12.0	0.8	2.5	12.7	0.7	0.9	1.0	2.5	18.2	0.6	0.5	0.1	0.8	0.3	0.3
Deamark	1.1	0.0	0.6	0.1	0.4	0.0	1.7	0.7	19.9	0.0	0.5	0.7	3.9	0.5	6.4	0.9	56.4	n.a.	0.3	0.0	0.9	0.0	0.5
Finland	7.0	0.1	0.2	0.0	7.9	2.3	0.0	6.5	14.4	0.1	0.9	6.9	0.4	1.9	2.0	0.0	38.0	n.a.	0.0	0.0	0.1	0.0	3.3
France	6.7	1.2	0.6	0.4	14.4	0.6	0.1	0.0	9.4	0.8	4.4	2.5	0.2	3.2	0.5	6.7	15.1	0.1	0.5	0.1	0.9	0.3	0.5
Germanty	7.4	0.6	1.8	3.3	4.5	3.6	1.4	8.0	0.0	0.6	4.5	10.0	1.7	1.7	3.5	4.7	9.7	0.3	4.9	1.1	3.1	1.2	2.6
Greece	16.1	0.0	0.0	2.5	3.1	0.0	0.0	6.1	23.2	0.0	18.2	4.3	0.3	0.0	3.4	0.2	11.7	0.1	1.1	0.3	0.8	1.4	0.1
Italy	11.5	0.4	0.4	2.9	1.9	0.4	0.1	8.8	11.9	1.6	0.0	1.2	0.3	1.7	0.6	7.1	9.8	0.8	1.1	0.8	0.9	1.1	0.5
Netherlands	3.6	1.0	0.3	0.7	10.6	1.7	0.8	5.9	22.9	0.3	1.4	0.0	1.2	0.8	1.6	1.4	20.7	0.1	1.0	0.4	0.9	0.3	0.1
Norway	9.8	0.6	1.3	0.3	4.2	4.2	0.6	5.1	13.0	0.3	2.4	2.5	0.0	1.8	5.6	0.1	27.0	n.a.,	0.2	0.2	1.4	0.2	2.4
Spain	12.2	0.3	0.0	0.1	3.4	0.4	0.1	21.9	7.4	0.0	4.5	4.9	0.7	0.0	0.5	0.2	18.9	n.a.	0.0	0.0	0.0	0.0	0.7
Sweden	10.9	0.5	0.9	0.3	3.1	6.3	2.8	5.6	15.2	0.4	1.5	3.8	5.3	2.4	0.0	0.4	24.8	n.a.	1.1	0.1	1.0	0.3	1.5
Switzerland	9.9	1.8	2.1	3.3	2.7	0.9	0.3	8.6	16.9	0.5	7.5	3.2	0.6	2.6	1.5	0.0	13.7	0.1	2.6	0.8	2.0	0.8	0.5
United Kingdom	6.2	4.8	1.8	0.3	2.7	1.5	0.4	4.3	5.1	0.7	2.2	3.0	1.4	1.7	1.4	0.9	0.0	0.1	0.3	0.2	0.6	0.3	0.5
Bulgaria	1.7	n.a.	п.а.	12.5	4.6	0.1	0.1	5.1	29.9	7.6	10.5	1.4	0.0	0.0	0.1	2.1	1.6	0.0	4.8	2.7	8.5	0.4	0.0
Czechoslovakia	7.2	0.4	0.4	15.0	0.9	1.5	0.4	1.6	19.3	0.6	2.7	2.2	0.6	0.6	1.5	2.7	6.9	0.4	0.0	6.4	4.4	3.8	1.3
Hungary	1.1	0.0	0.1	30.4	1.0	0.3	0.4	1.2	11.7	1.1	6.9	1.3	0.1	0.2	0.3	4.0	3.6	0.1	16.4	0.0	1.7	4.5	0.1
Poland	1.1	0.0	0.6	10.5	2.4	3.9	1.4	2.2	31.2	0.1	1.4	2.8	0.9	0.2	3.8	1.4	10.3	0.1	10.5	2.0	0.0	2.3	2.9
Romania	0.2	0.0	0.0	9.4	1.6	0.0	<b>B.A.</b>	4.5	27.6	3.5	7.7	1.1	0.0	0.6	0.0	0.2	6.3	0.2	6.2	11.1	2.0	0.0	0.0
U.S.S.R.	4.6	0.0	2.1	0.9	2.1	1.9	0.8	4.6	23.4	0.6	3.6	3.4	0.4	1.3	0.2	0.1	21.9	n.a.	0.9	0.0	1.4	0.0	0.0

