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Abstract

The enlargement of the European Union will bring many political, economical and structural changes on the Continent, which require careful and deep analysis to be made.
This paper will grasp the enlargement of the European Union from the aspect of the trade pattern and trade specialization of six major European Union candidates; namely, Turkey, Bulgaria, Hungary, Romania, Poland and the Czech Republic by focusing on the years from 1996 to 2002. In other words, the main purpose of this paper is to examine the international competitiveness of six candidate countries and to compare the structure of specialization in foreign trade with each other and the EU/15.

JEL–Classification: F02, F15, F17

Keywords: Trade and FDI, Economic Integration

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THE FOREIGN TRADE PATTERN AND FOREIGN TRADE SPECIALIZATION OF CANDIDATES OF THE EUROPEAN UNION

A COMPARISON OF SIX COUNTRIES: TURKEY, BULGARIA, HUNGARY, RUMANIA, POLAND, THE CZECH REPUBLIC AND THE EU/15.[1]

Bahri Yilmaz
Selim Jürgen Ergun

1. INTRODUCTION

The enlargement of the European Union will in a few years result in the inclusion of the major eastern and southeastern European countries as full-members of the Union. The Czech Republic, Hungary and Poland are among the ten countries that will become a full-member of the Union at the date of 1 May 2004. Bulgaria and Romania are expected to become full-members in 2007. Turkey, on the other hand, being seen as a potential full-member is expected to fulfil a number of legislative and constitutional reforms. The fulfilment of the conditions declared by the European Union until December of 2004 will give Turkey the opportunity of starting the negotiations with the European Union at the first half of 2005 and open the door to the full-membership in the following years. In economic aspects, however, Turkey could be considered as a member of the Union due to many aspects mainly after the agreement of the Customs Union with the European Union in 1996, which enabled the free-movement of manufactured goods between the European Union and Turkey.

The enlargement of the European Union will bring many political, economical and structural changes on the continent, which require careful and deep analysis to be made. This paper will grasp the enlargement of the European Union from the aspect of the trade pattern and trade specialization of six major European Union candidates; namely, Turkey, Bulgaria, Hungary, Romania, Poland and the Czech Republic by focusing on the years from 1996 to

[1] We have only considered and compared the six comparable economies out of 13 candidate countries and the EU/15 in our empirical work. The Table A1 in appendix gives a comparison of these six countries and of the EU as a whole on a number of basic economic indicators.

2000[2]. In other words, the main purpose of this paper is to examine the international competitiveness of six candidate countries and to compare the structure of specialization in foreign trade with each other and the EU/15[3]. In comparison with the previous "Working Papers", we have additionally included three basic indicators in our analysis, which are " The Absolute Entropy Index (Marwah 1995)", " The Lafay's Revealed Comparative Advantages (RCA 1992)", and "The Conformity Coefficient (Fels-Horn 1972)". Once again, this paper basically aims to compare the international competitiveness and trade patterns of six EU-candidate countries. At this first stage, it is not our intention to explain causes and differences of the empirical results arising in our research work. [4]

The paper is divided into three main sections. In the first section we will describe the methodology for assessing the competitiveness of six candidate countries with the EU/15 as a whole. Then we will try to interpret the empirical results. This empirical analysis sheds light on the structural differences in trade sectors among the six countries and the extent to which such differences have increased or decreased between the EU/15. The final section draws some basic conclusions from the empirical results and considers the future position of the six within the enlarged EU.

Figure 1 and Figure 2 give an overall picture of the world export and import performances of the countries in question between 1996-2000:

[2] The similar empirical works have been done for the time period between 1970-1987 and 1987-1994. See Bahri Yilmaz, (1986), "The Turkish Exports to the EC", University of Durham/England, Occasional Paper Series Nr: 29, pp.3-35. "International Competitiveness of Turkey with the EU: A comparison with Greece, Portugal, Spain and the EU published in the *The Political Economy of Turkey in the Post-Soviet Era* (edited) by Libby Rittenberg, Praguer Publishing Company, 1996, pp.79-95. "Turkey's Competitiveness in the European Union", in: Russian & East European Finance and Trade", Vol.38.No: 3, May-June 2002, pp.54-72.

[3] Comparative advantage is distinct from competitiveness because of two reasons. First competitiveness is related to relative strength or weakness of a country for producing a given product, while comparative advantage is to the relative strength or weakness of products for a given country. Second, competitiveness is often subject to macroeconomic fluctuations (exchange rate or wage rate), while comparative advantage is structural. See for details [Gerhard Lafay (1992), " The Measurement of Revealed Comparative Advantages," in M.G Dagenais and P.A. Muet (Eds), International Trade Modelling, London, Chapman & Hall, 209-234].

[4] See Bahri Yilmaz, "Turkey's Competitiveness in the EU: A Comparison with Five Candidate countries"(2003), Ezoneplus Working Paper No: 12, FU Berlin, February 2003.

Figure 1.

