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The Huddle/Tangle Hypothesis of Regional Integration: The Case of the European Union and Its Enlargement

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Abstract
Regional integration can be a process that resembles that of a huddle/tangle. Some countries might be more prone or keen or able to integrate than others; however there is no guarantee that this process will be smooth through time. On the contrary, integrating countries seem to hover and spin around some main stronger economically countries and form a tangle. Was there a pattern of integration for the various stages of new countries joining the EU? Was the initial momentum created by the founding countries a situation that has never changed during the last 40 years or so? Is there any tendency for sub-integration, especially for some specific groups of countries? This paper focuses on national exports as a tool of evidence that joining the EU is not a solution to long term economic growth unless a strategy is adopted to counteract the inherent tendencies of the huddle/tangle process. Various methods will be used to bring this evidence forward and answer the questions above.

Key words: regional integration, exports, core, clusters

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1 Introduction

Europe is a much diversified region from several points of view, such as cultural, historical, and political. From an economic perspective, the European Union (EU) of 25 nations is also diversified in terms of GDP, foreign trade, standard of living and so on. Since World War II, as a consequence of the split between West and East, and as a consequence of the reconstruction of Western Europe we can notice the following tendencies in the EU. First, Germany (together with Belgium and Netherlands) has emerged as the pivotal country around which European development[1] takes place. Second, Germany constitutes the economic centre of Europe from a gravitational or geographic point of view. Third, east and west, or north and south still exist in Europe and the road is long for real economic (and political or social) integration.

[1] As we will remark further below, Germany and its immediate western neighbours have been an important centre of economic development since the Middle Ages.

These tendencies will form the main thesis of this paper. Some evidence will be provided here, however more research is needed to confirm the reached conclusions. A simple remark will provide preliminary confirmation. Germany is surrounded by the largest number of countries along its boundaries (land or sea), has the biggest population, and its neighbours collectively have the largest population. Table 1 shows the names and number of neighbours for each European country shown; as can be seen, Germany stands out in this comparison.

Table 1 The neighbours for some European countries

	Country	**Population In millions**	**Neighbours: names**	**Neighbours: number**	**Land, sea, distances**
1	Portugal	10	Spain, Morocco, USA, Canada	4 total, 1 European	Sea, 1 land
2	Spain	40.5	Portugal, France, Morocco, Algeria, Italy	5 total, 3 European	2 land, 3 sea
3	France	61	Spain, UK, Belgium, Germany, Switzerland, Italy, Algeria, Tunisia	8 total, 6 European	5 land, 3 sea
4	Ireland	4.1	USA, Canada, UK, France	4 total, 2 European	4 sea
5	UK	60.5	Ireland, France, Belgium, Netherlands, Norway, Denmark, Germany, USA, Canada	9 total, 7 European	9 sea
6	Belgium	10.5	Netherlands, Germany, France, UK	4 total	3 land, 1 sea
7	Netherlands	16.5	Denmark, Germany, Belgium, UK	4 total	2 land, 2 sea
8	Germany	82.4	France, UK, Belgium, Netherlands, Denmark, Sweden, Poland, Czech Republic, Austria, Switzerland, Italy (despite the narrow Austrian land in between)	11 total, all European	Almost all land immediate neighbours
9	Switzerland	7.5	France, Germany, Austria, Italy	4 total, all European	4 land
10	Italy	58.1	France, Switzerland, Austria, Slovenia, Balkan countries, African North	11 total, 9 European	4 land, 7 sea
11	Austria	8.2	Switzerland, Germany, Czech Rep., Slovakia, Hungary, Slovenia, Italy	7 total	All land

The neighbours of each country have the following significance. First, they offer and are part of an immediate economic market depending ultimately on the population and type of these neighbours; for example, are these neighbours already economically advanced, or were they former communist countries, or are they industrialized? And so on. Thus we can see from Table 1 that Germany plus its surrounding countries have a total population, hence potential market, of about 310 million people. Second, through historical, political and cultural links, the neighbours reinforce the common market of the central country. Thus, Germany in particular has neighbours with very close such links despite many European wars[2].

Germany's position in Europe is also a central gravitational position: it is approximately at equal distance from all other European countries (their capital can be considered as their representative point). Thus, it is obvious when we look at the map that France, or the UK, or Italy does not have this position. This geographical advantage of Germany can offer more economic spillovers, mainly because other countries which are not the centre are disadvantaged by further away situated markets. Thus for example, historically, a country like Portugal or Greece certainly has not possessed the same potential power in penetrating foreign economic markets as the Czech Republic has.

It can easily be verified that the economic development of Europe since the industrial revolution has started more intensively in England at the end of the 18th century and that the following area as is delimited by the lines linking the cities of Liverpool, Paris,

[2] Europe has been the centre of numerous wars through the history. However, these wars have also reinforced common racial, cultural, political, and economic trends. For example, most neighbours of Germany are of Germanic background and language, e.g. Belgium, Netherlands, Austria, and so on.

Lyon, Marseille, Venice, Vienna, Prague, Stockholm, Amsterdam, and York has been the main motor of manufacturing and economic development of Europe in the last 250 years. In this area, Germany is included in its totality. We will refer to this area and line as the C1 centre of Europe[3]. A similar but smaller region has been suggested by other researchers, the so called 'blue banana' that includes the southwest part of England, Belgium and Netherlands, the east and south part of France, the west part of Germany, the northern part of Italy and a small north east part of Spain (Hospers, 2003). As Heindenreich (1998) says this 'blue banana' was already prominent in Europe from the Middle Ages.

In the second section some propositions will be formulated regarding the huddle/tangle (HT) hypothesis of regional integration; the third section will provide quantitative evidence regarding the HT assertion; and the fourth section will draw conclusions and discuss policies.