Appendix Table 7 - Similarity Matrix for 1929

Source: League of Nations, Economic Intelligence Service - International Trade Statistics 1938. - League of Nations, Economic Intelligence Service - The Network of World Trade (1942).

Exporter/ Importer	USA	CDN	Japan	A	B/ LUX	DK	FIN	F	D	GR	IRL,	I	NL	N	Р	Е	s	СН	UK	BG	cz	GDR	н	PL	RO
USA	0	20.77	10.53	0.17	2.37	0.27	0.16	2.70	4.06	0.20	0.60	1.95	3.37	0.38	0.43	1.14	0.69	1.14	5.45	0.02	0.03	0.06	0.04	0.14	0.11
Canada	73.44	0	4.87	0.04	0.60	0.08	0.10	0.64	1.08	0.04	0.09	0.50	0.92	0.28	0.05	0.08	0.15	0.21	2.15	0.01	0.02	0.16	0.01	0.03	0.02
Japan	35.61	2.53	0	0.25	0.79	0.55	0.30	1.14	3.89	0.47	0.15	0.61	1.07	0.29	0.09	0.38	0.59	0.64	2.75	0.05	0.04	0.09	0.03	0.04	0.04
Austria	4.11	0.81	1.04	0	1.82	1.05	0.83	3.87	29.71	0.58	0.20	9,41	2.47	0.89	0.24	1.51	1.89	6.91	4.38	0.72	1.10	2.19	2.19	1.06	_0.36
Belgium-	6.05	0.57	0.83	0.84	0	0.91	0.42	18.41	19.73	0.50	0.37	5.13	13.91	0.68	0.34	0.87	1.37	2.69	9.89	0.09	0.11	0.14	0.15	0.17	0.09
Luxembourg																									
Denmark	9.76	0.93	2.84	0.81	1.70	0	1.95	4.44	16.05	0.66	0.55	3.90	3.32	6.38	0.24	0.89	11.33	1.86	12.85	0.08	0.21	0.21	0.20	0.39	0.04
Finland	8.11	0.84	1.28	0.73	1.48	4.08	0	3.96	9.62	0.56	0.56	2.12	3.55	4.55	0.22	0.73	12.27	1.25	11.97	0.16	0.38	0.46	0.35	0.29	0.04
France	7.72	1.01	1.05	0.71	8.21	0.74	0.39	0	14.07	0.83	0.45	10.42	4.55	0.74	0.67	3.13	1.26	3.72	7.57	0.11	0.12	0.22	0.15	0.28	0.16
Germany	9.44	0.87	1.40	4.92	6.90	2.03	0.96	12.40	0	1.00	0.43	7.62	8.51	1.10	0.44	1.78	2.62	5.24	8.20	0.27	0.42	1.30	0.55	0.48	0.18
Greece	8.39	0.58	1.16	1.00	1.76	0.69	0.35	8.43	19.64	0	0.23	13.73	3.38	0.08	0.31	0.60	0.64	0.83	6.19	0.87	0.46	0.29	0.52	0.27	0.79
Ireland	9.73	1.69	1.71	0.55	4.30	0.76	0.52	8.37	10.14	0.43	0	3.12	7.01	0.90	0.25	1.21	1.52	1.12	34.46	0.02	0.03	0.03	0.07	0.10	0.02
Italy	10.66	1.08	1.13	2.22	2.85	0.74	0.46	13.80	15.86	1.69	0.26	0	2.83	0.48	0.48	1.55	1.03	4.00	6.63	0.18	0.16	0.18	0.27	0.27	0.12
Netherlands	5.05	0.52	0.58	0.87	13.85	1.47	0.57	10.44	29.79	0.91	0.48	5.57	0	0.82	0.46	0.97	1.77	1.58	9.50	0.06	0.12	0.14	0.17	0.26	0.07