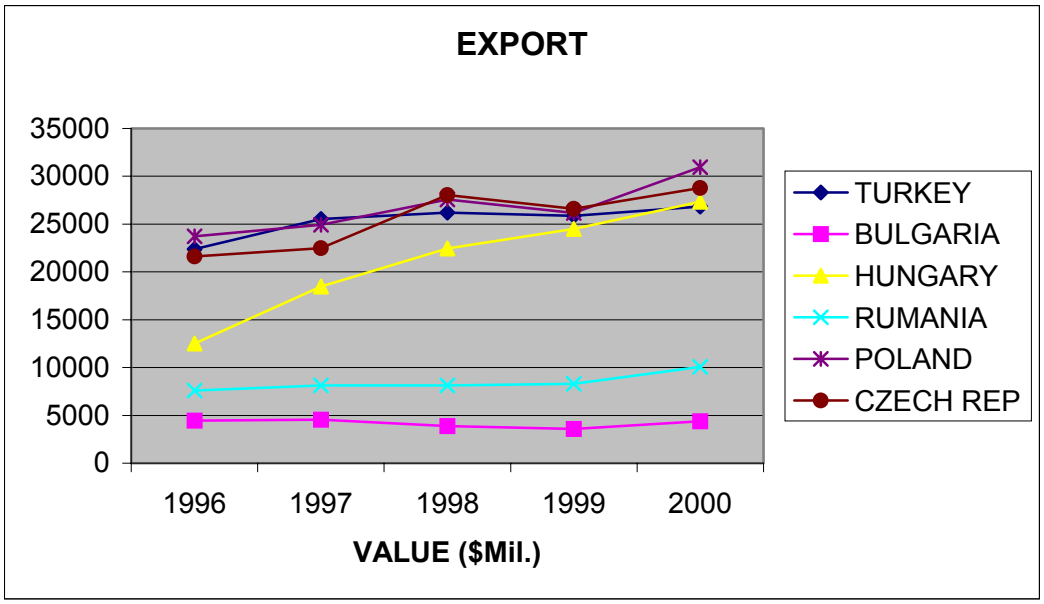
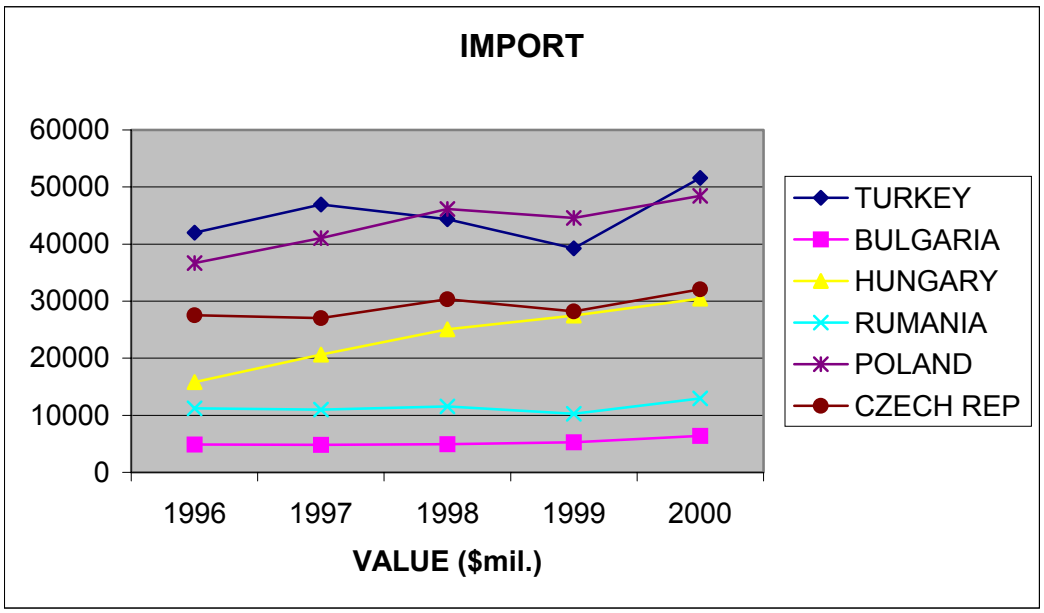


Figure 2.



Source: United Nations, Yearbook of International Trade Statistics

As the figures indicate the exports of Hungary followed a continuous pattern of increase between 1996 and 2000. Poland and the Czech Republic performed similarly except a small fluctuation in 1999. Bulgaria and Rpmania were not able to improve their export performance at all. Turkey, on the other hand, was able to only a slight improvement.

In the case of imports, Hungary performed the same continuous pattern of increase as it did in the case of exports. The same is true for Poland, which faced a slight fluctuation in 1999 and recovered from it in 2000. Bulgaria, Romania and the Czech Republic were not able to show any significant improvement. Following a decrease in 1998 and 1999, Turkey improved its amount of imports significantly in 2000.

II. METHODOLOGY AND DATA BASE

In order to estimate the competitiveness of the countries in question in different categories of trade, we use the following indices:

1. "Trade Entropy Index (TEI) "[5].

2. "Revealed Comparative Advantage (RCA) Coefficient" by using Balassa's (1965) formula.[6]

3. "Revealed Comparative Advantage (RCA) Coefficient" by using Lafay's (1992) formula.[7]

4. "Comparative Export Performance (CEP)" formula (Donges 1982) [8].

5. "Trade Overlap (TO) Formula (Finger and de Rosa) (1979) for the calculation of the overall importance of intra-industry, in comparison with inter industry. [9]

6. "Export Similarity (ES)" Formula of Finger and Kreinin (1979), in analogy to the TO index.[10]

7. "Conformity Coefficient" (CC) by using Fels and Horn (1972).[11]

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[5] This indicator is from Marwah (1995) who follows the reasoning of Theil (1971), and it was used by Laaser and Schrader (2002) in the analysis of the trade pattern of Baltic States. See "European Integration and Changing Trade Patterns: The Case of the Baltic States, WP No: 1088, Kiel Institute of World Economics, January 2002

[6] The methodology was originally developed by Bela Balassa (1965) and refined later. See Balassa, (1965) "Trade Liberalization and "Revealed Comparative Advantage", *The Manchester School of Economics and Social Studies, No: 33, pp.99-123.*

[7] see Laffay Gerrard (1992)

[8] For methodology see Jurgen Donges et.al. (1982), "The Second Enlargement of the Community", Kieler Studien 171, Tübingen, Kiel/Germany.

[9] For details on the methodology and its analytical applications see Finger and de Rosa (1979), "Trade Overlap, Comparative Advantage and Protection", in: Herbert Giersch (Eds), On the Economics of Intra-Industry Trade, Symposium 1978, Tübingen, pp.213-240.

[10] Finger, J.M. and M.E. Kreinin (1979), "A Measure of Export Similarity and its possible Use", *Economic Journal*, No: 89, pp.905-912.

In order to determine the trade pattern of the six countries and estimate their competitiveness the following seven indices will be used:

In calculating both RCA, CEP, TO, ES and CC, the trade sectors "Standard International Trade Classification (SITC)" values have been divided also in five different groups or sub-sectors for the period between 1996 and 2000. Table A2 in appendix provides more details on the grouping.[12]

The grouping used is as following:

- Raw material- intensive goods [SITC 0, 2-26, 3-35, 4, 56]
- Labour-intensive goods [SITC 26, (6-62, 67, 68), (8-87, 88)]
- Capital- intensive goods [SITC 1, 35, 53, 55, 62, 67, 68, 78]
- Easily imitable- research oriented goods [SITC 51, 52, 54, 58, 59, 75, 76]
- Difficultly imitable research-oriented goods [SITC 57, 7-(75, 76, 78), 87, 88]

Where 2-26 or 3-35 etc. means group 2 except 26, 3 except 35 etc.

III. EMPIRICAL RESULTS

1. Absolute Entropy Index (AEI)

In order to analyse the trade pattern of the six candidate countries we will as a first step calculate the absolute entropy index of those six countries and of Germany and the United Kingdom in order to be able to compare the results of the candidates with some major economies in the European Union.

The formula used to calculate the absolute entropy index of export (import) is as following:

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[11] G. Fels and E.J. Horn "Der Wandel der Industriestruktur im Zuge der wirtschaftlichen Integration der Entwicklungsländer". Die Weltwirtschaft, Tübingen 1972, H.1, pp.107-128. An application for this coefficient to data of Greece, Portugal, Spain is contained in Donges and Schatz (1980).

