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Partial Equilibrium Modelling of the EU-Med Agreements: The case of Morocco

Patricia AUGIER, CEFI
Michael GASIOREK, Sussex University

Étude Femise FEM21-21, Sussex European Institute, Sussex University – UK ; Centre d'Economie et de Finance Internationales – France ; Division Statistique du Ministère de l'Industrie – Maroc ; Faculty of Economic & Political Sciences – Egypt.

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The case of Morocco

Patricia Augier
(CEFI)
&
Michael Gasiorek
(University of Sussex & GREQAM)

Contact details:
Dr. Michael Gasiorek
School of European Studies
University of Sussex
Falmer, Brighton
BN1 6GJ, East Sussex
United Kingdom

Tel: 0044 1273 877101
Email: m.gasiorek@sussex.ac.uk

Introduction

There is a growing literature on the potential impact of the Barcelona process on the various countries of the Southern Mediterranean. This process of integration between the EU and the Southern Mediterranean involves, principally, the asymmetric reduction in tariff barriers by the latter group of countries on imports from the former. The reason for the asymmetry is that in principle the Southern Mediterranean countries already have largely tariff free access to the EU under the GSP. In return for the reduction in Southern Mediterranean import tariffs there are provisions on improved market access to the EU especially with regard to "sensitive" product areas (such as processed foodstuffs and textiles), technical cooperation, mutual recognition of standards, as well as increased aid. The aim of this research is to focus more closely than heretofore on the nature and process of structural adjustment that may take place as a result of this proposed liberalisation. In particular our focus is on specific industries, and on the detailed partial equilibrium modelling of those industries.

The methodology of much of the growing empirical literature on the impact of the Barcelona process is that of computable general equilibrium modelling. CGE modelling is an increasingly powerful and widely utilised tool. This is principally because it provides numbers based on real data which give "predictions" or "forecasts" of particular changes in policy. A key attractive features of such modelling is that it allows for the modelling of multiple sectors, factors and countries – as well as of course allowing for general equilibium interactions (via factor markets or through intermediates to be included). CGE models have thus become an extremely important part of the applied economist's and policy maker's toolkit.

There have been a number of such studies examining the impact of the Association Agreements on the SMCs. The focus is usually on a single country with the majority of studies dealing with, either Turkey, Egypt, Tunisia or Morocco. Using a model of trade under perfect competition Harrison, Rutherford and Tarr (1993, 1997, 1997) found that the welfare gain for Turkey ranges from 0.15% of GDP with a reduction in tariffs, to between 1-1.5% of GDP when allowing for improved access to EU markets, exchange rate changes and harmonisation of standards. Mercenier & Yeldan (1997)

use an inter-temporal CGE model with imperfect competition but also find a welfare gain of just under 1% of GDP for the Turkish economy of forming a customs union with the EU. Focussing on Egypt, Konan & Maskus (1997, 2000) investigate the interactions between trade liberalisation and changes in domestic fiscal policy. Across a range of scenarios they also find small welfare numbers, ranging between 0.2%-0.89% of GDP. In contrast Hoekman and Konan (1999) find tariff reduction alone would yield to a small welfare loss for Egypt (0.14%) but if accompanied by an extension of the process of liberalisation to agriculture and services, and if accompanied by changes in markets access and improved harmonisation of standards, the welfare gains could rise to between 13.5% and 20.6% of GDP. Dessus & Suwa Eisenmann (1998) find that a small welfare gain for Egypt of 0.49% of GDP, rises to a gain of 5.24% of GDP with the incorporation of changes in productivity. Similar ranges of results can be seen in the research carried out on Tunisia and Morocco. Cockburn et.al. (1998) compare both a perfectly competitive, and an imperfectly competitive model and find a welfare gain for Tunisia in the former case of 0.7% of GDP, and in the latter of 2.27% of GDP. Brown, Deardorff & Stern (1996) in a model with imperfect competition for Tunisia show that the welfare gains range from between –0.2% to 3.3% of GDP. Rutherford, Rustrom and Tarr (1997) once again within a perfectly competitive framework show that the welfare gains arising from a reduction in tariffs only are low (1% of GDP) but could rise to 2.4% of GDP with multilateral trade liberalisation.

