EUROPEAN ENLARGEMENT: MODELLING FRAMEWORK AND SIMULATIONS

Rossella Bardazzi and Maurizio Grassini
University of Florence (Italy)

" ..... one of the greatest tasks for the EU is to heal the division of Europe and to extend the same peace and prosperity to the central and eastern European countries that the present EU countries have" (Agenda 2000).

1 - INTRODUCTION

This paper examines the economic implications of European enlargement on the European Union and in particular on the Italian economy. Enlargement may be treated as the merging of two countries, that is, the EU15[1] and the Central and Eastern European Countries (CEEC)[2]. The main factor to be considered here is the creation of a Customs Union plus Single market implied by such an enlargement.

From a methodological perspective, the economic impact of this kind of enlargement may be evaluated for the new economic area as a whole or for each Member State individually. The subsequent accession, provided it takes place in the proper institutional framework, will foster economic growth and prosperity in both the candidate country and the existing Member States. Clearly, the impact will be unbalanced insofar as the positive impact will be much more significant for the applicant countries than for the existing EU countries.

The results of this, as any other, piece of research, need to be carefully read in the context of the instruments applied, the level of aggregation adopted, and the data employed if we are to obtain a correct reading of the analysis.

The availability of a multi-sectoral model of the Italian economy and of a significant group of similar models of key countries has made possible the present study. The Italian model is named INTerindustry Italian MOdel or INTIMO. The group of the models – including INTIMO – constitute the INFORUM (INterindustry FORecasting at University of Maryland)[3] system of models, and all of which are linked by means of an international trade model which makes the country multi-sectoral model a 'true' interlinked system. Thanks to this system of models, this

[1] The EU15 is the group of the present Member States of the European Union: Austria, Belgium, Denmark, France, Finland, Germany, Greece, Holland, Luxembourg, Ireland, Italy, Spain, Portugal, Sweden and United Kingdom.

[2] The CEEC are the present Candidate Countries under the Accession Program. (See next paragraph).

[3] The INFORUM works on economic modelling and forecasting is documented at the web site inforumweb.umd.edu

paper presents unprecedented results relating to the effects of the EU enlargement on a specific Member State, i.e. Italy.

The present study, which spans a period of ten years (2001-2010) refers to a baseline scenario where the applicants follow a growth path not strengthened by the benefits of improved economic integration. In the alternative scenarios, these advantages are assumed to increase the applicants GDP rates of growth by about 2 per cent annually; this is a widespread assumption which makes our simulations easily comparable with those of previous (and forthcoming) studies. Although applicant countries have made considerable progress towards the full participation in a single market under the Europe Agreements, trade is still restricted by the existence of a range of border and non-border measures and a bundle of tariffs mainly concentrated on agricultural and food products. The study investigates the impact of the complete removal of these residual barriers to free trade among the EU15 and the frontrunner applicants.

Focussing on the Italian economy, a first conclusion reached in the study concerns the evaluation of the direct and indirect impact of the assumed increase of the applicant country's GDP growth rates. Since the econometric model of the Italian economy (as every other model in the system) is based on the sectoral detail of the country input-output tables, we have used the detailed sectoral representation of the economy to measure the impact of the applicant demand for goods and services; namely, their import structure. Since the historical data on trade between the CEECs and the EU indicates a process of concentration of the import-export flows in a clearly defined bundle of commodities, we have investigated the effect of this trade specialization on the performance of the Italian economy.

The simulation design allows us to compare the impact of the Italy-CEEC relationship with regard to trade with Italy and the impact on Italy obtained from the more significant impact of the EU15-CEEC trade. In the first case, we have two countries, Italy and the CEEC, and in the second case, we have two countries, EU15 and CEEC, with Italy constituting a single region of the EU. This second case allows us to measure the indirect effect of the Eastern European enlargement on Italy. Furthermore, there is a third case where the trend in the composition of the CEEC imports is considered. This experiment provides evidence that in the case of Italy – which whilst it is not on the Eastern EU border is nevertheless not far from it – the indirect impact on the GDP rate of growth is even more important than the direct one. We can say that the transmission of the increase generated by enlargement is as important as the direct trade with the new entrants. Since the effect of the increase on exports induced by a growing demand for goods by the CEEC is preserved along the simulation period, we can see that the increase is doubled by the indirect effect and that the specialization in CEEC imports generates a further increase in the GDP rate of growth; so that, the total increase amounts to a factor of circa 2.6 with respect to that found in the case of Italy-CEEC.

This result clearly demonstrates that the Eastern enlargement is not simply a question of boundaries. In particular, it is clear that – for countries such as Spain – the indirect effect of Eastern enlargement may be much more significant than the direct effect. Furthermore, the sectoral analysis of foreign trade – together with the sectoral evaluation of its impact – is crucial for understanding the effects of enlargement.

The importance of a sectoral representation of the economy becomes clearer when the removal of tariffs and non-tariff barriers, which mainly concern agriculture and food industry products, have been evaluated. Non-tariff barriers still apply and constitute the bulk of measures

hampering international trade between the CEECs and the EU. Moreover, these measures are concentrated on particular products. For example, the international trade model used in this study examines information on 120 commodities; here, the non-tariff barriers – specifically singled out for simulating their removal – account for about 15 per cent of the range of commodities considered by the model.

As regards the simulation results for the removal of tariffs and non-tariff barriers, two alternative scenarios have been formulated: in the case of non-tariff barriers it is impossible to measure the precise size of their mark-up on price formation; the two scenarios refer to a generous effect in terms of Baldwin's hypothesis (1997) which assumes an overall reduction of 10 per cent, and to a conservative hypothesis similar to that proposed by Keuschnigg and Kohler (1999).

2 - KEY DATA ON THE CANDIDATE COUNTRIES

2.1 - Macrodata

The thirteen countries in the most recent wave of applications for EU membership are Bulgaria, Cyprus, the Czech Republic, Estonia, Hungary, Latvia, Lithuania, Malta, Poland, Romania, Slovakia, Slovenia and Turkey. These Candidate Countries (CC) rank very differently in terms of their 'applicability' for full membership. For example, they account for 45 per cent of EU population but only 7 per cent of EU GDP with GDP per capita varying from between 24 per cent of the EU average in Bulgaria to 82 per cent in Cyprus (see Table 1).

Table 1 - Key data of the Thirteen Candidate Countries, year 2000.

	population (millions	Area in km^2	GDP (bn euro)	GDP in PPS	population in million	Area in km^2	GDP (bn euro)	GDP in PPS
Bulgaria	8191	11971	13,0	5400	2,2	0,4	0,2	24,0
Cyprus	755	9251	9,5	18500	0,2	0,3	0,1	82,1
Czech Republic	10278	78866	55,0	13500	2,7	2,5	0,6	59,9
Estonia	1439	45227	5,5	8500	0,4	1,4	0,1	37,7
Hungary	10043	93030	49,5	11700	2,7	2,9	0,6	51,9
Latvia	2424	64589	7,7	6600	0,6	2,0	0,1	29,3
Lithuania	3699	65300	12,2	6600	1,0	2,0	0,1	29,3
Malta	388	316	3,9	11900	0,1	0,0	0,0	52,8
Poland	38654	312685	171,0	8700	10,3	9,8	2,0	38,6
Romania	22456	238391	40,0	6000	6,0	7,5	0,5	26,6
Slovakia	5399	49035	20,9	10800	1,4	1,5	0,2	47,9
Slovenia	1988	20273	19,5	16100	0,5	0,6	0,2	71,5
Turkey	64818	769604	217,4	6400	17,2	24,1	2,5	28,4
EU-15	376455	3191000	8526,0	22530	100,0	100,0	100,0	100,0

Source: Eurostat (2001).

Given this variation in 'applicability' ranking, the Candidate Countries have over time been classified as either as 'front-runners' or 'latecomers'. At the Luxembourg Council in December 1997, a group of five CCs (the Czech Republic, Estonia, Hungary, Poland and Slovenia) was

selected for EU membership in 2002. In 2001, all the candidates were posed on the same starting line. In December 2001, on the basis of the *Strategy Paper* and the *Regular Report on Enlargement*, the Laeken Council concluded that ten Candidate countries would be ready for membership in the year 2004. These candidates are now the front-runners in the so-called Luxembourg Group together with the two Baltic republics of Latvia and Lithuania, the islands of Cyprus and Malta, and Slovakia. For the time being, the candidates, Bulgaria, Romania and Turkey are not scheduled to become EU members before the year 2007 (i.e. they are not covered by the *Agenda 2000* horizon). These three countries constitute a relatively large in the group of the candidates; therefore, the 'size' of the enlargement turns out to be strongly rescaled.

On the basis of the data contained in Table 1, Table 2 summarizes the data on the Luxembourg Group, the 'New 5', and the Laeken Group (namely, the Luxembourg Group plus the 'New 5'). It also reports data on the Southern enlargement with Greece, Portugal and Spain which joined the EU-9 in the 1980s.

Table 2 - The Eastern and Southern enlargements: population and GDP data.

	population	GDP	GDP in PPS	GDPper capita in PPS
ENLARGEMENT				
Eastern				
Luxembourg group	16,6	3,5	7,5	45,3
New 5	3,4	0,6	1,4	41,1
Laeken group	19,9	4,2	8,9	44,6
EU-15	100,0	100,0	100,0	100,0
Southern				
EL-E-P	21,6	10,4	14,3	65,9
EC-9	100,0	100,0	100,0	100,0

Source: Eurostat(2001) and DG ECFIN (April 2001)

The population of Greece, Portugal and Spain amounted to 21.6 per cent of the EC-9 in 1985, while the Laeken Group is slightly below 20 per cent of the EU-15. As regards GDP, the Eastern candidates for enlargement have a GDP of slightly over 4 per cent, rising to 9 per cent in terms of PPS. The Southern enlargement generated an increase of GDP of 10.4 and 14.3 per cent respectively for the EC countries. These differences are reflected in the relative level of GDP per capita in PPS. While the average GDP per capita for Greece, Portugal and Spain amounted to two-thirds of that of the EC-9, per capita GDP for the Candidate Countries does not amount to 50 per cent of that for the EU-15 one.

On the basis of the data on population and GDP in Table 2, the comparison of Eastern and Southern enlargement suggests that, from a macroeconomic perspective, the impact of the Candidate Countries on the EU economy is likely to be small. Indeed, the weight of the 'Leaken Group' is relatively smaller than that of the 'Southern enlargement group' which was relatively smoothly absorbed by the EC-9. However, the low level of income of the future members will necessarily imply a significant EU transfer in the name of economic cohesion. If the impact of

the Eastern enlargement on the economy of the EU as a whole or on that of single Member States is generally considered modest, by contrast the budgetary implications are likely to be highly significant.

Generally speaking, the Member States lacked a clear overall strategy to tackle the effects of the collapse of Communism. The first reaction was to set up a programme of assistance with the PHARE programme in December 1999. Subsequently, the European Council agreed on a plan to negotiating Association Agreements with individual countries (April 1990). This plan, which in several respects marked a turning point, was called Europe Agreements and has characterised the relationships between the European Community (and subsequently the European Union) and the CEECs throughout the 1990s.

One objective of the Agreements was to promote trade liberalization by removing trade barriers and encouraging the CEEC to direct economic activity towards the Western European markets. In this way the trade flows of the candidates countries were diverted from East to West, and their shares of EU imports and exports indicate the progress made in terms of integration with the EU economy (see Table 3). The Candidate Countries' share of EU imports range from 44 to 68 per cent, whilst their share of exports go from a minimum of 47 per cent for Cyprus to over 76 per cent for Estonia. For the EU Member States as a whole, each candidate country represents a negligible share in terms of both end market and supplier.

Table 3 - Relative EU Shares of the Candidate Countries Imports and Exports

Candidates	EU's share in the country's imports in 2000(%)	EU's share in the country's exports in 2000(%)	Country's share in the EU's imports 2000(%)	Country's share in the EU's exports in 2000(%)
Bulgaria	44,0	51,1	0,3	0,3
Cyprus	55,9	47,7	0,1	0,3
Czech Republic	62,0	68,6	2,1	2,5
Estonia	62,6	76,5	0,3	0,3
Hungary	58,4	75,1	2,1	2,5
Latvia	52,4	64,6	0,2	0,2
Lithuania	43,3	47,9	0,2	0,3
Malta	59,9	33,5	0,1	0,3
Poland	61,2	69,9	2,3	3,6
Romania	56,6	63,8	0,7	0,9
Slovakia	48,9	59,1	0,7	0,7
Slovenia	67,8	63,8	0,6	0,9
Turkey	48,8	52,3	1,7	3,2

Source: Eurostat (2001).

Many of the enlargement effects on the CEECs have been effective in so far as the Europe Agreements have been effective as of 1993. The PHARE programme, the EU assistance on driving the CEECs economy towards a market economy, the positive effect of a remarkable flow of Foreign Direct Investments (FDI), the generous removal of many European trade barriers, have all helped stimulate the growth of the Candidates Countries. The average GDP rates of

growth in the years 1995-99 shown in Table 4 reveal a very successful process of 'catching up' which has highlighted the existence of the Laeken Group of countries. One task of the enlargement process is to respond to the existing division within Europe by extending the benefits of peace and prosperity to the present EU's neighbours; the speed with which the CCs are currently moving is certainly encouraging, at last for the near future (see the last three columns of Table 4).

Table 4 - Candidate Countries GDP rates of growth

Candidates	Average GDP growth rate at constant prices 95-99(%)	GDP growth rate at constant prices in 2000 (%)	*Autumn 2001 Forecasts* 2001	2002	2003
Bulgaria	-1,8	5,8	4,2	3,6	4,4
Cyprus	4,0	4,8	4,0	3,3	3,9
Czech Republic	1,5	2,9	3,5	3,8	4,2
Estonia	4,6	6,9	5,3	4,7	5,4
Hungary	3,3	5,2	3,8	3,2	4,6
Latvia	3,2	6,6	7,9	4,5	6,5
Lithuania	3,2	3,3	4,5	3,5	4,3
Malta	4,5	5,0	2,4	3,3	3,5
Poland	5,7	4,0	1,5	1,9	3,4
Romania	-0,6	1,6	4,6	4,4	4,8
Slovakia	5,0	2,2	2,7	3,5	4,0
Slovenia	4,2	4,6	3,7	3,3	4,0
Turkey	3,9	7,2	-6,8	2,7	4,2
EU	2,4	3,3	1,6	1,3	2,9

Source: Eurostat (2001) and ECFIN(2001).

2.2 Sectoral data

The accession of the Candidate Countries, provided it takes place within the proper institutional framework, should foster economic growth in both the CEECs and the EU Member States. Clearly, the impact will continue be skewed insofar as the positive impact on the applicants will be much more significant than the equivalent impact on the EU-15 which is generally expected to be modest. But this result is strictly related to the level of aggregation; from a macroeconomic perspective, the enlargement may have a negligible effect, while a sectoral impact may be substantial in some cases.

Table 5[4] contains those Chapters of Combined Nomenclature (CCN) of the Harmonised System with a share over total EU15 exports to and imports from CEEC10[5] greater than 1 per cent. In part due to the CCN definition, about five Chapters cover 50 per cent of the trade flows between

[4] In Tables 5 and 6, on the right of the description of each CCN the corresponding number of chapter is reported. These numbers make easier the frequence of some CCN's in the largest trade flows.

[5] CEEC10 is the Leaken Group of 10 countries.

the EU15 and the Leaken group. This group of CCN largely prevails in bilateral flows between the EU15 and single Candidate Countries. Table 6 reports, the largest five CCN imports and exports shares of the trade flows between EU15 and Poland, Czech Republic, Hungary are shown. As in Table 5, the left column shows the Candidate Country import shares of each Chapter on the total imports from EU15; the right column symmetrically shows the exports as

Table 5 - Sectoral shares of EU total exports and imports, year 1998.

EU's exports to CEEC10		EU's imports from CEEC10	
Machinery and mechanical appliances84	19,74	Electrical machinery and equipments85	12,33
Electrical machinery and equipments85	13,79	Machinery and mechanical appliances84	11,13
Motor vehicles and parts thereof87	12,21	Motor vehicles and parts thereof87	9,94
Plastic and plastic products39	5,09	Clothing accessories(not knitted)62	8,80
Paper, paper product and pulp48	2,72	Clothing accessories(knitted)62	5,45
Articles of iron and steel73	2,59	Furniture, lamps and lighting fittings94	4,60
Optical and precision instruments90	2,46	wood and articles of wood44	3,94
Pharmaceutical products30	2,32	Iron and steel72	3,89
Iron and steel72	2,17	Articles of iron and steel73	3,45
Mineral fuels27	1,75	Mineral fuels27	2,90
Other chemical products38	1,59	Plastic and plastic products39	2,07
Furniture, lamps and lighting fittings94	1,53	Footware64	1,85
Paints and varnishes32	1,44	Aluminium and articles thereof76	1,78
Man-made staple fibres55	1,32	Edible fruits and nuts8	1,58
Organic chemicals29	1,22	Rubber and articles thereof40	1,51
Cotton52	1,08	Other textile articles63	1,39
Rubber and articles, perfumery40	1,06	Glass and glassware70	1,15
Aluminium and articles thereof76	1,06	Organic chemicals29	1,10
Essential oils, cosmetics, perfumery33	1,06	Paper, paper products and thereof48	1,09
Clothing accessories(not knitted)62	1,02	Copper and articles thereof74	1,05
Hides, skins and leather41	1,00	Cotton52	0,98
Total	78,23	Total	81.98

Source: Eurostat, COMEXT.

Table 6 - Sectoral shares of EU total exports and imports, selected Candidate Countries, year 1998.

