WIIW Working Papers

No. 21

March 2002

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Abstract

This paper estimates a classical gravity model for trade on aggregate trade volumes between OECD and transition countries. The results are used to analyse and make projections on trade flows into and out of Southeast European countries following scenarios on potential GDP levels and possible membership of institutions. Alternative variables are also tested, namely transport times instead of geographical distance, and GDP in PPP instead of nominal. Replacing distance with transport times does not lead to great improvements in the model's performance. The use of GDP at PPP is presented mainly to try to deal with specific situations where local prices prevail. The striking feature that emerges in Southeast Europe is of flows of extreme values, in some cases far below, but in others far above, what classical gravity model estimates show. The main conclusion is that Southeast Europe can no longer be viewed as a region from the point of view of aggregate trade flows.

Keywords: Gravity model; Trade; Southeast Europe; Regionalism; Transport time; Transport costs

JEL classification: F17, P27

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Introduction

Gravity models have been used extensively in recent years to try to quantify potential trade levels, particularly with transition countries. This paper presents a classical approach to the problem, and focuses the discussion on the variables of the model, with a specific emphasis on trade flows with and within southeast Europe.

The overall performance of the model presented in this paper seems good when viewed superficially, notably from the viewpoint of classical goodness-of-fit measurement. On closer inspection, many trade flows are substantially larger or substantially smaller than the model would forecast, especially flows with and within southeast Europe.

These large deviations nevertheless constitute interesting information regarding trade levels for the region, and a certain number of comments of interest can be inferred from the model's estimations. Perhaps the most important conclusion is that the classical question: 'Have they reached potential already, or is there still some way to go?' receives a very differentiated answer depending on which trade flow one considers.

The gravity model

The gravity model for trade is analogous to Newton's gravity law in mechanics: the gravitational pull between two physical bodies (in newtons) is proportional to the product of each body's mass (in kilograms) divided by the square of the distance between their respective centres of gravity (in metres).

$$F = G\frac{M_1 M_2}{D^2} \qquad \text{(F1.1)}$$

The analogy for trade is as follows: the trade flow between two countries is proportional to the product of each country's 'economic mass', generally measured by GDP, each to the power of quantities to be determined, divided by the distance between the countries' respective 'economic centres of gravity', generally their capitals, raised to the power of another quantity to be determined. Such a model, which will be referred to from now on as the baseline gravity model, offers room for estimation, as the exponents for the two masses and for distance are not set.

$$M = kY_M^{\,b} Y_X^{\,g} D^d \qquad \text{(F1.2)}$$

where M is the flow of imports into country M from country X, Y_M and Y_X are country M's and country X's GDPs, and D is the geographical distance between the countries' capitals.

The linear form of the model is as follows:

$$Log(M) = a + bLog(Y_M) + gLog(Y_X) + dLog(D) \quad \text{(F1.3)}$$

This baseline model, when estimated, gives relatively good results. However, we know that there are other factors that influence trade levels. On the other hand, since this model seems to provide a reasonably neutral base as to what levels of trade should be, why not test for specific groups of countries between which trade is believed to be unusually high or unusually low? One could try to determine, for example, if a given trade agreement really does give rise to 'higher than normal' trade.

To address both of these questions, most estimates of gravity models add to (f1.3) a certain number of dummy variables that test for specific effects, for example being a member of a trade agreement such as NAFTA or the EU, sharing a common land border, speaking the same language and so on.

Assuming that we wish to test for p distinct effects, the model then becomes:

$$Log(M) = a + bLog(Y_M) + gLog(Y_X) + dLog(D) + \sum_{s=1}^{p} l_s G_s \quad \text{(F1.4)}$$

Which is equivalent to:

$$M = \exp(a) Y_M^b Y_X^g D^d \prod_{s=1}^{p} \exp(l_s G_s) \quad \text{(F1.5)}$$

Estimation and specification issues

One important thing to do when using specifications that include a large number of dummy variables is to avoid cases of near- or perfect multicollinearity. This is avoided by making sure that there is no excessive combined or single overlap between the categories defined by the dummy variables.

Furthermore, the magnitude and the significance of a dummy variable changes depending on which other dummy variables are already in the model, even when the dummy variables are completely independent from each other. With dummy variables for categories that never overlap, the significance and magnitude of the estimate of the

coefficient of a particular dummy variable changes depending on which other dummy variables are already there. What happens is that as categories of higher than average flows are dummied out, the coefficients on GDP and distance become smaller, causing the model's base to be lower. This in turn means that the necessary upward correction from the base for an even completely independent category of flows becomes larger.

For example the magnitude of the dummy for the EU will change substantially depending on whether it is simply added onto the baseline model or whether it is added when dummy variables for CEFTA, the CIS and other categories are already there.

This implies that the interpretation of the magnitude of the coefficients of the dummy variables must always be made bearing in mind that the other dummy variables are in the model, and that this has had an effect on the magnitudes of the coefficients of the baseline model.

Another way of looking at it is to say that the corrective factor accounts not only for categories which the flow belongs to, but also for the categories the flow does not belong to.

For example, the estimate of a dummy for trade flows between FR Yugoslavia and a group comprising Germany, Italy and Austria is significant when introduced into the baseline model, giving the impression that there is still some unfulfilled potential. But after adding the other dummy variables, the former dummy variable is no longer significant: the flows are neither EU nor OECD nor EU Association Agreement flows and therefore the flows between these three EU member states and FR Yugoslavia are lower than with most other countries, GDP and distance accounted for.

Breuss and Egger (1999) argue that cross-section estimations of trade potential are not very reliable. They find very large confidence intervals around estimates, making comments as to whether current flows are below or above potential often statistically meaningless. Indeed, there is a high degree of country-pair heterogeneity in trade flows, and southeast European flows are a good example of that. The main problem with cross-section analysis is that one has in the sample many trade flows that are either abnormally high or abnormally low, which increases the standard error and yields large confidence intervals. Comparing flows to central estimate values, which correspond to 'average behaviour', is worth doing when, as is the case here, one focuses on specific flows and when one takes into account specific local factors. In this way, one can account for the heterogeneity of country-to-country trade flow levels.

Data, variables and units

Questions on how to measure the concepts of economic mass and economic distance arise as soon as one makes the analogy from Newton's gravity law to the corresponding gravity model for trade.

It is debatable what can best represent the concept of 'economic mass'. Gross Domestic Product seems an obvious guess, but then, should one measure it nominally and at current exchange rates, or at constant prices, or perhaps at Power Purchasing Parities?

Distance is also a problem. Geographical distance between capitals, although broadly a reasonable idea, does not take sufficient account of a whole series of trade impediments that surely matter, such as tariff and non-tariff barriers, or actual real transport costs. Goods are transported by sea, by road, by rail or over inland waterways.

Other practical questions include waiting times at borders and transport infrastructure quality. Also, measuring between capitals may not always be a good idea: Austria and Slovakia, whose capitals are very close, is a case in point.

Regarding economic mass, I have settled for nominal GDP in US dollars at exchange rates for the main model, but I also estimate a model with GDP at PPP. The main assumption is that trade usually happens at international prices, and therefore GDP at PPP has no bearing on trade levels. On the other hand, given the strong under valuation of certain countries' GDPs, most notably Russia for 1999, and given the fact that specific country pairs may be conducting substantial shares of their trade at different, 'local' prices, say, within the CIS, it is tempting to estimate the model with GDPs at PPP and see how the corresponding dummy variable coefficients change.

The data used for this paper was initially borrowed from Jarko and Jan Fidrmuc (4) and was enhanced to include Albania, Bosnia-Herzegovina and FR Yugoslavia, as well as all observations for 1999. Subsequently, OECD data was taken for GDPs, all in billions of US dollars at current prices, instead of the initial IMF-IFS figures. Missing GDP figures were filled in with WIIW data where available. The GDPs at PPP were also from the WIIW.

For trade flows, measured as c.i.f. imports in millions of US dollars at current prices, the main source was the IMF-DOT database. Missing values were filled in using WIIW data, where available. The distance matrix was provided by Jarko Fidrmuc. The distances were taken as the geographical distance between capital cities in kilometres, the only exception being for Germany, where the capital was replaced by the centre of a triangle linking Frankfurt, Munich and Berlin.

The main model in this paper uses geographical distance between capitals, but in a separate estimation, attempts are made to take better account of transport costs by using data from the ÖIR, the Austrian Institute for Spatial Planning. The data from the ÖIR is a transport time matrix between the main transport nodes of Central and Eastern Europe. Total transport times (including waiting times at borders) are given for each bilateral connection between nodes (separately for each direction) and each node can be viewed as the centre of a region that accounts for a certain proportion of national GDP. It is thus possible to compute an aggregate average transport time between two countries. This aggregate transport time is then used in a gravity model instead of geographical distance. The main hope behind this procedure is to take better account of 'real-life' problems such as infrastructure quality and transport impediments such as border waiting times. I come back to this in more detail in a separate section.

Apart from these various attempts at using alternatives for mass and distance, the main thrust of the models in this paper was to use a set of dummy variables to isolate country groups of interest. For non-southeast European trade flows, categories that were taken into consideration, were the EU, the non-EU OECD (old membership, i.e. without Turkey and without the new central European members), CEFTA, the CIS (restricted to Russia, Belarus and Ukraine), the Europe Agreements (between the EU and certain transition countries), the Baltic States, flows between the Baltic States and the CIS, flows between Bulgaria and the CIS and flows between the Visegrad-4 and the CIS. A further dummy variable was added for English-speaking countries, which overlaps with OECD membership.

For southeast Europe, various overall regional and sub-regional effects were tested in order to answer various questions of interest. One important question was to try to see whether, with regards to trade flows, southeast Europe qualifies as a region, and/or whether selected sub-groups of countries may qualify as regions. Another question of interest was to take a closer look at flows between the region and the EU.