[12] Gary C. Hufbauer and J.C.Chilas,"Specialization by Industrial Countries: Extend and Consequence". In H.Giersch (eds), The International Division of Labour, Problems and Perspectives, International Symposium, Tübingen 1974, pp.3-38.Henning Klodt, "Teknologietransfer und Internationale Wettbewerbsfahigkeit", Aussenwirtschaft, Vol.45.H.1, St Gallen, 1990, pp.57-79.
The whole exercise would have been more relevant, if it was done at individual product-at least at 3digit level-. It would be useful to compare share of each product in total exports.

$$I_{xi} = \sum_j b_{ij} \ln (1/b_{ij}) \text{ with } 0 < b_{ij} < 1 \text{ and } \sum_j b_{ij} = 1 \quad (1)$$

where b_{ij} is the export (import) share of country i to (from) country j. While calculating the absolute entropy index, the export (import) to (from) the European Union countries is taken into consideration. This indicator is used to measure the concentration or dispersion of the trade flow of the country in question. The higher the index the more dispersed is the export (import) pattern of that country. The validity of the index derives from weighting each component of share (b_{ij}) by its relevance $\ln(1/b_{ij})$. That means if the value of b_{ij} for a country is very high it will be scaled down by the $\ln (1/b_{ij})$ term and the maximum value is achieved when all shares are equal.[13] The results for the six countries in question a Germany and the United Kingdom are as following:

Table 1.

ABSOLUTE ENTROPY								
EXPORT								
	Turkey	**Bulgaria**	**Hungary**	**Romania**	**Poland**	**Czech Rep.**	**Germany**	**UK**
1996	1.8614983	1.909615	1.710066	1.786424	1.768018	1.4635865	2.223503	2.231138
1997	1.9177212	1.882845	1.609449	1.764661	1.766578	1.5219144	2.225901	2.224057
1998	1.9714922	1.943744	1.7134	1.757723	1.725821	1.4839337	2.227608	2.225091
1999	2.0144626	1.958586	1.732232	1.78359	1.760782	1.5105091	2.23378	2.219791
2000	1.9675476	1.942334	1.757718	1.829974	1.770543	1.5626079	2.226494	2.217119
IMPORT								
	Turkey	**Bulgaria**	**Hungary**	**Romania**	**Poland**	**Czech Rep.**	**Germany**	**UK**
1996	2.0160218	2.056658	1.879481	1.777305	1.995275	1.7352391	2.228018	2.143553
1997	2.0677357	2.062504	1.797973	1.809865	2.015524	1.7250083	2.226119	2.162911
1998	2.1087929	2.082783	1.792604	1.816019	1.978297	1.6294716	2.240906	2.168309
1999	2.1856816	2.088921	1.767986	1.805438	1.995691	1.6983643	2.262415	2.161777
2000	2.0979681	2.037757	1.806877	1.840259	1.993817	1.7283491	2.250186	2.164374

Source: United Nations, Yearbook of International Trade Statistics, own calculations

From the above results the conclusions that can be drawn are as following:

[13] For methodology see Laaser and Schrader (2002), pp.17-19.

- The export entropy values show that there are no noticeable changes over a time period of five years except to some extent for the Czech Republic and Turkey. This fact should be interpreted by the necessity of a considerable time period that the trade pattern of a country needs to show major changes since it is strongly linked to the production, labour distribution and long term- contracts of the various sectors.
- Interestingly, Turkey and Bulgaria seem to have the most diverse export pattern among the countries in question although they are still much more concentrated than those of Germany and the United Kingdom. The Czech Republic, on the other hand, has to face the most concentrated export pattern among the countries in question. Poland and Hungary have also a quite concentrated trade pattern. Those three countries share a common property of sending more than 50% of their overall European exports to Germany (around 62% for Czech Republic) and they have also a considerable amount of trade share with Austria. So, a conclusion that could be made would be the importance of distance between two countries in their trade volume. The distance between these three countries and Germany, one of the major economies in the European Union, is much smaller than to any other major European Union member economy. Turkey and Bulgaria, on the other hand, compared to those three countries are further away from any major economy (France, Germany, UK), which might be a factor of having a more dispersed export pattern.
- In case of the import entropy index each of the six countries is closer to the values of Germany and France as it was the case for the export entropy index. For the years of 1999 and 1998 Turkey had even higher import dispersion than the United Kingdom. The reason for the closeness of the values might be the fact that all European Union countries are highly industrialized.
- Turkey showed a considerable increase in its import entropy index (except 2000), which might very well be a result of signing the Customs Union Agreement. Therefore, there might be expected similar increases in the other countries after joining the European Union.

2. Revealed Comparative Advantages (RCA Indices)

The revealed comparative advantage indices are used to calculate the international competitiveness in terms of trade of the six countries in question. In order to analyse the performance of these six countries two different methods of calculating the RCA indices are used. The first one derives from Balassa (1965) and the formula is as following:

$$RCA = \ln\left[X_i / M_i\right]\left(\sum_{i=1}^{n} X_i / \sum_{i=1}^{n} M_i\right) \times 100. \quad \textbf{(2)}$$

In this formula, X stands for exports and M for imports respectively. The subscript i refers to the two digit SITC members of one of the groups used; namely, raw material intensive goods, labour intensive goods, capital intensive goods, easily imitable research oriented goods and difficultly imitable research oriented goods. The higher (lower) the RCA index, the more (less) successful is the trade performance of the country in question in a particular area of industry. The empirical results of the RCA index of Balassa for the six countries and the European Union as a whole, to make a better analysis, are as following.