2 The huddle/tangle hypothesis of regional integration

We can now use the conclusions reached in the previous section to construct and propose our hypothesis of regional integration in Europe. Before we announce this proposition we also must refer to an important economic postulate regarding economic development, namely that of poles of growth as elaborated by scholars such as Perroux, Rostow, and others (see Sanidas, 2005 for a brief account of this postulate). For example, Rostow (1990, p. 469) says:

> …In short, a modern economy is not driven forward by some sort of productivity factor operating incrementally and evenly across the board. It is driven forward by the complex direct and indirect structural impact of a limited number of rapidly expanding leading sectors

[3] A similar core region to C1 is the greater Shanghai core in China (see Sanidas, 2006a).

> within which new technologies are being efficiently absorbed and diffused. And it is this process of technological absorption that substantially generates, directly and indirectly, the economy's flow of investment via the plowback of profits for plant and equipment, enlarged public revenues for infrastructure, and enlarged private incomes for residential housing…

The rapidly expanding leading sectors to which Rostow refers were essential to the economic development of countries such as England, Netherlands, and Germany. For example the textiles and clothing industry in England, the oil industry in Holland, and the chemical one in Germany have lead these countries to higher economic development at different points of time. Each one of the countries and subregions included in the C1 core have a long history of manufacturing performance in several sectors and groups of firms like Philips in Netherlands.

Hospers (2003) refers to three building blocks of theoretical development in order to explain the existence and changes in the growth poles in Europe. Based on the Schumpeterian premises of creative destruction, he refers to structural change theory (mainly proposed by Fourastiè) which accounts for intersectoral changes due to technological change. The third building block is the agglomeration theory (as proposed by Perroux and Myrdal) built around leading firms and industries and their spread effects or backlash effects; according to this theory we have the "Matthew" effect which suggests that the rich (core) becomes richer, while the poor (periphery) becomes poorer. Hospers (2003) uses all this theoretical background to suggest that the already mentioned 'blue banana' greater region of the EU will continue to be the centre of economic development in Europe.

The concentration of wealth (not only economic) in the core C1 is evidence of the theoretical postulates as described briefly above. Thus, if we take the small version of this core, the 'blue banana' (Hospers, 2003), in 1996 40 % of the EU population lived inside that 'banana' with many large and medium size cities; the regions within that 'blue banana' have higher income per capita than the rest of Europe, have a well-developed physical and telecommunications infrastructure, and they supply most of cultural and educational products such as exhibitions, conferences, universities and so on. Needless to say there are similar pockets of wealth in some other parts of Europe, but the 'blue banana' or our core C1 has the highest concentration or density of wealth and economic or social development in the EU.

From this brief theoretical background we can infer that a strong regional integration is one that propagates economic development from the centre or pole to the periphery in a consistent and positive way. The following propositions capture this idea.

> *Proposition 1: Economic regional integration can take place through the existence of a pole of growth –a particular region or country- that attracts an exceptional economic and social activity which in turn leads to the asymmetric development of the pole in relation to the periphery.*

> *Proposition 2: The degree of asymmetric development depends on several factors: historical background, age of formal integration, distance from the centre of the core, and differences in size between the country/subregion of the core and the peripheral country/subregion.*

Proposition 3: If the central country/subregion of the core has been the formal hub of integration for a long time before new members join in, and if this country/subregion is very large in relation to the remaining or peripheral countries/subregions then we have the huddle/tangle hypothesis: an over concentration (anarchistic) of economic growth translated into much higher exports of the central country/subregion.

Proposition 4: Unless properly regulated and monitored this type of regional integration (as per proposition 3) cannot be beneficial to the most distant peripheral countries/regions. The only solution would be to create another centre of another potential core.

To theoretically support these propositions we can use a system of two differential equations as per Sanidas (2006a) analysis[4]:

$$\dot{x} = \alpha_{11}x + \alpha_{12}y \text{ and } \dot{y} = \alpha_{21}x + \alpha_{22}y \qquad (1)$$

A core country's exports growth rate ($\dot{x}$) depends on this country's level of exports x (with a positively signed coefficient) and on the level of the non-core country's level of exports y (also with a positively signed coefficient, because more exports from the non-core nation means more economic growth for the latter, hence more imports from the core country) as per system (1). The coefficients of the non-core country's exports rate of growth differential equation are also positively signed. This has as a consequence a probable saddle equilibrium point in the long run with both exports reaching some high point in the distant future *ceteris paribus*. This point can be such that the core country's exports can be 95% of the sum of both countries' exports.

[4] All the details of the solutions to this system can be found in Sanidas (2006a).

Consequently "Matthew's effect" is verified, thus confirming the huddle/tangle hypothesis promoted in the present paper.

3 Quantitative evidence for the validation of the huddle/tangle hypothesis

Exports can be considered to be a good overall representation of a country's economy. A vast literature on this topic (e.g. Awokuse, 2006; Carbaugh, 2004) shows that exports are very important in promoting economic growth and development. In this paper exports will be used to quantify the integration position[5] of each European country.

The data are available from the ITC internet site.[6] We have thus a matrix of each European country's exports to all other European countries in terms of US$ (see data in Appendix). In order to standardise these data, export ratios are calculated (for example, Hungary's exports to Germany constitute about 36% of Hungary's total exports, and so on). Only the exports data will be used in the analysis below, since what are exports for one country it is also imports for its trade partner (if the difference between f.o.b. and c.i.f. is considered).

3.1 The central role of Germany

In this sub-section we will show more explicitly how Germany is the central nation in terms of exports and imports. The average (across exporters) percentage of exports towards each country is an important indication. Thus Germany stands out with 18% exports on average across countries directed to this country. The countries that receive most of the exports after Germany are Italy (8%), the UK (7%), France (7%), the

[5] Integration position is defined as the position of a country in relation to a sub-cluster or any other group considered in the analysis.
[6] For Portugal and Ukraine, the source is the UN publication (see references).

Netherlands (4%), and Belgium (4%)[7]. These 6 countries together received about 50% of all European countries' exports in 2003. Furthermore, the countries that export a very high percentage of their exports to Germany are those that are its immediate neighbours. All this is a preliminary support for our idea about the significance of C1 core whose centre is Germany.