For these purposes, it is necessary to define what is meant by southeast Europe. In this paper, southeast Europe is defined as the following group of seven countries: Albania, Bosnia-Herzegovina, Bulgaria, Croatia, Macedonia, Romania and FR Yugoslavia. This group is referred to as SEE-7. In a wider view of the region, it is interesting to include Slovenia and Hungary in the northwest, and Greece and Turkey in the southeast. This latter group is referred to as SEE-11.

The categories defined for dummy variables for this paper included the SEE-7 and the SEE-11 (to see if there is any specific overall regional effect) as well as several different sub-groups. The idea is that since, as will be shown later, trade flows are rather 'irregular' in the region due to political circumstances, certain groups of countries may have diverted

trade from certain traditional regional partners to other traditional partners. For instance, trade between Croatia and FR Yugoslavia is extremely low, whereas trade between Bosnia-Herzegovina and FR Yugoslavia is very high. On the eastern side of Yugoslavia, there has been much talk of 'eastern Slav' solidarity with Yugoslavia from Macedonia and Bulgaria. Macedonia, on the other hand, has trade agreements with Croatia and Slovenia, a category also tested in the model.

Three categories are defined: North-West Balkans, widened to include Bosnia, Croatia, Slovenia and Hungary and East Balkans, the 'eastern Slav effect', including Yugoslavia, Macedonia and Bulgaria. The third category covers the trade agreement linking Macedonia with Slovenia and Croatia. There is a partial overlap between the North-West Balkans variable and the Macedonia-Slovenia-Croatia agreement, as they both include trade between Slovenia and Croatia.

Estimation results

The table below displays the results of an Ordinary Least Squares (OLS) estimation on pooled cross-section data from 1996 to 1999. This is similar to applying Fixed Effects on the equivalent panel, although only time effects are selected here, not individual effects, i.e. one-way-country-pair specific effects, which would miss the point of the gravity model entirely. (Having a specific dummy for trade from Croatia to Hungary, another one for trade from Hungary to Croatia and so on, for each trade relationship, would make the gravity model itself rather pointless.)

The column furthest to the right is the calculated multiplicative effect of the respective dummy variable coefficient estimation. The total number of observations was 5211. The estimations were made with E-Views 3.1.

The data used for this estimation is sorted so that the set of observations for 1996 occupies the first 1303 observations, followed by the same numbers of observations for 1997 and so on.

The results display the following effects:

There is a slight but steady rise of the intercept through time, which indicates a slight increasing trend in overall trade throughout the sample. The interpretation is the following: *all other parameters being equal*, the increase in the overall coefficient is 11% from 1996 to 1997, 13% from 1996 to 1998 and 15% from 1996 to 1999. Given the chosen years, this could simply be due to the business cycle.

Dependent Variable: Aggregate imports c.i.f.

Variable	Coefficient	Std. Error	t-Statistic	Prob.	Dum. Effect
OVERALL INTERCEPT	4.692106	0.135365	34.6626	0.0000	*****
YEAR97	0.102904	0.038737	2.656459	0.0079	1.11
YEAR98	0.125137	0.038737	3.23042	0.0012	1.13
YEAR99	0.138858	0.038737	3.58467	0.0003	1.15
LOG(GDP of Importer)	0.869624	0.008951	97.15489	0.0000	*****
LOG(GDP of Exporter)	1.012203	0.008983	112.6841	0.0000	*****
LOG(DISTANCE)	-1.208167	0.019285	-62.64648	0.0000	*****
ENGLISH LANGUAGE	0.859058	0.169248	5.075727	0.0000	2.36
Non-EU OECD	1.206146	0.119414	10.10057	0.0000	3.34
Non-EU OECD with EU	0.752947	0.055314	13.61224	0.0000	2.12
EU14	0.796057	0.050058	15.90262	0.0000	2.22
EU Association Agreements	0.641404	0.038526	16.64856	0.0000	1.90
CEFTA7	1.027585	0.08267	12.43	0.0000	2.79
CIS	3.15302	0.203911	15.4627	0.0000	23.41
BALTIC States	3.756004	0.205896	18.24224	0.0000	42.78
BALTIC States – CIS	2.520586	0.119902	21.02204	0.0000	12.44
Bulgaria – CIS	2.325087	0.203316	11.43582	0.0000	10.23
Visegrad-4 – CIS	1.713819	0.103316	16.58819	0.0000	5.55
Austria – Slovakia	-1.740547	0.355801	-4.891906	0.0000	0.18
Czech Republic – Slovakia	2.293305	0.358588	6.395373	0.0000	9.91
North-West Balkans	1.063333	0.157447	6.753582	0.0000	2.90
East Balkans	2.355599	0.225348	10.45317	0.0000	10.54
Bulgaria – EU3	0.48001	0.204351	2.348951	0.0189	1.62
Romania – EU3	0.747425	0.223715	3.340968	0.0008	2.11
Slovenia-Croatia-Macedonia	2.44454	0.210115	11.63431	0.0000	11.53
Yug. Imports from Bosnia	3.135012	0.496684	6.311885	0.0000	22.99
Yug. Imports from Russia	1.8264	0.494864	3.69071	0.0002	6.21

R-squared	0.855507	Mean dependent var	5.068252
Adjusted R-squared	0.854782	S.D. dependent var	2.594083
S.E. of regression	0.988539	Akaike info criterion	2.81999
Sum squared resid	5065.852	Schwarz criterion	2.853972
Log likelihood	-7320.485	F-statistic	1180.506
Durbin-Watson stat	1.637761	Prob(F-statistic)	0

The baseline variables (both GDPs and distance) are very highly significant, have the expected signs and are of reasonable magnitude compared to other gravity model estimations. One point of interest: the coefficient estimates for the two GDPs are significantly different from each other, a result not found in all estimations. There is no theoretical justification for this. In fact, it is due to the sample, since the sample contains many small economies (most transition economies) that, in most cases, have trade deficits with the larger economies (most EU countries).

The dummies for western countries indicate significant effects for the EU and for the OECD, as well as for trade between English-speaking countries. OECD membership (all members except Turkey and the recent central European entrants) is split in three categories: trade flows between EU member states, trade flows between non-members of the EU, and trade flows between non-members and members.

The effect of the English language is quite strong as it is a subset of OECD membership and is nevertheless significant. One should note that other languages, such as German or French, do not display such effects.

For central Europe, we find CEFTA membership to be significant, as well as the EU Association Agreements. Also, there is still very high trade between the Czech and Slovak republics whereas trade between Austria and Slovakia is rather low and needs a correction for the very short distance between the countries' capitals.

The CIS (here Russia, Ukraine and Belarus) seems a huge effect, as well as trade between the Baltic States and the CIS, and trade amongst the Baltic States. Before rushing to any conclusion, one should bear in mind that the GDPs of some of these countries are grossly undervalued, the most striking example being Russia in 1999, in the aftermath of the 'Russian Crisis' of 1998. Also, countries such as Russia and Ukraine have very large informal sectors, the size of which one can only guess at. Finally, as discussed in the previous section, some of the trade within the CIS takes place at non-international prices. The CIS dummy coefficient should therefore be seen as accounting for a combination of factors, not just excessive trading when economic distances and masses are accounted for. To a lesser extent, the same critique can be made regarding certain other dummy variable coefficient estimations, since there is no adjacency dummy variable in the model. (In effect, one must choose between regional groupings and adjacency.)

The main points of interest, however, lie with the various effects tested for trade with and within southeast Europe.

First of all, overall regional variables covering all seven countries or all eleven countries (according to the wider definition of the region) are both non significant for the year 1999. Overall, they appear as significant in the panel model, but on separate cross-section regressions their significance deteriorates with the years. In other words, from the point of view of trade, southeast Europe cannot be considered as a region, at least not any more.

This particular point is shown in the annex, where I give the parameter estimate’s value for cross-section regressions.

Nevertheless, there are ways of dividing southeast Europe into sub-regions which prove to be successful. The main split is between Croatia and FR Yugoslavia, with Bosnia-Herzegovina belonging to both sub-regions. Unfortunately, separate trade data for the Federation and for Republika Srpska was not available, but it is clear that Republika Srpska is mainly directed towards FR Yugoslavia. Thus, the dummy for imports into FR Yugoslavia from Bosnia is significant and high in magnitude. The North-West Balkans and the East Balkans dummy are both significant.

This split in the middle of the former Yugoslavia affects mainly links between Croatia, Bosnia-Herzegovina and FR Yugoslavia, however, as Macedonia has trade agreements with Slovenia and Croatia. The corresponding dummy is both significant and high in magnitude.

Regarding trade flows between countries of the region and countries of the EU, I decided to focus on the three 'frontline' EU partners, i.e. Germany, Italy and Austria.

I tested seven different dummy variables, each for trade flows between the latter three EU member states and each country of the region. The only significant dummy variables are for trade with Romania and Bulgaria. Both have association agreements with the EU, whereas the other countries of the region don't. But the EU association agreements (Europe Agreements) dummy variable is also in the model, which means that the distortion in favour of trade with Germany, Italy and Austria is quite high.

For the other countries of the region this result implies that there is no significant negative distortion of their trade with the three EU member states.

One further comment should be made: contrary to many other gravity models, the models in this paper do not include the adjacency dummy variable (common land border). This is not to say that such effects do not take place. What happens is that the various sub-regional groupings defined in this paper capture various effects simultaneously, and adjacency is one of them. In the end, the presence in the model of all the regional groupings where adjacency actually has an effect render the adjacency variable itself non-significant. Indeed, there are many counter-examples to the adjacency effect even in Western Europe. France and Belgium or Italy and Switzerland are typical examples. As for southeast Europe, positive adjacency effects, say, between Croatia and Bosnia-Herzegovina or between FR Yugoslavia and Macedonia, are captured by the respective sub-regional dummy variables.