Table 2

RCA Indices by Product Category						
Category /Year	**Turkey**	**Bulgaria**	**Hungary**	**Rumania**	**Poland**	**EU/15**
Raw Material Intensive Goods						
1996	-48.3034	-77.1588	-8.95051	-56.4599	-32.1814	-39.7353
1997	-36.7679	-76.4669	1.074185	-56.7747	-19.9431	-36.5721
1998	-29.9057	-70.1203	5.745996	-53.3491	-22.599	-13.4745
1999	-39.9993	-43.5435	-3.33761	-21.0716	-27.9422	-35.0475
2000	-57.2541	-51.4373	-2.87906	-26.771	-42.4056	-44.7325
Labour Intensive Goods						
1996	31.0104	10.67545	-8.84321	10.55883	-0.80015	8.162357
1997	30.26224	10.94216	-14.5454	10.08841	-4.1554	8.683593
1998	35.59936	1.862314	-19.3676	4.683361	-6.51859	1.385738
1999	48.07308	1.263334	-20.5335	6.705975	-5.64589	2.934625
2000	29.09503	9.907596	-22.5071	6.410676	-1.74043	2.946976
Capital Intensive Goods						
1996	-23.3951	87.42484	-27.1451	6.532161	-16.7859	15.63051
1997	-35.6087	99.1317	-25.3212	31.47984	-23.0047	15.67277
1998	-39.4172	52.26951	-35.5219	5.992258	-30.5642	11.45449
1999	-24.8141	0.391633	-24.6764	6.523602	-29.0723	10.26159
2000	-39.6537	-2.75204	-21.3807	-3.58825	-15.8849	9.377196
Easily Imitable Research-Oriented Goods						
1996	-133.553	-18.1452	-44.3157	-84.3012	-93.7762	-0.00162
1997	-127.462	-6.60435	-0.04628	-89.6075	-84.598	1.638976
1998	-116.487	-49.1674	7.562118	-112.609	-85.5536	-1.34526
1999	-143.158	-71.7251	14.59991	-108.935	-92.4095	-0.26264
2000	-107.158	-62.0538	24.07018	-58.7632	-91.1966	-4.4926
Difficult Imitable Research-Oriented Goods						
1996	-102.401	0.080408	-17.5325	-59.9871	-43.7307	30.80067
1997	-99.9811	-11.4927	-13.9654	-63.28	-60.9114	31.17524
1998	-99.9454	-60.2555	-11.4531	-49.1111	-44.6333	25.39098
1999	-81.3473	-59.0639	-17.678	-43.8733	-40.6845	19.18847
2000	-66.5371	-53.4302	-25.9665	-56.8297	-30.3391	10.84716

Source: United Nations, Yearbook of International Trade Statistics, own calculations

The main conclusions that can be drawn from this empirical results are as following:

- It is interesting to notice that, except for Hungary, all other five countries and the EU/15 have comparative disadvantages in the raw material-intensive sector. Turkey, the Czech Republic, Romania and partly Bulgaria appear in broad terms to be in a strong competitive position with respect to the labour-intensive sector, but they did so in different degrees. Turkey and the Czech Republic have been maintaining their strong positions compared to others. In the case of Hungary and Poland the results show that both countries have been losing their comparative advantage concerning intensive-intensive products. As far as the capital- intensive goods are concerned, in Group I, the Czech Republic has the strongest position. Even though Bulgaria and Romania have been losing their comparative advantage they still seem to be in a better situation compared to Turkey, Hungary and Poland. Despite fluctuations are observed in some years, it is obvious that Turkey's position in the capital-intensive goods is relatively much worsened than the one of the Czech Republic and Bulgaria.
- Except for Hungary in the easily imitable research oriented goods sector, all six countries have very noticeable disadvantages in terms of the easily and difficultly imitable research oriented goods which shows their strong dependence to the European Union in those sectors.
- As it is expected, the European Union with 15 members seems to have a strong comparative advantage partly in labour- intensive goods, mainly in capital-intensive and difficultly imitable research-oriented goods.

The second RCA index used for calculating the international competitiveness of the six countries in question comes from Lafay (1992) which formula is as following:

The Lafay index f_{ik} is defined as $f_{ik} = y_{ik} - z_{ik}$

where

$$y_{ik} = a\,(e_k^t\, X_{ik} - I_k^t\, M_{ik}) / Y_i$$

$$z_{ik} = g_{ik} y_{ik}$$

$$g_{ik} = (e_k^t\, X_{ik} + I_k^t\, M_{ik}) / (e_k^t\, X_i + I_k^t\, M_i)$$

$$X_i = \sum_k X_{ik}$$

$$M_i = \sum_k M_{ik}$$

$$Y_i : \text{GDP} \qquad (3)$$

a: constant which is taken as 1000 in the empirical work

e_k^t, i_k^t : weights = $(W_k^0/W^0) / (W_k^t/W^t)$

W: volume of world trade

Where i stands for the country in question and k for the different sectors, the superscript t stands for the year in question and the superscript 0 for the base year which was taken as 1996 into the calculations. X refers to exports and M to imports respectively.

The Lafay index, unlike to the one of Balassa, takes in a sense into account the difference between the values of the exports and imports. This measure of RCA considers whether the sector in question has a comparative advantage or disadvantage by comparing its attributed trade balance with its actual trade balance in relation to GDP. The Lafay index can be used to rank different sectors in terms of their comparative advantage status. The Lafay index tries to overcome some shortcomings of the Balassa index by taking into consideration the intra-trade flows, the GDP and the weighting scheme reflecting the characteristics of the product at the world level.[14]

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[14] Honggue Lee (1995), "A Perspective on the Effects of NAFTA on Korea", 6th Annual East Asian Seminar on Economics", Korea Development Institute, Paper 3.2. Seoul, Korea p.13

The empirical results obtained for the six countries and the European Union are as following:

Table 3

RCA Lafay Index		Turkey	Bulgaria	Hungary	Rumania	Poland	CzechRep.
Raw Material Intensive Goods							
	1996	-27.5348	-70.2915	-6.30023	-44.1075	-21.3288	-28.8682626
	1997	-21.2222	-74.9219	-0.60684	-43.293	-14.9521	-33.4897888
	1998	-20.1795	-86.222	-10.3355	-53.6565	-26.3385	-41.9164341
	1999	-19.6338	-60.4802	-5.86321	-18.3011	-22.0824	-22.6544821
	2000	-31.5692	-72.0222	-1.57407	-22.8169	-28.1772	-39.1802659
Labor Intensive Goods							
	1996	19.98981	7.605198	-6.86941	9.80629	-0.66658	12.8918308
	1997	20.86128	9.165914	-11.0424	10.26493	-3.35565	12.2584344
	1998	25.16783	7.244326	-12.3592	11.46385	-2.24311	28.6070083
	1999	26.04875	2.752874	-18.3668	8.016304	-4.3136	21.3987031
	2000	20.53154	9.946689	-25.0219	4.549751	-3.7051	16.9693216
Capital Intensive Goods							
	1996	-11.0464	57.3358	-13.539	3.335946	-9.21677	0.82789803
	1997	-17.8659	66.07166	-12.7175	16.6313	-14.1393	9.39283108
	1998	-15.386	45.04431	-18.8033	5.572798	-18.7444	26.2637227
	1999	-8.59868	1.334141	-15.7109	3.271344	-17.9244	23.9846483
	2000	-23.589	-4.55822	-17.7806	-3.45361	-11.9057	21.3502112
Easily Imitable Research-Oriented Goods							
	1996	-27.0109	-7.89127	-21.8427	-25.352	-33.1703	-42.8301988
	1997	-27.9994	-3.04861	-0.26131	-26.9989	-34.299	-39.6502134
	1998	-26.2445	-21.6601	8.02445	-36.8393	-35.6286	-37.6995552
	1999	-29.9741	-27.7634	10.68287	-30.0306	-36.2994	-39.4665013
	2000	-33.8256	-27.4119	20.30931	-26.432	-36.5747	-39.3565241
Difficultly Imitable Research-Oriented Goods							
	1996	-44.2071	0.036957	-11.0113	-33.3139	-26.9495	-33.2318616
	1997	-44.7431	-4.72874	-11.3051	-34.392	-37.7634	-19.3743326
	1998	-38.3824	-24.7905	-6.42054	-27.3178	-30.5771	-9.04228212
	1999	-27.1093	-35.8954	-12.8637	-21.0246	-25.7084	-6.29879612
	2000	-29.5573	-30.8893	-21.148	-33.1851	-17.5589	-6.54921252

Source: United Nations, Yearbook of International Trade Statistics and World Bank Online Database, own calculations. Own calculations.