In this subsection we will use a simple OLS regression to uncover the importance of the C1 core. The main argument is that exports of European countries depend on how these countries are integrated with the centre of the C1 core which is Germany, and with the complement of C1 core which is the addition of Belgium, plus Netherlands, plus France, plus Italy[8] (abbreviated as Benefrit). Thus, the higher the export ratio of a given country to either Germany or Benefrit is (as in relation to all other countries), the higher the total exports of this country are. Note that the UK is not included in this group Benefrit because it seems that this country has moved away from the original C1 core delineation and is closer to the USA and Scandinavian connection[9].

In addition, if a country is further away from the C1 core, if it belongs to a disadvantaged region, and if it does not belong to another major core, then this country's exports are lower than if it did not have either of these 3 characteristics. Country candidates that belong to this category are the Balkan nations, plus Portugal. Finally, exports are as usual also dependent on the size of the country in terms of its national income (GNI is used here). The data for this regression are shown in Table 2.

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[7] Even if we consider the relationship between exports and GDP, Germany still exports much more than any other country with a similar size in GDP (such as France, the UK, and so on).
[8] These are the initial countries of the EU.
[9] There is probably another core of a minor significance whose centre is the axis UK plus USA. The countries that seem to belong to this core are at least Ireland (40% of its exports are exported to this core), Norway (31.5%), and Sweden (20.5%).

Table 2 The huddle/tangle regression data

country	exports	germany	gni	easteu	benefrit	balk
Austria	76.4	0.342	192	0	0.181	0
Belarus	9	0.046	13.5	2.83	0.072	0
Belgium	233.3	0.209	237	0	1.472	0
Bulgaria	6.37	0.127	14	2.87	0.311	1
Czech R	47.31	0.381	56	5.00	0.16	0
Croatia	5.61	0.13	20	3.31	0.337	1
Denmark	54.38	0.198	163	0	0.154	0
Esthonia	5.28	0.089	6	2.04	0.073	0
Finland	47.11	0.126	124	0	0.16	0
France	323.34	0.161	1362	0	0.904	0
Germany	648.89	4	1876	0	0.298	0
Greece	12.2	0.139	124	0	0.21	1
Hungary	40.47	0.356	54	4.93	0.188	0
Ireland	85.62	0.086	90	0	0.298	0
Italy	261.25	0.15	1101	0	0.752	0
Latvia	2.77	0.155	8	2.29	0.095	0
Lithuania	6.89	0.103	13	2.78	0.132	0
Netherlands	211.44	0.246	378	0	1.132	0
Norway	62.57	0.135	176	0	0.254	0
Poland	49.8	0.346	177	7.92	0.209	0
Portugal	26.8	0.181	109	0	0.265	1
Romania	16.5	0.167	42	4.45	0.392	1
Russia	85.2	0.075	307	0	0.192	0
Slovakia	21.454	0.315	21	3.37	0.165	0
Slovenia	12.079	0.244	20	3.31	0.225	1
Spain	130.68	0.145	597	0	0.425	0
Sweden	91.699	0.106	232	0	0.191	0
Switzerland	92.422	0.227	264	0	0.242	0
Turkey	39.1	0.191	173	0	0.213	1
UK	268.366	0.115	1511	0	0.297	0
Ukraine	20	0.037	38	0	0.072	0

Sources and notes: The exports data used in this regression are compiled from the ITC, available on internet, for the year 2003 (except for Portugal and Ukraine, for which exports are extracted from the UN publication). For GNI, the World Bank site provided the data for 2002. The variable "exports' is in US$ billions; the variable "germany" is expressed in ratios (for example, Poland's exports to Germany constitute 0.346, or 34.6% of this country's total exports); the variable "gni" is in US$ billions; the variable "easteu" is expressed in US$ billions, is calculated as "gni" of an Eastern (zero otherwise) European country raised to the power 0.4 (this value is determined empirically in an iterative way), and shows the impact of having been previously belonged to another block of integration; finally the variable "balk" is a dummy taking the value of 1 for the Balkan countries plus Portugal and 0 otherwise. The very small countries either in terms of population or in terms of exports were excluded for this regression: Bosnia, FYROM, Cyprus, Malta, Luxemburg, and Iceland.

Some comments are necessary for the construction of these series. First, the ratios of exports to Germany in column 2 (variable "germany") of Table 2 necessitate a value of exports to Germany from …Germany; this is estimated iteratively from the regression to be 4 (see Table 2). Thus, for Germany the value 4 shows the reciprocity

of exports: the higher the exports of other countries to Germany are the higher of Germany's exports to these countries are. We will call this value the huddle/tangle (HT) effect of the C1 core on Germany. In the same way, the value 3 in the formula below is estimated for the 4 countries of the variable Benefrit; for example for Belgium: HT of Belgium= exports ratio of exports of this county to the other 3 countries 0.368 plus 0.368*3= 1.47; and so on for the other 3 countries.

The results of this regression are shown in Table 3, the HT effect in Table 4, and the analysis of residuals in Table 5.

Table 3 Regression results

	germany	**gni**	**easteu**	**benefrit**	**balk**	**R^2**
Coefficient	84.88	0.145	-4.23	144.43	-33.49	0.995
t-statistic	23.3	25.4	-5	21.1	-7.5	

Table 4 The HT effect

C1 country	**Germany**	**France**	**Netherlands**	**Italy**	**Belgium**
Total exports	648.89	323.34	211.44	261.25	233.3
HT effect	339.52 (=4*84.88)	130.56 (=0.904*144.43)	163.49 (=1.132*144.43)	108.61 (0.752*144.43)	212.60 (1.472*144.43)
HT effect %	52.3%	40.4%	77.3%	41.6	91.1%

All coefficients are highly significant and have the right signs and magnitudes. According to these results the HT effect can be easily appreciated. Thus, for example, for Germany, out of her total US$648.89 billions of exports, US$339.52 or 52.3% are due to this effect (variable "germany") and the remaining due to its market size ("gni"). The variable "gni" indicates that 14.5% of GNI can be expected to be exported. The variable "easteu" indicates that for example for Poland 4.23*7.92 = 33.5 US$ billions are "lost" exports due to this country's affiliation with the ex communist block. The variable "balk" indicates that all Balkan countries plus

Portugal exported US$33.49 billions[10] less in 2003 than they could have done if their integration position relative to the core was not disadvantageous.