Trade flows between countries of southeast Europe and Germany, Italy or Austria are at relatively unsurprising levels, whereas trade flows between countries of the region are mostly very far from what the baseline model would predict. Some flows are well below

potential whereas others are far higher than potential. Southeast Europe is not a region in itself, but it contains at least two sub-regions. There is a major fault line that runs right through Bosnia-Herzegovina, putting Croatia in one sub-region and FR Yugoslavia in the other. This divide does not affect all countries, however, as Macedonia in particular has trade agreements of significant importance with Slovenia and Croatia.

Bulgaria and Romania have significant trade agreements with the EU which the other countries of the core region do not have. Simultaneously, Bulgaria still displays some strong links to the CIS.

Future prospects for trade flows with and within Southeast Europe

Two elements characterise the present situation of many transition economies: below potential GDP and incomplete integration in international structures. This is especially the case for the core countries of southeast Europe.

With the notable exceptions of Romania and Bulgaria, none of the remaining five core countries have yet been short-listed for negotiations to join the EU. They all have much further scope for economic growth, and they all have very high levels of unemployment.

These remaining five countries, Croatia being a favourite for first place, will almost certainly be invited to sign up for association agreements with the EU for a transitory period. (as have Romania and Bulgaria) In the mean time, compatible with western wishes and building on the trade agreements linking Macedonia to Croatia and Slovenia, there is the possibility that the region could create a free-trade agreement of its own.

Finally, in the long run, it is likely that the whole region will join the EU and the euro. (The euro is already important in the region in practice through DM-ization.)

GDP levels in the region are below their long-term potential, but how and how fast a catch-up might happen is a complex question, and one major methodological problem is the interaction between trade and growth. The gravity model is a single equation model that considers GDP to be exogenous, so there is no scope for export-led growth.

In spite of this limitation, one can have an 'educated guess' at potential GDPs for the countries of the region and feed them back into the model to have an estimation of potential trade. One should bear in mind, however, that this is by no means a forecast, as it uses the estimated parameters from 1999. By the time the countries reach the levels of GDP considered, there may have been one or several regime changes.

One possibility for estimating potential is to calculate the extra GDP generated by a partial absorption of unemployment under the assumption of constant average labour productivity.

There are two different aspects to look at: the first is the actual unemployment rates, whether officially registered or otherwise measured, say, using ILO methodology. The other aspect is that of the participation ratio. This is important especially for the countries of former Yugoslavia. Bosnia is an extreme case, having been hit especially hard by years of war, it has a large number of persons of working age that are either dead, wounded or refugees in other countries. Similar circumstances explain similar, although less severe, situations in Croatia and FR Yugoslavia.

The idea is to estimate a potential GDP according to what GDP would be if both the population structures and the unemployment rates were 'normal', i.e. similar to what they are in central Europe. For this purpose, and to avoid speculation as to how the change would be distributed between population structure and unemployment rate, I just calculate the extra output generated if the total employment to total population ratio were for all seven countries the same as the average for the Visegrad countries.

In the following tables I give the current employment-to-population ratios for the four Visegrad countries and for all seven countries. I then provide the estimates for potential GDP. Population figures are in millions, GDP data are in millions of USD at current 1999 prices, GDP per worker data are in USD.

The 'Extra empl' line refers to the number of additional employed persons necessary for the Employment/Population ratio to reach the Visegrad-4 average of 41.38%. The additional GDP is calculated by multiplying the number of extra employees by the current GDP/worker.

The term ILO refers to ILO methodology. This is done by conducting surveys where people are asked if they are looking for work, rather than counting the number of unemployment benefit claimants.

The data in these tables are from WIIW, themselves from national statistics sources. They are end-of-year values. Some employment totals may differ from direct national sources. This is because WIIW corrects certain values to include additional sections of the workforce that are not necessarily in the nationally published statistics. This is for example the case for FR Yugoslavia, where WIIW adds employment in SMEs to the figure quoted by the Yugoslav national statistics office.

Unsurprisingly, the biggest winners from this scenario are Bosnia-Herzegovina, Macedonia and FR Yugoslavia. Albania and Croatia also gain a significant amount, whereas Romania

and Bulgaria are only slightly affected, given their more classical employment and higher participation rates.

In the subsequent tables, selections of flows within the region and between the countries of the region and selected partners are given at 1999 levels, at 1999 cross-section gravity model potential levels, and at potential levels using potential GDPs, firstly without any assumption as to further integration, and then assuming, respectively, EU Association Agreements, a regional free-trade agreement estimated by the CEFTA dummy effect, and finally full EU membership for all. All flows are quoted in millions of USD, and all are measured from the importer's viewpoint, as imports c.i.f.

The full table with all available flows with and within the region is available in the annex.

Visegrad-4

	CZ	**HU**	**SK**	**PL**	**TOTAL**
Population	10.2826	10.044	5.3951	38.6536	64.3753
ILO Unempl	8.80%	7.00%	19.20%	13.00%	12.01%
ILO Un.Tot.	0.457	0.295	0.535	2.350	3.637
Work Force	5.1915	4.21875	2.7865	18.0769	30.2737
WF/Pop	50.49%	42.00%	51.65%	46.77%	47.03%
Empl/Pop	46.05%	39.06%	41.73%	40.69%	41.38%

Southeast Europe

	BG (ILO)	**HR (ILO)**	**MK (ILO)**	**RO (ILO)**	**YU (reg.)**	**AL (reg.)**	**BA (reg.)**
Population	8.2106	4.554	2.0178	22.458	8.3722	3.373	3.75
Unempl rate	15.70%	13.60%	32.40%	6.90%	25.50%	18.40%	38.50%
Unempl tot	0.600	0.244	0.262	0.678	0.774	0.240	0.409
Work Force	3.8188	1.7906	0.8071	9.826	3.035	1.304	1.063
WF/Pop	46.51%	39.32%	40.00%	43.75%	36.25%	38.66%	28.35%
Empl/Pop	39.21%	33.97%	27.04%	40.73%	27.01%	31.55%	17.43%
Employed	3.219	1.547	0.546	9.148	2.261	1.064	0.654
GDP	12368	20425	3428	34024	16450	3788	4418
GDP/worker	3841.9	13202.3	6283.0	3719.3	7275.3	3559.9	6758.0
Extra empl	0.178	0.337	0.289	0.144	1.203	0.332	0.898
New GDP	**13052**	**24877**	**5246**	**34561**	**25203**	**4968**	**10486**
GDP incr%	**5.5%**	**21.8%**	**53.0%**	**1.6%**	**53.2%**	**31.2%**	**137.3%**

The methodology used is to re-estimate the model for 1999 without any of the dummy variables that affect southeast Europe to get a 'fair estimate' of what should be happening. This estimate is referred to in the tables as the Base Estimate. Then, one substitutes GDPs with their potential values and sets chosen dummies such as the EU dummy at 1.

The reason for this methodology is that the dummies specific to southeast Europe can be considered to correct for situations that are 'abnormal'. Not correcting for these specific abnormalities enables us to compare potential flows with current flows.

Before we go on, two comments are in order. First of all, the methodology used means that the Base Estimate is rather low. This is because it is based on a model where there are dummies almost exclusively for positive distortions: OECD, EU Association Agreements, CEFTA, CIS, Baltic and Balt-CIS flows. With the exception of flows between Romania or Bulgaria and the EU, the flows below are computed from the model's baseline, as none of the dummies mentioned above apply to them. One consequence of this is that trade between Croatia and FR Yugoslavia, for example, appears to be at Base Estimate potential, when in fact it is quite low. This is why there are the other columns to show more probable potentials, such as may exist if there were a free-trade agreement, higher GDP and so on.

Secondly, regarding the interpretation of the potentials in general, one should bear in mind that these are based on 1999 data and on a model estimated with that year's data. They should therefore not be viewed as forecasts. If one wishes to adapt the potentials to future years, one should bear in mind firstly that the GDP levels of all the countries will change, including EU or CIS countries, and secondly, that the parameters of the model may change as well.

Bosnia-Herzegovina (BA), FR Yugoslavia (YU), Croatia (HR)

Importer	Exporter	Current flow (1999)	Base Estimate	Estimate with potential GDPs	With the EU membership dummy	With the CEFTA dummy
BA	HR	595.122	14.289	37.218	73.560	103.342
BA	YU	NA	19.546	63.231	124.973	175.572
HR	BA	115.9	11.690	33.202	65.622	92.191
HR	YU	24.070	23.288	42.734	84.462	118.658
YU	BA	187.785	16.428	56.311	111.296	156.357
YU	HR	18.870	23.925	42.661	84.317	118.454

Yugoslav exports to Bosnia-Herzegovina were USD 304.1 million f.o.b.

Judging by these potential values, there is scope for much more trade between Croatia and Yugoslavia in the medium- to long-term. The level of Bosnian imports from Croatia is very high compared to potential values and should be expected to fall. Croatian imports from Yugoslavia are not surprising from the Base Estimate point of view, but that is a low base. There is a large potential to fulfil from GDP growth and better regional integration.

It should be said that the model does not take proper account of the very specific geographic configuration of the region: Bosnia is 'locked' by Croatia and FR Yugoslavia and it is not entirely surprising that there is some over-trade compared to a gravity model.

Furthermore, there is what one could call 'ethnic trading' between Croatia and the Federation on the one hand, and between Republika Srpska and FR Yugoslavia on the other hand.

FR Yugoslavia (YU), Macedonia (MK), Bulgaria (BG)

Importer	Exporter	Current flow (1999)	Base Estimate	Estimate with potential GDPs	With the EU membership dummy	With the CEFTA dummy
BG	MK	24.61	14.431	23.033	45.523	63.954
BG	YU	176.946	19.394	31.028	61.325	86.154
MK	BG	91.32	17.102	25.982	51.351	72.142
MK	YU	181.883	6.607	14.603	28.862	40.547
YU	BG	151.595	18.684	28.443	56.217	78.977
YU	MK	122.425	5.371	11.867	23.455	32.951

FR Yugoslavia trades very far above potential with Macedonia and Bulgaria, about double or more the largest potential which is computed with the potential GDPs and with the CEFTA dummy. Both countries are important for both imports and exports.