Norway	5.13	0.57	1.41	0.43	0.90	3.54	1.45	3.38	16.33	0.21	0.15	1.55	7.29	0	0.41	0.34	9.89	0.69	36.50	0.03	0.11	0.07	0.07	0.14	0.04
Portugal	8.76	0.86	0.91	1.02	3.31	1.61	1.40	12.42	13.70	0.31	0.50	4.29	5.92	1.67	0	4.45	3.36	2.47	15.35	0.09	0.08	0.10	0.08	0.03	0.22
Spain	9.58	0.97	1.57	0.45	2.54	0.65	0.36	15.05	9.01	0.60	0.40	3.98	5.27	0.43	2.38		0.90	1.76	9.09	0.19	0.14	0.26	0.14	0.15	0.09
Sweden	11.38	1.31	1.44	1.15	3.70	8.30	3./4	3.02	10.66	0.38	0.03	2.28	9.4/	9.20	0.31	1.14	1.00	1.64	10.23	0.18	0.22	0.33	0.26	0.53	0.07
Switzerland	9.83	0.91	5.29	3.90	2.45	1.20	0.79	0.20	19.55	0.62	0.28	7.55	2.00	0.81	0.62	1.90	1.99	U	8.01	0.47	0.43	0.24	0.50	0.42	0.10
United	14.60	1.68	1.32	0.45	4.34	1.69	0.96	10.01	10.52	0.50	4.82	4.06	8.72	1.38	0.55	1.87	4.11	2.22	0	0.08	0.11	0.13	0.14	0.24	0.10
Kingdom	0.20	0.05	0.62	0.30	0 17	0.04	0.04	0.52	1.40	047	10.0	0 74	0.20	0.01	0.02	0 37	012	0.10	0.21	0	4.05	£ 06	1 07	1 27	1 79
Bugana Crashealeushia	0.43	0.05	0.02	2 55	0.17	0.33	0.04	0.92	4 88	0.73	0.01	0.74	0.20	0.01	0.02	0.57	0.12	0.17	1 10	2 70		9.90	4 08	7 12	1.70
Czechoslovakia	0.45	0.28	0.20	0.60	0.57	0.55	0.32	1 74	14 27	0.44	0.00	0.54	0.75	0.88	0.00	0.19	1.64	0.73	1.10	3.67	9.26	0.05	7 45	3.50	215
L'Ocimany	2.67	0.30	0.40	5 26	0.45	0.38	0.47	1 67	7 46	0.44	0.00	3.28	1 10	0 1 1	0.00	0.17	0.72	2 24	1 50	1 46	5 10	5 93	2.45	4.28	1 46
Polend	2.19	0.34	0.42	2.12	0.84	1.34	1.57	2.49	8.87	0.36	0.43	2.39	1.63	0.38	0.00	0.98	1.80	1.25	4.07	2.41	5.59	4.59	3.20	7.20	2.76
Romania	5 56	0 32	0.65	1.50	0.47	0.17	0.09	2.38	5.97	1.49	0.02	7.39	1.98	0.17	0.02	0.28	0.30	0.62	1.90	1.38	1.83	3 46	161	3.00	~0
USSR	0.41	0.02	1.13	1.02	1.62	0.45	3.25	3.29	6.10	0.78	0.05	4.24	2.17	0.17	0.06	0.45	0.76	0.73	1.87	8.23	8.86	10.06	5.81	8.16	2.43

Appendix Table 8 --- Similarity Matrix for 1984

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Source: IMF, Direction of Trade Statistics Yearbook 1990. - UN, International Trade Statistics Yearbook 1988.