Table 5 Residuals analysis

Country	*Actual*	*Predicted*	*Residuals*
Austria	76.4	79.1	-2.7
Belarus	9	2.7	6.3
Belgium	233.3	232.4	0.9
Bulgaria	6.37	5.3	1.1
Czech R	47.31	38.9	8.4
Croatia	5.61	7.7	-2.1
Denmark	54.38	59.3	-5.0
Estonia	5.28	8.7	-3.4
Finland	47.11	48.3	-1.2
France	323.34	322.2	1.1
Germany	648.89	648.6	0.3
Greece	12.2	22.0	-9.8
Hungary	40.47	40.2	0.2
Ireland	85.62	56.9	28.8
Italy	261.25	264.8	-3.5
Latvia	2.77	16.2	-13.5
Lithuania	6.89	15.0	-8.1
Netherlands	211.44	214.4	-3.0
Norway	62.57	68.1	-5.6
Poland	49.8	47.2	2.6
Portugal	26.8	30.2	-3.4
Romania	16.5	15.9	0.6
Russia	85.2	74.5	10.7
Slovakia	21.454	35.7	-14.2
Slovenia	12.079	3.7	8.4
Spain	130.68	151.1	-20.4
Sweden	91.699	66.1	25.6
Switzerland	92.422	87.3	5.2
Turkey	39.1	33.9	5.2
UK	268.366	265.7	2.7
Ukraine	20	17.5	2.5

Most residuals are satisfactory but there are some exceptions for which we suspect the reasons. For Russia the large positive error is due to its increasing role as an oil products exporter. For Ireland and Sweden we know that their Atlantic connection is

[10] Sanidas (2006b) has found that this effect is about US$35 billions based on the analysis of the 2000 largest companies in the world. This result obviously confirms the result in the present paper.

very strong (see also a previous footnote); for example Ireland exports more than 20% of its total exports to the USA[11].

An important remark will close this section. The foregoing analysis is in some ways an indirect application of the gravity model for international trade which explicitly takes into account distances between trading nations and relative sizes in economies. However there is an essential difference between our regression and any gravity model regression. The latter does not distinguish between a core of clustered countries and peripheral countries like the present model does. For the gravity model all countries have an equal weight in terms of their mutual distances and sizes; this is not true here.

3.2 Further supportive quantitative evidence

Cluster analysis[12] will now be used to arrive at some more formal results regarding the spontaneous clustering process of most European countries. We will use export ratios again to gauge the links between countries when these form groups of common interest. Figure 1 shows the results; the countries Russia, Belarus, Ukraine, Bosnia, FYROM, Germany, Portugal, Switzerland, and Turkey are excluded, as these countries do not add more information to the picture, for different reasons each one of them. Thus, when these countries are included they seem to be grouped in areas of non-relevance. These countries –except Germany- also seem to be the least integrated in the C1 core. If Germany is included in the cluster analysis, then it seems to be alone and perhaps belongs to the group of the most "independent" nations (France,

[11] In the regression used here when we added another variable of the exports ratio of each country to the USA we got a marginally significant coefficient for this variable, thus confirming the Atlantic connection of countries such as Ireland, Norway, Sweden and others.

[12] The hierarchical cluster analysis based on the Ward method and z-scores is used here (Hair et al, 2006). Other methods provided similar results.

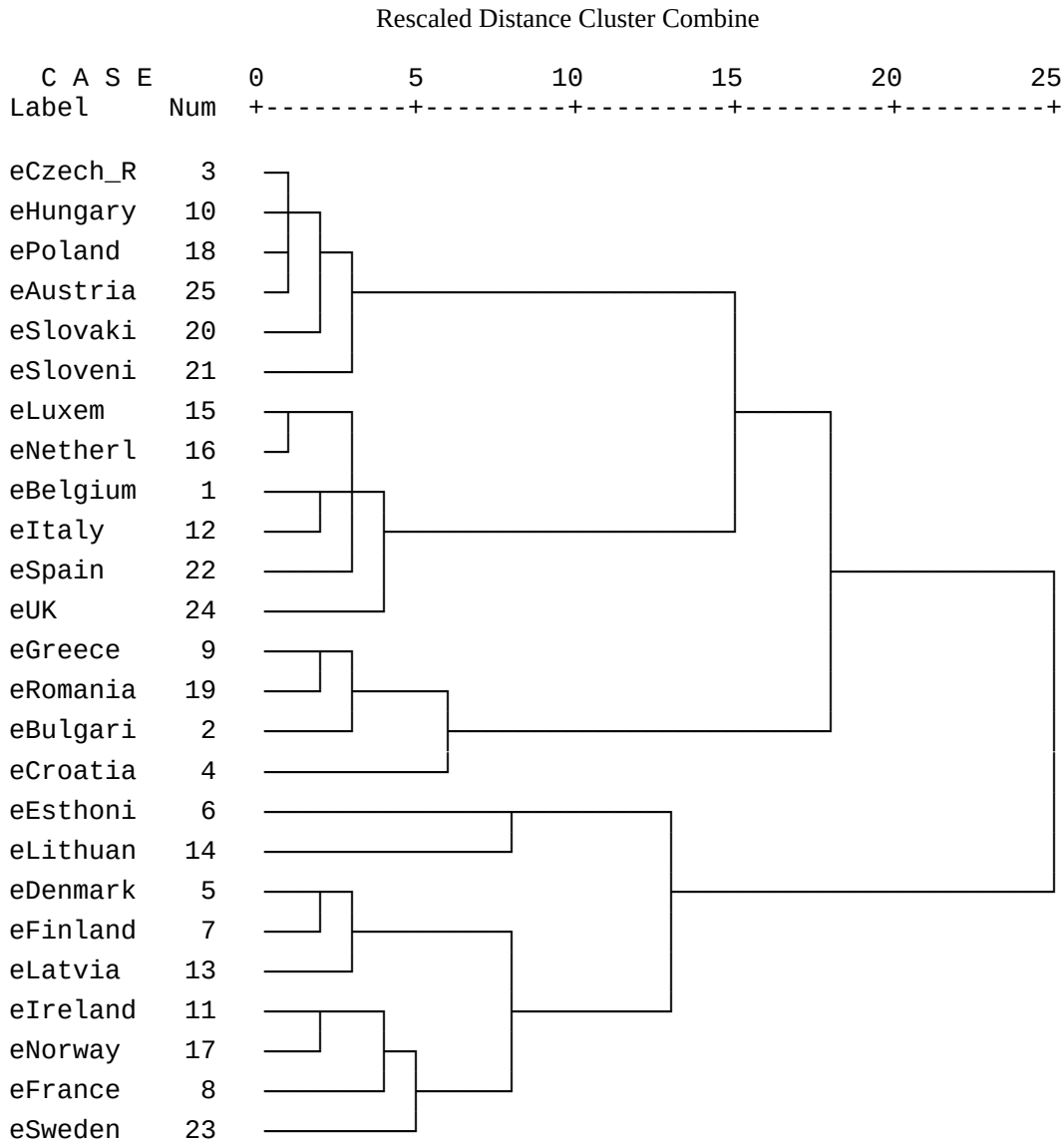
Sweden, Norway, Ireland as shown in Figure 2). Nonetheless Germany exports the bulk of its exports to its neighbours (France 10.9%, the UK 8.5%, Netherlands 6.2%, Italy 7.5%, Belgium 5.2%, Austria 5.4%, and Switzerland 4.4%, a total of 48%). This shows again the central position of Germany as per our hypothesis.