In the light of the above empirical results the following conclusions can be drawn:

- The results for the Balassa index and the Lafay index show in general parallel characteristics. But we have to take into account that for the Lafay index the comparative disadvantage for easily and difficultly imitable research oriented goods is nearer or sometimes less to the comparative disadvantage in the other sectors when compared with Balassa's RCA index. The underlying reason might be that although they performed very poorly in exports of research oriented goods their imports of such goods is not as high as it would be expected.
- Poland surprisingly showed comparative disadvantage in all of the sectors, whereas Bulgaria worsened its performance year by year. Hungary improved its performance in terms of easily imitable research oriented goods and the Czech Republic improved its performance in terms of capital intense goods, which might be a result of the increasingly attracted foreign direct investment by those countries.
- A general point to be noticed is that all of the six countries will need a considerable time period to catch up with the performance of the European Union countries.

3. Comparative Export Performance (CEP)

Since the RCA indices are based on actual export and import flows, trade policy interventions in the form of tariff and non-tariff barriers on imports can distort their calculation. The CEP- index based only on export shares and allows for comparison of findings between the two measures. As a second step we estimated the structure of international competitiveness for the six candidate countries between 1996 and 2000.

$$CEP = \left(x_{ij} / X_{iw}\right) / \left(\sum x_{ij} / \sum X_{iw}\right) \qquad (4)$$

where the subscript j refers to the country in question and subscript w to the EU/15, respectively. CEP index values above (or below) unity mean that the particular sectors have a greater (lower) share in total exports of the individual country than they have in the EU as a

whole. Thus, the country in question possesses a relative advantage (disadvantage) in the export of these products.

Table.4

CEP		Turkey	Bulgaria	Hungary	Romania	Poland	Czech Rep.
Raw Material Intensive Goods	*1996*	1.475433	1.601834	1.836943	1.496581	1.548977	1.00178736
	1997	1.497794	1.584964	1.368086	1.334352	1.648594	0.8740686
	1998	1.252748	1.287149	1.000775	1.050357	1.305591	0.65615663
	1999	1.3585	2.020569	0.957537	1.519608	1.424801	0.78424863
	2000	1.1065	2.029639	0.830081	1.527644	1.246406	0.75064866
Labor Intensive Goods	*1996*	2.311125	1.069708	1.315015	2.025261	1.726113	1.51098923
	1997	2.351106	1.154423	0.994236	2.071454	1.766301	1.43873776
	1998	2.591834	1.468172	1.036652	2.415301	1.854742	1.50341032
	1999	2.389582	1.59418	0.956688	2.296542	1.802373	1.45940943
	2000	2.41511	1.740439	0.853971	2.136478	1.66087	1.41539315
Capital Intensive Goods	*1996*	0.941161	1.50239	0.673841	0.881974	0.883403	1.09184565
	1997	0.899094	1.501235	0.581321	1.004718	0.941626	1.2243841
	1998	0.806157	1.654632	0.551779	0.91208	0.888053	1.23519388
	1999	0.859413	1.174095	0.628992	0.672619	0.901412	1.22136936
	2000	0.891729	1.032956	0.64075	0.69883	0.994412	1.27088427
Easily Imitable Research	*1996*	0.127678	0.64209	0.732327	0.2895	0.33675	0.47098822
Oriented Goods	*1997*	0.149588	0.665073	1.315067	0.283293	0.383833	0.42860182
	1998	0.224392	0.527762	1.350904	0.228174	0.371184	0.39192325
	1999	0.191358	0.306701	1.372459	0.233609	0.328317	0.33539175
	2000	0.252725	0.326349	1.544682	0.430943	0.346992	0.42221185
Difficult Imitable Research	*1996*	0.290045	0.476235	0.745813	0.456027	0.642131	0.84515374
Oriented Goods	*1997*	0.311297	0.427498	0.942391	0.445747	0.519266	0.91007086
	1998	0.338947	0.305929	1.082071	0.496003	0.702831	1.03361575
	1999	0.420683	0.428535	1.080495	0.555288	0.740161	1.04237736
	2000	0.4574	0.386828	1.075431	0.497426	0.844526	1.00545811

Source: United Nations, Yearbook of International Trade Statistics, and various years. Own calculations. Own calculations.

For this analysis, the whole trade sector has been broken down into five different groups.

The results for Comparative Export Performance (CEP) are summarised in Table 5A and the following conclusions can be drawn:

- To begin with, Turkey appears to have been keeping its initially strong position of comparative advantages in the export of raw material and labour intensive goods. Concerning the capital -intensive goods Turkey has increased its competitiveness remarkably but its CEP's values are still below the unity. As the results show, the Turkish economy has continuous disadvantages in easily and difficultly imitable research-oriented goods.
- Bulgaria and Turkey had generally the same export structures regarding raw material and labour intensive goods. Concerning easily and difficultly imitable research-oriented goods Bulgaria has shown a quite low export performance. The results for 1996 and 1997 indicate that Bulgaria is still highly competitive in trade of capital-intensive goods with the EU as a whole.
- Hungary possessed relative advantage in export of raw material and labour intensive goods 1996-1999. Generally spoken, Hungary seems to be loosing its advantages in these sectors with the EU/15. Hungarian economy indicates a noticeable performance improvement in the export of easily and difficultly imitable research-oriented goods.
- In the case of Romania, the results show that the country is highly competitive in terms of export performance in raw material and labour intensive goods. But it still has comparative disadvantages in exporting of capital intensive; easily and difficultly research- oriented goods.
- Poland seems to be still highly competitive in raw material and labour intensive goods. The export performance of the capital-intensive goods shows an increasing tendency throughout the time. It is obvious that Poland's economy shows a low performance in exporting of easily and difficultly imitable research-oriented goods.