RO USSR

0.11

0.02 1.84

0.04

0.09 1.06

0.04

0.04 19.12

0.16 0.18 0.79

0.02 0.12

0.07 0.04 0.22 0.09

0.07

0.10 0.77

0.10 1.04

1.78 70.79

1.73 43.43 2.15 47.58

1.46 2.76 30.15 29.34

1.47

1.48

4.49

0.73

2.00 2.18 2.60 0.23 2.12

0.46

1.06 1.52 0.96

13.12 0

Exporter/ Importer	USA	CDN	Japan	A	B/ LUX	DK	FIN	F	D	GR	IRL.	I	NL	N	P	E	S	СН	UK	BG	cz	SK	H	PL	RO	former USSR
USA Canada Japan Austria Belgium-	0 80.49 29.90 3.52 5.76	22.29 0 1.49 0.61 0.43	10.43 4.15 0 1.55 1.43	0.27 0.09 0.31 0 1.34	2.18 0.56 0.96 1.88 0	0.24 0.04 0.22 0.85 1.00	0.21 0.05 0.25 0.52 0.53	2.66 0.53 1.33 4.53 16.75	3.75 0.92 4.48 37.94 18.70	0.16 0.03 0.15 0.46 0.72	0.67 0.06 0.42 0.21 0.35	1.40 0.53 0.85 8.09 6.68	2.65 0.50 2.14 2.97 11.19	0.25 0.27 0.34 0.56 0.59	0.21 0.04 0.19 0.46 0.76	0.91 0.15 0.53 2.13 2.59	0.49 0.08 0.37 1.39 1.51	1.09 0.48 0.57 6.33 2.16	5.24 1.34 3.21 3.15 8.61	0.02 0.00 0.01 0.26 0.06	0.06 0.02 0.03 2.61 0.29	0.01 0.00 0.00 0.87 0.04	0.06 0.01 0.07 3.90 0.32	0.12 0.02 0.03 1.17 0.45	0.07 0.02 0.01 0.29	0.70 0.09 0.35 1.84 0.82
Luxembourg Denmark Finland France Germany Greece Ireland Italy Netherlands	5.27 7.19 6.95 7.99 5.04 8.98 7.76 3.65	0.51 0.67 0.69 0.65 0.72 1.05 0.92 0.37	3.96 2.09 1.94 2.38 1.43 3.67 2.13 0.98	1.02 1.04 1.08 5.86 1.96 0.79 2.46 1.10	1.73 2.25 8.67 6.69 3.21 3.98 2.98 11.18	0 3.42 0.87 1.84 0.20 0.59 0.84 1.34	2.29 0.35 0.80 0.61 0.67 0.40 0.56	5.25 5.05 0 12.05 5.40 8.88 13.08 9.01	21.44 13.42 16.95 0 21.21 13.70 19.01 24.19	0.73 0.57 0.71 0.83 0 0.56 1.79 0.86	0.46 0.46 0.61 0.45 0.24 0 0.35 0.52	3.81 2.99 9.29 7.55 14.64 4.39 0 4.44	3.81 5.11 4.59 7.50 2.31 4.99 2.86 0	6.19 3.16 0.41 0.88 0.41 1.01 0.41 0.70	0.52 0.52 1.47 0.85 0.20 0.29 1.35 0.67	1.74 2.31 7.09 3.21 1.80 2.36 4.70 2.21	9.97 10.96 1.14 2.27 0.97 1.73 0.91 1.45	1.83 1.51 3.73 5.47 1.03 2.10 3.77 1.60	7.82 10.34 9.80 7.98 5.57 27.71 6.50 8.05	0.07 0.14 0.06 0.16 4.77 0.01 0.16 0.10	0.36 0.55 0.29 1.33 0.48 0.15 0.45 0.28	0.09 0.16 0.05 0.30 0.25 0.00 0.20 0.20	0.28 0.76 0.22 0.94 0.50 0.11 0.62 0.28	1.38 1.66 0.41 1.53 0.06 0.12 0.93 0.70	0.08 0.07 0.15 0.30 0.96 0.01 0.46 0.10	1.60 8.56 0.72 2.44 2.64 0.66 1.49 1.10