For the other clusters (in Figure 1) some comments are necessary. The central European group Hungary, the Czech Republic, Poland, Austria, Slovakia, and Slovenia (all of them to the east or south of Germany) seem to form a compact group with similar characteristics, either because of history (Hungary and Austria, or Slovakia and the Czech Republic), or because of former ex communist affiliation. Greece, Romania, Bulgaria, and Croatia form another cluster as expected (the Balkan group). The Baltic and Scandinavian countries seem to form another large cluster although split into smaller sub-clusters (like Denmark, Finland, and Latvia); this is also as expected.

However, one of these sub-clusters include France and Ireland; this is somehow a surprising result at least for France (Ireland as already mentioned above seems to have Atlantic connections, in the same way as Scandinavian countries do). Finally, Belgium, Netherlands, Luxemburg are in the same cluster together with the UK, Italy and Spain. The UK's integration position is not surprising but Spain's and Italy's are (in the same way as France was in the previous cluster). These "surprises" are easily explained: Spain, large parts of Italy and France seem to be located at unfavourable spots in Europe in relation to the centre (Germany).

▿

Figure 1 Cluster analysis excluding Germany



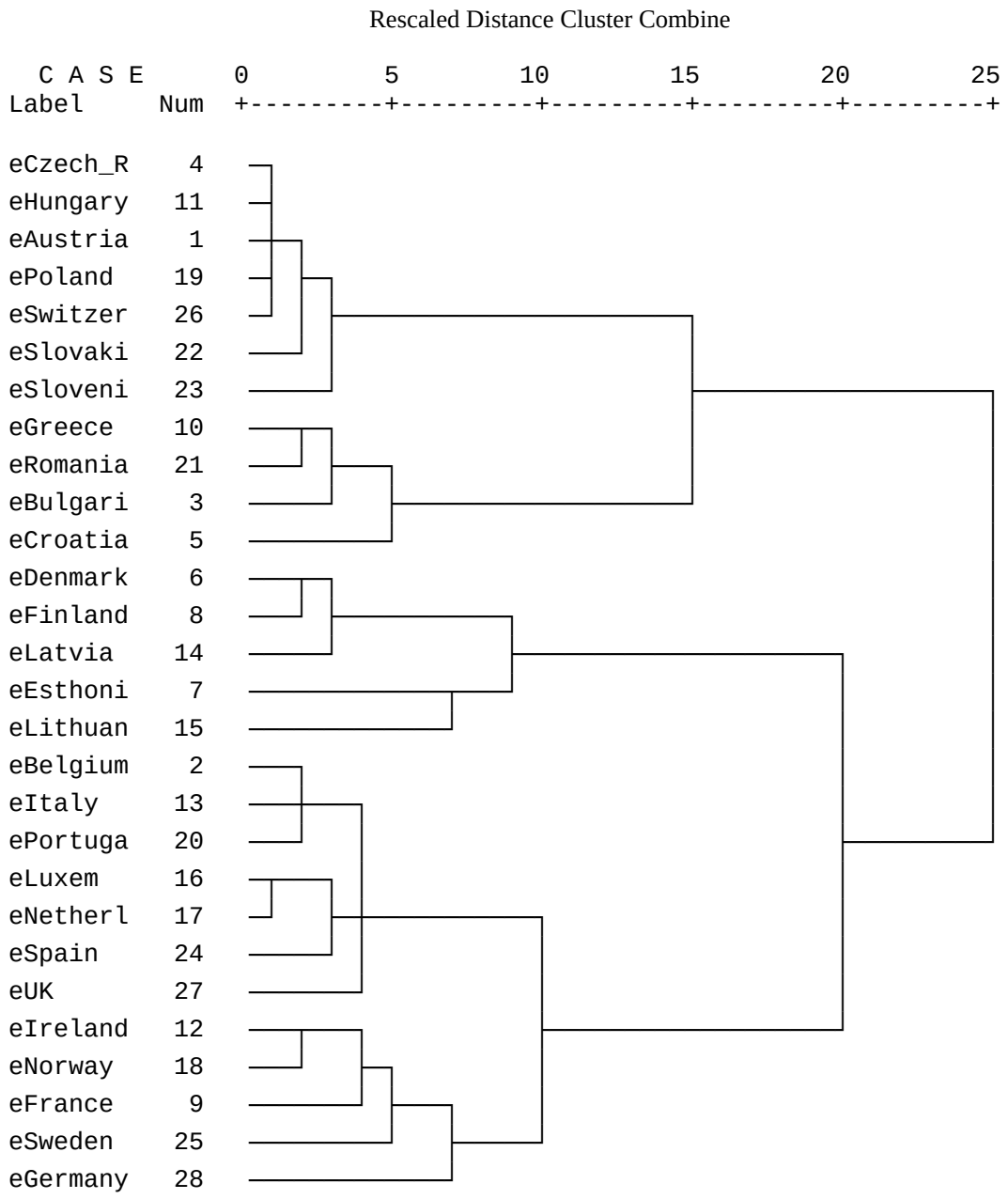
Note: This is a dendrogram using Ward Method and z-scores.