EU's exports to Poland		EU's imports from Poland	
Machinery and mechanical appliances84	20,25	Electrical machinery and equipments85	11,06
Motor vehicles and parts thereof87	11,53	Motor vehicles and parts thereof87	9,53
Electrical machinery and equipments85	10,63	Clothing accessories(not knitted)62	9,35
Plastic and plastic products39	5,89	Furniture94	9,02
Paper, paper products and pulp48	3,56	Mineral fuels27	5,77
EU's exports to Czech Republic		**EU's imports from Czech Republic**	
Machinery and mechanical appliances84	18,66	Motor vehicles and parts thereof87	16,90
Electrical machinery and equipments85	15,77	Machinery and mechanical appliances84	13,05
Motor vehicles and parts thereof87	9,86	Electrical machinery and equipments85	12,77
Plastic and plastic products39	5,92	Articles of iron and steel73	6,05
Articles of iron and steel73	3,08	Furniture94	4,62
EU's exports to Hungary		**EU's imports from Hungary**	
Machinery and mechanical appliances84	21,14	Machinery and mechanical appliances84	28,98
Electrical machinery and equipments85	18,97	Electrical machinery and equipments85	21,71
Motor vehicles and parts thereof87	15,59	Motor vehicles and parts thereof87	6,83
Plastic and plastic products39	4,19	Clothing accessories(not knitted)62	4,42
Paper, paper products and pulp48	2,27	Plastic and plastic products39	2,57

Source: Eurostat, COMEXT.

a share of on the total exports to the EU15. The total of the largest five shares amounts to from about 50 per cent to overs 60 per cent; this means that the trade flows between the EU15 and the Candidates Countries is strongly concentrated in a small bundle of commodities which are largely common to each CEEC. In fact, the three Chapters a) Machinery and mechanical appliances, b) Electrical machinery and equipment, and c) Motor vehicles and vehicle parts rank top of the list for the three largest countries expected to join the EU15 in the near future.

During transition, these commodities have maintained and even increased their trade significance with EU countries. Indeed, this specialization on trade has been detected in a number of EU Member States. In France and Italy the trends of import-export flows are very similar and close to the EU average. In Germany these flows show the same – albeit less sharp – trend towards specialization; and in Spain import-export flows concentrate on a remarkably limited bundle of commodities. This observed structural change in EU-CEEC trade flows deserves closer investigation; meanwhile, we notice that this fact appears to confirm the emerging pattern in trade specialization detected by Baldone *et al.* (1997) already in early 1990s.

2.3 - The International Trade Pattern of a Member State: the Case of Italy

The statistics provided by SISTAN (*Sistema Statistico Nazionale*, National Statistical System) and ISTAT (*Istituto Nazionale di Statistica,* National Statistical Institute) contained in the Italian Trade Center (ITC) Report (2000) cover a sizeable amount of data on Italy's trade patterns (exports and imports), including information on commodities for 19 economic sectors and for Italian trade partners; in particular, detailed import-export statistics are reported for the top 20 (TOP20) countries. In Tables 7a and 7b, exports and imports of the TOP20 have been respectively converted into shares of the total flows: TOP20 flows are largely over 95 per cent of the total trade flows. Each table reports the top three countries by relative share and ranking; in the far right columns the share and ranking of the CEECs are listed if they are present in the ITC Tables.

As regards export shares (see Table 7a), Germany is Italy's main destination market and indeed appears to be its most important commercial partner in 14 out of the 19 sectors., whereas as regards import shares, Germany is Italy's prime supplier in only 8 sectors (see Table 7b). This difference suggests that the destination of Italian exports is much more concentrated than the origin of its imports. On the export side, the countries listed in the first three positions are the same across almost all sectors with France, the United Kingdom and the Unites States figuring as the main destination countries in addition to Germany. On the import side, countries in the first three positions belong to a larger set including – in addition to neighbouring Germany and France – imports from Romania, Algeria, the Netherlands, Libya, China, Austria, and Spain. While the CEECs are not listed among the top three Italian destination markets, Italian imports are supplied by a number of CEECs, some of which rank among the top three countries for specific sectors. Some trade flows may be influenced by the kind of commodity, for example, Libya, Russia and Algeria are the three top-ranking origin countries for the production of methane, Austria has traditionally been the main supplier of wood, while Italy maintains a high quality standards in the artisan furniture industry. In general, the origin of imports and the destination of exports indicate that Italy absorbs inputs from a range of countries and sells outputs to a small and prosperous group of countries.

Regarding the rating and shares of the CEECs in the TOP20 (see Tables 7a and 7b, right-hand columns), although the shares rapidly decline after the top three positions, the CEECs are present throughout the TOP20 export and imports flows. Although the EU applicants never reach positions close to the top three, their aggregate share may compete with the dominant origin and destination countries. For example, the aggregate share of 'wood' product imports from Croatia[6], Hungary, Slovenia, Poland and Romania is greater than the share of the United Kingdom, which ranks third as an origin country. On the export side, the aggregate share of 'petroleum products' for Malta, Slovenia, Romania, Turkey and Croatia is greater than that of the largest destination country, i.e. Spain. Furthermore, we should stress the prominent position of Romania which ranks as the primary supplier of 'textiles', 'clothing' and 'leather' products whilst importing precisely the same products from Italy, although not in a prominent position among the importers. These trade flows are generated by 'outward processing' which is well established between Italy and Romania. We argue that the outward processing in the CEECs is widespread and well supported through the substantial Italian relevant flows of FDI.

In the 1900s, as a result of the agreements with the EU and the opening up to international markets, trade between the CEECs and the EU has developed rapidly. The volume of EU15 exports to the CEECs, and the volume of EU15 imports from them grew respectively at annual rates of 15 and 12 per cent respectively. Although the EU15 is now the most important trading partner for the CEECs, these countries still represent a small proportion of the EU15 foreign trade. Whereas the EU15 accounts for over 60 per cent of the CEECs foreign markets, the latter account for only 10 per cent of EU15 international trade (CEC, ECFINa, 2001). If we consider a single Member State, the CEECs may even rank among the residual trade partners. Tables 7a and 7b clearly show how each CEEC represents, in general, a negligible foreign market.

Although the comparison among aggregate trade flows allows us to say that the impact of Eastern enlargement on a single Member-State economy can be assumed to be modest, the structure of sectoral trading is highly significant in some industries. For example, due to enlargement, the CEECs will not benefit from an increase in the export of 'mining' and 'petroleum products' to Italy. On the export side, Italy will not receive any direct positive stimulus from the CEECs demand for 'food', 'clothing', 'other transport equipment', 'non-metal and mineral products' and 'other manufactured products'.

If we focus on the CEEC5 group, we note that a maximum of 3 out of the total are listed in the Italian exports TOP20, and that 4 of the 5 are among the main Italian suppliers. In both cases, the candidates rank mainly at the bottom (see Tables 7a and 7b, position column) of the TOP20 list. However, we note that Slovenia and Poland are the Italian main export markets in the CEEC5 area while Hungary and Slovenia are the main suppliers.

Considering the economic weight of the CEEC based on their population, it is surprising to find a small country like Slovenia prevailing over the CEEC as both as destination and origin country for a number of Italian trade flows. However, among the CEEC, Slovenia is the only country which borders with Italy and, of course, in this case geographical proximity appears to be an important determinant of trade flows.

[6] Croatia does not belong to the CC group. However, focussing on Italy and looking at the debate on a further enlargement of the EU after the complete dissolution of the Federal Republic of Yugoslavia, we have extended our attention to the Balkan countries.

Table 7a - Italian exports to its main 20 markets, 1998

Sectors	First		Second		Third		Central and Eastern European Countries														
	Count	Share	Count	Share	Count	Share	Po.	Count	Share	Po.	Count	Share	Po.	Count	Share	Po.	Count	Share	Po.	Count	Share
AgrForFish	Ger	0.40	Fra	0.12	UK	0.06	11	Slve	0.01	13	Pol	0.012	15	CzR	0.011	16	Croz	0.010			
Mining	Ger	0.21	Sp	0.11	Fra	0.09	12	Tur	0.03	17	Slve	0.019									
FoodTob	Ger	0.24	Fra	0.15	USA	0.12	20	Slve	0.01												
Text	Ger	0.24	Fra	0.15	UK	0.08	12	Rom	0.02	16	Tur	0.020	17	Pol	0.018	19	Hun	0.013			
Cloth	Ger	0.18	USA	0.15	Jap	0.09	14	Rom	0.02												
Leath	Ger	0.19	USA	0.15	Fra	0.11	8	Rom	0.04	17	Hun	0.015	18	Pol	0.014	19	Tur	0.014			
Wood	Ger	0.27	Fra	0.11	USA	0.08	14	Slve	0.02	17	Tur	0.016	20	Hun	0.008						
PaperProd	Fra	0.24	Ger	0.22	UK	0.10	11	Pol	0.02	14	Slve	0.013	15	Tur	0.011	20	Croz	0.008			
PetroProd	Sp	0.14	Braz	0.09	Fra	0.09	7	Malta	0.05	11	Slve	0.040	13	Rom	0.030	14	Tur	0.020	20	Croz	0.010
Chem	Ger	0.16	Fra	0.14	USA	0.10	9	Tur	0.03	14	Pol	0.010	20	Slve	0.011						
RubPlast	Fra	0.21	Ger	0.21	Sp	0.10	11	Pol	0.02	14	Tur	0.012	17	CzR	0.010	20	Slve	0.008			
NMetProd	Ger	0.25	USA	0.16	Fra	0.14	12	Pol	0.02												
MetProd	Ger	0.23	Fra	0.19	Sp	0.09	11	Tur	0.02	12	Pol	0.018	14	Slve	0.016						
Mach	Ger	0.16	Fra	0.14	USA	0.11	6	Tur	0.04	7	Pol	0.032									
PrecInst	Ger	0.20	Fra	0.20	UK	0.09	9	Tur	0.02	16	Pol	0.016	17	Hun	0.012						
MotorVh	Ger	0.23	Fra	0.19	UK	0.12	7	Pol	0.03	11	Tur	0.020	19	Hun	0.008	20	CzR	0.007			
OthTransp	USA	0.20	Lbr	0.15	Fra	0.12	13	Malta	0.01												
Furn	Ger	0.24	USA	0.14	Fra	0.13	14	Slve	0.02	16	Pol	0.012	19	Croz	0.011						
OthManuf	USA	0.27	Ger	0.10	Fra	0.09	19	Tur	0.01												

Source: ICE-ISTAT, L'Italia nell'economia internazionale, 2000.

Table 7b - Italian imports from its main 20 markets, 1998

Sectors	First		Second		Third		Central and Eastern European Countries																					
	Count	Share	Count	Share	Count	Share	Po	Count	Share	Po	Count	Share	Po.	Count	Share	Po.	Count	Share	Po.	Count	Share	Po	Count	Share	Po.	Count	Share
AgrForFish	**Fra**	0.27	**Sp**	0.08	**Nth**	0.07	**13**	**Tur**	0.020	**17**	**Pol**	0.019	**18**	**Hun**	0.018												
Mining	**Lib**	0.19	**Rus**	0.18	**Alg**	0.16																					
FoodTob	**Ger**	0.20	**Nth**	0.18	**Fra**	0.17	**18**	**Tur**	0.007																		
Text	**Fra**	0.16	**Ger**	0.15	**Chi**	0.09	**5**	**Tur**	0.060	**12**	**Rom**	0.020	**20**	**Hun**	0.010												
Cloth	**Rom**	0.15	**Chi**	0.14	**Tun**	0.11	**10**	**Hun**	0.030	**14**	**Tur**	0.020	**17**	**Slvc**	0.019	**18**	**Croz**	0.018	**19**	**Bulg**	0.017					
Leath	**Rom**	0.17	**Chi**	0.14	**Braz**	0.07	**12**	**Hun**	0.030	**14**	**Bulg**	0.020															
Wood	**Astr**	0.28	**Ger**	0.09	**USA**	0.08	**8**	**Croz**	0.030	**12**	**Hun**	0.028	**13**	**Slve**	0.025	**19**	**Pol**	0.016	**20**	**Rom**	0.016					
PaperProd	**Ger**	0.19	**Fra**	0.12	**USA**	0.10	**19**	**Slve**	0.009	**20**	**CzR**	0.008															
PetroProd	**Lib**	0.17	**UK**	0.15	**Alg**	0.09																					
Chem	**Ger**	0.23	**Fra**	0.15	**BgLx**	0.10	**16**	**Hun**	0.006	**20**	**Croz**	0.004															
RubPlast	**Ger**	0.25	**Fra**	0.19	**UK**	0.08	**15**	**Tur**	0.013	**19**	**Slve**	0.008															
NMetProd	**Fra**	0.24	**Ger**	0.23	**UK**	0.07	**9**	**CzR**	0.022	**10**	**Tur**	0.019	**14**	**Slve**	0.015	**15**	**Pol**	0.012	**16**	**Hun**	0.012	**18**	**Croz**	0.009	**19**	**Rom**	0.008
MetProd	**Ger**	0.20	**Fra**	0.13	**Swtz**	0.11	**15**	**Rom**	0.016	**16**	**Tur**	0.015															
Mach	**Ger**	0.33	**Fra**	0.12	**USA**	0.09	**17**	**CzR**	0.006	**18**	**Slve**	0.005	**19**	**Pol**	0.005	**20**	**Rom**	0.005									
PrecInst	**Ger**	0.21	**Fra**	0.14	**Nth**	0.13	**19**	**Hun**	0.007																		
MotorVh	**Ger**	0.36	**Fra**	0.17	**Sp**	0.11	**7**	**Pol**	0.020	**12**	**Slve**	0.010	**13**	**CzR**	0.009	**16**	**Slvc**	0.009	**18**	**Tur**	0.003	**19**	**Hun**	0.002			
OthTransp	**USA**	0.32	**Fra**	0.17	**Ger**	0.09																					
Furn	**Fra**	0.19	**Ger**	0.17	**Sp**	0.07	**4**	**Rom**	0.050	**11**	**Slve**	0.030	**12**	**Pol**	0.020	**15**	**Croz**	0.019	**16**	**Tur**	0.017	**17**	**Slovc**	0.017	**19**	**Hun**	0.013
OthManuf	**Chi**	0.26	**BgLx**	0.10	**Ger**	0.09	**20**	**Hun**	0.009																		

Source: ICE-ISTAT, L'Italia nell'economia internazionale, 2000.

Key to Tables 7a and 7b

Sectors

AgrForFish	Agriculture, Forestry, Fishery
Mining	Mining
FoodTob	Food & Tobacco
Text	Textiles
Cloth	Clothing
Leath	Leather
Wood	Wood
PaperProd	Paper products
PetroProd	Petroleum products
Chem	Chemical
RubPlast	Rubber & Plastic products
NMetProd	Non-metal min&prod
MetProd	Metal products
Mach	Machinery
PrecInst	Precision instruments
MotorVh	Motor vehicles
OthTransp	Other transport equipment
Furn	Furniture
OthManuf	Other manufactured products

Countries

Alg	Algeria
Astr	Austria
BgLx	Belgium and Luxembourg
Braz	Brazil
Bulg	Bulgaria
Chi	China
Croz	Croatia
CzR	the Czech Republic
Fra	France
Ger	Germany
Hun	Hungary
Jap	Japan
Lbr	Liberia
Lib	Libya
Malta	Malta
Nth	the Netherlands
Pol	Poland
Rom	Romania
Rus	Russia
Slvc	the Slovak Republic
Slve	Slovenia
Sp	Spain
Swtz	Switzerland
Tun	Tunisia
Tur	Turkey
UK	the United Kingdom
USA	USA

3. THE MODELLING APPROACH

This paper examines the impact of Eastern enlargement on a present EU Member State. The scenarios implied by this perspective have been evaluated using a system of econometric models. This system is made up by country models which are linked by means of a world commodity trade model.

It is worth repeating that no result of any analysis is independent of the instrument and its characteristics on which it is based, and that no result is independent of the hypotheses made and of the level of aggregation and the data used. In order to read the results in the correct perspective it is essential to be aware of some of the characteristics of the framework within which the analysis was carried out.

The country models used here belong to the Inforum system, and each country model has been constructed by the country partner so that it embodies the peculiarities of the economy as observed and understood by the model builder. The system consists of multisectoral models of Western Europe (Germany, France, Spain, Austria, the UK, Belgium, and Italy), the Far East (China, Japan, South Korea, and Taiwan), and Central-North America (Canada, the United States, and Mexico).[7] As described in Grassini (2001), a more descriptive name for these models might be Interindustry Macroeconomic Models (IM) or Multisectoral Macroeconomic Models (MM); 'interindustry' and 'multisectoral' stress the presence of an input-output structure and the detailed representation of the industries in the economy; and 'macroeconomic' emphasizes that the usual variables of macroeconomics are covered.[8] Inforum models are rooted in data: an enormous database is necessary to support a proper IM model given the underlying belief that a model incorporating as much past economic outcomes as possible will have a better chance at forecasting or accurately simulating policy changes than a model that incorporates less information.[9]

In the same way as macroeconometric models, Inforum models use regression analysis on time-series. Therefore, parameters in behavioural relations are econometrically estimated using observed economic outcomes and not calibrated by the model builder. A distinctive property of these models is their 'bottom-up' approach; that is, the macro totals are obtained by summing the industry details.

Inforum models are explicitly dynamic with real dates on each year's solution and the researcher

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[7] There are many contributions on economic analyses carried out using Inforum country models. Here we refer to special sessions devoted to Inforummodels at the International Conferences on Input-Output Techniques in 1989 (Kethzely, Hungary) and 1998 (New York, U.S.A.). Papers presented at the first conference are collected in a special issue of Economic Systems Research, Vol. 3 (1), 1991. Contributions presented at the XII International Conference in New York may be found on the web site *www.iioa.at*.