It is worth, however, bearing in mind certain key aspect to CGE modelling. Most empirical work in economics requires careful and intensive preparation of appropriate data. A typical CGE model may require data for several countries, across a range of industries, and for a large number of variables and is hence very intensive in the underlying data requirements. While good quality sectoral data is usually available for most developed economies though not always at a very detailed level of sectoral disaggregation. Hence, for example, correspondence between trade and production data is usually only possible at a fairly low level of sectoral disaggregation. It is typically much difficult and often impossible to obtain reasonably disaggregated sectoral data for many developing countries. From the point of view, therefore, of the underlying data availability the typical CGE model works to a relatively high degree of sectoral aggregation (with rarely more than 10-15 sectors).

Given the data constraints, and also the practical difficulties associated with formulating the underlying economic model, the typical CGE model usually simplifies greatly the treatment of each sectors which is almost invariably treated in a highly symmetric fashion. Hence, many if not most CGE models are still based on perfect competition and products are differentiated by source by use of the Armington assumption.. Those models that allow for imperfect competition typically treat firms symmetrically within each sector – both in terms of their underlying characteristics and in terms of their behaviour.

There are good practical reasons for many of these difficult choices faced by the CGE modeller. The purpose of this discussion is not to dismiss the important contribution made by CGE models to our understanding of the possible impact of changes in economic policy. It is indeed important to consider the economy-wide effects of policy changes, as well as to allow for the interaction between final goods markets, intermediate goods markets, and factor markets. These are aspects of the empirical economists' toolkit which CGE modelling is in principle good at addressing. However, there are also important limitations to such modelling. Those limitations largely centre around the simplifying assumptions made in determining the structure of the model, and around the quality or richness of the underlying data.

In this paper, therefore, we propose a complementary approach to that of CGE modelling. In order to provide a potentially better or deeper understanding of the potential impact on particular sectors of policy changes we take a partial equilibrium modelling approach. We focus on one sector – textiles – and explore the possible impact on that sector of the Barcelona process. The advantage of this approach is that it enables us to model the sector, and in particular the production side of the sector (a) in much more detail than is typically done in a CGE model, and (b) to make use of much higher quality data. The basic modelling framework we work with is that of imperfect competition, and the data set we use for Morocco is that of the FACS, supplemented with information from the Annual Survey, as well with standard trade data where needed.

The rest of this paper is divided as follows. In the first section we detail key features of the Southern Mediterranean economies, and in particular focus on the importance of the textile and clothing industry. The second section describes the key features of

the model and data employed. The third section presents our results, and finally the fourth section concludes.

1. The EuroMed Economies – patterns of trade and production

In this section we take a brief look at some key statistics concerning the structure of production and trade of the Southern Mediterranean economies. If we turn first to Table 1.1 which gives the sectoral shares of value added and employment in manufacturing for six of the EuroMed economies. The bottom row gives total manufacturing value added, and shows that the largest economy was Turkey, followed by Israel, with the remaining economies being considerably smaller.