The clustering results for exports[13] show that Germany is the country around which the local clusters are crowded in: the central European to its east and south flank, the Baltic and Scandinavian on the north and northeast, the Balkan group on its south east (at a bigger distance), and the western cluster on its northwest, and south west (although Italy is directly on its south). If Portugal is also included in the cluster

[13] In terms of imports the results are again quite clear: approximately the same local clusters as for exports are formed.

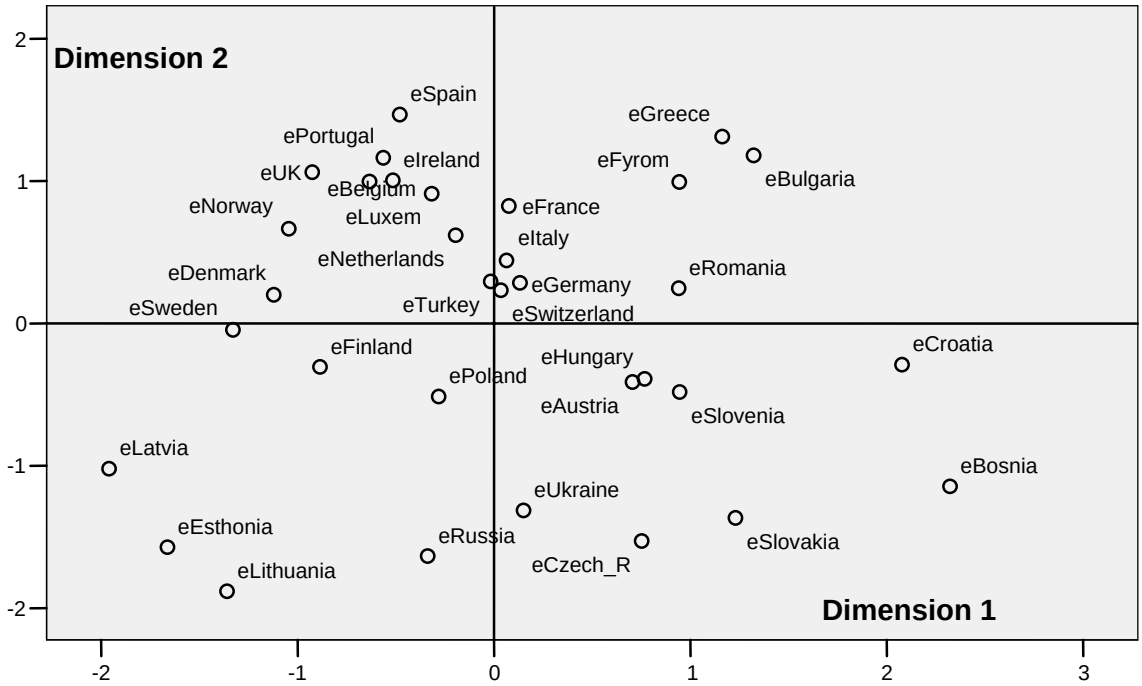
analysis (see Figure 2), then the algorithm puts this country in the western group where Spain is (not a surprising result). If Germany is also included then it initially forms a cluster on its own and is then grouped with the sub cluster of France, Norway, Sweden, and Ireland. The results are seen in Figure 2.

Figure 2 Cluster analysis including Germany



The next method we use to support our results is multidimentional scaling[14] (ALSCAL algorithm as per SPSS program, see also Hair *et al*, 2006). We excluded Belarus for its extreme values (51% of its exports go to Russia and this is picked up by this method, hence "disturbing" the other countries), but all other countries are included. The results are shown in Figure 3. We can see that the various clusters as indicated by the cluster analysis are confirmed here. In addition, the C1 core countries are grouped almost together. Once more Turkey seems not to fit in the Balkan countries (this country has also many connections with its eastern, south, or northern neighbours like Russia, Israel, Iran, and Azerbaijian).

Figure 3 Multidimentional scaling analysis



4 Conclusions and policy implications

The evidence from the foregoing analysis is appealing for a confirmation of propositions 1 to 4 outlined in section 2. More precisely, core C1 seems to be the

[14] The model used is based on Euclidean distances between the variables of exports in terms of ratios and standardizing these ratios by z-scores. Alternative models produce quite the same results with minor differences.

moving force of the European economic and social development but more importantly to be the most favoured region of Europe. The centre of this core, Germany (and perhaps Belgium) is the nation that takes advantage of the HT hypothesis the most. According to this hypothesis the positive externalities of European integration are tangling around Germany and its main allies Belgium, Netherlands, and parts of France and Italy (the initial founding nations of the EU). At the moment in Europe there is not any other major core such as the C1 one. If we fully accept this proposition then we can predict the consequences for the clusters around Germany.