International trade sanctions, together with NATO's military intervention, have forced FR Yugoslavia into above potential trade with selected neighbours and Russia, and rather low trade with everyone else. In effect, FR Yugoslavia's foreign trade displays a very irregular pattern, with massive redirecting of trade to specific 'friendly partners'.

So although Macedonia, Bulgaria and Republika Srpska can be expected to retain strong ties to FR Yugoslavia, it is clear that there is scope for a large-scale redirecting of FR Yugoslavia's trade.

In the region, Croatia is the first obvious choice. After all, these are neighbouring countries that share a virtually identical language.

Outside of the region, as will be shown in a subsequent table, there are also large potentials for trade with EU countries.

Russia (RU) and FR Yugoslavia (YU)

Importer	Exporter	Current flow (1999)	Base Estimate	Estimate with potential GDPs	With the CEFTA dummy
RU	YU	NA	26.355	40.342	112.015
YU	RU	274.294	36.278	52.488	145.740

The CEFTA dummy column in this case does not imply a scenario for a free-trade agreement between Russia and Yugoslavia. It is there as a benchmark.

Russian imports c.i.f. from FR Yugoslavia were unavailable for 1999. However, Yugoslav exports to Russia f.o.b. (as reported by Yugoslav sources) was 77.7 million USD in 1999 and had a peak of 183.1 million USD in 1997.

If those figures are not too far from the actual c.i.f. values on the Russian side, one can interpret them as being much higher than potential. Care should be taken with the figure for 1997, as that was a time when both GDPs were much higher: before the Russian crisis and before the NATO bombings.

In the other direction the flow of Russian goods into FR Yugoslavia were substantially larger even than the potential flow with the CEFTA dummy. Although there is scope for more potential if and when both Russia and FR Yugoslavia join the WTO, it is unrealistic to assume an agreement as strong as CEFTA between the two countries. On the contrary, reasonable future prospects point to FR Yugoslavia having more trade with the EU.

However the figures include oil and gas, so one should be cautious in interpreting potentials in the Russia-to-FRY direction. Russian exports are significantly above potential with most partners precisely because of this.

Bulgaria (BG), Russia (RU), Ukraine (UA)

Importer	Exporter	Current flow (1999)	Base Estimate	Estimate with potential GDPs	With the CEFTA dummy
BG	RU	1124.26	28.309	29.588	82.155
BG	UA	130.20	11.149	11.652	32.354
RU	BG	109.00	19.812	20.847	57.884
UA	BG	67.46	9.887	10.403	28.886

Trade links between Bulgaria and Russia and Ukraine are much higher than potential levels in both directions, although, again, Russian exports are specifically high. It seems old trade links die hard. However, one should bear in mind that Bulgaria imports almost as much from Germany as it does from Russia.

Bulgaria with EU3 – Germany (DE), Italy (IT), Austria (AT)

Importer	Exporter	Current flow (1999)	Base Estimate with the EU Association Agreement dummy	Estimate with potential GDPs and EA dummy	Estimate with potential GDPs and EU dummy
AT	BG	88.17	78.400	82.495	91.800
BG	AT	162.17	113.820	118.961	132.378
BG	DE	812.84	613.795	641.514	713.869
BG	IT	459.05	377.166	394.200	438.660
DE	BG	524.73	311.256	327.514	364.454
IT	BG	565.09	206.768	217.568	242.107

In the table above, the EU Association Agreement dummy is included in the Base Estimate.

Bulgaria has an association agreement with the EU and is doing its best to join. Flows between Bulgaria and the three frontline EU members are all close to or above potential. For the first four flows in the table, the differences are not significant.

Exports to Germany and Italy, especially to Italy, are high, however.

Romania (RO) with EU3 – Germany (DE), Italy (IT), Austria (AT)

Importer	Exporter	Current flow (1999)	Base Estimate with the EU Association Agreement dummy	Estimate with potential GDPs and EA dummy	Estimate with potential GDPs and EU dummy
DE	RO	1894.45	766.491	778.544	866.354
RO	DE	1778.40	1322.755	1340.794	1492.019
IT	RO	2064.46	443.732	450.710	501.544
RO	IT	2039.60	708.333	717.993	798.974
RO	AT	303.50	240.190	243.466	270.926
AT	RO	284.86	189.053	192.026	213.684

Flows between Romania and the EU3 are already above potential.

German imports from Romania are twice the potential level, and Italian imports from Romania are about four times the potential level. It seems Italy has a 'special relationship' with Romania in both directions. This can continue in the future (there are special relationships between OECD countries as well) as there is no specific evidence of Romania ignoring another potentially important partner.

One can expect, at most, these levels to grow along with GDP.

Romania and Bulgaria

Importer	Exporter	Current flow (1999)	Base Estimate	Estimate with potential GDPs	With the EU membership dummy	With the CEFTA dummy
BG	RO	71.66	32.794	34.811	68.803	96.659
RO	BG	54.90	28.698	30.607	60.493	84.986

Both flows are slightly below their potentials, as both countries are already members of CEFTA. The other potentials are there as benchmarks. As stated earlier, these figures are imports c.i.f. as reported by the importer country. In the particular case of Bulgaria importing from Romania, there is a large discrepancy with the export (f.o.b.) figure reported by Romania which is 136.6 million USD.

This would call for a very different interpretation.

Basing ourselves on the table as it is, however, one sees a potential for slightly more trade between the two countries. However the potential GDP scenario used in this paper fits the situation of former Yugoslav republics much more appropriately than it does Romania or Bulgaria. A scenario based on changes in productivity would yield higher potential GDPs and therefore higher trade potentials.

It is also interesting to note that the CEFTA potential is much higher than the EU potential. One could view future EU membership of both countries as a cause for redirecting of trade, with less trade between them. This is not certain, however. The EU dummy is the average effect for the 182 trade flows within the EU14 (Luxemburg is not in the sample), and there is room for substantial country-pair variations. (The UK and France significantly under-trade with each other, for example.)

Albanian trade with selected regional partners – Bulgaria, Macedonia, FRY, Turkey (TR)

Importer	Exporter	Current flow (1999)	Base Estimate	Estimate with potential GDPs	With the EU membership dummy	With the CEFTA dummy
AL	BG	26.545	5.333	7.096	14.026	19.704
BG	AL	0.033	4.559	6.246	12.345	17.343
AL	MK	17.881	2.694	5.203	10.284	14.448
MK	AL	3.1554	2.730	5.166	10.211	14.345
AL	YU	NA	6.083	11.776	23.274	32.698
YU	AL	NA	5.010	9.501	18.778	26.381
AL	TR	49.161	27.300	34.524	68.234	95.861
TR	AL	NA	16.332	21.408	42.312	59.443

The point is that the CEFTA effect is much stronger than the EU effect. Since all CEFTA members will be members of the EU at some stage, and given that all CEFTA members have Association Agreements with the EU, whose affects on trade are close in magnitude to actual membership, this means that the scope for trade diversion from intra-CEFTA to CEFTA-EU could be quite limited.

Unsurprisingly, data for trade between Albania and FR Yugoslavia is unavailable, and probably nil. With other countries of the region, Albania has very significant trade deficits. Albania does not have much to export for the moment. On the import side, flows are above potential, especially with Bulgaria and Macedonia. Imports from Turkey are a bit above potential.

Albanian trade with selected EU partners – EU3 and Greece (GR)

Importer	Exporter	Current flow (1999)	Base Estimate	Estimate with potential GDPs	With the EU Association dummy	With the EU membership dummy
AL	AT	16.21	29.535	37.350	66.338	73.820
AL	DE	50.454	166.556	210.630	374.104	416.298
AL	IT	341.454	177.349	224.279	398.346	443.275
AT	AL	2.391	17.392	22.797	40.490	45.056
DE	AL	22.377	72.206	94.645	168.101	187.060
IT	AL	168.798	83.118	108.949	193.506	215.331
AL	GR	249.32	35.577	44.992	79.911	88.924
GR	AL	38.0156	22.416	29.383	52.187	58.073

Italy and Greece are by far Albania's most important trade partners. Albania has large trade deficits with its main EU partners as well, although in relative terms its deficit with Italy is smaller than with other countries, making Italy by very far Albania's first export destination.

Flows with Italy are slightly above present potential but can be expected to increase with future developments. Flows with Austria and Germany are significantly lower than potential and should increase in the future.

Imports from Greece are larger than potential. This can be viewed as evidence of redirecting of trade since trade with FR Yugoslavia is non-existent and not so high with other regional partners. Exports to Greece are at a normal level, slightly above present potential.

Albania's trade is selectively focused on certain countries, mainly non-Balkan southern countries, firstly Italy, then Greece, and then Turkey. Albania is not integrated in southeast Europe and is especially cut off from Yugoslavia. For the moment, Albania looks south.

Macedonian trade with Bosnia, Croatia and Slovenia (SI)

Importer	Exporter	Current flow (1999)	Base Estimate	Estimate with potential GDPs	With the EU membership dummy	With the CEFTA dummy
BA	MK	21.307	1.691	5.456	10.784	15.150
MK	BA	8.8173	1.748	5.979	11.818	16.602
HR	MK	52.40	3.390	6.206	12.267	17.233
MK	HR	61.79	4.285	7.624	15.069	21.169
SI	MK	36.63	2.258	3.449	6.816	9.576
MK	SI	156.67	2.851	4.116	8.136	11.430

Macedonia trades above potential with most countries of the region. Macedonia has a trade agreement with Slovenia and Croatia which works very well. Trade with both these

countries is much higher even than potential with the CEFTA dummy. Trade with Bosnia is also surprisingly high, although especially for Macedonian exports to Bosnia.