- In the case of the Czech Republic, the results show that the country seems to be loosing its advantage in export performance in raw material intensive goods and keeping its relative competitiveness in labour and capital intensive goods. CEP's also show that the Czech Republic is the only country of the six (Turkey, Bulgaria, Hungary, Romania, Poland and the Czech Republic) that has been completing the first stages of export substitution and export diversification processes successfully and achieving a relative advantage together with Hungary compared to others in exports of difficultly imitable research-oriented goods between 1996 and 1999.
- The trade patterns for the six countries that has been revealed by the RCA indices, based on export-import ratios, are generally and to large extent confirmed by the CEPs. Turkey, Bulgaria, Romania and Poland are more similar in their export structures in relation to Hungary and the Czech Republic.

Table 5:

	TURKEY		BULGARIA		HUNGARY		ROMANIA		POLAND		CZECH REP.	
	CEP1	CEP	CEP1	CEP2	CEP1	CEP2	CEP1	CEP2	CEP1	CEP2	CEP1	CEP2
RAW MATERIAL INTENSIVE	0,887642	0,938822	0,919677	1,093965	0,565679	0,824991	0,907395	1,032702	0,907921	0,955588	0,764913	0,943893
LABOR INTENSIVE	1,054425	1,013084	1,392252	1,132137	0,730324	0,903556	1,101065	1,017484	1,026046	0,991652	0,962441	0,984426
CAPITAL INTENSIVE	0,918119	0,9889	0,892398	0,922695	0,891472	0,992627	0,93207	0,955848	1,054304	1,031807	1,133821	1,039892
EASILY IMITABLE	1,601809	1,211287	0,710915	0,868633	1,847156	1,241107	1,01556	1,163133	1,06186	1,012064	0,837669	0,984762
DIFFICULT IMITABLE	1,317319	1,12263	0,813039	0,979183	1,401286	1,101413	1,093391	1,026382	1,092761	1,089072	1,180709	1,046406

Note: CEP1 shows the comparison of the average ratio CEP 2000-1997/CEP 1996. CEP2 indicates the comparison of average ratio CEP 2000/ CEP 1999 and so on.

- Competition is a process evolving and changing over time. Therefore, it seems to be necessary to compare changes in the indicators over time. Table 5 shows changes in competitiveness of the six candidate countries. In the case of Turkey it is obvious that the CEP indicator for "difficult imitable research-oriented " is still below those of all other countries in Table 4. Nevertheless, according to CEP2 Turkey's success

in improving its competitiveness has been far better than of all other countries. This can be measured by the comparison of the ratio CEP2 (/2000)/ CEP 1999...for the relevant item for candidate countries which are 1.12 for Turkey, 1.10 for Hungary, 1.05 for the Czech Republic, 1.02 for Romania, 1.09 for Poland and 0.98 for Bulgaria. In other words, Turkey has its comparative advantage in "difficult imitable research oriented goods" compared to the other five countries including Hungary, the Czech Republic and Poland. Besides Hungary somewhat similar results are obtained in the case of "easily imitable research-oriented goods". According the results, Turkey is leading and gaining ground while the Czech Republic is losing rapidly. As far as "capital intensive goods" are concerned, the Czech Republic and Poland have improved their positions in comparison to the other candidate countries. Turkey's position remains almost unchanged. In the case of "labour intensive goods", Hungary and the Czech Republic are losing its initial positions while other countries are keeping their strong positions over time. Interestingly, besides Bulgaria and Romania all other countries have been losing its comparative advantage in trade of "raw material intensive goods".

4. Trade Overlap (Intra-and Inter- Industry Trade)

As a further step, we consider the overall importance for The Six and the EU/15 of intra-industry in comparison to inter-industry specialization in international trade. As it is known, under monopolistic competition there exists two-way trade within the manufacturing sector. This exchange of manufactures for manufactures is called intra-industry trade and an exchange of manufactures for food, for example, is called inter-industry trade. The intra-industry trade suggests how and to what extent the economy in question is already integrated into the world market and the degree of liberalization that the economy has already realized throughout the economic development process.

$$TO = 2\sum_{i=1}^{n} min(X_i, M_i) / \sum_{i=1}^{n} (X_i + M_i). \qquad (5)$$

where *Xi* and *Mi* refer to exports and imports, respectively, of each of the SITC 0-9 production sectors *i,* and *"min"* defines the magnitude of the total trade that overlaps in dollar terms. The coefficient can vary between 0 and +1. The closer it comes to unity, the more intra-industry specialization exists. A lower coefficient implies that trade takes place in form of inter-industry specialization.

The empirical results for The Six and the EU/15 with the world presented in Table 4.1 can be divided into two main parts:

Aggregate TO Coefficients

- It is expected that the TO coefficients for EU/15 would be higher than for any of the countries and come close to unity. This emphasises that the EU/15 has already realized full intra-industry specialization in trade with the world.
- Of the six countries the Czech Republic's, Hungary's and Poland's TO coefficients come closest to unity but are still below the TO coefficients for the EU/15. The Czech Republic seems to be in the best position as compared to others and seems capable of catching up with the EU/15 in the next decades.
- The TO coefficients for Turkey and Romania are much lower than for the others. For both countries, though, the TO coefficient suggests mainly inter-industry specialization. The TO results for Bulgaria (1996-97) occupy an intermediate position and the gap between the EU/15 and Bulgaria is getting closer.

Table 6

TO-Overall							
	Turkey	**Bulgaria**	**Hungary**	**Romania**	**Poland**	**Czech Rep.**	**EU/15**
1996	0.482521	0.617597	0.710944	0.541062	0.668839	0.78198412	0.886705
1997	0.446093	0.669	0.795194	0.530164	0.649079	0.80486711	0.888521
1998	0.462043	0.612815	0.810757	0.524868	0.804005	0.84919744	0.892767
1999	0.491212	0.570192	0.813403	0.542232	0.80097	0.84204687	0.902894
2000	0.4647	0.607689	0.804561	0.557893	0.710405	0.79626044	0.911848

Source: United Nations, Yearbook of International Trade Statistics, and various Years