The central European cluster which is overwhelmingly a group of former communist countries will soon develop in a spontaneous way as a result of its close vicinity to CI core. Already this is happening with all countries belonging to this cluster. The Baltic subgroup is interacting in a positive way with both the Scandinavian sub cluster and the C1 core. Hence the Baltic group will also follow in economic development the Central European cluster. The problematic cluster is the Balkan group plus Turkey. These countries are the poorest in Europe and very far from C1 and far from other possible cores of development (for example a core that could be formed around the axis Moscow-Kiev or a Middle East core around Dubai/Iran).

What are possible solutions for the Balkan cluster? As already hinted at in Proposition 4 above, the only solution seems to be the creation of another centre of a core like C1 inside the boundaries of the Balkan cluster. What are possible core centres? All the Balkan nations could be part of the new core centre (called C2) since these nations are not densely populated , and the ex Yugoslav nations could be the link between this new core and the C1 core as most of them are not far from C1. This is the only

solution for the Balkan states and has as a prerequisite a very sound political and cultural cooperation between all countries, something which is now perhaps more possible than ever before.

It is then further proposed that all Balkan nations put as priority number one to develop their inter-links first before they develop other links with other countries further away. This also means that these nations must not regard their inclusion to the EU as the panacea to their problems. On the contrary this inclusion can only imply a very long and uncertain path to economic development because all the other clusters closer to the centre of C1 will be naturally first developed. The example of Greece can be illuminating: although it is the most advanced country in the Balkan area, its exports are lagging behind considerably as they still remain very low even after 25 years of this nation being a member of the EU.

From the political point of view, we suspect that all Balkan states are not aware of the severity of the problem in terms of the importance of core C1 and other cores which might eventually emerge as poles of growth in this part of the planet. We strongly suggest in the light of the analysis in this paper that the creation of the core C2 and another one based on the axis Moscow-Kiev are necessary conditions for a peaceful and prosperous economic development in larger Europe. Furthermore if we look at the past, we can see that Constantinople (now Istanbul) was the centre of a developmental core, probably the most important one (another one being the North of Italy, and so on) in Europe. This might be further evidence for our proposition for the support of the C2 core creation.