Macedonia with EU3

Importer	Exporter	Current flow (1999)	Base Estimate	Estimate with potential GDPs	With the EU Association dummy	With the EU membership dummy
AT	MK	6.80	15.762	24.070	42.750	47.572
DE	MK	260.14	62.759	95.838	170.219	189.418
IT	MK	168.87	63.422	96.851	172.019	191.421
MK	AT	44.52	27.118	39.153	69.540	77.383
MK	DE	245.27	146.664	211.755	376.102	418.522
MK	IT	92.69	137.100	197.946	351.575	391.228

The most noticeable flow is German imports from Macedonia, which is much higher than potential, even than the potential with the EU membership dummy. Surprisingly, Austrian imports from Macedonia are, on the contrary, very low, lower even than the Base Estimate. An adjustment of both of these values should be expected. Italian imports from Macedonia are already high as well.

In the other direction, Macedonia imports below potential from Italy. Macedonian imports from Germany and Austria are a bit above present potential levels.

FR Yugoslavia with EU3

Importer	Exporter	Current flow (1999)	Base Estimate	Estimate with potential GDPs	With the EU Association dummy	With the EU membership dummy
AT	YU	169.397	151.158	231.382	410.962	457.313
YU	AT	113.856	211.409	305.867	543.256	604.528
DE	YU	383.938	375.181	574.302	1020.029	1135.075
YU	DE	404.831	712.747	1031.205	1831.543	2038.118
IT	YU	408.094	421.895	645.808	1147.032	1276.403
YU	IT	331.541	741.383	1072.635	1905.128	2120.003

There is significant potential for more trade between FR Yugoslavia and the EU3 countries. From the point of view of FR Yugoslavia's exports, present levels are in line with the Base Estimates. But potentials from the various scenarios point to much higher values.

Italy and Germany should become by very far FR Yugoslavia's most important partners, much more important than Russia and much more important than any regional partner.

Croatia and EU3

Importer	Exporter	Imports 1999	Base Estimate	Estimate with Potential GDPs	Estimate with potential GDPs and EA dummy	Estimate with potential GDPs and EU dummy
AT	HR	262.48	673.145	829.627	1473.517	1639.712
HR	AT	549.19	916.393	1098.584	1951.216	2171.289
DE	HR	685.41	790.700	974.510	1730.846	1926.064
HR	DE	1439.47	1462.132	1752.823	3113.224	3464.356
IT	HR	715.41	1067.696	1315.898	2337.193	2600.798
HR	IT	1234.24	1826.277	2189.366	3888.576	4327.158

There is also a high potential for trade between Croatia and the EU3. Current levels as well as the Trade between Austria and Croatia is far below the Base Estimate, so in relative terms there should be large gains there. There is also some unfulfilled potential for trade with Italy in the current situation.

Although trade with Germany should increase in the future, its relative importance should decrease in favour of Italy, Croatia's prime natural trade partner.

A model using GDP at PPP

In this section we look at estimation results when using GDP at PPP instead of at exchange rates. The point is to see how the dummy variables for certain groups of countries are affected. This model was estimated on pooled data for 1996 to 1999 for countries for which GDP at PPP was available. The year effect dummies were taken out as they were not significant.

GDPs at PPP were not available for all countries, most notably they were not available for Yugoslavia or for Bosnia, which is why interpretations are more difficult to make, and this model is therefore not directly comparable to the earlier one with GDP at exchange rates.

Apparently, the core seven countries display a positive distortion of trade, but that's without Yugoslavia or Bosnia. The East Balkans dummy only refers to trade between Bulgaria and Macedonia. The North-West Balkans dummy is not significant any more.

More interestingly though, the CIS dummy and the Bulgaria – CIS dummy are still significant but much lower in magnitude. GDP at PPP corrects for the under valuation of Russian and Ukrainian GDPs, and corrects for trade happening at non-international prices.

It would have been interesting to have trade and PPP data for Republika Srpska and FR Yugoslavia, since they probably conduct a substantial part of their trade at local prices.

The dummy for trade between Macedonia, Slovenia and Croatia is even higher than with the original model. This should be put in perspective since the original model also includes the North-West Balkans dummy which overlaps on trade between Croatia and Slovenia.

Dependent Variable: Aggregate imports c.i.f.

Variable	Coefficient	Std. Error	t-Statistic	Prob.	Dum. Effect
OVERALL INTERCEPT	3.573546	0.131368	27.20263	0.0000	*****
LOG(GDP-IMP-PPP)	0.896312	0.009631	93.06576	0.0000	*****
LOG(GDP-EXP-PPP)	1.00027	0.009661	103.5353	0.0000	*****
LOG(DISTANCE)	-1.154196	0.018023	-64.04026	0.0000	*****
ENGLISH LANGUAGE	0.583092	0.148519	3.926046	0.0001	1.79
Non-EU OECD	2.140523	0.103693	20.64286	0.0000	8.50
Non-EU OECD with EU	1.612721	0.046544	34.6494	0.0000	5.02
EU14	1.613317	0.041935	38.47169	0.0000	5.02
EU Association Agreements	0.536451	0.035264	15.21245	0.0000	1.71
CEFTA7	0.185628	0.074205	2.50156	0.0124	1.20
Czech Rep.-Slovakia	2.199867	0.314442	6.996095	0.0000	9.02
BALTIC States	2.989007	0.181858	16.43592	0.0000	19.87
BALTIC States – CIS	1.239048	0.127677	9.704526	0.0000	3.45
CIS	1.504648	0.308321	4.880142	0.0000	4.50
Bulgaria – CIS	0.985941	0.217923	4.524261	0.0000	2.68
Visegrad-4 – CIS	0.603044	0.111243	5.420973	0.0000	1.83
Slovenia-Croatia-Macedonia	2.97032	0.186216	15.95097	0.0000	19.50
Variable (followed)	Coefficient	Std. Error	t-Statistic	Prob.	Dum. Effect
East Balkans	1.581406	0.33955	4.657365	0.0000	4.86
Southeast Europe 7	-1.089992	0.144281	-7.554658	0.0000	0.34

R-squared	0.868372	Mean dependent var	5.518495
Adjusted R-squared	0.867832	S.D. dependent var	2.384123
S.E. of regression	0.866747	Akaike info criterion	2.55617
Sum squared resid	3291.231	Schwarz criterion	2.583761
Log likelihood	-5604.575	F-statistic	1605.682
Durbin-Watson stat	1.614571	Prob(F-statistic)	0

A model with transport time instead of distance

The data on total transport times is as follows: each country has a certain number of chosen important transport nodes. The matrix contains the transport time from each node to every other node. Each transport node can be considered as representing a region of the country it is in, with a corresponding share of the country's GDP. Therefore, one can aggregate the transport times by computing a two-way weighted sum of transport times.

For instance, say country A has 2 nodes, A_1 and A_2, and say country B has 2 nodes, B_1 and B_2, and say that the respective GDP shares are a_1, a_2, b_1 and b_2, whereas the transport times from A to B are respectively $T_{A1,B1}$ (for goods transported from A_1 to B_1), $T_{A1,B2}$, $T_{A2,B1}$ and $T_{A2,B2}$. Then the aggregate transport time from A to B will be computed as:

$$\text{Aggregate Transport Time (A,B)} = a_1 T_{A1,B1} b_1 + a_1 T_{A1,B2} b_2 + a_2 T_{A2,B1} b_1 + a_2 T_{A2,B2} b_2$$

One should bear in mind that transport times are not necessarily the same depending on the direction of the flow, i.e. the aggregate time from A to B may defer from the aggregate time from B to A, since the individual transport time from a given node X to another given node Y may be different from the individual transport time from node Y to node X.

The data available covers all the countries of central and Eastern Europe except Moldova and the Baltic States. Turkey, Germany, Italy and Austria are also included. The complete list of nodes, together with the shares in national GDP attributed to each node, is given in the appendix.

Individual *travel times* between nodes include a 15% allowance for stops of various kinds (petrol and so on) and also depend on estimated congestion and road infrastructure quality, in particular the number of lanes and their condition. Transport times between nodes are equal to travel time plus border waiting times.

The table below presents two versions of the Baseline model estimated on a 1999 cross-section, the first one with distance and the second with aggregated transport times.

Dependent Variable: Aggregate imports c.i.f. **Distance Used**

Variable	Coefficient	Std. Error	t-Statistic	Prob.
INTERCEPT	6.576763	0.681848	9.645499	0.0000
LOG(GDP of Importer)	0.792092	0.037846	20.92935	0.0000
LOG(GDP of Exporter)	1.013014	0.038458	26.34074	0.0000
LOG(DISTANCE)	-1.296578	0.109228	-11.87041	0.0000

R-squared	0.735523	Mean dependent var	4.67653
Adjusted R-squared	0.733269	S.D. dependent var	2.385452
S.E. of regression	1.231992	Akaike info criterion	3.266314
Sum squared resid	534.267	Schwarz criterion	3.309852
Log likelihood	-577.4039	F-statistic	326.3088
Durbin-Watson stat	2.097236	Prob(F-statistic)	0.0000

Since the sample, the dependent variable and the number of variables are identical from one estimation to the next, one can compare the R-squareds directly. The improvement in

goodness-of-fit is tiny. In fact, modifying the sample slightly could turn the result the other way, so in a way the results are a bit disappointing.

Dependent Variable: Aggregate imports c.i.f. **Transport Time Used**

Variable	Coefficient	Std. Error	t-Statistic	Prob.
INTERCEPT	8.215693	0.807441	10.17498	0.0000
LOG(GDP of Importer)	0.642042	0.035922	17.87311	0.0000
LOG(GDP of Exporter)	0.865479	0.036378	23.79102	0.0000
LOG(Transport Time)	-1.206307	0.100736	-11.97489	0.0000

R-squared	0.736853	Mean dependent var	4.67653
Adjusted R-squared	0.73461	S.D. dependent var	2.385452
S.E. of regression	1.22889	Akaike info criterion	3.261272
Sum squared resid	531.5802	Schwarz criterion	3.304811
Log likelihood	-576.5065	F-statistic	328.5512
Durbin-Watson stat	2.024136	Prob(F-statistic)	0.0000

Weighted Transport time performs better for some flows (Austria-Slovakia is a good example) but distance is more appropriate for certain other flows.