[8] Here, we do not compare the peculiarities of this kind of models with those of other macroeconomic or multisectoral models. However, see West (1995) for a synoptic presentation of Computable General Equilibrium models, Classic Input-output models and Input-output+econometrics models. For a comparison among macroeconomic models see also Almon (1991). Furthermore, see Monaco (1997) who gives an interesting evaluation of different kinds of macroeconomic multisectoral models from the perspective of a model builder and user.

[9] For an analysis of problems posed by economic data and ways of dealing with them in an Inforummodel, see Richter (2001).

also knows the dynamic path by which the new solution is reached, which may have enormous practical considerations for those policy-makers who are often just as interested in the path to equilibrium as they are in the ultimate equilibrium point. Predictions of time paths are naturally computed at the industry level: the macro dynamics are simply the result of the industry dynamics. For example, we will show that, after enlargement, sectoral growth paths are not at all steady over time with accelerations, decelerations, recessions, and recoveries occurring along the simulation horizon. Therefore, an economic analysis of the enlargement effects based only upon the comparison between two equilibria would be misleading: the model should offer a guidance of how sectors may cumulate gains and losses along the path so that policy makers may consider potential policy actions.

In these models, the foreign trade flows have a distinctive feature. They are driven by a world commodity trade model, the Bilateral Trade Model (BTM) created and originally estimated by Qiang Ma (1996).[10] The basic idea underlying this trade model was formulated in the late 1960s (see Armington (1969a) and (1969b), and Rhomberg (1970) and (1973)), and subsequently, a number of studies tackled estimation problems involved in the construction of this kind of trade model (see, for example, Nyhus (1975), and Fair (1983)). These analyses focused on modelling trade shares by using relative prices as explanatory variables; the BTM model shares the basic characteristic of earlier works and contains interesting innovations which will be discussed later on.

The integration of the Italian Inforum model into a family of interlinked models has a number of important advantages for the analysis of the questions under considerations. In contrast to any economic analysis with a 'stand alone model' of a national economy, we were able to consider a number of indirect effects of enlargement studying the question within a framework of interlinked national models. The following lists cites just a few of these relevant effects operating through the European economies on a specific Member State:

- changes of the demand for Italian commodities as intermediate products by other EU countries due to additional imports from CCs to present EU members other than Italy;
- changes of the demand for Italian consumption goods by other EU countries induced by income effects caused by economic growth in present Member States due to enlargement;
- changes of the demand of Italian capital goods from other EU countries due to the same economic reasons explained above;
- substitution effects in trade with CCs between commodities of EU Member States — Italy included — due to changes in competitiveness caused by the impact of the removal of trade barriers on relative prices.

Furthermore, our approach is innovative with respect to other studies in the literature insofar as it allows us to evaluate not only those direct effects of enlargement normally presented in such analyses, but also to highlight the *indirect effects* generally ignored by more traditional models of analysis.

3.1 Some features of the Italian Model

INTIMO begins from the Italian input-output table and the institutional accounts. The input-

[10] This has subsequently been revised and updated with more recent data.

output table used in the model has 44 sectors, 40 of which represent the private component of the economy, 4 of which represent non-market sectors, of which 3 are governmental and 1 is non-profit. The table distinguishes between domestic and foreign production in each cell, and the model preserves this distinction.

The 'institutional accounts' have been aggregated into three sectors: 'enterprises', 'households', and 'government'. In the European System of Accounts (ESA) there are seven institutional accounts: 1) production; 2) generation of income; 3) distribution of income; 4) use of income; 5) capital; 6) financial; and 7) current transactions (with rest of the world). The input-output table and the 'institutional accounts' are closely linked. Aggregates from the intermediate consumption and value added matrixes in the input-output table go into the first two accounts, 'production' and 'generation of income'. INTIMO then models the third and seventh accounts, the 'distribution of income' and 'current transactions' accounts to calculate disposable income. The 'use of income' and 'capital' accounts allow us to compute macroeconomic variables such as saving, investment, consumption, inventory changes in nominal terms. Needless to say, the household disposable income which results from the computation in the institutional accounts is not necessarily that assumed in the computation of households in the input-output accounts. The model must be solved iteratively to ensure that the two are equal.

Equations from input-output identities
In an input-output table there are two sets of accounting identities:

$$Aq + f = q \qquad A'p + v = p \tag{1}$$

where q is the (column) vector of sectoral outputs, f is the vector of final demand, the sum of consumption, investment, inventory changes and net exports, v is the value added vector per unit of output, p is the vector of sectoral prices and, finally, $A = [a_{ij}]$ is the matrix of coefficients so that $q_j * a_{ij} = q_{ij}$ where q_{ij} is the flow from sector i to sector j in the input-output table; matrix A is also known as the 'input-output technical coefficient matrix'. The set of equations on the left side are known as the 'fundamental equation in the input-output analysis' or 'the Leontief equation'; the set of equations on the right side are known as the 'Leontief price equation'.

In INTIMO, all these variables should have also a t subscript to emphasize that they vary over time, so that the equation for the determination of output would be

$$q_t = A_t q_t + f_t. \tag{2a}$$

In determining prices, the distinction between foreign and domestic products is important. For the price equations, we need to separate the A_t into a matrix of domestic inputs, H_t and imported inputs, T_t, such that $A_t = H_t + T_t$. The resulting equation for determining domestic prices is

$$p_t = H_t p_t + T_t p^m_t + v_t \tag{2b}$$

where p_t^m is the vector of import prices. While the elements of matrix A may be interpreted as 'technical' coefficients, H and T matrices simply distinguish the origin of inputs, a distinction

which is useful for analyzing the impact of foreign prices on domestic prices but independent of any technological consideration. There are no annual input-output tables for Italy, but we do have historical series on outputs, final demand, imports, domestic prices, and foreign prices. From these series and the 1988 input-output table, we have made a series of *A*, *H*, and *T* tables from which we project future tables.

Behavioural equations
In very general terms, the real and price sides of INTIMO (or any MM model) can be presented in the following form

$$q = Aq + f(q,p,z_R) \qquad p = Hp + Tp^m + v(p,q,z_N) \tag{3}$$

where z_R and z_N are vectors of variables not appearing in the input-output table, such as interest rates, money supply, or population. Note the 'crossovers'; prices appear in the final demands and physical outputs appear in the price equations. We omit the *t* subscripts which should be understood on each matrix or vector. We have not included a dependence of the matrices on prices because that dependence has not been built into the present version of INTIMO. Whilst there is no problem in principle or theory in doing so, it would create very substantial empirical problems. Besides these equations, there are others which lack a sectoral dimension, such as those for collecting personal taxes or government accounting.

For a schematic overview of INTIMO and of the various behavioural equations that make up the *f* and *v* functions, see Appendix A. The real side and the nominal side of the model are strictly integrated and this must be taken into consideration when the simulations in this study are used to evaluate the effect of the Eastern enlargement of the EU on the Italian economy. Furthermore, the model incorporate a very advanced treatment of indirect taxes (see, Bardazzi (1992), Bardazzi *et al.* (1991), Bardazzi and Grassini (1993), Bardazzi (1996), and Grassini (2001)); in particular, the model explicitly shows the impact of the tax burden on the (sectoral) production side and the corresponding impact in terms of revenues on the national budget.

3.2 The Bilateral Trade Model (BTM)

BTM is estimated using a bilateral database, WTDB, released by Statistics Canada and made available to the Inforum research center. This database provides high quality and up-to-date information on commodity trade, which covers world commodity trade and makes the bilateral model genuinely 'global'. The raw dataset has been submitted to two aggregations. One concerns the commodity classification where the large number of commodity flows have been reduced to a set of 120 trade flows. The second is geographical so that the number of trading countries has been reduced from 200 to about 60, including the countries of the system of multisectoral models and other countries or groups of countries (for instance, the transitional economies of Eastern Europe, the OPEC countries, South Africa, other developing Asian countries, and major South American countries). The data allows us to construct bilateral trade flows matrices for 120 commodity groups. Each matrix has a number of rows and columns which are related to these 60 countries. If the BTM database is ready to accommodate this huge number of countries, the present working version is tailored to the existing country models in the system.[11] The structure

[11] The United States, Mexico, Canada, Japan, South Korea, China, Taiwan, the UK, France, Germany, Italy, Spain, Austria, and Belgium and two areas comprised by the rest of the OECD countries and 'the rest of the world'.

of the data allows us to investigate the trade structure of other countries not yet included in system of models and, hence, to tackle problems such as those considered in the present research..

The BTM works as follows. It takes the sectoral imports from each country model and allocates them to the exporting countries within the system by means of import share matrices computed from the trade flows matrices; imports demanded to a country by all its trading partners turns out to sum up to its exports. Hence, this model ensures the balance of imports demanded to a given country with its exports; this balance is obtained for each commodity group.

Then, the key work of the model is to calculate the movement in 120 import-share matrices. First of all, imports by product, prices by product, and capital investment by industry are taken from the national models. Then the model allocates the imports of each country among supplying countries by means of the import share matrices mentioned above. In any one of these matrices, which we denote by S (for share), the element S_{ijt} is the share of country i in the imports of country j of the product in question in year t. (t is 0 in 1990). The equation in the BTM for this typical element is

$$S_{ijt} = \beta_{ij0} * \left(\frac{P_{eit}}{P_{wjt}}\right)^{\beta_{ij1}} * \left(\frac{K_{eit}}{K_{wjt}}\right)^{\beta_{ij2}} * e^{\beta_{ij3} T_t}$$

where,

P_{eit} = the effective price of the good in question in country i (exporter) in year t, defined as a moving average of domestic market prices for the last three years;

P_{wjt} = the world price of the good in question as seen from country j (importer) in year t (see description below);

K_{eit} = an index of effective capital stock in the industry in question in country i in year t, defined as a moving average of the capital stock indices for the last three years;

K_{wjt} = an index of world average capital stock in the industry in question as seen from country j in year t (see description below);

T_t = Nyhus trend variable, set to zero in the base year, 1990.

β_{ij0}, β_{ij1}, β_{ij2}, β_{ij3} are estimated parameters.

The world price, P_{wjt}, is defined as a fixed-weighted average of effective prices in all exporting countries of the good in question in year t:

$$P_{wjt} = \Sigma_i S_{ij0} P_{eit} \quad ; \quad \Sigma_i S_{ij0} = 1$$

and the world average capital stock, K_{wjt}, is defined as a fixed-weighted average of capital stocks in all exporting countries of the sector in question in year t:

$$K_{wjt} = \Sigma_i S_{ij0} K_{eit}$$

The fixed weights in the definition of the world price and the world average capital stock, the S_{ij0}, are the trade shares for the base year 1990. The use of the fixed weights ensures that the share equation satisfies the 'homogeneity' condition as suggested by the demand theory. For example, if all effective domestic prices, P_{eit}, are doubled, then a doubling of the world prices as seen by each importing country (or its import prices) leaves the price ratio unchanged.

The BTM work begins with the collection of prices, imports and capital investments, but we see that the share equations require capital stock data which are intentionally not collected from the country models, even if they are endogenously computed. Capital stock data made available by official national statistics are largely based on different criteria, and may not always be comparable (as required in the above equation). Consequently, we chose to compute capital stock directly from statistics taken from a 'comparable' perpetual inventory model where comparability is mainly based on the use of a common depreciation rate.

The idea behind a relative capital stock as an explanatory variable is that (new) investments contain embodied technical progress. A capital stock which contains more recent investments may render the industry more competitive. In other words, an industry can buy market shares by investing. In order to stress this assumption, capital stock is computed from investments, and the depreciation rate is consequently chosen as strategic variable. At present, it is equal to 8 per cent.

These parameters were estimated using Ordinary Least Squares (OLS) in the following specification:

$$\log S = \alpha + \beta_1 \log P + \beta_2 \log K + \beta_3 T$$

where, for simplicity sake, we have dropped the time and country subscripts (*t, i, j*) and let P and *K* denote the relative price ratio and relative capital stock ratio, respectively. Qiang Ma (1996) searched the parameter space for estimates of β_{ij0}, β_{ij1}, β_{ij2}, and β_{ij3}, and only included estimates with correct signs. The search procedure explored seven alternative functional forms as follows, beginning with the above typical equation. If the estimated price parameter or capital parameter was of the wrong sign, various combinations of a subset of the three explanatory variables were then used in the regression. If a wrong sign persisted in either the price parameter or capital parameter, the share equation was regressed on the Nyhus trend variable alone, because there was no sign restriction on the Nyhus trend variable.

It should be noted that in any forecast period each trade share must be non-negative, and the sum of shares from all sources in a given market must add up to 1 (i.e. $\sum_i S_{ij} = 1$ for all j and t). The non-negativity condition is automatically satisfied through the use of the logarithmic functional form, but the adding-up condition is not. A way must, therefore, be found to modify the forecast trade shares so that the adding-up condition is met. Estimates of all the *n* shares are made separately and subsequently adjusted to meet the adding-up condition. In this way, the forecast shares in each market will satisfy both the adding-up condition and the non-negativity condition. In scaling the forecast shares to meet the adding-up condition in each import market, those with the best fits will require less adjustment than those with poor fits. There is a set of good weights at hand: the standard errors of the estimated equations. Thus, the adding-up condition in each import market is imposed by distributing the residual in proportion to the standard error of each estimated share equation.

Qiang Ma estimated equations for over 19,000 trade flows. The capital term entered equations accounting for some 60 per cent of total trade flow. We should emphasize that the estimation uses time-series rather than cross-sectional data. Thus, the coefficients showing the effect of investment in Italy on Italian shares in the imports of other countries only reflects the Italian experience and is not based on, for example, the effects of German investment on Germany exports. Although the procedure described above appears rather mechanical due to the treatment of the large number of equations involved, the model is not treated like a 'black box'. Shares different from zero are examined individually for their plausibility throughout the sample period together with the routine forecast horizon. This procedure is carried out annually in order to anticipate any mis-functioning on the part of the model.

4. SIMULATION SCENARIOS FOR EU ENLARGEMENT: THE CANDIDATE COUNTRIES GROWTH EFFECTS

4.1 The horizon

INTIMO is a dynamic multisectoral econometric model. The other models in the system, such as BTM, are also fully dynamic. Hence, the evaluation of different scenarios is carried out year-by-year over a future period. Indeed, different shocks may take place in different years in the future, and their effects need to be evaluated year-by-year over the period of simulation which is 2001–2010.

4.2 The 'baseline' scenario

We will refer to the baseline scenario as the future economic performance of the domestic economy without EU enlargement. The design of this reference forecast requires us to make assumptions about some exogenous variables described below to provide a credible path for a 'business-as-usual' growth.

4.2.1 The Candidate Countries' growth scenario in the baseline

In the baseline, the GDP growth in the Candidates Countries is assumed to follow the average rate of growth for other countries in the system. In other words, we assume that the CCs grow at a pace close to that of the main industrialized countries, that is, Western Europe, the United States, Canada and Japan.

4.2.2 The exchange rate and exports scenario

4.2.2.1 The exchange rate for key currencies

The exchange rates among the key currencies in the baseline as well as in the other scenarios are assumed not to vary much over time. The Euro/US$ exchange rate rises steadily from the present 0.90 to 1.00 by 2010 on the assumption that the widely held view that the Euro is undervalued is not just wishful thinking in the EU. The Euro/Pound ratio remains constant at 0.630 on the expectation that the UK will monitor this rate closely and try to maintain it, rather than the Pound/US$ ratio, constant. The Euro/Yen ratio rises from 110 to 117 and indicates a slight but progressive weakening of the Japanese currency.

4.2.2.2 The prices in the CC relative to those in the present members

At present BTM details exchange among 14 countries and two regions, 'other OECD', and 'the rest of the world'. The 14 country models each produce sectoral price projections. For BTM, these are adjusted by assumed exchange rates to produce indexes of effective prices. Industry-specific trade-weighted averages of these country prices are then taken as the prices of the two remaining regions. Since all CC countries fall into one or other of these two regions, the basic assumption of the baseline is that these countries have 'average' prices relative to those in countries in the model, where 'average' is the average over the 14 included countries examined.

This rather neutral role of prices is not inconsistent with what has taken place in the recent past. When the CCs began the transition from their past economic system towards a market-oriented economy ten years ago, there was an acute crisis of their former economic and political system. After an immediate downward plunge, the recovery was characterized by GDP rates of growth higher than those of EU countries. The transition immediately aimed at a close economic integration with Western Europe. The countries with the best economic

performance took reform seriously and were supported by the EU Commission through the PHARE Program and Structural Funds as well as by substantial flows of foreign direct investment (FDI). Despite the good performance in GDP growth, the depth of the structural changes produced disequilibria that led to high rates of inflation. Present and anticipated inflation would be likely to damage the competitiveness of these countries were it not offset by a drop in the value of their currencies. We assume that this drop will cancel the rise in inflation so that the effective prices of imports from these countries will be about average for the countries in the BTM.

4.2.2.3 Exports

As mentioned above, BTM distributes the imports of each country among supplying countries. This means that each country model endogenously computes (sectoral) import requirements; BTM converts these requirements into exports of the other countries. Symmetrically, each country model in the system receives from BTM its (sectoral) exports as the sum of the imports requirements of the other countries. The amount of (sectoral) exports of each country will vary according to the shares of imports captured from each other country in the system. Hence, exports do not belong to the set of the scenario variables; indeed, (sectoral) exports of each country in the model system are endogenous.

4.2.3 Wages

In a former version of the INTIMO model, wages were completely endogenous. Unfortunately, the recent history of industrial relations has made the time series on labour market variables too heterogeneous to allow us to investigate structural wage equations. The labour market is presently undergoing institutional reforms, and the role of the trade unions in this process is not yet well delineated. The old aggregate wage equation does not fit recent data, and we do not have enough data to fit a new one. Thus, we have assumed an exogenous aggregate wage growth rate. More precisely, the basic assumption is that this will amount to about 3.6 per cent per year. This assumption combines the target inflation and productivity growth widely assumed in the present debate.