Table 1.1: Sectoral Shares in Value Added and Employment

Sectors	Egypt		Israel		Jordan		Morocco		Tunisia		Turkey	
	1997		1996		1997		1999		1999		1999	
	VA	Emp	VA	Emp	VA	Emp	VA	Emp	VA	Emp	VA	Emp
Food, Bev.& Tob.	18.5	20.3	12.4	15.2	27.9	20.8	32.7	20.2	17.4	14.2	13.2	16.7
Textiles & apparel	12.9	29.8	7.9	15.0	4.4	9.1	15.9	38.3	27.8	41.3	16.2	31.8
Leath. & Footwear	0.4	1.2	0.7	1.4	1.3	2.2	1.1	3.0	5.1	4.4	0.8	1.5
Wood & furniture	0.5	1.9	2.7	4.1	3.8	8.9	1.6	2.1	6.6	3.5	1.6	2.6
Paper & printing	3.0	4.0	7.3	7.8	5.8	7.6	4.2	3.2	2.9	3.2	3.0	3.0
Chemicals	18.1	9.3	5.2	2.4	17.2	11.5	15.0	6.6	9.8	3.9	10.7	5.2
Petroluem	13.7	2.2	5.7	3.5	7.9	4.0	0.0	0.0	6.3	0.4	15.6	0.8
Rubber & plastic	1.9	2.2	6.0	5.5	3.6	5.2	2.5	2.8	2.5	3.7	3.8	3.6
Non-met. Minerals	10.4	8.2	4.4	3.4	15.4	13.5	8.9	7.7	7.3	8.0	7.3	6.8
Metals	7.9	10.1	13.4	15.2	7.4	10.5	5.9	5.5	4.7	5.8	10.3	10.4
Mach. not elec.	4.3	4.2	3.1	3.2	2.3	3.1	4.1	3.7	0.4	2.4	4.6	5.2
Machinery, electric	3.9	2.6	22.5	14.8	1.5	1.5	3.1	3.1	5.4	4.9	5.4	4.6
Transp. Equipment	3.9	3.1	6.1	5.4	0.8	0.9	4.7	3.5	2.5	3.1	6.4	6.4
Prof., Sc. & other	0.6	0.9	2.5	3.1	0.7	1.4	0.3	0.3	1.3	1.2	1.1	1.3
Total manuf. ($M)	6767.8		14107.7		1066.2		5660.8		3935.9		31295.7	

Source : UNIDO Industrial Statistics Database, Rev.2, 2002

If we consider first which are the most important sectors in terms of both value added and employment. Looking at these it can be seen that Food, Beverages and Tobacco is one of the three largest industries in terms of both employment and value added for each of these economies. The other sector which figures prominently is that of Textiles and Apparel. For Morocco, Tunisia & Turkey this is one of the most important sectors in terms of value added, and for all of the countries except Jordan it is one of the most important sectors in terms of employment shares. Indeed for Egypt, Morocco, Tunisia and Turkey this is the most important sector in this regard with the share of manufacturing employment ranging from 29.8% in Egypt, to 41.3% in Tunisia. Other sectors that are clearly important in terms of either value added or employment for at least three of these economies are Chemicals, Non-metallic minerals, and Metals. Overall the table shows there are some considerable similarities in production structure for most of these economies, in particular in the emphasis on Food, Beverages & Tobacco, and on Textiles and Apparel. Perhaps not surprisingly the country that differs the most significantly from this is that of Israel, where for example, the most significant sector in terms of value added is machinery.

Tables 1.2 focusses on the the sectoral breakdown of imports and exports. For each of the six Southern Mediterranean countries included we have calculated the share of imports and exports at the 2-digit SITC rev.3 level. The table then gives for each of these countries the five largest imports (M) and export (X) industries. The last two rows give the aggregate shares of the five and ten largest industries. In aggregate the five largest import industries account for between 30%-49% of all imports, and the ten largest between 48% and 64% of all imports. For exports the five largest account for between 48% and 68%, and the ten largest for between 65% and 84% of all exports. This suggests a high degree of specialisation particularly with regard to exports. Each country (except Egypt) has at least one industry which comprises more than 10% of all imports, and more than 20% (except Jordan) of all exports. In terms of imports there are five sectors which are one of the top five industries for three or more countries - cereal (SITC 04), petroleum (SITC 33), textile yarn (SITC 65), electrical machinery (SITC 77), and road vehicles (SITC 78). In terms of exports there are three such sectors – vegetables & fruit (SITC 05), electrical machinery (SITC 77), and clothing etc (SITC 84).