The first conclusion is that distance may, after all, be a rather good indicator of trade impediments. It captures more complex phenomena than it would seem at first glance.

The second conclusion is that transport time is also a good indicator. One should note that only transport time was taken into account, not actual transport cost, so further improvements are conceivable.

The second phase in using this data is to simulate EU membership by replacing transport time with travel time, i.e. by taking away border waiting times, since this is the main effect that EU membership would have on the transport of goods. This is done by estimating flows using the model with transport times while replacing transport times with travel times.

Methodologically speaking, the underlying assumption is that the model's parameters would not change under these circumstances. Economically speaking, in the strict sense, one assumes that a reduction in transport time would cause an increase in bilateral trade, furthermore always with the same ratio in relative terms, since the gravity model's specification imposes constant partial elasticities. In a wider sense, however, one need not view transport time itself as the sole cause for changes in trade levels. Rather, one can view transport time also as a consequence of other events, such as EU membership: it is not only due to a shortened transport time that two countries will trade more, but also because of all the other economic, political and institutional improvements that common

EU membership would bring. To simulate flows by reducing transport times in the model is to proxy for an array of other changes that are not necessarily linked to transport issues.

Another aspect to bear in mind is that the model with transport time presents a larger difference between the impact of the exporter's Log(GDP) and the importer's Log(GDP), thus giving estimates that are further apart depending on the direction of the flow. This is due to the fact that the reduced sample for the transport time model contains mainly large countries with trade surpluses with their smaller partners, e.g. Germany, Italy and Russia with most other countries of the sample, whereas the larger sample for the main model also had countries such as the USA which generally import more from transition economies than they export to them.

Below are tables displaying a small selection of flows alongside their estimates from the transport time model. The full table is in the annex, together with the estimates from the main model. As a first example, here are the estimated flows for Bulgaria with the EU3.

Importer	Exporter	Current flow (1999)	Flow estimate with border waiting times	Flow estimate without border waiting times	Estimate from main model with EU dummy
AT	BG	88.166	64.020	155.737	91.8
BG	AT	162.165	120.098	292.474	132.378
IT	BG	565.091	169.079	358.659	242.107
BG	IT	459.050	462.526	990.793	438.66
DE	BG	524.731	232.451	466.203	364.454
BG	DE	812.840	720.883	1469.294	713.869

The estimated potentials based on the disappearance of border waiting times are substantially higher than those estimated with the classical model.

Bulgaria's geographical location means that total border waiting times are large so removing them has a substantial impact on the estimated flow. Average aggregated transport time between Bulgaria and Germany is 3574 minutes (59hrs 34min) of which 1580 minutes (26hrs 20 min) are border waiting time.

Flows between FR Yugoslavia and the EU3

Importer	Exporter	Current flow (1999)	Flow estimate with border waiting times	Flow estimate without border waiting times	Estimate from main model with EU dummy
AT	YU	169.397	217.795	322.682	457.313
YU	AT	113.856	409.262	569.097	604.528
DE	YU	383.938	650.867	827.393	1135.075
YU	DE	404.831	1930.649	2448.571	2038.118
IT	YU	408.094	508.264	674.316	1276.403
YU	IT	331.541	1318.215	1748.881	2120.003

In this case, estimated flows from the main model with the EU dummy are generally higher. In part, this is due to the effect of the potential GDP used in the main model.

Regarding the estimates compared to the current flows, the model with transport times does not contain all the dummies present in the main model, thereby generating a much higher base.

As for the general interpretation, it is much the same as when the main model was used: there are large potentials if FR Yugoslavia integrates with the EU.

Flows between FR Yugoslavia, Croatia and Bosnia-Herzegovina

Importer	Exporter	Current flow (1999)	Flow estimate with border waiting times	Flow estimate without border waiting times	Estimate from main model with EU dummy
BA	HR	595.122	58.606	70.119	73.56
BA	YU	304.128 (f.o.b.)	39.205	64.479	124.973
HR	BA	115.900	41.855	50.099	65.622
HR	YU	24.068	84.886	121.406	84.462
YU	BA	187.785	29.226	48.067	111.296
YU	HR	18.870	88.848	127.073	84.317

The interpretations are the same as with the main model: there is very strong overtrade between Bosnia-Herzegovina and both Croatia and FR Yugoslavia, whereas trade flow levels between Croatia and FR Yugoslavia are low but would increase dramatically in case of common integration.

Conclusions

Gravity models contribute to the analysis of potential trade levels by giving a simple and clear benchmark based on economic size and geographical distance. In two smaller sections, this paper experimented with alternatives to the usual GDP and distance. Both attempts yielded interesting results, but neither of them clearly outperformed the more classical set of variables. The classical gravity model can certainly be improved, but there are too many country-pair specific factors for there to be an easy breakthrough.

The flows discussed in this paper are interesting in that many of them differ quite significantly from what a gravity model would predict. On the one hand, this points to the limited capacity of gravity models for forecasting of trade flow levels, but on the other hand, some of these large deviations clearly constitute important information: some trade levels in southeast Europe are unnaturally high or unnaturally low. This comes as no surprise from a region that has experienced several military conflicts in recent years, but it also

means that, if one is to believe that reintegration is possible, the scope for change both in levels and in the country-to-country distributions of these levels is very high.

For many purposes, it still makes sense to consider the region as three groups, one being the former Yugoslavia, the second Albania and the third Romania and Bulgaria. Romania and Bulgaria were not involved in any of the conflicts in the region. They each have an EU association agreement, and they both trade at or above potential levels with the frontline EU countries.

Albania is the least integrated country of the region, and it is doubtful whether it will ever really be part of the region in an economic sense.

As for the countries of the former Yugoslavia, a combination of low GDP, high unemployment and past (or present in the case of Macedonia) military conflicts has caused trade levels to be highly distorted. Croatia and FR Yugoslavia trade little with each other, but they both trade massively with their corresponding entity in Bosnia. Simultaneously, they both have large future trade potentials with the EU.

In 1999, Macedonia traded at high levels with everyone in the region. Through its agreement with Slovenia and Croatia on the one hand, and through still strong links with Yugoslavia, it has acted almost as the region's pivotal partner. Recent events, unfortunately, may change this.

From a gravity model point of view, however, it is really FR Yugoslavia that should have this role. FR Yugoslavia borders with all other six countries, has an access to the sea, and has a border with Hungary, one of central Europe's most successful economies and EU-member-to-be.

Future political developments in the region could enable Yugoslavia to find its pivotal role again. For example, FR Yugoslavia and Bosnia-Herzegovina are the only countries in Europe with which a TIR operation (road transport within the framework of the TIR system) cannot be established. Changing this, together with WTO membership and some agreement with the EU should help FR Yugoslavia re-integrate with its region. Also, many people in western countries would like to see the countries of the region form some kind of free-trade area. The agreement between Macedonia, Croatia and Slovenia has shown that this might be possible.

However there is a risk that the countries of the former Yugoslavia redirect massively to the EU and end up being a set of small peripheral economies that are next to each other, rather than integrated with one another. As was shown, the future potential levels of trade between, say, Croatia and FR Yugoslavia are much smaller than the levels either of them

would have with Germany or Italy. This implies that regional integration would need to go beyond just a free-trade zone to enable FR Yugoslavia to play its full part in the region.

For FR Yugoslavia to be pivotal, in other words, as some people put it, to be the region's Germany, it needs to have a much higher GDP, and it needs to be embedded in a strongly integrated southeast Europe. For the moment, it only has the geographical location. This is also a reason why the SEE-7 countries do not constitute a region today.

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Special thanks to

Dr Jarko Fidrmuc, for providing data, advice and feedback at various stages of the project.

Dr Reinhold Deussner, of the ÖIR (Österreichisches Institut für Raumplanung) for the transport time data and back-up comments.

Ms Margit Pointner-Prager, of WIIW's Statistics Department for making the data exchange with the ÖIR possible.

All the staff of WIIW and all the participants of the June 2001 Workshop on Regionalism in Southeast Europe for their comments and feedback.

A N N E X

Full table of flows and potential flows for 1999

This is the full table of (available) flows with and within Southeast Europe. All flows are in millions of US dollars. Potential GDPs are used for the seven countries of the region where indicated.