Table 7 ***(Own Calculations)***

By Sectors	**Turkey**	**Bulgaria**	**Hungary**	**Romania**	**Poland**	**Czech Rep.**	**EU/15**
Raw Material Intensive Goods							
1996	0.342703	0.522838	0.514252	0.577172	0.75609	0.68444283	0.811997
1997	0.318255	0.604325	0.524436	0.57604	0.816323	0.68562352	0.827629
1998	0.338916	0.532533	0.56194	0.543983	0.857114	0.75843928	0.79668
1999	0.353979	0.600785	0.567191	0.576441	0.798507	0.74369875	0.829663
2000	0.270436	0.628474	0.623974	0.609021	0.679812	0.63240328	0.773591
Labor Intensive Goods							
1996	0.652622	0.753464	0.776644	0.522419	0.74003	0.89177769	0.946244
1997	0.64615	0.734294	0.789853	0.509978	0.751631	0.90048601	0.942851
1998	0.634095	0.69477	0.814022	0.527698	0.794803	0.90828262	0.949648
1999	0.604586	0.640271	0.829981	0.482418	0.797388	0.90636029	0.931549
2000	0.6437	0.695179	0.826776	0.471363	0.796002	0.88018433	0.954336
Capital Intensive Goods							
1996	0.700264	0.388175	0.675544	0.563546	0.670947	0.86668845	0.905985
1997	0.632058	0.365706	0.772345	0.511548	0.638713	0.83796942	0.902275
1998	0.625572	0.582546	0.740706	0.48243	0.810799	0.78283069	0.919527
1999	0.720256	0.448698	0.823244	0.543817	0.8357	0.77442778	0.931207
2000	0.614118	0.471459	0.832868	0.552756	0.813914	0.76200382	0.92682
Easily Imitable Research-Oriented Goods							
1996	0.151097	0.658661	0.69556	0.383752	0.316019	0.48884451	0.918853
1997	0.175395	0.637752	0.871839	0.397729	0.344177	0.51108121	0.916076
1998	0.244218	0.660681	0.832413	0.311918	0.867865	0.67481337	0.907829
1999	0.204424	0.508454	0.796605	0.38585	0.8401	0.62998183	0.900394
2000	0.225968	0.501998	0.779789	0.616597	0.347868	0.58362397	0.931567
Difficult Imitable Research-Oriented Goods							
1996	0.397692	0.999562	0.889649	0.583479	0.674074	0.80262394	0.846943
1997	0.274785	0.939607	0.922064	0.59565	0.536265	0.88121729	0.850264
1998	0.310897	0.635228	0.936129	0.664468	0.730991	0.94961059	0.873477
1999	0.450716	0.589373	0.901265	0.734783	0.75182	0.95502603	0.899659
2000	0.435275	0.628896	0.856514	0.650189	0.766936	0.92029392	0.939447

TO Coefficients by Sector:

- Table 4.2 shows estimations for the TO coefficients by sub-sectors. As far as the sub-sectors are concerned Turkey approaches intra-industry specialization only in capital intensive and in labour intensive goods. In other groups of goods, Turkey shows the characteristic of inter-industry trade with the world.
- Interestingly, Bulgaria's economy indicates the characteristics of intra-industry trade mainly in difficultly imitable research-oriented and labour intensive goods between 1996 and 1997, whereas in other groups the Bulgarian economy shows the typical industrialization pattern of developing countries. Romanian economy generally shows features of inter-industry trade with the world market.
- It is interesting to notice that Hungary's trade in many industries or areas of production is on the best way to create more the intra-industry type of specialization, with the exception of raw-material-intensive goods.
- The TO results for the Czech and to large extent Hungarian economy reflect mainly intra-industry specialization but they did so in different degrees. In all groups of production more than half of the values of its exports to the world is offset by similar imports. Especially in labour intensive and capital-intensive products, the country has already caught up with the EU/15.[15]

5. Export Similarities (ES)

Finally, we calculate whether or not the exports of Turkey overlapped with each of the six-candidate countries in the period 1996-1999. Coefficients of "export similarity" (ES) using the formula of Finger and Kreinin (1979) measures the proportion of a country's exports matched by its competitor's exports in the same product category. The ES coefficient can vary

[15] As is known, the relative importance of intra-industry and inter-industry trade depends on how similar the capital-labour ratios are. If they are different, there will be a relatively low level of intra-industry trade, and trade will be based on more comparative advantage. However, it must be pointed out that models of imperfect competition can explain intra-trade but cannot by themselves explain why some countries are net exporters of certain manufactures and net importers of other goods. See Paul Krugman and Maurice Obstfeld, International Economics, Fifth Edition, 2000, pp.136-141. Therefore, the TO results must be regarded and interpreted with the other results in order to explain the whole trade pattern.

between 0 and 1. The closer it comes to unity the greater is the degree of similarity between two countries. On the other hand, 0 indicates no export similarity between the countries in question and no overlap at all.

$$ES(ab,c) = \sum_i \left[EX_i(ac) - \frac{EX_i(ac) + EX_i(bc)}{2} \right] \qquad (6)$$

This formula measures the difference in the export patterns of country *a* and *b* to market *c*. If the commodity distribution of the exports of (*a*) and (*b*) are identical, then the index will take on a value of 0. Ex_i (*ac)* is the share of commodity *i* in *a's* exports to *c*.

The estimated ES coefficients show that the degree of export similarity (besides Hungary) between Turkey, Bulgaria, Romania, and Poland with the world market is very high. This means that by a possible accession of Turkey into the EU or within the customs union, Turkish export industries compete, first of all, with export goods originating from Poland and Romania, and then Bulgaria, followed by the Czech Republic and the EU/15, but at a lesser degree. The main question here is whether Turkish export goods bear complementary or substitutive features.

Table 8

Export Similarity Coefficients, 1996-2000

Year	Bulgaria	Hungary	Romania	Poland	Czech Rep.	EU /15
1996	0,73	0,73	0,93	0,86	0,76	0,65
1997	0,74	0,62	0,92	0,87	0,72	0,64
1998	0,76	0,60	0,94	0,85	0,70	0,64
1999	0,83	0,60	0,94	0,88	0,73	0,66
2000	0,84	0,59	0,90	0,84	0,75	0,69

Source: United Nations, *Yearbook of International Trade Statistics*, various years, own calculations.

6. Conformity Coefficient (EC)

The last instrument that will be used to analyse the trade pattern and the competitiveness of the six countries in question is the conformity coefficient for the exports of the six countries compared with the exports of the European Union as a whole. The formula that is used to calculate the values for these six countries is as following:

$$\frac{\sum_{i=1}^{n} x_i m_i}{\sqrt{(\sum_{i=1}^{n} XiXi)(\sum_{i=1}^{n} MiMi)}} \qquad (7)$$

which takes values between 0 and 1. In this equation, x_i and m_i refer to the two structures that are compared; that is, one of them refers to the exports of one of the six countries and the other to the exports of the European Union. The summation is made over the five main groups of sectors. (raw-material intense, labor intense, etc) The higher the value of the conformity coefficient the more identical are the export structures of the two countries compared with each other.