Appendix Matrix of exports ratios of all European nations

	Aus	Bel	Belg	Bos	Bulg	Cze	Croa	Den	Est	Finl	Fra	Fyr	Ger	Gre	Hun	Ire	Ita	Lat	Lit	Lux	Net	Nor	Pol	Por	Rom	Rus	Slov	Slon	Spa	Swe	Swi	Tur	UK	Ukr
Aus	0	0.2	1.1	4.9	2.4	6.4	8.6	1.1	0.5	1.1	1.1	0.7	5.4	1	8.5	0.4	2.5	0.5	0.3	1.6	1.6	0.2	1.8	0.8	3.4	0	7.6	7.7	1.1	1	3.6	1.2	0.7	1.2
Bel	0	0	0	0	0	0	0.2	0	0.4	0	0	0	0	0	0	0	0	1.5	3.2	0	0	0	0.7	0	0	0	0	0.2	0	0	0	0	0	1.3
Belg	1.7	0.5	0	0	6.8	2.3	0.8	1.7	1.4	2.9	8.4	0.8	5.2	1.6	2.4	14	2.9	1.1	2.2	13	11	2.8	3.4	4.5	1.7	0.7	2	0.9	3.6	4.8	2.1	2.2	6.3	0
Bos	0.3	0	0	0	0	0.2	16	0	0	0	0	2.2	0	0	0.7	0	0	0	0	0	0	0	0	0	0	0	0.1	4.4	0	0	0	0	0	0
Bulg	0.4	0	0	0	0	0.3	0.4	0	0	0	0	2.4	0	6.8	0.4	0	0	0	0.2	0	0	0	0.2	0	1.8	0.4	0.3	0.5	0	0	0	1.6	0	1.4
Cze	3.2	0.5	0.6	0	0.6	0	0.8	0.5	0.5	0.5	0.7	0.3	2.8	0.6	2.1	0.2	1.1	0.5	0.4	0.9	0.8	0.6	4.3	0	0.6	1.2	13	1.9	0.7	0.6	0.8	0.5	0.6	0.9
Croa	1.2	0.2	0	23	0.6	0.6	0	0	0	0	0	6.2	0	0.4	1	0	0.9	0	0	0	0	0.1	0.3	0	0.8	0	0.6	9.4	0	0	0	0	0	0
Den	0.7	1.2	0.8	0	0.5	0.6	0.3	0	3.4	2.4	0.8	0.3	1.7	0.9	0.8	0.6	0.8	6.1	4.9	0.5	1.4	3.9	2.5	1	0	0	0.7	0.9	0.8	6.6	0.8	1.2	1.3	0
Est	0	0.7	0	0	0	0	0	0.3	0	2.7	0	0	0	0	0	0	0	6.9	4.5	0	0	0.1	0.3	0	0	1.6	0	0	0	0.7	0	0	0	0
Finl	0.6	0.2	0.6	0	0	0.4	0.2	3.6	23	0	0.6	0	1	0	0.8	0.4	0.5	2.8	1.6	0.7	1.1	1.7	0.7	0.4	0	4.4	0.7	0.2	0.5	5.8	0.6	0.5	0.9	0
Fra	4.6	0.6	19	0.1	6	4.9	3	5.1	1.6	3.9	0	5.1	11	4.6	6	6.1	13	2.3	5.2	21	11	8.7	6.5	13	7.8	2	3.6	6	23	5.2	9.5	7.2	11	1.6
Fyr	0	0	0	0	2.4	0	1.2	0	0	0	0	0	0	3	0	0	0	0	0	0	0	0	0	0	0	0	0	1.3	0	0	0	0	0	0
Ger	34	4.6	21	21	13	38	13	20	8.9	13	16	26	0	14	36	8.6	15	16	10	27	25	14	35	18	17	7.4	31	24	14	11	23	19	11	3.7
Gre	0.7	0	0.7	0	11	0.5	0.7	0.9	0.2	0.9	1	17	0.8	0	0.4	0.4	2.3	0.1	0.1	0.3	1	0.2	0.3	0.4	2.6	0.7	0.3	0.4	1.4	0.6	0.9	2.3	0.7	0
Hun	3.7	1.2	0.5	0	0.9	2.3	1.4	0.4	1.1	0.8	0.7	0.3	1.7	0.6	0	0.2	1.2	0.2	0.7	0.5	0.7	0	2.6	0.3	3.7	1.7	5	2.1	0.6	0.6	0.7	0.7	0.5	2.6
Ire	0.3	0	0.7	0	0.2	0.4	0.5	1.7	0.8	0.5	0.7	0	0.6	0.4	0.4	0	0.6	1.3	0.5	0.3	1.3	0.8	0.3	0.6	0	1.1	0.1	0	0.7	0.5	0.7	0.7	7.6	0
Ita	9.6	1.6	5.7	16	16	4.6	29	3.4	1.2	4.2	10	8.9	7.5	12	6	4.7	0	2.7	2.3	6.2	6.3	3.7	6.1	4.8	26	6.8	7.7	14	12	3.8	9	8.1	5	4.2
Lat	0	3.8	0	0	0	0.2	0	0.3	8	0.8	0	0	0	0	0	0	0	0	10	0	0	0.2	0.7	0	0	1.1	0.2	0	0	0.4	0	0	0	1.2
Lit	0	2.9	0	0	0	0.4	0	0.5	4.4	0.6	0	0	0	0	0.2	0	0	8.7	0	0.1	0	0.1	2.6	0	0	2.3	0.3	0.3	0	0.4	0	0	0	1
Lux	0	0	0	1.1	0	0.2	0	0	0	0	0.6	0	0.5	0	0	0	0	0	0	0	0.4	0	0	0	0	0	0.2	0.2	0	0	0	0	0	0
Net	2.2	4.6	13	0	1.9	4.2	0.9	5.1	3	4.9	4.2	4.4	6.2	3	4.3	5.5	2.6	3.4	3.5	4.8	0	10	4.8	3.9	3.8	9.7	2.8	1.8	4	5.3	3.5	3.9	7.8	1.4
Nor	0.4	0.3	0.4	0	0	0.4	0	6.5	3.2	2.6	0.4	0	0.8	0.3	0.3	0.7	0.5	2	2.3	0.4	1	0	2.2	0.7	0.7	0.4	0.2	0.2	0.4	9.1	0.4	0.4	1.1	0
Pol	1.8	4.8	0.9	0	0.9	4.9	0.5	1.7	1	2	1.3	0	2.8	1.6	2.4	0.3	2	1.6	3.5	1.3	1.3	0.6	0	0.5	1	4.4	4.9	2.9	1.2	1.8	0.9	1.2	0.9	2.5
Por	0.4	0	0.5	0	0	0	0	0.5	0	0.5	1.3	0	0.9	0	0	0.3	1	0	0	0	0.9	0.7	0.7	0	0	0	1.6	0	8.9	0.5	0.4	0.6	0.8	0
Rom	1.3	0.5	0.2	0	3.5	0.7	0.4	0	0	0	0.5	0.1	0.6	2.9	2.6	0	1.7	0	0.1	0	0.3	0	0.9	0	0	0.8	1	0.9	0	0	0.2	2.2	0.3	1.7
Rus	1.6	51	0.6	0	1.6	1.2	1.2	1.3	12	8.2	1	1.3	2	2.8	1.6	0.3	1.7	5.8	10	0.5	1.4	0.6	3	0	0.3	0	1.2	3.2	0.7	1.4	0.9	3.5	0.8	16
Slov	1.5	0.2	0.2	0	0.3	8.2	0.4	0	0	0	0	0	0.9	0	2	0	0	0.3	0.1	0	0	0	1.7	0	0.3	1.6	0	1.5	0.4	0	0	0	0	1.5
Slon	2	0	0	12	0.5	0.7	9.1	0	0	0	0	2	0.4	0	0.8	0	1	0	0	0.2	0	0	0.3	0	0.4	0	0.8	0	0	0	0	0	0	0
Spa	2.8	0.3	4.2	0	3.1	2.2	0.7	3.4	0.5	2.9	11	1.9	5	3.9	2.9	2.9	7.6	0.9	0.9	2.9	4.1	2.4	2.3	21	1.9	1.5	1.7	1.5	0	3.4	3.8	4.5	5.1	1.9
Swe	1.2	0.7	1.5	0	0.6	1.2	0.8	14	13	11	1.5	0.6	2.2	1.1	3.4	1.5	1.1	11	4.2	1.5	2.1	7.4	3.8	1.5	0.6	1.1	0.8	1	1.2	0	1.3	1.2	2.2	0
Swi	4.8	0	1.2	13	0.6	1.5	0.7	1.2	0.6	1.1	3.6	1.8	4.4	0.9	1.4	3.3	4.3	0.5	12	1.4	1.8	0.4	0.8	1.1	0.6	4.2	1.1	1.4	1.3	1.1	0	0.9	1.7	0
Tur	0.9	0.3	0.8	0	9.6	0.7	0.4	0.5	0.3	0.8	1.1	3.1	1.5	4.3	0.7	0.4	2	0	1.7	0.3	0.9	0.6	0.7	0	5.4	3.7	0.7	0.7	1.4	0.8	1.3	0	1	6.2
UK	4.8	11	9.8	0	3	5.5	1.6	9.1	3.8	8.7	10	3.3	8.5	8.2	4.8	19	7.6	16	6.5	6.2	11	22	5.4	10	7.1	4.6	2.2	2.3	11	7.9	5.3	9.4	0	2.7
Ukr	0.3	2.9	0.1	0	0.9	0.5	0	0.2	0	0.4	0.1	0	0.3	0	0.5	0	0.2	0	1.8	0	0.1	0	1.1	0	0	7.4	0.6	0	0.1	0.2	0.2	0.5	0.1	0

Note: Source is ITC except for Portugal and Ukraine. Figures are shown as percentages.

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