Importer	Exporter	Imports (1999)	Base Estimate	Estimate with Potential GDPs	Estimate with Potential GDPs and EA dummy	Estimate with Potential GDPs and EU dummy	Estimate with Potential GDPs and CEFTA dummy	Estimate without border waiting times
AL	AT	16.21	29.535	37.350	66.338	73.820	103.708	59.738
AL	BG	26.545	5.333	7.096	12.604	14.026	19.704	9.266
AL	DE	50.454	166.556	210.630	374.104	416.298	584.847	310.177
AL	GR	249.32	35.577	44.992	79.911	88.924	124.927	80.996
AL	HR	8.396	4.246	6.617	11.753	13.079	18.374	12.893
AL	HU	8.599	9.270	11.723	20.822	23.170	32.551	20.354
AL	IT	341.454	177.349	224.279	398.346	443.275	622.746	254.786
AL	MK	17.881	2.694	5.203	9.242	10.284	14.448	9.065
AL	RO	6.202	7.153	9.187	16.317	18.157	25.509	14.471
AL	SI	15.833	3.430	4.337	7.704	8.573	12.043	9.876
AL	TR	49.161	27.300	34.524	61.318	68.234	95.861	48.423
AT	AL	2.391	17.392	22.797	40.490	45.056	63.299	18.587
AT	BA	30.9655	8.669	20.537	36.477	40.591	57.025	106.224
AT	BG	88.17	44.141	46.447	82.495	91.800	128.967	155.737
AT	HR	262.48	673.145	829.627	1473.517	1639.712	2303.591	698.362
AT	MK	6.80	15.762	24.070	42.750	47.572	66.833	52.902
AT	YU	169.397	151.158	231.382	410.962	457.313	642.468	322.682
BA	AT	157.106	14.424	30.485	54.145	60.252	84.646	251.204
BA	BG	9.343	4.059	9.027	16.034	17.842	25.066	20.531
BA	DE	376.581	282.593	597.235	1060.760	1180.400	1658.316	1099.240
BA	GR	14.515	20.247	42.790	76.000	84.572	118.813	105.960
BA	HR	595.122	14.289	37.218	66.104	73.560	103.342	70.119
BA	IT	323.504	279.155	589.969	1047.855	1166.040	1638.142	844.710
BA	MK	21.307	1.691	5.456	9.691	10.784	15.150	8.187
BA	RO	12.32	7.483	16.063	28.530	31.748	44.602	42.876
BA	RU	15.843	10.258	21.678	38.503	42.846	60.193	51.148
BA	SI	397.908	8.451	17.860	31.722	35.300	49.592	48.080
BG	AL	0.033	4.559	6.246	11.093	12.345	17.343	5.417
BG	AT	162.17	64.084	66.978	118.961	132.378	185.975	292.474
BG	DE	812.84	345.582	361.189	641.514	713.869	1002.897	1469.294
BG	GR	307.50	48.257	50.436	89.581	99.684	140.044	324.713
BG	HR	2.26	18.206	23.452	41.653	46.351	65.118	52.259
BG	HU	49.39	21.633	22.609	40.157	44.686	62.779	111.823
BG	IT	459.05	212.354	221.944	394.200	438.660	616.263	990.793

Importer	Exporter	Imports (1999)	Base Estimate	Estimate with Potential GDPs	Estimate with Potential GDPs and EA dummy	Estimate with Potential GDPs and EU dummy	Estimate with Potential GDPs and CEFTA dummy	Estimate without border waiting times
BG	MK	24.61	14.431	23.033	40.909	45.523	63.954	23.153
BG	RO	71.66	32.794	34.811	61.829	68.803	96.659	142.163
BG	RU	1124.26	28.309	29.588	52.551	58.478	82.155	117.410
BG	SI	22.71	7.409	7.743	13.753	15.305	21.501	44.013
BG	TR	164.78	82.595	86.326	153.325	170.618	239.697	432.226
BG	UA	130.20	11.149	11.652	20.696	23.030	32.354	48.571
BG	YU	176.946	19.394	31.028	55.109	61.325	86.154	84.577
DE	AL	22.377	72.206	94.645	168.101	187.060	262.797	57.539
DE	BA	104.556	125.027	296.212	526.109	585.447	822.481	277.233
DE	BG	524.73	175.245	184.399	327.514	364.454	512.012	466.203
DE	HR	685.41	790.700	974.510	1730.846	1926.064	2705.880	1467.986
DE	MK	260.14	62.759	95.838	170.219	189.418	266.109	156.620
DE	RO	1894.45	431.582	438.340	778.544	866.354	1217.119	1279.779
DE	YU	383.938	375.181	574.302	1020.029	1135.075	1594.640	827.393
GR	AL	38.0156	22.416	29.383	52.187	58.073	81.586	28.272
GR	BA	3.4695	13.019	30.845	54.784	60.963	85.645	50.271
GR	BG	348.79	35.566	37.424	66.469	73.966	103.913	194.092
GR	HR	30.04	41.767	51.477	91.429	101.741	142.933	163.900
GR	RO	208.10	58.575	59.492	105.666	117.584	165.190	273.782
GR	YU	116.573	55.709	85.275	151.459	168.541	236.780	222.959
HR	AL	0.38	3.404	5.348	9.499	10.570	14.850	6.762
HR	AT	549.19	916.393	1098.584	1951.216	2171.289	3050.392	1178.439
HR	BA	115.9	11.690	33.202	58.971	65.622	92.191	50.099
HR	BG	8.48	17.072	21.535	38.249	42.564	59.796	46.875
HR	DE	1439.47	1462.132	1752.823	3113.224	3464.356	4866.991	4152.681
HR	GR	17.54	53.141	63.706	113.150	125.912	176.890	246.108
HR	HU	174.50	104.240	124.964	221.951	246.984	346.982	351.940
HR	IT	1234.24	1826.277	2189.366	3888.576	4327.158	6079.121	3536.920
HR	MK	52.40	3.390	6.206	11.023	12.267	17.233	17.533
HR	RO	12.79	20.618	25.104	44.587	49.616	69.704	101.872
HR	RU	668.07	36.097	43.274	76.859	85.528	120.157	143.674
HR	SI	616.10	127.743	153.139	271.994	302.671	425.216	314.387
HR	TR	29.67	57.359	68.763	122.131	135.906	190.931	263.065
HR	UA	25.00	11.377	13.638	24.224	26.956	37.869	49.923
HR	YU	24.070	23.288	42.734	75.901	84.462	118.658	121.406
HU	AL	0.131	6.624	8.682	15.420	17.160	24.107	8.788
HU	BA	2.779	17.214	40.783	72.435	80.605	113.240	53.824
HU	BG	33.36	18.080	19.024	33.789	37.600	52.824	82.571
HU	HR	39.80	92.908	114.506	203.376	226.314	317.943	289.719
HU	MK	3.07	6.976	10.652	18.920	21.054	29.578	27.758

Importer	Exporter	Imports (1999)	Base Estimate	Estimate with Potential GDPs	Estimate with Potential GDPs and EA dummy	Estimate with Potential GDPs and EU dummy	Estimate with Potential GDPs and CEFTA dummy	Estimate without border waiting times
HU	RO	234.48	41.869	42.524	75.528	84.047	118.075	262.089
IT	AL	168.798	83.118	108.949	193.506	215.331	302.513	53.926
IT	BA	179.723	133.519	316.332	561.844	625.213	878.346	243.201
IT	BG	565.09	116.416	122.496	217.568	242.107	340.131	358.659
IT	HR	715.41	1067.696	1315.898	2337.193	2600.798	3653.799	1427.381
IT	MK	168.87	63.422	96.851	172.019	191.421	268.922	127.827
IT	RO	2064.46	249.849	253.761	450.710	501.544	704.607	831.498
IT	YU	408.094	421.895	645.808	1147.032	1276.403	1793.187	674.316
MK	AL	3.1554	2.730	5.166	9.176	10.211	14.345	7.062
MK	AT	44.52	27.118	39.153	69.540	77.383	108.714	132.383
MK	BA	8.8173	1.748	5.979	10.620	11.818	16.602	8.662
MK	BG	91.32	17.102	25.982	46.147	51.351	72.142	30.851
MK	DE	245.27	146.664	211.755	376.102	418.522	587.971	657.726
MK	GR	163.97	32.666	47.163	83.768	93.216	130.956	236.801
MK	HR	61.79	4.285	7.624	13.541	15.069	21.169	26.045
MK	HU	20.02	9.891	14.281	25.364	28.225	39.652	50.092
MK	IT	92.69	137.100	197.946	351.575	391.228	549.627	470.530
MK	RO	9.08	10.231	15.002	26.646	29.651	41.656	38.424
MK	RU	91.38	8.489	12.256	21.769	24.224	34.032	42.235
MK	SI	156.67	2.851	4.116	7.311	8.136	11.430	20.407
MK	TR	53.50	25.378	36.641	65.079	72.419	101.739	127.705
MK	UA	114.79	3.155	4.555	8.090	9.003	12.648	16.229
MK	YU	181.883	6.607	14.603	25.937	28.862	40.547	50.078
RO	AT	303.50	135.242	137.077	243.466	270.926	380.617	661.390
RO	BG	54.90	28.698	30.607	54.362	60.493	84.986	113.463
RO	DE	1778.40	744.795	754.901	1340.794	1492.019	2096.101	3219.103
RO	GR	198.50	69.551	70.495	125.208	139.330	195.741	365.723
RO	HR	5.70	19.241	24.036	42.691	47.506	66.740	90.643
RO	HU	412.00	43.840	44.435	78.921	87.823	123.380	283.284
RO	IT	2039.60	398.836	404.248	717.993	798.974	1122.459	1833.279
RO	MK	3.10	7.555	11.693	20.769	23.111	32.468	23.015
RO	RU	702.30	86.679	87.855	156.042	173.641	243.945	265.421
RO	SI	46.50	14.958	15.161	26.928	29.965	42.098	80.365
RO	TR	236.80	153.577	155.661	276.472	307.655	432.217	493.499
RO	UA	106.40	43.289	43.876	77.929	86.719	121.829	126.079
RU	BA	5.0905	6.263	14.838	26.355	29.327	41.201	22.087
RU	BG	109.00	19.812	20.847	37.026	41.202	57.884	64.221
RU	HR	91.20	26.940	33.203	58.972	65.624	92.193	87.612
RU	MK	18.18	5.013	7.655	13.597	15.130	21.256	17.337
RU	RO	47.80	69.318	70.403	125.045	139.148	195.486	181.662