While the aggregate wage index is assumed exogenously, sectoral wage indexes are allowed to vary in relation to it. In other words, the sectoral wage indexes follow their own paths around the given aggregate wage index.

4.2.4 Government expenditure

In the multisectoral model there are 4 collective final demand components. Government is divided into three components: (1) general administration; (2) education; and (3) national health services. Furthermore, there is a relatively modest (4) non-profit services component. The multisectoral model is, of course, grounded in the sectoral accounts — the input-output table. It also uses the structure of the institutional accounts. A simple summation of sectoral variables fit right into the institutional accounts for ‘production and generation of income’ (also called the Distribution of GDP account). These accounts open the way to the ‘distribution of income’ account. The allocation of this disposable income and, in particular, the amount used for government expenditure makes it endogenously determined.

Meanwhile, we have preferred to assume that the stability and growth pact, which imposes budgetary discipline and improvement on the budgetary procedure, will force national governments to limit their expenditure to a growth rate approximately equal to, or slightly below, that expected for GDP. Considering the volume of the Italian public debt, a low

profile growth in government expenditure may be realistic. In the present scenario as well as in the other scenarios designed in the present study, the rate of growth of real government expenditure is assumed constant during the simulation period and equal to 2.2 per cent.

4.2.5 Savings rate

The question of how to split household disposable income between consumption and saving is a challenge for every macroeconomic model builder.

Thirty years ago, Italy ranked among the economies with very high saving rates (20–25 per cent); later in the 1980s, the Italian savings rate began to shrink, and in the 1990s it fell to below 10 per cent. This structural change has been shared by many others economies. Recently, the *Centro Europa Ricerche* (CER, 2001) has reported that widespread public budget tightness in the United States and in the Euro area in the 1990s has been accompanied by a reduction in the private savings' rate. This reduction has been even stronger in the United States than in Europe, a fact which is particularly salient in explaining the different economic performances of the two areas. According to the CER analysis, if the government budget constraint is relaxed and government spending increased, an increasing private savings rate can be expected, whereas if private demand is stimulated by credit expansion, we may assume a decreasing private savings' rate.

Given this uncertainty, it seemed best to leave the savings ratio as exogenous as a *behavioural proportion* (Almon, 1995). In this scenario, we will make it constant and equal to its average value in the 1990s. A reliable economic policy outlook could have be used as the basis for varying the rate over the future period.

4.2.6 Population and Migration

The model includes a well-elaborated Demographic Projections Model (DPM). The role played by DPM is to produce projections of population by age and gender (Bardazzi, 2001). As with any other demographic model, DPM is tailored to generate medium to long-term projections. DPM relies upon scenarios concerning fertility rates by age, mortality rates from one age cohort to the next, and net immigration by age and gender. The hypothesis regarding net immigration is the most unpredictable of the components of population projections. The working assumption employed here is designed by ISTAT (Italian Statistical Office) and based on the past behaviour of migration flows: this hypothesis does not take into account other potential factors that may heavily influence future migrations such as the enlargement of EU labour market to Eastern countries. Indeed, the accession of the CCs to the EU is likely to have a significant impact on the conditions of migration. Not surprisingly, a debate on the consequences of potential migration has provoked the fear in many countries that the increase in EC populations due to Eastern labour flows may lead to a deterioration of the labour-market position of the local workforce and to wage reduction and job losses. These concerns are particularly acute in countries which are likely to be net recipients of migratory flows, such as Germany and Austria.[12] In spite of the central role played by migration in the negotiations on Eastern enlargement, migration research suggests that the overall impact of enlargement on the EU15 labour market will be limited and that migratory flows will be

[12] As argued by EIC (2000), regions bordering the CCs may be expected to take the bulk of post-enlargement migration. For a recent report on migration in Central and Eastern Europe, see OECD (2001).

concentrated in specific Member States. Moreover, demographic projections for CCs present similar characteristics with those of most Western countries, that is, population decline and population ageing. If these projections are confirmed in the future, applicants will no longer have a positive demographic surplus to export.[13] In addition, the economic situation of candidate countries is expected to improve thus reducing the incentive to emigrate. Finally, in the past Italy has not been a migratory pole for Eastern migrants, given its geographical location and prevailing economic conditions, and there is little reason to believe that this framework will change dramatically in the near future. Therefore, we have assumed no change of migration flows in the simulation scenarios based on the hypothesis that any potential variation in the number of migrants will be so low as to leave the labour market and the economy as a whole largely intact.

4.3 The first set of simulations: the Candidate Countries growth effects

The first group of simulation scenarios do not include any change of prices due to the reduction of tariffs. Therefore, the economic effects are due only to changes in the demand. In fact, an increase of the CCs imports turns out to be an increase of Italian exports. Whatever the sectoral output (or GNP) increases, the magnitude of the impact on domestic prices is expected to be negligible because: a) the CCs prices do not change in any scenario; and b) the increase in final demand will be expected to be modest and plausibly it will not sensibly affect the productivity which is — in this case — the main lever influencing the price formation.

4.3.1 The first scenario: Italy versus the Candidate Countries

The recovery of Central and Eastern European Countries in terms of real GDP has been, on average, completed in the last decade. Indeed, their economies seem to have grown more rapidly than the present EU area, and we can assume that the higher growth in real GDP will continue in the near future (see Table 4). The more rapid growth of the applicant countries in terms of GDP growth should be considered an appropriate assumption and EU enlargement clearly assumes that economic integration implies that the newcomers' economies will be hauled towards EU levels of prosperity level, which means a faster GDP rate of growth for over another decade.

In this first alternative scenario, we assume that CCs' GDP will grow by 2 per cent more rapidly annually than in the baseline. Since we do not have models for the CEECs, nothing can be said about the shifts in the composition of their final demand. On the resource side, however, we assume that imports will grow as rapidly as GDP, so that the resource structure remains unchanged. Higher levels of imports from the CC imports will turn out to be higher exports for the countries in the model system.

This first alternative scenario only considers the direct effect of the CCs' increase in imports on the Italian economy in terms of Italian exports to these countries. In other words, given the increase in Italian exports due to the increase in CCs demand, the Italian model is run alone. No account is taken of the effect of the enlargement on other economies.

[13] For an analysis of past migration flows between the CCs and Italy and some comments on projections following enlargement as in EIC (2000), see Grassini *et al*. (2001).

4.3.2 The second scenario: EU versus the Candidate Countries

This scenario considers the impact of this increase in CCs imports on the export structure of all models in the system. The model system, including BTM and country-specific models, is run. In this case, the effect of the growth in exports to the Central and Eastern European countries will effect every model in the system. Each country will receive the impact of the changes in the outputs, and therefore imports, of every other country. In this case, Italian exports will be determined by changes in demand for imports by all the countries in the system. Basically, in the first scenario the Italian model runs alone, whereas in the second scenario it is run together with its most important trading partners.

4.3.3 The third scenario: specializing the Candidates Countries Foreign Demand

In the 1990s, the Candidate Countries have overcome the deep crisis which occurred after the crash of the socialist economies. During this decade, the trade between EU and these countries increased as the 'catching up' of the applicants took off (see Table 3). When the transition positive trend began, the import-export composition was concentrated on a small group of 'Chapters'. During the transition, these commodities have maintained and even increased their importance in trade with the EU countries, accounting for about 60 per cent of the total commodity trade.

The data reveals a concentration of import-export flows in a small bundle of commodities (see Table 5 and Table 6). Since this specialization occurred during a period of restructuring towards market-oriented economies, in this scenario we will assume that this specialization will persist in the near future, that is, over the time span of the present study. Indeed, this trend toward specialization may well be the result of the good use that applicants have made of their negotiations with the EU and programs such as PHARE. Other direct advantages are generated by their access to the Structural Funds; indirect advantages came from FDI flows which are expected to remain substantial as the policy of the CCs continues to focus on integration with the countries of Western Europe. All these elements generate investments. Many of the 'Chapters' listed in Table 5 and Table 6 relate to equipment or its production. The concentration in trade may therefore be related to the accumulation process.

Hence, this scenario may be appropriate to investigate the effects of the CCs import structural changes (not only) on the Italian economic structure.

4.4 Analysis of the three scenarios

The three scenarios are designed for an initial investigation of the effect of EU enlargement. The contrast between the first two scenarios highlights the relevance of the indirect effect of the EU enlargement on a single Western European country, namely Italy. The third scenario — to be compared with the second — allows us to see the significance, if any, of the change in the import structure of the Central and Eastern European countries .

These scenarios may be all be viewed as standard Keynesian, demand-oriented experiments. In fact, an increase of the CCs' imports actually induces an increase of Italian exports. Whatever the sectoral output increases induced by this component of foreign demand, these changes in output are unlikely to have a significant impact on domestic prices because: (a) the CCs' prices do not change in any scenario; and (b) the increase in final demand is modest and does not noticeably affect productivity, which is the main factor influencing price formation.

4.4.1 What can we learn from the gravity effect in a multilateral context

As already noted, European enlargement affects each Member State directly and indirectly, irrespective of its geographical distance from any given Candidate Country. In other words, where the gravity model approach tends to weaken the bilateral link as the distance increases, we instead argue that the indirect effects may be even more important than the direct ones. San Marino may have no bilateral link with Hungary; but the linkages between Hungary and Germany and Germany and Italy may link San Marino with Hungary in unexpected ways. This is an extreme case where only the indirect effect of the link matters.

Scenarios 1 and 2 have been designed to highlight the relative importance of the indirect impact with respect to a simple bilateral connection between Italy and the CCs.

4.4.2 The multilateral context and the structure of CCs imports: the GDP profile

The GDP growth rates for the three scenarios are plotted in the following two figures. The increase in GDP is modest but more relevant than expected. In the scenario for 'Italy versus the Central and Eastern European countries', the increase in GDP is very modest; and falls from 0.2 to 0.13 along the simulation interval. In the second scenario, the increase in GDP is roughly twice the previous one at the beginning of the simulation interval; the increase in GDP develops smoothly up to a maximum of a factor of about 2.5 at the end of the period. In the third scenario, where the CCs are only assumed to increase their imports for those commodities with the largest shares and covering about 60 per cent of total imports, the increase in GDP is close to 0.5.

In the product account side, exports and imports reveal the highest difference with respect to the baseline scenario. In particular, taking the third scenario, there is a divergence of over 1 per cent from the baseline for the increase in exports. The increase in imports is much lower, at about 0.6 per cent. The trade balance produces an increase in GDP; consequently, the accelerator pushes investments up and the increase in disposable household income — which implies an increase in household consumption — adds another stimulus to GDP growth.

4.4.3 First selection

Given the baseline, the first selection concerns which scenario will be the benchmark for the subsequent step. We have seen that the differences in the scenarios have a clear impact on the results for the simulation. In particular, the first scenario implies an increase of GDP rates of growth of about .15 per cent for the entire the simulation period. The second scenario, which also takes into account the indirect effects of the EU enlargement, generates an increase of GDP close to 0.4 per cent for the period 2000–2010. The third scenario pushes this increase up by another 0.10 per cent.

Clearly, the first scenario demonstrates that a comparison of Italy versus the CCs is not adequate. The second and the third scenarios provide evidence of the relevance of the detected trade specialization between (not only) Italy and the most important applicants. At the end of the first round of simulation, we then start to investigate the effect of other factors relative to the third scenario (and, of course, to the baseline).

Figure 1

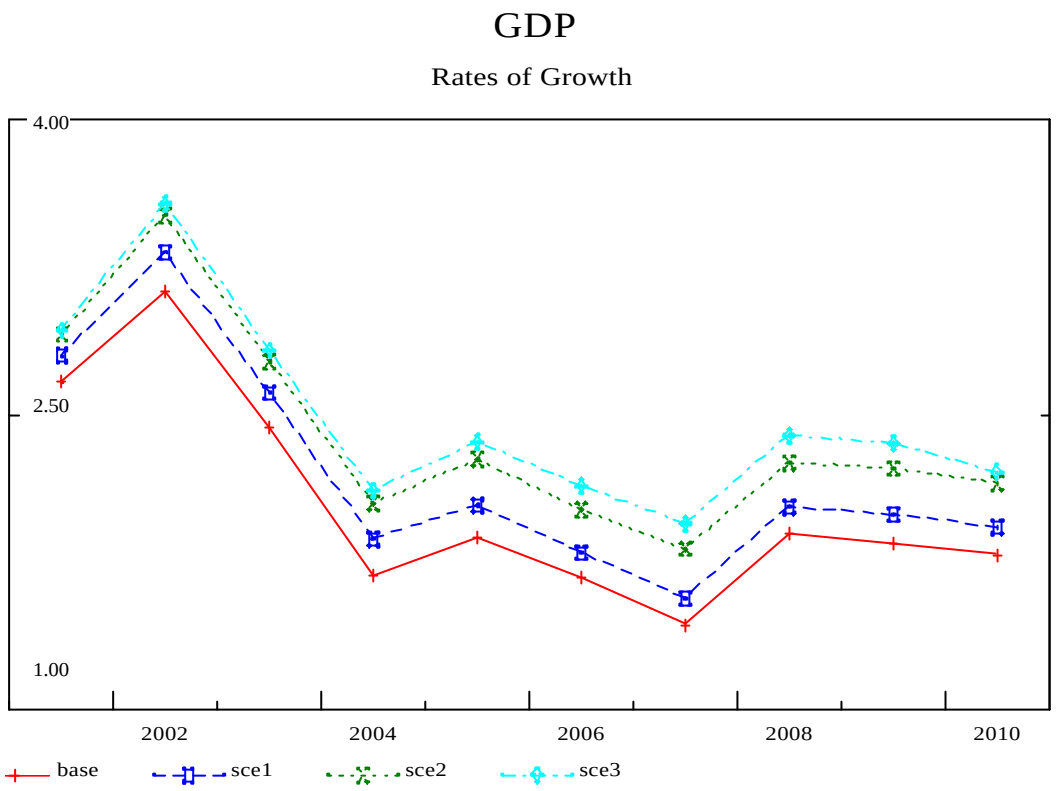
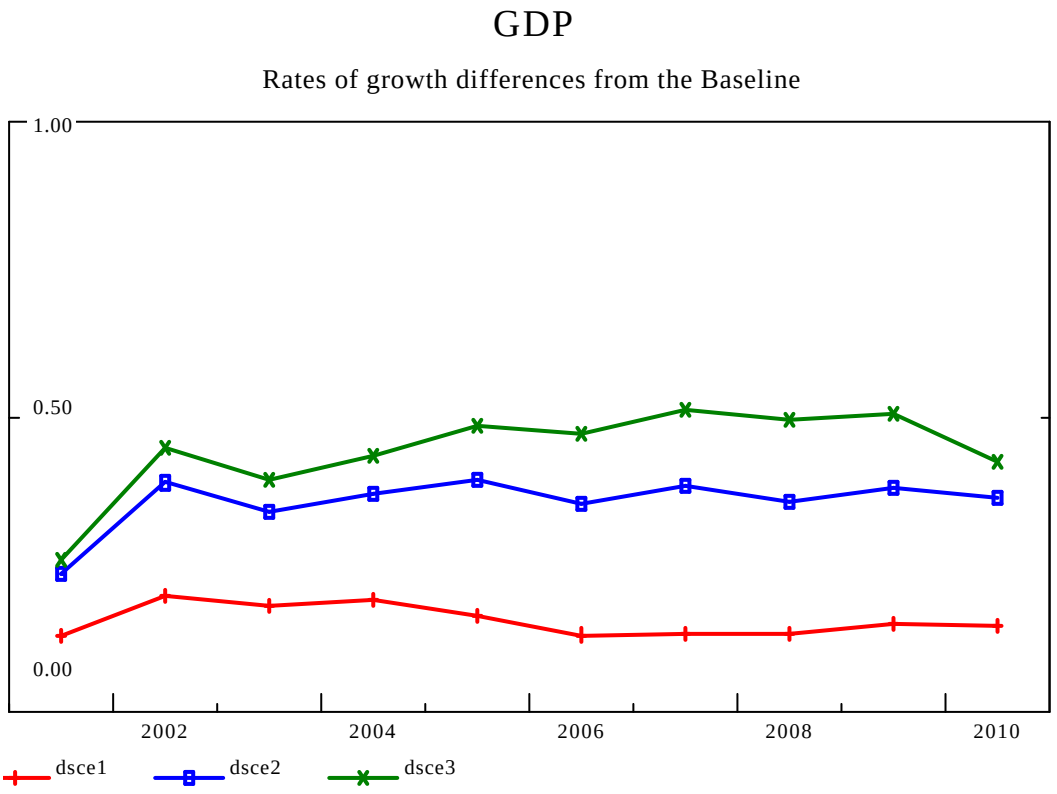


Figure 2



4.5 The Second Set of simulations: the removal of Trade Barriers

This group of simulations is designed to evaluate the impact of a change in trade and non-trade barriers following the EU enlargement to the East. In a modelling perspective, this means linking the CCs growth effects and trade specialization as assumed in the previous section with a change in relative prices due to the removal of barriers.

4.5.1 The Design of Scenarios[14]

Under the Europe Agreements custom tariffs on EU imports from the CCs and on CCs imports from the EU have been eliminated for practically all industrial goods with very few exceptions. On the other hand, custom tariffs are still imposed on agricultural products and fisheries both in the CCs and in the EU, that is, on products listed in Chapters 1–24 of the Harmonized System coding.

The structure of (residual) custom tariffs for agricultural products imposed by the EU on imports from the CCs and by these countries on imports from EU for the first 24 sectors of the Harmonized System have been estimated using data on custom duties to an 8-digit level of detail. To design this scenario, these custom duties for CCs have been approximated by the import-weighted average of tariff rates set by the Czech Republic, Hungary and Poland.[15] These computed tariff rates are shown in Table 8.