The empirical results found are as following:

Table 9

EXPORT		Turkey	Bulgaria	Hungary	Rumania	Poland	Czech Rep.
1996		0.758615	0.906485	0.933093	0.827263	0.889198	0.951274592
1997		0.753399	0.897671	0.968844	0.823687	0.867594	0.953265099
1998		0.738014	0.851467	0.969772	0.788333	0.891165	0.943855416
1999		0.765157	0.846287	0.972325	0.785959	0.887944	0.939843386
2000		0.775927	0.825155	0.958627	0.816599	0.917569	0.948049848

Source: United Nations, Yearbook of International Trade Statistics, own calculations

The main results that can be drawn from the above data are as following:

- Especially Poland, the Czech Republic and Hungary have values very near to 1, meaning that their export structure or pattern shows great similarity with that of the European Union. The fact is that considering the European Union as a single country, would not be a too unrealistic way of analysis. The results point to the fact that especially those three countries show in a sense a microstructure of the export pattern of the whole European Union. The results would be different if the analysis would be made with respect to only one of the members of the European Union.
- Turkey, Bulgaria and Romania on the other hand show a rather differentiated structure from the European Union, which can be confirmed with their RCA indices. Their strong disadvantages in some sectors are not only because of their seemingly large amount of import but also their weakness in the export performance of some sectors.

CONCLUSION

The empirical analysis made on the export and import entropy (AEI), the revealed comparative advantage indices (RCA), comparative export performance (CEP), trade overlap (TO), export similarity index (ES) and the export conformity coefficients (CC) put light on the trade pattern and trade competitiveness of Turkey, Bulgaria, Rumania, Hungary, Poland and the Czech Republic – all of them candidates for the European Union.

First of all, the results show that all countries have still a long way to catch up with the European Union. The main failure of all these countries is their weakness in the performance of production in research-oriented goods where only Hungary could be an exception to some extent. Their performance in other sectors is still to weak to compensate the negative effective of the research oriented goods. Especially the Czech Republic, Hungary and Poland have to overcome their poor performance in the diversification of their exports which still seems to be profoundly dependent. Turkey on the other hand seems to catch up with the European Union countries in a short time period, which can be justified with the upward trend. Empirical work not included in this work covering the period from 1991 to 1996 shows that Turkey has improved its trade diversification in a great extent from the beginning of the 1990s to the

beginning of the 2000s. There a great acceleration can be seen especially after 1996 which points to the fact that the Customs Union Agreement signed with the European Union had a positive effect on the trade pattern of Turkey.

The main point that could be drawn is that all six countries need to increase their transfer of technology to overcome the shortcomings of their trade balance. The main accelerator would be to attract more and more foreign direct investment, which requires a stronger economic stability in all countries.[16] Improving competitiveness is depended on three levels: Firm, industry and national macroeconomic policies. Although the national macroeconomic stability is one of the main determinants for successful trade policy, firms have to take action to invest in close cooperation with multinational companies (MNCs), up-grade and improve productivity, quality of human resources, in-time delivery, otherwise the country will not succeed. It is very important for managers to adjust themselves to changes in the rules of the game for operation in the domestic and international markets.

Becoming a full-member of the European Union will have very positive effects on the process of overcoming the existing negative aspect in the trade diversification of the analysed six countries. Repeating the above analysis in a couple of years will definitely bring results that will prove the positive effects of becoming a European Union member in terms of trade competitiveness.

[16] It seems to be a close relationship between Foreign Direct Investments (FDI) and structural changes in foreign trade. In fact, two-third of FDI invested in Eastern Europe went to the Czech Republic, Hungary and Poland. See for more detailed analysis, Jamuna P. Agarwal (2000) , " EU-Direktinvestionen im Integrationsprozess: Perspektiven für die Osterweiterung", in: Die Weltwirtschaft, Heft 3, pp.330-354.

APPENDIX

Table A1

Some Indicators of Economic Structures of Bulgaria, the Czech Republic, Hungary, Poland, Romania Turkey and the EU/15.

Indicator	Bulgaria	Romania	Poland	Turkey	Hungary	Czech Rep.	EU/15
Population (2001, in millions)	7,9	22,4	38,6	68,6	10,2	10,2	375,0
Budget deficit (%) – 2000	-0,7	-4,0	-3,6	-11,0	-3,1	-4,3	-
Inflation rate (%) - 1997-2001	9,8	46,3	9,9	69,9	12,4	5,6	3,3
Current Account/GDP (%) – 1997-2001	-1,5	-5,3	-5,4	-0,8	-3,4	-4,3	-
Annual GDP Growth rates (%) – 1997-01	2,0	-1,0	4,2	1,2	4,5	1,1	3,7
GDP (billion Euro) – 2001	51,5	132,2	355,5	356,8	121,3	136	8348,3
Distribution of GDP (%)							
Agriculture	13,8	14,6	3,4	12,1	5,8	4,2	4,4
Industry*							30,6
Services*							65
Per capita income (Euro) – 2001	6500	5900	9200	5200	11900	13300	23380
Foreign direct investments (net inflow in % of GDP) – (Average 1997-01)	5,6	3,5	4,2	0,8	4,3	7,8	-
Trade with the EU							
Export (%) – 2001	54,8	67,8	69,2	51,6	74,3	68,9	-
Import (%) – 2001	49,4	57,3	61,4	44,6	57,8	61,8	-

Source: The European Union (Economics and Politics), Ali M. El-Agraa; Financial Times, Prentice Hall, 2001, Toward the Enlarged Union; Strategy Paper and Report of the European Commission, 9 October 2002.

Table A2:

SITC Classification

Raw material intensifies goods: (RMIG)

SITC 0 Food and live animals
SITC 2 Crude Materials excl. fuels
SITC 3 Mineral Fuels etc
SITC 4 Animal Vegetable Oil fat

Labour intensive goods (LIG)

SITC 26 Textile fibres and Waste
SITC 6 Basic Manufactures
SITC 8 Misc Manufactured Goods

Capital-intensive goods (CIG)

SITC 1 Beverages and Tobacco
SITC 35 Electrical Energy
SITC 53 Dyes, Tanning, Colour Production
SITC 55 Perfume, Cleaning etc Production
SITC 62 Rubber manufactures Nes
SITC 67 Iron and Steel
SITC 68 Non-Ferrous Metals
SITC 78 Road Vehicles

Easy Imitable Research Oriented Goods (EIRG)

SITC 51 Organic Chemicals
SITC 52 Inorganic Chemicals
SITC 54.1 Medical Pharm Products
SITC 58 Plastic Materials etc
SITC 59 Chemical Materials Nes
SITC 75 Office Machines and Adapt Equipment

Difficultly imitable research-oriented goods

SITC 7 Machines, Transport Equipment
SITC 87 Precision Instrument
SITC 88 Photo Equipment, Optical Goods etc

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