Importer	Exporter	Imports (1999)	Base Estimate	Estimate with Potential GDPs	Estimate with Potential GDPs and EA dummy	Estimate with Potential GDPs and EU dummy	Estimate with Potential GDPs and CEFTA dummy	Estimate without border waiting times
SI	AL	1.8159	2.752	3.608	6.408	7.131	10.018	5.189
SI	BA	54.2176	6.921	16.398	29.125	32.410	45.532	34.405
SI	BG	50.06	6.955	7.318	12.998	14.464	20.320	39.551
SI	HR	443.98	127.881	157.609	279.932	311.505	437.626	314.963
SI	MK	36.63	2.258	3.449	6.126	6.816	9.576	13.762
SI	RO	45.67	16.046	16.297	28.945	32.210	45.251	90.486
TR	BG	295.57	57.801	60.820	108.023	120.207	168.876	236.399
TR	RO	401.16	122.810	124.733	221.541	246.528	346.341	338.185
UA	BG	67.46	9.887	10.403	18.477	20.561	28.886	39.634
UA	HR	8.30	10.759	13.260	23.552	26.208	36.819	45.418
UA	MK	1.56	2.361	3.605	6.403	7.125	10.010	9.939
UA	RO	52.35	43.867	44.554	79.132	88.058	123.710	128.894
YU	AT	113.856	211.409	305.867	543.256	604.528	849.287	569.097
YU	BA	187.785	16.428	56.311	100.016	111.296	156.357	48.067
YU	BG	151.595	18.684	28.443	50.519	56.217	78.977	79.405
YU	DE	404.831	712.747	1031.205	1831.543	2038.118	2863.302	2448.571
YU	GR	146.946	72.818	105.353	187.119	208.223	292.528	350.265
YU	HR	18.870	23.925	42.661	75.771	84.317	118.454	127.073
YU	HU	101.823	101.507	146.860	260.842	290.261	407.781	251.453
YU	IT	331.541	741.383	1072.635	1905.128	2120.003	2978.341	1748.881
YU	MK	122.425	5.371	11.867	21.077	23.455	32.951	35.284
YU	RO	108.569	41.504	60.989	108.323	120.541	169.345	137.978
YU	RU	274.294	36.278	52.488	93.224	103.739	145.740	127.977
YU	SI	23.820	18.276	26.442	46.964	52.261	73.420	94.802
YU	TR	59.708	69.366	100.359	178.250	198.355	278.664	328.794

Country codes are: AL=Albania, AT=Austria, BA=Bosnia-Herzegovina, BG=Bulgaria, DE=Germany, GR=Greece, HR=Croatia, HU=Hungary, IT=Italy, MK=Macedonia, RO=Romania, RU=Russia, SI=Slovenia, TR=Turkey, UA=Ukraine, YU=FR Yugoslavia.

Cross-section estimation for 1999, SEE dummy variables not included

The estimated model below is the one used in the 'Future Prospects for Trade' section. The underlying idea is to have a model which contains estimations for all distortion effects except those that affect Southeast Europe.

Dependent Variable: Aggregate imports c.i.f. in millions of USD

Variable	Coefficient	Std. Error	t-Statistic	Prob.	Dummy Effect
INTERCEPT	5.513635	0.271051	20.34172	0.0000	
LOG(GDP of Importer)	0.865738	0.019488	44.42419	0.0000	*****
LOG(GDP of Exporter)	0.997911	0.019525	51.11029	0.0000	*****
LOG(DISTANCE)	-1.275107	0.040463	-31.51256	0.0000	*****
ENGLISH LANGUAGE	0.912033	0.360666	2.528747	0.0116	2.49
Non-EU OECD	1.172918	0.254893	4.601617	0.0000	3.23
Non-EU OECD with EU	0.681494	0.118983	5.727637	0.0000	1.98
EU14	0.681299	0.107962	6.310561	0.0000	1.98
EU Association Agreements	0.574431	0.080628	7.124483	0.0000	1.78
CEFTA7	1.021248	0.175322	5.824981	0.0000	2.78
Visegrad-4 – CIS	1.567151	0.219726	7.132303	0.0000	4.79
CIS	3.251591	0.433814	7.495364	0.0000	25.83
BALTIC States	3.24397	0.437525	7.414361	0.0000	25.64
BALTIC States – CIS	2.270264	0.255149	8.897813	0.0000	9.68
Austria – Slovakia	-1.903502	0.757331	-2.513435	0.0121	0.15
Czech Republic – Slovakia	1.878192	0.763623	2.459579	0.0140	6.54

R-squared	0.833755	Mean dependent var	5.109244
Adjusted R-squared	0.831817	S.D. dependent var	2.567727
S.E. of regression	1.053027	Akaike info criterion	2.953417
Sum squared resid	1427.109	Schwarz criterion	3.016931
Log likelihood	-1908.151	F-statistic	430.3058
Durbin-Watson stat	1.585891	Prob(F-statistic)	0

The evolution of the SEE-7 effect

The clearest and least controversial way of showing the SEE-7 effect's downturn is to estimate the baseline gravity model (with only GDPs and distance) with only the SEE-7 dummy variable on cross-section data, separately for the years 1996 to 1999 and to look at the evolution in the parameter estimate and its t-statistic.

Cross-section regression on 1996 data

Variable	Coefficient	Std. Error	t-Statistic	Prob.
INTERCEPT	6.021508	0.272907	22.0643	0.0000
LOG(GDP of importer)	0.905998	0.017287	52.40965	0.0000
LOG(GDP of exporter)	1.057857	0.017335	61.02359	0.0000
LOG(DISTANCE)	-1.370067	0.040449	-33.87146	0.0000
SEE-7 Dummy	0.895068	0.2219	4.033657	0.0001

Cross-section regression on 1997 data

Variable	Coefficient	Std. Error	t-Statistic	Prob.
INTERCEPT	6.268236	0.269312	23.27499	0.0000
LOG(GDP of importer)	0.931933	0.017299	53.87294	0.0000
LOG(GDP of exporter)	1.060305	0.017363	61.06694	0.0000
LOG(DISTANCE)	-1.406385	0.040086	-35.08377	0.0000
SEE-7 Dummy	0.786715	0.218989	3.592489	0.0003

Cross-section regression on 1998 data

Variable	Coefficient	Std. Error	t-Statistic	Prob.
INTERCEPT	6.262779	0.276976	22.61125	0.0000
LOG(GDP of importer)	0.916918	0.018119	50.6055	0.0000
LOG(GDP of exporter)	1.057186	0.018182	58.14331	0.0000
LOG(DISTANCE)	-1.390566	0.041213	-33.7412	0.0000
SEE-7 Dummy	0.395531	0.225174	1.756562	0.0792

Cross-section regression on 1999 data

Variable	Coefficient	Std. Error	t-Statistic	Prob.
INTERCEPT	6.345941	0.276102	22.98403	0.0000
LOG(GDP of importer)	0.917771	0.01799	51.01579	0.0000
LOG(GDP of exporter)	1.04712	0.01806	57.98049	0.0000
LOG(DISTANCE)	-1.39374	0.041274	-33.76804	0.0000
SEE-7 Dummy	0.376603	0.224154	1.680105	0.0932

The SEE-7 dummy variable loses its significance at the 5% level already in 1998, and is even less significantly different from zero in 1999. There used to be an overall regional effect, meaning a significant average positive distortion in favour of trade within the region compared to trade between the other countries in the sample, but in 1998 and 1999, this was no longer the case.

This result is more striking than it seems: even if the countries of the region had no specific links with each other, they should display a significant positive distortion because of the multiple common land borders they share.

Transport nodes and corresponding shares of national GDP

Country	Transport Node	Share in GDP	Country	Transport Node	Share in GDP
DE	Berlin	0.16	MK	Skopje	0.50
DE	Hamburg	0.07	MK	Tetovo	0.20
DE	Braunschweig	0.10	MK	Bitola	0.30
DE	Köln	0.17	GR	Athens	0.50
DE	Frankfurt	0.19	GR	Ioannina	0.10
DE	Stuttgart	0.14	GR	Thessaloniki	0.20
DE	Nürnberg	0.05	GR	Larissa	0.10
DE	Regensburg	0.03	GR	Alexandroupoli	0.10
DE	München	0.09	RO	Cluj	0.12
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AT	Villach	0.05	RO	Timisoara	0.08
AT	Linz	0.16	RO	Orsova	0.05
AT	Wien	0.39	RO	Craijova	0.04
AT	St. Pölten	0.07	RO	Giurgiu	0.02
AT	Eisenstadt	0.02	RO	Sibiu	0.07
AT	Graz	0.12	RO	Brasov	0.09
AT	Salzburg	0.06	RO	Bucharest	0.23
AT	Bregenz	0.04	RO	Cernavoda	0.03
Country	**Transport Node**	**Share in GDP**	**Country**	**Transport Node**	**Share in GDP**
CZ	Praha	0.66	RO	Constanta	0.04
CZ	Brno	0.34	RO	Galati	0.06
SK	Bratislava	0.46	RO	Lasi	0.12
SK	Zilina	0.32	BG	Vidin	0.07
SK	Kosice	0.22	BG	Sofia	0.41
HU	Györ	0.08	BG	Pleven	0.06
HU	Budapest	0.40	BG	Plovdiv	0.09
HU	Szombahtely	0.05	BG	Russe	0.08
HU	Szekesfehervar	0.08	BG	Stara Zagora	0.06
HU	Debrecen	0.07	BG	Varna	0.11
HU	Pecs	0.05	BG	Burgas	0.12
HU	Dunaújvaros	0.04	UA	Lvov	0.20
HU	Miskolc	0.08	UA	Kyiv	0.30
HU	Szeged	0.10	UA	Uzhorod	0.05
HU	Nagykaniza	0.05	UA	Odessa	0.15
SI	Ljubljana	0.72	UA	Dnepropetrovsk	0.30
SI	Maribor	0.28	RU	Moskva	0.80
HR	Rijeka	0.06	RU	Novorossijsk	0.20
HR	Split	0.19	TR	Istanbul	0.60
HR	Zagreb	0.48	TR	Izmir	0.40
HR	Slavonski Brod	0.14	IT	Roma	0.40
HR	Osijek	0.13	IT	Milano	0.40
BA	Sarajevo	0.40	IT	Venezia	0.20
BA	Banja Luka	0.25	PL	Warszawa	0.25
BA	Tuzla	0.20	PL	Krakow	0.15
BA	Mostar	0.15	PL	Katowice	0.15
YU	Novisad	0.18	PL	Wroclaw	0.15
YU	Beograd	0.40	PL	Poznan	0.15
YU	Podgorica	0.08	PL	Gdansk	0.15
YU	Kraljevo	0.10	AL	Tirana	0.75
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