[14] We thank Elisa Quinto and Alessandro Missale for theri contributions on the design of the following scenario variables.

[15] First, we have calculated the unweighted average tariff rate on imports originating from the EU for each country at the 4-digit level (data have been taken from the database of the EU available at the web site: www.mkaccdb.eu.int). Then, for each of the three Candidate Countries the average tariff rates for the 24 agricultural sectors (2-digit sectors), have been computed as a weighted average of the 4-digit rates, using as weights the value of Italian exports to the country (data on Italian exports have been taken from the COMEXT database) in question (see Table 8, first column).
The structure by sector of Italian custom tariffs on products originating in the Czech Republic, Hungary and Poland has been computed using data on EU custom duties reported in the TARIC Consultation database (this database can be found at the web site http://europa.eu.int/comm/taxation_customs/dds/cgi-bin/tarchap of the European Commission or at the web site www.finanze.it of the Italian Ministry of Finance). We have again used the above procedure. First, we have computed the average of custom tariffs at the 4-digit level from the detailed data at the level of 8-digits and, then, the weighted average rate per sector using data on Italian imports for the three countries under examination. In the case of volume duties we have computed total tariff revenues using the volume of Italian imports of the particular product from the COMEXT database and then constructed the *ad valorem*-equivalent tariff rate. The average tariff rates by sector are reported in the second column 2 of Table 8.

Table 8 - Average tariffs rates on Italian Trade with the Czech Republic, Hungary and Poland
Percentage values

Sectors	on exports to CZH-HU-POL	on imports from CZH-HU-POL
Unmilled cereals	36	21
Fresh fruits, vegetables	12	13
Other crops	3	6
Livestock	17	12
Fishery	5	9
Meat	32	21
Dairy products and eggs	24	64
Preserved fruits, vegetables	24	14
Preserved seafood	28	16
Vegetable, animal oils, fats	8	1
Grain mill products	18	31
Bakery products	24	16
Sugar	35	18
Cocoa, chocolate, etc	25	11
Food products n.e.c.	17	7
Prepared animal feeds	6	1
Alcoholic beverage	34	6
Non-alcoholic beverage	34	6
Tobacco products	31	29
Paints, varnishes, lacquers	1	1
Scrap, used, unclassified	1	0
Average on above sectors	20	14

Source: EU Market Access Database and TARIC Consultation.

Since the front-end effect of the elimination of EU tariffs on CCs products is equivalent to a reduction in import prices of the same percentage, we model such an effect as a reduction in the relative prices of Italian imports in the import equation of the Bilateral Trade Model.[16] This allows us to evaluate the effect, at the sectoral level, of the removal of the remaining tariffs. It is worth noting that we do not consider the potential effect on Italian exports of the removal of tariffs by CCs on products originating in Italy. *Therefore, the potentially negative impact on Italian output from accession is likely to be overestimated by our simulation.*

Non-Tariff Barriers (NTBs) are impediments to trade such as: a) quantitative restrictions; b) price control measures; c) import licensing; d) different standards; and e) other technical requirements and custom procedures. It is commonly believed that the effect of the removal of NTBs should be substantial. Unfortunately, available information on NTBs is mostly qualitative and it is difficult to translate it into a quantitative index useful for investigating the impact of NTBs on trade. This explains why it is not uncommon in the literature to model the effect of NTBs by relying on pure judgement. For instance, Baldwin *et al.* (1997) guess

[16] More precisely, a reduction of the average tariff rate per sector from its actual level to zero is considered equivalent to a change in the relative price of imported goods for the corresponding sector.

that the elimination of NTBs between the EU and CCs could be assimilated to a 10 per cent reduction in trade costs, that is equivalent to a 10 per cent reduction in custom duties. Keuschnigg and Kohler (1999) follow the same approach, but opt for a more conservative 5 per cent.

Although our analysis relies on the same kind of judgement as Baldwin *et al.* (1997), our study is innovative in two respects. First, we provide estimates for two different scenarios in order to evaluate the sensitivity of trade flows, and thus results, to alternative hypotheses on the effect of the removal of NTBs. Secondly, we take into account that the incidence of NTBs differs across sectors and thus distinguish between three different *ad valorem* equivalents of NTBs so as to develop the full potential of our sectoral model.

To evaluate the extent to which EU imports are subject to NTBs in the various sectors, we use 'trade coverage ratios' for each EU sector. Coverage ratios are provided by Wang (2000) who uses information on NTBs indicators contained in the Trade Analysis and Information System (TRAINS) database of UNCTAD. TRAINS provides information for each Harmonized System item (6-digit level) on the presence of NTBs.[17] Depending on the corresponding 'trade coverage ratios' we distinguish between three types of sectors, heavily protected, mildly protected, and unprotected by NTBs (see Table 9).

[17] 'Coverage ratios' for each (2-digit) sector are computed as the percentage of imports (per sector) that are covered by at least one of the following NTBs:
a) Tariff Measures (other than ad *valorem*) such as tariff quota and temporary duties;
b) Price Control Measures countering the damage caused by the application the unfair practice of foreign trade/unfair foreign trade practices;
c) Standards and Other Technical Requirements, including quality, safety, health and other regulations;
d) Automatic Licensing Measures;
e) Monopolistic Measures;
f) Quantity Control measures that are however absent in EU-CEECs trade, being lifted by the Europe Agreements.

Table 9 - NTBs Coverage Ratios by Sectors

Heavily Protected Sectors	NTBs
2 Fruits and Vegetables	34
6 Cotton	53
7 Wool	27
12 Coal	52
18 Meat	19
27 Food Products n.e.c.	64
29 Alcoholic Beverages	20
32 Yarns and Threads	81
33 Cotton Fabrics	52
34 Other Textile Products	88
36 Wearing Apparel	88
49 Synthetic resins, man-made fibres	79
57 Product of coal	52
65 Basic iron and steel	10
67 Aluminium	50
Mildly Protected Sectors	
3 Other crops	1
10 Fishery	6
28 Prepared animal feed	3
35 Floor coverings	1
47 Basic chemicals	3
52 Soap and toiletries	2
53 Chemical products, n.e.c.	1
58 Tyres and tubes	1
59 Rubber products, n.e.c.	1
73 Metal containers	5
75 Hardware	5
93 Radio, TV, phonograph	1
94 Other telecomm. Equipment	1
106 Motor vehicles	2
107 Motorcycles and bicycles	2
108 Motor vehicle parts	2

Source: TRAINS and Wang (2000).

4.5.2 The two scenarios

To estimate the impact of the reduction of the NTBs imposed by the EU we consider two scenarios:

1) A first *conservative* scenario (see Keuschnigg and Kohler, 1999) assumes that the removal of NTBs is equivalent to the abatement of a 10 per cent tariff rate in the heavily affected sectors and to the abatement of a 5 per cent tariff rate in the mildly affected sectors.

2) A second *generous* scenario (see Baldwin *et al.* 1997) assumes that all sectors are to a certain extent protected by NTBs, whose effect is on average equivalent to a 10 per cent tariff rate. Such scenario assumes that the removal of NTBs is equivalent to the abatement of custom tariffs equivalent to 15, 10 and 5 per cent in the heavily, mildly and (apparently) unprotected sectors, respectively.

In the following section we examine the effect of removing trade protection in the form of both custom tariffs and NTBs. In order to highlight the negative impact of trade liberalisation on some sectors of the Italian economy we present such effects as deviations from the 'Specialising CCs scenario'. It is worth noting that such a negative impact would not be immediately evident if we presented results for the combined scenario of 'Specialising CCs plus the removal of trade protection' as deviations from the baseline scenario, since the effect of 'specialisation', in the 'Specialising CCs scenario', would offset the effect of trade liberalisation.

5. The Impact of the Enlargement on Structural changes in the Italian economy

Over time all economies face structural changes which can be detected in changes in the composition of aggregated economic variables. The sectoral composition of any national economy observed one century ago is very different from the present structure. The transition from the old to the new structure may be a relatively smooth process. The mutation of an economic sectoral structure is determined by different and changing sectoral rates of growth. According to the designed scenarios, the enlargement modifies the sectoral composition of final demand as well as the composition of (sectoral) resources. Clearly, these changes are reflected in the rates of growth of sectoral output. Tables 10–12 report the most rapidly growing sectors in the years 2001–2003 for the Baseline and those with the highest rates of growth for the Baseline again (years 2008-2010), the 'Specialising CCs', for the case of the removal of the tariff barriers preserving the NTBs ones (Table 11), and the cases of the 'conservative' and the 'generous' scenarios (Table 12) for 2008–2010.

In Table 10, the Baseline is represented at the starting point, period 2001–2003, and at the end of the horizon, period 2008–2010. At a glance, we can see that the rates of growth mark a general reduction at least for the top 25 sectors. 'Building & construction' is the sector with the highest growth rate for the period 2001–2003, but falls to 9th position in the years 2008–2010, while the 'other manufacturing industry' rises from 12th position to the top of the list at the end of the simulation period. So 'real estate' from period 2001–2003 to period 2008–2010 rises from the 19th to the 6th position. In Table 11, in the 'specialising CCs', 'building & construction' continue its downward trend ranking 21st in the years 2008–2010. This sector is stimulated by investments, and throughout the decade we witness a drop in the growth rate of investments so that consequently 'building & construction' drops towards the bottom of the list together with 'stone, clay & glass products' which supplies intermediate input to 'building & construction'. The growth of 'metal products' and 'electrical goods' slows down while some services sectors ('communication', 'inland transport services', 'banking & insurance', 'private health services', 'hotels & restaurants') have risen towards the top of the list. The sector of 'motor vehicles' halves its growth rate, dropping to last position. 'Other manufacturing industry' and 'other transport equipment', which occupy the first and second place respectively with growth rates of around 6 per cent annually, appear to be the winners in the anticipated structural change.

Table 11 reports the average rates of growth of the sectoral output respectively for the 'specialising CEEC5' scenario and 'non-tariff' scenario for the years 2008–2010. The 'removal of trade barriers' scenario is based on a reduction on import prices from CCs for those sectors where tariffs still apply. Although the reduction in import prices due to the

removal of residual tariffs only concerns a small group the 'agricultural' and 'food industry' sectors directly, we can also detect changes in the ranking of a wide range of industries. These changes are modest, but noticeable; for example, 'electrical goods' report a rate of growth reduction of 0.4 per cent.

The structural changes in the 'removal of trade barriers' scenarios are shown in Table 12. The conservative scenario is on the left side and the generous is on the right side. We see many changes in the two lists, but there is no significant reshuffling. By the way, if we consider the highest and the lowest rates of growth in each list, we can say that the range of rates of growth narrows as we move from the conservative to the generous assumption. This allows us to say that the higher the reduction of import prices due to the removal of trade barriers, the lower the process of structural change. In our simulation experiments we can also deduce that the intensity of the structural change is correlated with the performance of the economy by looking at the output or at GDP.

Table 10

Structural changes in the Specialising CEEC5 scenario
Top 25 sectors in descending order with respect to the output rate of growth

Baseline average output rates of growth in years 2001-2003		**Baseline** average output rates of growth in years 2008-2010	
27	Building & Construction	6.272	26 Other Manufacturing Industry 6.185
11	Agric. & Indus. Machinery	6.064	15 Other Transport Equipment 4.740
10	Metal Products	5.229	22 Leather, Shoes & Footwear 2.865
15	Other Transport Equipment	4.908	34 Communication 2.757
7	Primary metals	4.704	39 Private Health Services 2.380
13	Electrical Goods	4.368	37 Real Estate 2.239
8	Stone,Clay & Glass products	4.207	30 Hotels & Restaurants 2.146
12	Office,Precision,Opt.Instruments	3.925	7 Primary metals 2.128
34	Communication	3.822	27 Building & Construction 2.108
25	Plastic Products & Rubber	3.743	31 Inland Transport Services 2.065
31	Inland Transport Services	3.719	35 Banking & Insurance 1.965
26	Other Manufacturing Industry	3.706	11 Agric. & Indus. Machinery 1.885
23	Timber, Wooden Product & Furniture	3.654	38 Private Education Services 1.856
39	Private Health Services	3.216	40 Recreation & Culture 1.741
35	Banking & Insurance	3.201	12 Office,Precision,Opt.Instruments 1.736
36	Other Private Services	3.198	33 Auxiliary Transport Services 1.681
33	Auxiliary Transport Services	2.911	23 Timber, Wooden Product & Furniture 1.608
14	Motor Vehicles	2.907	8 Stone,Clay & Glass products 1.557
37	Real Estate	2.883	19 Alcohol & Non Alcoh. Beverages 1.515
38	Private Education Services	2.738	36 Other Private Services 1.470
24	Paper & Printing Products	2.659	24 Paper & Printing Products 1.395
30	Hotels & Restaurants	2.505	25 Plastic Products & Rubber 1.350
29	Wholesale & Retail Trade	2.297	10 Metal Products 1.319
40	Recreation & Culture	2.121	29 Wholesale & Retail Trade 1.087
19	Alcohol & Non Alcoh. Beverages	1.892	18 Other Foods 1.077

Table 11

Structural changes in the Specialising CEEC5 and no tariffs scenarios
Top 25 sectors in descending order with respect to the output rate of growth

Specialising CEEC5 average output rates of growth in years 2008-2010		**No tariffs** average output rates of growth in years 2008-2010	
26 Other Manufacturing Industry	6.277	26 Other Manufacturing Industry	6.343
15 Other Transport Equipment	5.180	15 Other Transport Equipment	5.366
11 Agric. & Indus. Machinery	4.129	11 Agric. & Indus. Machinery	3.695
34 Communication	3.154	7 Primary metals	3.121
7 Primary metals	3.126	34 Communication	3.112
22 Leather, Shoes & Footwear	2.701	22 Leather, Shoes & Footwear	2.817
31 Inland Transport Services	2.651	31 Inland Transport Services	2.595
39 Private Health Services	2.599	39 Private Health Services	2.577
35 Banking & Insurance	2.519	37 Real Estate	2.472
37 Real Estate	2.498	35 Banking & Insurance	2.469
10 Metal Products	2.495	12 Office,Precision,Opt.Instruments	2.456
24 Paper & Printing Products	2.430	30 Hotels & Restaurants	2.361
30 Hotels & Restaurants	2.382	38 Private Education Services	2.276
25 Plastic Products & Rubber	2.365	10 Metal Products	2.241
38 Private Education Services	2.327	24 Paper & Printing Products	2.232
12 Office,Precision,Opt.Instruments	2.322	25 Plastic Products & Rubber	2.190
33 Auxiliary Transport Services	2.217	33 Auxiliary Transport Services	2.157
13 Electrical Goods	2.167	23 Timber, Wooden Product & Furniture	2.036
36 Other Private Services	2.088	36 Other Private Services	2.024
40 Recreation & Culture	2.055	40 Recreation & Culture	2.022
27 Building & Construction	1.983	27 Building & Construction	2.011
23 Timber, Wooden Product & Furniture	1.811	8 Stone,Clay & Glass products	1.885
19 Alcohol & Non Alcoh. Beverages	1.771	19 Alcohol & Non Alcoh. Beverages	1.823
8 Stone,Clay & Glass products	1.753	13 Electrical Goods	1.781
14 Motor Vehicles	1.606	29 Wholesale & Retail Trade	1.531

Table 12

Structural changes in the No tariffs and NTBL and NTBH scenarios
Top 25 sectors in descending order with respect to the output rate of growth

No tariffs and NTBL(0-5-10)
average output rates of growth in years 2008-2010

26	Other Manufacturing Industry	6.330
15	Other Transport Equipment	5.332
11	Agric. & Indus. Machinery	3.711
7	Primary metals	3.126
34	Communication	3.125
22	Leather, Shoes & Footwear	2.826
31	Inland Transport Services	2.607
39	Private Health Services	2.586
37	Real Estate	2.483
12	Office,Precision,Opt.Instruments	2.482
35	Banking & Insurance	2.477
30	Hotels & Restaurants	2.379
38	Private Education Services	2.288
10	Metal Products	2.277
24	Paper & Printing Products	2.231
25	Plastic Products & Rubber	2.218
33	Auxiliary Transport Services	2.168
23	Timber, Wooden Product & Furniture	2.065
36	Other Private Services	2.036
27	Building & Construction	2.035
40	Recreation & Culture	2.032
8	Stone,Clay & Glass products	1.903
19	Alcohol & Non Alcoh. Beverages	1.835
13	Electrical Goods	1.825
29	Wholesale & Retail Trade	1.545

No tariffs and NTBH(5-10-15)
average output rates of growth in years 2008-2010

26	Other Manufacturing Industry	6.311
15	Other Transport Equipment	5.266
11	Agric. & Indus. Machinery	3.995
34	Communication	3.183
7	Primary metals	3.180
22	Leather, Shoes & Footwear	2.785
31	Inland Transport Services	2.682
39	Private Health Services	2.629
35	Banking & Insurance	2.536
37	Real Estate	2.530
10	Metal Products	2.492
12	Office,Precision,Opt.Instruments	2.435
30	Hotels & Restaurants	2.431
38	Private Education Services	2.350
24	Paper & Printing Products	2.347
25	Plastic Products & Rubber	2.333
33	Auxiliary Transport Services	2.236
27	Building & Construction	2.113
36	Other Private Services	2.111
13	Electrical Goods	2.090
40	Recreation & Culture	2.083
23	Timber, Wooden Product & Furniture	2.000
8	Stone,Clay & Glass products	1.900
19	Alcohol & Non Alcoh. Beverages	1.852
29	Wholesale & Retail Trade	1.616

6 - SELECTED MACROECONOMIC RESULTS

In addition to the effects on the Italian productive sectors due to the EU Eastern enlargement, some other results for selected domestic economic variables deserve to be mentioned.
Household consumption response is important in understanding the domestic demand behaviour and some key features of the model. Household consumption is estimated using PADS[18] and population projections for the demand system have been made using the demographic projection model connected to INTIMO. In these equations, household disposable income and a price term are the most important independent variables. Household disposable income is modelled in the accountant part of the multisectoral model as the sum of 'resources' (such as compensation of employees, property income and transfer payments) minus 'uses' (such as taxes, social security contributions and transfers to others) of the Income Distribution Account for Households. For example, an increase in exports will generate an increase in employment which will in turn boost the compensation of employees and personal consumption expenditure. On the other hand, a price increase will reduce consumption, through a complex price term in the equation.
Turning to our results, Table 13 compares the household consumption growth rates of the baseline with two simulation scenarios: the specialization of CCs (without changes in trade barriers), and the removal of trade and non-trade barriers (according the generous hypothesis).