Norway Portugal Spain Sweden Switzerland United	6.41 5.22 4.93 8.00 9.73 12.98	3.32 0.69 0.58 1.11 0.73 1.43	1.90 0.77 1.35 2.67 4.12 2.25	0.40 1.12 0.83 1.39 3.81 0.78	2.97 3.67 2.99 4.90 2.64 5.16	4.69 2.32 0.64 6.90 1.14 1.22	2.97 1.05 0.34 4.77 0.60 0.98	8.05 14.66 20.14 5.10 9.75 9.34	12.34 18.64 14.18 13.27 24.89 12.03	0.22 0.46 0.93 0.58 0.62 0.64	1.21 0.50 0.44 0.67 0.41 4.69	2.85 3.35 9.20 3.77 7.90 4.72	8.56 5.07 4.11 5.27 2.86 6.60	0 1.02 0.34 8.15 0.53 1.51	0.88 0 7.80 0.46 0.71 0.87	1.36 14.58 0 1.92 2.12 3.59	9.27 2.49 0.77 0 1.50 2.51	0.62 1.88 1.21 1.93 0 1.84	20.90 11.63 8.21 10.13 7.06 0	0.02 0.05 0.04 0.05 0.10 0.06	0.14 0.05 0.15 0.34 0.47 0.28	0.01 0.02 0.03 0.05 0.11 0.04	0.04 0.11 0.33 0.47 0.46 0.19	0.96 0.03 0.47 0.97 0.53 0.53	0.03 0.02 0.07 0.23 0.14 0.10	0.56 0.42 0.50 1.47 0.75 0.72
Rugacili Bulgaria Czech Rep. Slovak Rep. Hungary Poland Romania Former USSR	7.28 2.13 1.94 3.98 3.49 3.14 4.97	0.90 0.27 0.24 0.28 0.38 0.63 0.29	0.70 0.61 0.12 0.82 0.22 0.86 2.71	1.90 6.33 5.02 9.87 2.23 1.58 1.07	1.30 1.10 0.52 1.78 2.51 1.69 1.78	0.70 0.67 0.30 0.40 3.23 0.15 0.49	0.43 0.52 0.33 0.69 1.77 0.07 2.89	4.74 2.17 1.74 3.33 4.04 5.14 1.91	14.03 31.30 18.75 27.94 36.09 16.06 7.91	7.11 0.61 0.35 0.50 0.39 2.29 0.42	0.03 0.13 0.03 0.02 0.38 0.03 1.46	9.89 4.26 5.06 8.08 5.02 12.97 4.35	2.57 1.89 1.23 2.22 5.96 3.54 3.15	0.20 0.31 0.05 0.22 0.67 0.18 0.34	0.20 0.13 0.09 0.10 0.16 0.05 0.10	1.70 0.85 0.68 1.34 1.04 0.91 0.40	0.47 0.82 0.59 1.15 2.60 0.55 1.39	0.37 0.92 0.56 1.34 1.00 0.75 4.42	3.27 2.71 1.18 3.04 4.59 3.25 4.75	0 0.32 n.a. 0.26 0.26 1.67 1.36	0.40 0 31.70 0.89 2.68 1.24 1.83	n.a. 16.57 0 0.53 n.a. 0.13 0.86	0.73 1.54 n.a. 0 1.08 2.62 1.39	0.63 3.19 n.a. 1.90 0 0.23 2.05	1.97 0.32 0.44 1.46 0.19 0 0.85	11.29 4.84 3.15 15.32 9.37 6.66 0

Appendix Table 9 --- Similarity Matrix for 1994

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Source: IMF, Direction of Trade Statistics Yearbook 1995.

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