We can observe an increase in the demand of some goods, such as food products, where the negative growth rate of the baseline reverts to a positive sign, at least for some years. This result may be explained by the reduction of tariffs and prices for some traditionally highly-protected items such as 'bread and cereals', 'meat', 'dairy products', 'fruit and vegetables', and 'tobacco' (see Table 15, Household Consumption Deflators). We find the same effect, albeit less evident, for 'clothing and footwear' and for 'transport' mainly due to the removal of non-trade barriers. The household consumption of some services also increases: in this case, an income effect due to the rise of private disposable income prevails over a negligible price effect due to higher income elasticities for these items (see Bardazzi *et al.*, 2001). For example, the trend of an increasing consumption of 'housing' and 'health' services due to population ageing was already apparent in the baseline scenario (Bardazzi, 2001). The household disposable income profile is shown in Table 14 for the baseline and the two alternative scenarios. As can be seen, households will benefit from enlargement in both nominal and real terms, even though, the removal of custom barriers produces a decrease in disposable income with respect to the case of 'specialising CCs'. We have, however, overestimated the negative effect on Italian output from enlargement, because we do not take the potentially positive effect on Italian exports of the removal of tariffs by CCs on Italian commodities into account.[19]

A summary of the main macroeconomic variables is shown in Table 16 (Product Account and Price Indexes). Here the baseline scenario is compared with the overall simulation of 'removal of trade barriers (generous scenario)'. On the uses side, household consumption benefits from the removal of tariffs although the profile of its aggregate growth rate remains relatively unchanged. The results of this table are obtained by summing up the sectoral estimates presented above: household consumption by category presents a more variegated behaviour which is lost in the aggregate figure. The highest difference between the baseline

[18] This demand system has been designed by Almon (1979, 1996).
[19] For an evaluation of the impact on household welfare see Grassini *et al.* (2001).

and the alternative scenario is for exports (with an increase of about 1 per cent at the end of the simulation horizon), while the increase in imports is much lower (about 0.5 per cent). The increase in sectoral outputs and the growth of imports and exports lead to an increase of GDP which is close to 0.5 at the end of the period. The removal of tariffs and NTBs has a distinctive impact of prices: the GDP deflator growth rate decreases compared with the baseline. On the contrary, the Personal Consumption Expenditure Deflator growth pattern is not much affected by the alternative scenario apart form the accession year 2004 when the reduction in price growth is about 0.24 per cent. Although this effect on growth rates then vanishes altogether, the levels are permanently affected. These aggregate results clearly show that enlargement has a larger effect, in terms of prices, on the total domestic product than on the bundle of goods and services for private consumption. This result is explained by the efficiency gains in terms of productivity combined with the reduction of prices for some imported commodities used in the production process.

Table 13 - Household Consumption, Selected Items, Rates of Growth

Titles of Alternate Runs
Line 1: Baseline
Line 2: Specialising CCs
Line 3: Specialising CCs + Removal of trade barriers (Generous Scenario)

Alternatives are shown in deviations from base values.

	02-03	03-04	04-05	05-06	06-07	07-08	08-09	09-10
TOTAL	1.687	1.460	1.458	1.472	1.359	1.563	1.622	1.596
	0.209	0.210	0.228	0.234	0.251	0.230	0.226	0.178
	0.210	0.397	0.184	0.164	0.239	0.265	0.261	0.220
-Foods & Beverages	-0.190	-0.433	-0.404	-0.343	-0.429	-0.175	-0.100	-0.104
	0.209	0.211	0.230	0.238	0.256	0.232	0.227	0.169
	0.211	0.462	0.193	0.171	0.249	0.273	0.267	0.216
-Clothing & Footwear	0.577	0.316	0.372	0.408	0.326	0.563	0.646	0.545
	0.200	0.198	0.218	0.227	0.245	0.222	0.224	0.177
	0.202	0.428	0.181	0.165	0.244	0.270	0.239	0.219
-Housing	2.529	2.303	2.208	2.113	1.993	2.192	2.212	2.204
	0.229	0.215	0.224	0.235	0.258	0.239	0.242	0.193
	0.232	0.350	0.175	0.161	0.243	0.269	0.276	0.228
-Furniture & Services	1.136	0.926	0.948	0.953	0.857	1.033	1.110	1.125
	0.210	0.210	0.228	0.237	0.256	0.233	0.229	0.179
	0.212	0.398	0.182	0.164	0.243	0.266	0.267	0.222
-Health	3.191	2.904	2.879	2.733	2.577	2.702	2.743	2.664
	0.219	0.217	0.232	0.235	0.250	0.234	0.233	0.189
	0.220	0.353	0.185	0.161	0.234	0.264	0.265	0.225
-Transports & Communications	2.604	2.337	2.379	2.302	2.152	2.283	2.321	2.237
	0.180	0.196	0.223	0.224	0.236	0.214	0.205	0.173
	0.179	0.410	0.185	0.156	0.226	0.249	0.238	0.211
-Recreation & Education	2.411	2.160	2.150	2.150	2.066	2.255	2.282	2.236
	0.205	0.211	0.230	0.236	0.254	0.231	0.227	0.182
	0.207	0.379	0.183	0.164	0.243	0.266	0.261	0.222
-Other Goods and Services	1.805	1.599	1.537	1.684	1.511	1.725	1.780	1.772
	0.213	0.215	0.235	0.237	0.251	0.231	0.224	0.168
	0.214	0.384	0.190	0.167	0.237	0.266	0.266	0.222

Note: These consumption categories are obtained by aggregation over the 40 consumption items considered in INTIMO. Here follows the list of these aggregated categories with the number of items from which they are obtained: Foods & Beverages (13), Clothing & Shoes (2), Housing (2), Furniture & Services (6), Health (4), Transports & Communications (4), Recreation & Education (4), Other Goods and Services (5).

Table 14 - Household Disposable Income (1988 Prices)

Titles of Alternate Runs
Line 1: Baseline
Line 2: Specialising CC5
Line 3: Specialising CCs + Removal of trade barriers (Generous Scenario)

Alternatives are shown in deviations from base values.

	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010
Household disposable income	789	826	863	899	937	973	1011	1050	1093	1137
(Thousands Euros)	1	3	5	8	10	13	16	19	23	26
	1	3	5	6	9	10	13	16	20	23

Table 15 - Household Consumption Deflators, Selected Items, Rates of Growth

Titles of Alternate Runs
Line 1: Baseline
Line 2: Specialising CEEC5
Line 3: Specialising CEEC5 + Removal of trade barriers (Generous Scenario)

Alternatives are shown in deviations from base values.

	02-03	**03-04**	**04-05**	**05-06**	**06-07**	**07-08**	**08-09**	**09-10**
-Bread & Cereals	2.95	2.85	2.69	2.20	2.15	1.89	1.91	2.16
	0.09	0.04	0.02	0.01	0.01	0.08	0.07	0.11
	0.08	-0.52	-0.03	-0.06	-0.08	-0.04	0.04	0.06
-Meat	3.47	3.54	3.33	2.79	2.83	2.65	2.60	2.54
	0.09	0.05	0.02	0.00	0.00	0.04	0.08	0.15
	0.09	-0.75	-0.03	-0.04	-0.03	0.00	0.03	0.10
-Fish	3.48	3.68	3.51	2.95	3.04	2.87	2.83	2.85
	0.03	0.01	-0.01	-0.03	-0.04	-0.02	-0.01	0.04
	0.03	-0.19	-0.04	-0.04	-0.06	-0.06	-0.03	0.00
-Dairy products	3.35	3.51	3.34	2.84	2.95	2.79	2.74	2.67
	0.02	0.02	-0.01	-0.03	-0.04	-0.02	0.01	0.09
	0.02	-0.51	-0.04	-0.03	-0.06	-0.03	-0.01	0.02
-Fruits & Vegetables	3.45	3.65	3.48	2.93	3.02	2.85	2.81	2.82
	0.03	0.01	-0.02	-0.03	-0.04	-0.02	0.00	0.04
	0.03	-0.21	-0.04	-0.05	-0.06	-0.06	-0.03	0.00
-Clothing	3.13	3.20	2.96	2.37	2.33	2.09	2.15	2.54
	0.10	0.10	0.07	0.05	0.04	0.07	0.05	0.05
	0.11	-0.29	0.02	-0.01	-0.04	-0.02	0.13	0.02
-Shoes	2.94	2.80	2.72	2.30	2.36	2.30	2.27	2.45
	0.04	0.02	0.00	-0.01	-0.02	0.01	0.03	0.08
	0.05	-0.39	-0.01	-0.02	-0.03	-0.02	0.01	0.04
-Furniture	2.98	2.93	2.80	2.34	2.32	2.31	2.31	2.41
	0.16	0.06	0.00	-0.01	-0.01	0.03	0.07	0.08
	0.17	-0.18	-0.01	-0.02	-0.05	-0.01	0.04	0.05
-Medicines	3.38	3.18	3.08	2.70	2.65	2.52	2.48	2.39
	0.06	0.07	0.06	0.02	-0.01	0.03	0.05	0.08
	0.06	-0.27	0.05	0.00	-0.05	0.01	0.03	0.01
-Auto & Cycles	2.89	2.41	2.20	1.88	1.86	1.81	1.88	2.01
	0.20	0.15	0.09	0.08	0.08	0.12	0.15	0.09
	0.20	-0.27	0.06	0.05	0.04	0.10	0.15	0.09

Table 16 - Product Account and Price Indexes

Titles of Alternate Runs
Line 1: Baseline
Line 2: Specialising + removal of barriers (generous scenario)- difference from base

Alternatives are shown in deviations from base values.

	02-03	03-04	04-05	05-06	06-07	07-08	08-09	09-10
RESOURCES								
GDP	2.40	1.67	1.86	1.65	1.42	1.88	1.83	1.77
	0.38	0.39	0.32	0.30	0.48	0.51	0.53	0.43
Imports	6.10	4.58	4.83	4.09	3.60	4.54	4.42	4.39
	0.52	0.64	0.54	0.37	0.56	0.64	0.67	0.54
USES								
Consumption	1.79	1.62	1.62	1.63	1.54	1.70	1.75	1.73
	0.16	0.31	0.14	0.13	0.19	0.21	0.20	0.17
Household Consumption	1.69	1.46	1.46	1.47	1.36	1.56	1.62	1.60
	0.21	0.40	0.18	0.16	0.24	0.27	0.26	0.22
Government expenditure	2.18	2.18	2.18	2.18	2.18	2.18	2.18	2.18
	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Investments	8.69	3.98	4.64	2.83	1.25	3.85	2.98	2.51
	0.56	0.61	0.29	-0.22	0.01	0.27	0.22	0.44
Inventory change	5.87	4.28	4.68	3.72	3.13	4.09	4.08	4.12
	0.82	0.86	0.68	0.60	0.98	1.00	1.04	0.73
Exports	2.77	2.79	3.14	3.16	3.37	3.41	3.68	3.87
	0.82	0.61	0.87	1.03	1.38	1.33	1.40	0.91
GDP Deflator	3.19	3.38	3.36	2.85	2.87	2.76	2.82	2.82
	-0.04	-0.05	-0.03	-0.06	-0.11	-0.11	-0.12	-0.08
PCE Deflator	2.71	2.64	2.65	2.37	2.37	2.29	2.33	2.34
	0.03	-0.24	0.02	-0.01	-0.04	-0.01	0.01	0.01

7. FINAL REMARKS

The impact of the European enlargement on Italy has been evaluated by disentangling the scenarios into the effect of the new prosperity of the applicants and the removal of persisting trade barriers.

The effect of the new prosperity of the applicants has been directly taken as the increase of their imports from the EU and not in terms of the effect of the enlargement inside the CCs economies. This is characteristic of all studies of enlargement viewed exclusively from one side, in this case, the Member States.

In the first place, the effect of an increase in imports to the Central and Eastern European Country from the EU has been simulated considering the case of a) Italy vs. the CCs, and b) the EU-15 vs. the CCs; and then going on to focus on the specific effect of b) on the Italian economy. From this comparison we learn that the effect of the enlargement, which reaches the Italian economy indirectly through the impact on the other European economies, is about the same (in size) of the direct effect. Furthermore, a concentration of the CCs imports (as well as exports) in a small group of commodities reveals a trend in 'specialisation' which indeed affects all EU countries. This evolution of the CC demand for imports from EU-15 adds a further modest but clear benefit to the Italian economy.

The removal of outstanding barriers to trade concerns tariffs and non-tariff barriers. The tariff barriers, which mainly effect agricultural and food industry commodities, have been estimated at a very detailed level and, according to the commodity detail of the Bilateral Trade Model used here, effect a total of 22 sectors (out of 120 in the BTM model). As regards the simulation results for the removal of non-tariff barriers, two alternative scenarios have been formulated. The sectoral detail of the impact of the enlargement on the Italian economy is shown in Table 17. The table reports the comparisons of the output rates of growth of the generous scenario with respect to the baseline. For each sector, the first line shows the rate of growth from year 2003 to 2010; the second line shows the difference from the first line. For example, the total output (TOTAL) growth rate in year 2006 is expected to be equal to 1.55; the 'generous scenario' suggests a growth rate equal to 1.55+.35, that is to say a growth rate of 1.9 per cent. A negative value in the second line of each sector reveals a reduction in growth due to the enlargement. For example, 'agriculture, forestry, fishery' shows a rate of growth equal to -.48 per cent in the baseline and equal to -.75 (= -.48+(-.27)) in year 2005.

In a macroeconomic perspective, for sake of simplicity, the channel 'method' may be used to sketch the picture; one can choose the reduction of import prices to figure out the sequence: the drop in import prices makes imported commodities more competitive, the increase of imports substitutes domestic output, production decreases, income decreases and finally consumption shrinks. On the other hand, the drop in import prices reduces the growth of domestic prices; if the imported commodities are mainly input which are processed by the domestic industries, then the (sectoral) outputs gain in competitiveness, the exports grow, income grows and finally consumption swells (however, changes in relative prices will modify the composition of consumption). However, many other channels can be posited. The channel 'method' is generally used to support an *ex-post evaluation* of a study, or is imposed as a predetermined thesis which proves to be independent of any appropriate investigation. This 'method' is appropriate only if the model used is strictly recursive. However, this is

normally not the case; in particular, when the model is macroeconomic and necessarily based on national accounts data, the time interval will not be short enough to allow the use of a recursive modelling approach. In these cases what matters is the simultaneity. Given the changes in the import prices and the increase in imports of the CCs (EU exports), the impact on a country economy will 'simultaneously' involve all the 'endogenous' variables in the model (and the set of them is a characteristic of the model used). The channel 'method' may be used for an *ex-post evaluation* of the present study, but it *cannot* provide the necessary understanding of the properties of the multisectoral model which constitutes the cornerstone of this research.

At the macroeconomic level, the cumulative impact on the Italian economy of the new prosperity of the applicants (measured as an increase in import growth rates), and the removal of tariffs and non-tariff barriers is clearly positive. Despite the generally positive impact of the enlargement, some sectors are better off, whilst others do not benefit very much from the re-shaping of the EU production structure, and others are directly hit by a reduction of imports prices, that is, 'agriculture' and 'food industries', and suffer a clear, albeit temporary, drop in competitiveness.

If we examine sectoral performance, we find that 'milk & dairy products' suffered an upsurge of (foreign) competitiveness thus forfeiting the gains generated by the expansion of the CCs economies and subsequently falling during recession. The sector 'other manufacturing industry' does not appears to have been much affected by the enlargement and remains a highly dynamic sector. Other sectors tend to decelerate following the removal of trade barriers, but subsequently regain a good pace of growth.

Sectoral growth paths are not steady over time with accelerations, decelerations, recessions, and recoveries leading to different 'final' scores. Table 18 presents an evaluation of the enlargement in two columns respectively headed 'average', which gives the percentages of the difference between the cumulated outputs of the 'generous scenario' and the cumulated outputs of the 'baseline' in the interval 2001-2010, and '2010' which reports percentages relative to the difference of total outputs in the last year examined. This second column reveals our preferences for analysing the simulations by 'level' rather than 'rate of growth' of output; the rate of growth is fully satisfactory for short-term analysis where a single period rate of growth contains all the information about the path for the time interval; but permutations of a rate of growth time series may describe very different paths. The horizon of analysis in this study is a decade so that we are in presence of long-run simulations where the sequence of growth rates may well be significant; the percentages reporting the difference in total outputs for the last year sum up structural changes over time.

Retuning to Table 18, we see that in general the average values are lower than those measured in '2010' . This is because the 'average' contains the structural shocks generated by the removal of trade barriers. The column '2010' gives a good picture of the effects of the enlargement according to the scenarios considered. In particular, the real effects of the enlargement are measured by cumulating the annual gains (or losses) in order to obtain a more accurate impression of the impact in a given year. Although a number of studies conclude that the impact of the enlargement (on the EU-15 countries, groups of countries or single countries) is expected to be modest, we should stress that if the impact turns out to have a given sign, what matters is its cumulative effect over time. In the case of Italy a relatively substantial expansion will affect some sectors ('agriculture and industrial

machinery', 'electrical goods', 'motor vehicles, 'metal products'), whilst others (mainly 'food industries' and 'tobacco') will lose their relative importance. A cumulative output rate of growth of over 10 per cent (at the end of the 2000s) will indicate a sizeable sectoral impact.

A multisectoral model is particularly useful when investigating the impact of our scenarios on the structure of Italian industry. First, the anticipated increase of exports generated by the demand of the CCs in their process of 'catching up' exerts a clear keynesian demand effect so that all industries benefited in varying degrees in terms of output growth. This is the overall result obtained from the first set of 'CC's growth effects scenarios'.

Clearly, the removal of tariffs and NTBs interferes with these results. In order to evaluate such interference, we must consider that the removal of trade barriers makes imports from the CCs more competitive. These imports, which constitute part of the resources, will be used to feed intermediate and final consumption. If we examine import composition, we find that some imports tend to feed intermediate consumption whilst others figure directly in final consumption, such as for example, goods produced for household consumption. Hence, the effect of more competitive imports may vary across sectors.

Figures 3-8 highlight the impact of the new prosperity of the CCs represented in the 'specialising CCs Scenario' and the changes due to the removal of trade barriers in the 'conservative' and 'generous' scenarios. In each sector, the output index (2001=1) shows higher growth in the 'specialising CCs scenario' confirming the positive benefit of the keynesian effect due to the increase in imports for the CCs. For 'agriculture, forestry, fishery' (Figure 3), the removal of trade barriers has a negative impact on sectoral performance in term of output, particularly when shifting from the 'conservative' to the 'generous' scenario. In 'milk & dairy product' (Figure 4), the removal of trade barriers is even more severe; all the benefits of the expansion stimulated by higher exports are lost and sectoral output falls below the 'baseline' track until the end of the period when it once again approaches the 'baseline' level. On the contrary, the removal of trade barriers improves the sectoral performance for 'leather, shoes & footwear'(Figure 5); in particular, the 'conservative scenario' stimulates further growth while the 'generous scenario' tends to undermine this stimulus. This means that according to the 'conservative scenario' commodities with reduced import prices generally constitute intermediate consumption for this sector, whilst in the 'generous scenario' the import price reduction is more likely to affect sectoral competition in final consumption products.

In Figure 6, the expansion of 'chemical products' is slightly improved under the 'conservative scenario', but clearly deteriorates with the 'generous scenario'. Figures 7 and 8 illustrate two cases where the removal of trade barriers generates a negative effect which is more severe for the 'conservative' than for the 'generous' scenario. On closer examination, the input structure of these two sectors ('metal products' and 'agriculture and industry machinery'), reveals that those imports absorbed as inputs mainly belong to the group of commodities not covered by the 'conservative scenario'.

The last two Figures (9 and 10) present evidence of the case where the 'generous scenario' does not modify the performance related to the 'conservative scenario' ('electrical goods'), and the case of no influence due to the removal of trade barriers ('recreational & cultural services'). The explanation in the case of 'recreational & cultural services' is simple: no

imported commodities prove to be relevant for sectoral production and no imported service competes with it on the final demand side.

In terms of GDP, studies on the impact of the Eastern enlargement on a single Member State or on the EU-15 generally conclude that the impact is modest, negligible, or has no discernable sign (see, for example, Baldwin (1997), CEC-ECFIN(2001)). We cannot confirm such conclusions given that they usually are based on analytical tools which are inappropriate for evaluating the sort of effects examined in this study. It should be noted that the process of enlargement implies the evaluation of hauling the CC economies, their processes of trade specialisation, the removal of commodity-specific tariffs and trade barriers , and that this in turn requires a 'mesoeconomic' approach where the sectoral representation of the economy may well helps highlight the structural changes induced by these factors. Underlying macrovariables such as GDP or 'total output', one can detect, as in the present study, changes in the structure of the economy which certainly merit policy-makers' attention.

Table 17 - Total Output Rates of Growth

Line 1: Baseline
Line 2: Specialising + removal of trade barriers(generous scenario)

Line 2 shows deviations from base values.

	02-03	03-04	04-05	05-06	06-07	07-08	08-09	09-10
TOTAL	2.40	1.60	1.83	1.55	1.28	1.79	1.74	1.69
	0.45	0.44	0.37	0.35	0.58	0.62	0.65	0.51
1 Agriculture,Forestry,Fishery	-0.24	-0.38	-0.48	-0.41	-0.41	-0.02	0.23	0.39
	0.28	0.09	-0.27	-0.13	0.31	0.31	0.34	0.30
4 Coal,Oil,Petroleum Ref.Products	3.68	1.85	1.46	3.17	4.37	4.95	5.05	4.74
	0.10	0.03	0.38	0.46	0.41	0.26	0.21	0.37
5 Electricity,Gas,Water	1.89	1.36	1.44	1.13	0.93	1.33	1.32	1.32
	0.41	0.43	0.30	0.30	0.51	0.55	0.58	0.46
MANUFACTURING	2.16	1.34	1.64	1.08	0.81	1.36	1.41	1.50
	0.68	0.64	0.58	0.60	0.94	0.99	1.07	0.78
7 Primary metals	3.16	2.10	2.53	1.83	1.51	2.19	2.13	2.13
	0.81	0.50	0.46	0.52	1.02	1.08	1.14	0.97
8 Stone,Clay & Glass products	3.66	2.16	2.76	2.17	1.44	2.22	1.68	1.44
	0.30	0.26	0.16	0.01	0.25	0.32	0.30	0.38
9 Chemical Products	0.71	0.51	0.65	0.38	0.22	0.44	0.54	0.49
	0.38	0.24	0.20	0.24	0.52	0.52	0.59	0.44
10 Metal Products	3.87	1.67	2.08	1.04	0.55	1.58	1.31	1.33
	0.93	0.97	0.85	0.77	1.17	1.29	1.37	0.97
11 Agric. & Indus. Machinery	3.74	1.42	2.23	0.93	0.62	1.61	1.64	2.14
	1.47	1.34	1.60	1.56	2.07	2.22	2.34	1.88
12 Office,Precision,Opt.Instruments	2.00	1.42	1.77	1.48	1.51	1.34	1.66	1.81
	0.65	0.72	0.64	0.62	0.82	0.82	0.90	0.49
13 Electrical Goods	2.66	1.42	1.56	0.75	0.45	0.84	0.71	0.75
	1.15	1.28	1.25	1.30	1.59	1.61	1.69	1.02
14 Motor Vehicles	0.10	0.55	0.17	-0.54	-1.25	-0.65	-0.69	-0.73
	1.35	1.28	1.23	1.42	2.14	2.19	2.45	1.58
15 Other Transport Equipment	3.52	3.92	4.52	4.13	3.96	3.98	4.46	5.02
	0.39	0.29	0.37	0.42	0.48	0.54	0.66	0.39
16 Meat & Preserved Meat	-0.41	-0.51	-0.46	-0.36	-0.41	-0.04	0.18	0.39
	0.22	0.40	-0.11	0.00	0.27	0.29	0.31	0.14
17 Milk & Dairy Products	0.81	0.63	0.66	0.76	0.67	0.92	1.02	1.10
	0.25	-0.60	-0.71	-0.46	0.23	0.26	0.26	0.26
18 Other Foods	0.70	0.61	0.60	0.68	0.62	0.92	1.07	1.08
	0.21	0.39	-0.03	0.05	0.31	0.31	0.28	0.29
19 Alcohol & Non Alcoh. Beverages	1.59	1.30	1.11	1.20	1.11	1.43	1.50	1.53
	0.27	0.30	-0.02	0.06	0.30	0.32	0.34	0.33
20 Tobacco	-2.23	-2.67	-2.97	-3.21	-3.53	-3.48	-3.61	-3.84
	0.25	-0.44	-1.94	-1.26	0.00	0.03	0.03	-0.01
21 Textile & Clothing	0.78	0.85	0.73	0.33	0.26	0.67	1.05	0.91
	0.15	0.10	0.03	0.06	0.34	0.29	0.36	0.40
22 Leather, Shoes & Footwear	-0.36	0.12	0.34	0.47	0.60	1.56	2.36	3.36
	0.17	0.48	0.32	0.35	0.37	0.39	0.55	-0.70
23 Timber, Wooden Product & Furniture	3.46	2.26	2.73	2.00	1.39	1.84	1.70	1.52
	0.18	0.41	0.17	0.08	0.35	0.38	0.39	0.39
24 Paper & Printing Products	1.52	1.14	1.30	1.01	0.91	1.19	1.36	1.43
	0.64	0.47	0.49	0.56	0.86	0.91	1.04	0.86
25 Plastic Products & Rubber	1.98	1.53	1.81	1.46	1.23	1.34	1.37	1.33
	0.81	0.75	0.77	0.83	1.11	1.09	1.21	0.75
26 Other Manufacturing Industry	2.73	3.64	4.46	4.83	5.27	5.51	5.94	6.43
	0.13	0.29	0.21	0.25	0.29	0.22	0.26	0.00

27 Building & Construction	6.26	3.59	4.76	4.05	2.34	3.68	2.57	1.64
	0.19	0.10	0.03	-0.28	-0.15	0.03	-0.12	0.13
SERVICES	2.09	1.53	1.65	1.46	1.24	1.61	1.60	1.57
	0.37	0.44	0.32	0.30	0.46	0.50	0.52	0.41
28 Recovery & Repair Services	0.15	-0.62	-0.67	-1.14	-1.56	-1.35	-1.47	-1.66
	0.48	0.50	0.41	0.42	0.64	0.69	0.73	0.58
29 Wholesale & Retail Trade	1.67	0.98	1.17	0.92	0.67	1.12	1.11	1.07
	0.40	0.50	0.36	0.33	0.52	0.56	0.59	0.47
30 Hotels & Restaurants	2.28	2.02	1.90	2.04	1.84	2.13	2.15	2.14
	0.25	0.41	0.22	0.20	0.29	0.31	0.32	0.25
31 Inland Transport Services	2.83	1.94	2.23	1.90	1.60	2.16	2.09	2.04
	0.48	0.49	0.42	0.38	0.61	0.66	0.69	0.55
32 Sea & Air Transport Services	0.71	0.54	0.64	0.59	0.57	0.71	0.76	0.80
	0.23	0.21	0.23	0.25	0.37	0.38	0.42	0.32
33 Auxiliary Transport Services	2.18	1.54	1.74	1.50	1.29	1.70	1.69	1.67
	0.41	0.45	0.38	0.36	0.55	0.59	0.62	0.49
34 Communication	3.26	2.79	2.85	2.68	2.51	2.78	2.78	2.74
	0.34	0.45	0.30	0.29	0.44	0.47	0.48	0.37
35 Banking & Insurance	2.37	1.80	1.99	1.79	1.60	1.97	1.97	1.96
	0.42	0.42	0.38	0.37	0.57	0.61	0.64	0.50
36 Other Private Services	2.29	1.46	1.73	1.37	1.06	1.56	1.49	1.45
	0.49	0.48	0.43	0.41	0.64	0.68	0.72	0.56
37 Real Estate	2.62	2.29	2.27	2.17	2.02	2.25	2.25	2.23
	0.26	0.36	0.21	0.19	0.28	0.31	0.32	0.26
38 Private Education Services	2.06	1.68	1.77	1.60	1.52	1.77	1.84	1.87
	0.41	0.48	0.37	0.36	0.52	0.54	0.57	0.41
39 Private Health Services	3.02	2.72	2.68	2.49	2.28	2.40	2.40	2.36
	0.23	0.31	0.19	0.16	0.23	0.26	0.27	0.23
40 Recreation & Culture	1.77	1.51	1.53	1.53	1.44	1.70	1.73	1.75
	0.28	0.39	0.24	0.23	0.34	0.37	0.38	0.30
SERVICES NON-MARKET	2.12	2.11	2.11	2.11	2.11	2.12	2.12	2.11
	0.01	0.02	0.01	0.01	0.01	0.02	0.02	0.01
41 General Public Services	1.84	1.84	2.04	2.08	2.21	2.31	2.48	2.62
	0.49	0.41	0.53	0.63	0.85	0.85	0.91	0.64
42 Public Education	2.06	1.84	1.84	1.84	1.83	2.01	2.08	2.06
	0.22	0.37	0.18	0.16	0.24	0.26	0.26	0.22
43 Public Health Services	2.18	2.18	2.18	2.18	2.18	2.18	2.18	2.18
	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
44 Non-profit Institutions	1.28	1.08	0.98	1.06	0.87	1.05	1.08	0.96
	0.22	0.40	0.18	0.16	0.24	0.27	0.26	0.22

Table 18 - Generous scenario vs. Baseline-Sectoral output per cent difference, averages refer to the period 2001-2010

Sectors	average	2010
TOTAL	2.5	4.9
Agriculture,Forestry,Fishery	0.7	1.6
Coal,Oil,Petroleum Ref.Products	2.4	3.7
Electricity,Gas,Water	2.2	4.2
MANUFACTURING	3.9	7.7
Primary metals	4.1	8.2
Stone,Clay & Glass products	1.4	2.5
Chemical Products	1.8	3.8
Metal Products	5.4	10.4
Agric. & Indus. Machinery	9.1	18.5
Office,Precision,Opt.Instruments	3.9	7.1
Electrical Goods	7.2	13.8
Motor Vehicles	8.2	17.4
Other Transport Equipment	2.0	4.0
Meat & Preserved Meat	1.0	1.9
Milk & Dairy Products	-0.3	-0.2
Other Foods	1.1	2.2
Alcohol & Non Alcoh. Beverages	1.1	2.3
Tobacco	-1.5	-3.0
Textile & Clothing	0.9	2.1
Leather, Shoes & Footwear	1.4	2.2
Timber, Wooden Product & Furniture	1.5	2.9
Paper & Printing Products	3.4	7.1
Plastic Products & Rubber	4.8	9.2
Other Manufacturing Industry	1.1	1.9
Building & Construction	0.3	0.2
SERVICES	2.1	4.0
Recovery & Repair Services	2.6	5.4
Wholesale & Retail Trade	2.3	4.5
Hotels & Restaurants	1.4	2.6
Inland Transport Services	2.7	5.3
Sea & Air Transport Services	1.4	2.9
Auxiliary Transport Services	2.4	4.7
Communication	2.8	3.8
Banking & Insurance	1.4	4.8
Other Private Services	2.3	5.4
Real Estate	1.2	2.6
Private Education Services	1.6	4.4
Private Health Services	0.1	2.2
Recreation & Culture	3.2	3.0

Figure 3

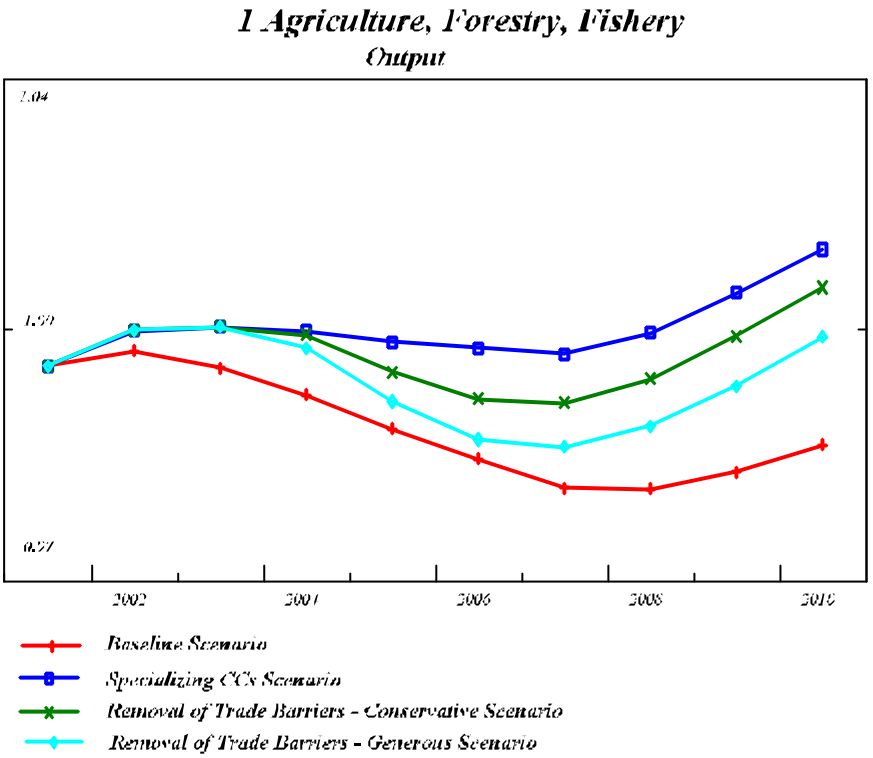


Figure 4

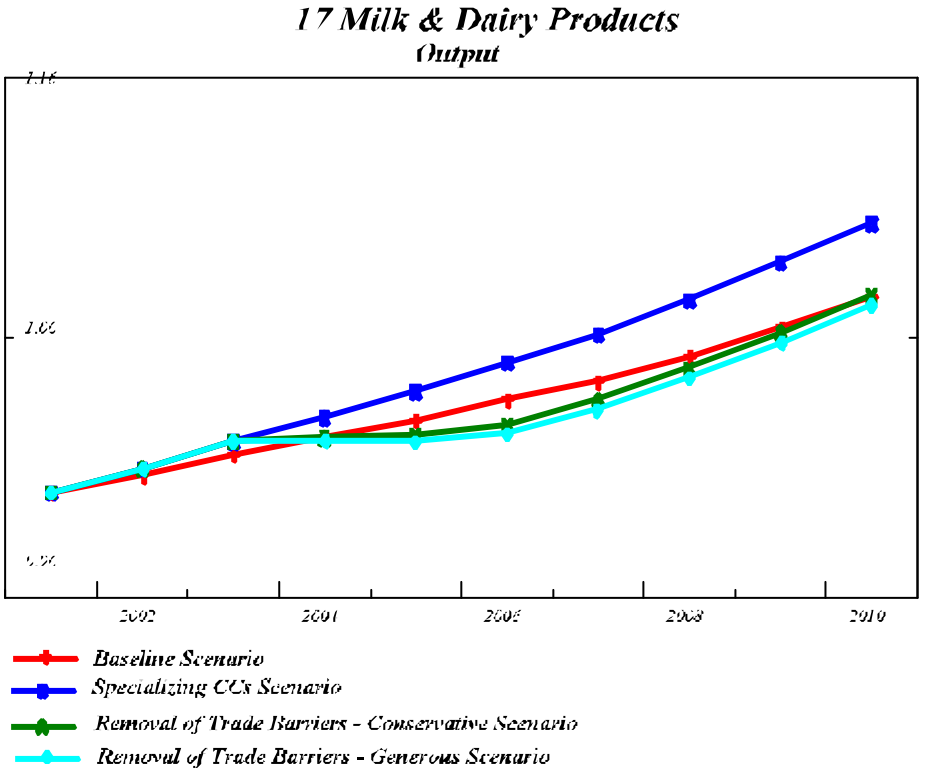


Figure 5

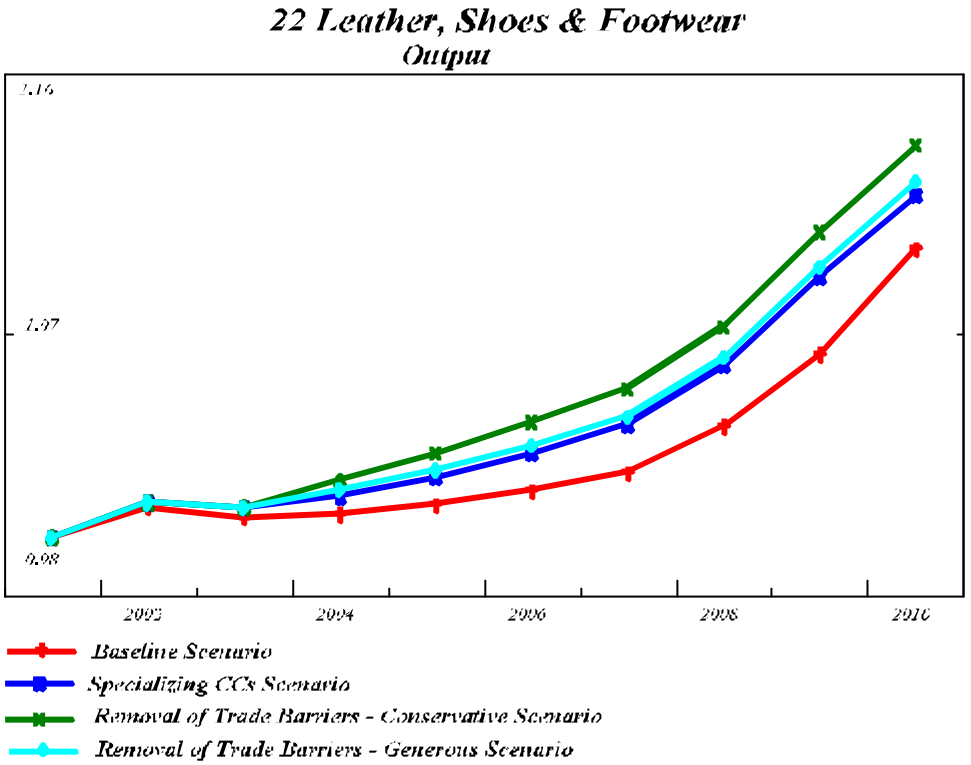


Figure 6

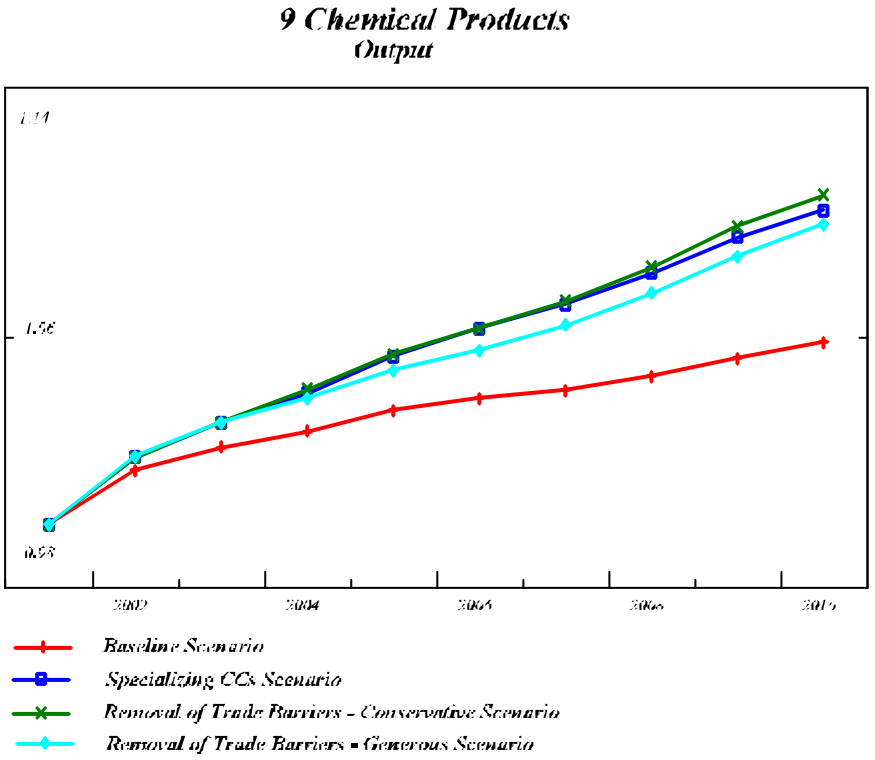


Figure 7

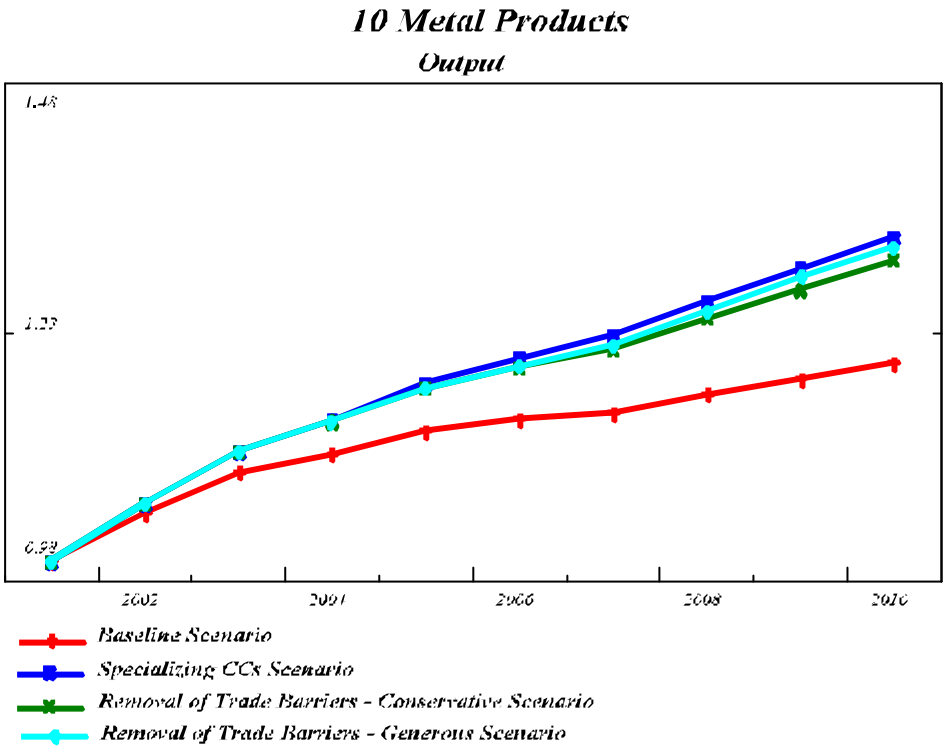


Figure 8

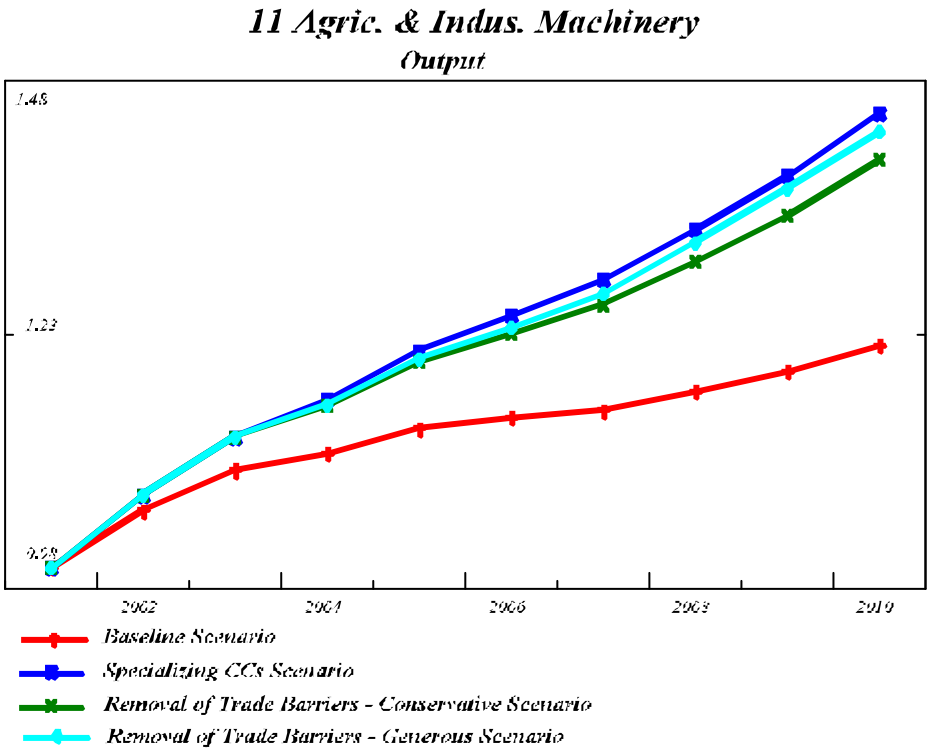


Figure 9

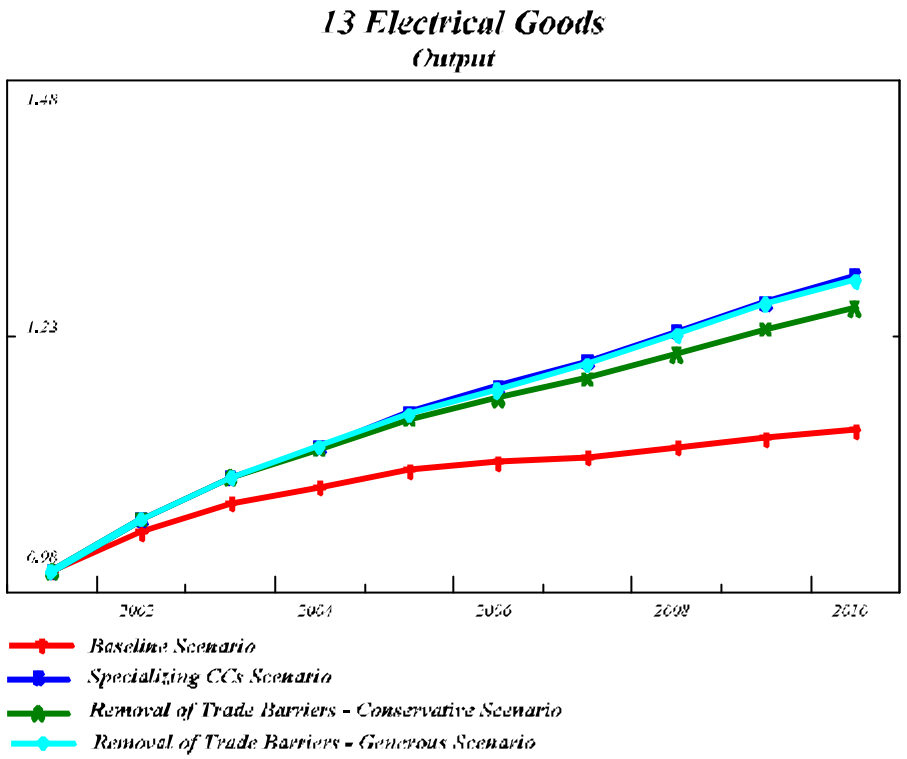
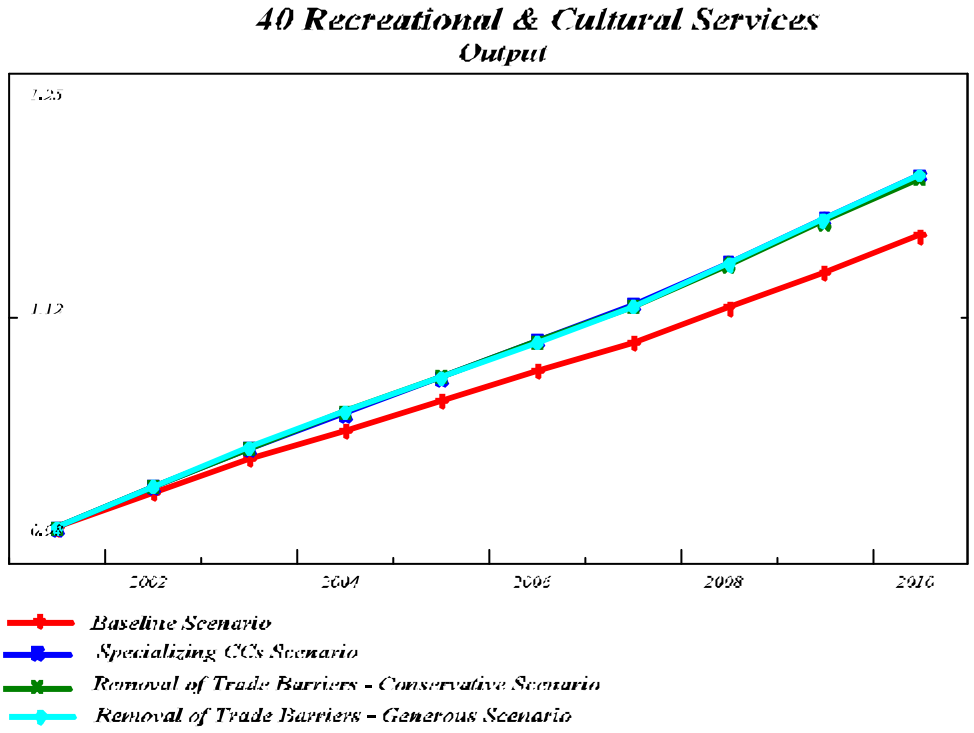


Figure 10



Appendix A

A Schematic Overview of INTIMO (INTerindustry Italian MOdel)

INTIMO is a Multisectoral Model (MM) based upon the accounting framework of the input-output table and the institutional accounts of Italy. This table has the intermediate consumption classified for 44 sectors. 40 sectors represent the private component of the economy; 4 sectors represent no-market sectors (3 Government and 1 non-profit).The peculiar representation of Government expenditure in the I/O table (as specified by international statistical standards) commands some changes which lead to the introduction of an extra sector labeled "Government wages"; this sector does not alter the basic accounting structure of the table and the behavior of the model and appears as the 45th sector of the I/O table.

INTIMO Real Side

Component	Sectors	Influences
Output by product sector	45	q=Aq+f
Personal Consumption by expenditure categories	40	Disposable income Size distribution of income Change in disposable income Relative prices Age structure of the population Other demographic variables
Investment by investing industries	21	Output over the last three years Change in product output
Inventory Change by product sector	27	Product output, inventory stocks
Imports by product sector	41	Import-share equations (ratio of sectoral imports to domestic demand) Foreign prices (supplied by the Bilateral Trade Model)/domestic prices 'Nyhus time trend'
Exports by product sector		Supplied by the Bilateral Trade Model (BTM)
Labour Productivity by product sector	40	Sectoral Output Time trend
Employment	40	Labour productivity
Consumption and Investment by product	45	Final demands by category are bridged to producing sectors
Government Purchases by product sector		Exogenous

INTIMO Price-Income Side

Component	Sectors	Influences
Prices by product sector	45	p = pA + v
Value Added by product sector	45	Value added by industry distributed to products based on product-to-industry bridge
Value added by industry:		
Wages		
Aggregate Wage	1	Personal Consumption deflator Total output/employment
Wage index sectoral/aggregate	42	Rates of growth of employment Output Labour productivity Time trend
Social securities	45	Exogenous
Gross operating surplus	42	Sectoral prices Change in sectoral output Sectoral foreign prices for non-sheltered sectors Time trend
Indirect Taxes		Output Prices Exogenous tax rates
Government Subsidies		Exogenous

INTIMO Macroeconomic and Other Variables

Component	Influences
Population	Supplied by Demographic Projection Model (DPM)
Labour Force	Supplied by Demographic Projection Model (DPM)
Tax Policy	Exogenous
Government Expenditures	Exogenous
Price of crude oil	Exogenous: supplied by BTM
Savings Rate	Exogenous: INTIMO assumption constant to its average in the 90's
Bridge Tables:	
Intermediate coefficients	Across-the-row trends
Personal consumption	Exogenous: supplied at the base year by the Italian Statistical Office
Investments	Exogenous: supplied at the base year by the Italian Statistical Office

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