In terms of the SITC 2-digit industries listed above textiles comprises most of industries 26 (Textile fibres), 65 (Textile yarn) and part of 84 (Clothing etc). Taking these in aggregate it is clear that textiles and clothing are significant import and export industries for the EuroMed countries. Textile yarn comprises 4.64% and 6.25% of imports for Turkey and Jordan, and 12.71% and 16.01 percent respectively for Morocco and Tunisia. On the export side, textile yarn comprises 6.96 of Egyptian exports, and 12.58 of Turkish exports, while Clothing etc comprises 5.75% of Egyptian exports, 12.92% fo Jordan, 21.26 for Turkey, and rising to 32.78% and 40.12% for Morocco and Tunisia. These are substantial figures and emphasise again the importance of the textile industry for these economies. It is also interesting to note for example the importance of textile yarn imports (ie intermediates) into Jordan, Morocco, Tunisia coupled with high export levels of clothing etc (ie most likely the transformed final good) for the same economies.

Table 1.2 : The Sectoral Breakdown of Trade

	Description	Egypt		Israel		Jordan		Morocco		Tunisia		Turkey	
		M	X	M	X	M	X	M	X	M	X	M	X
03	Fish etc								11.54				
04	Cereals etc	9.73				4.98		7.00					
05	Veg & fruit						5.95		7.44				6.84
26	Textile fibres		4.74										
27	Crude fertilisers						14.89						
33	Petroleum etc		37.59	6.36		13.51		13.71			7.48	11.29	
51	Organic chemicals				3.21								
52	Inorganic chemicals								6.35		4.14		
54	Med. Products						8.43						
56	Fertilisers										4.45		
65	Textile yarn etc		6.96			6.25		12.71		16.01		4.64	12.58
66	Non-metallic min			20.82	31.20								
67	Iron & steel	4.88											7.98
71	Power generating mach.											4.73	
72	Special indust. mach	4.90											
74	General indust. mach	4.47								5.43			
75	Office machinery			4.94									
76	Telecom. equip.				13.65	4.71							
77	Elec. Mach			10.36	11.40			5.61	9.23	7.56	12.23	5.18	
78	Road vehicles			6.67		8.95	6.22	4.67		6.89		4.38	7.33
84	Clothing etc		5.75				12.92		32.78	5.57	40.12		21.26
89	Misc. manuf.				3.68								
93	Transactions n.e.s.	6.83	7.04										
	Total (5)	30.81	62.08	49.15	63.14	38.40	48.41	43.70	67.34	41.46	68.42	30.22	55.99
	Total (10)	48.60	78.74	64.60	77.02	54.88	65.24	60.13	86.61	58.84	82.12	52.14	72.47

We now turn to the geographical pattern of trade for these economies. Table 1.3 details the share of imports and exports by partner 'country' at the aggregate level and for the textile industry. We have here defined the textile industry more narrowly (ie excluding apparel) as defined by the ISIC rev.3 classification[1]. The partner countries we consider are the EU15, the CEFTA and EFTA countries + the Baltic states) which we call the PanEU, the Southern Mediterranean countries, and the Rest of the World. In order to prevent any anomalies which might arise from one year's data we have taken the average shares over 1993-1995, and 1999-2001.

If we consider first total trade we can see that over 1993-95 the EU is the principal supplier of imports for Israel, Morocco and Tunisia with the respective shares of imports being 50.9%, 54.9% and 72.64%. Similarly over 1999-2001 the EU is the principal supplier for Morocco (57.5%), Tunisia (70.6%), and Turkey (48.6%). On the side of exports the EU is by far the principal destination market for Egypt, Morocco, Tunisia, and Turkey over 1993-95 and for the latter three countries over 1999-2001, whereas the rest of the world is the more important destination for the remaining economies. There are some interesting changes over time. With regard to both imports and exports three countries – Egypt, Israel and Jorden see a reorientation away from the EU and towards the Rest of the World. This is most marked for Egypt where the EU import share declined from 37.6% to 32.8%, and the export share from 44.6% to 30.9%. In contrast, Morocco and Turkey see the EU import share rise (while Tunisia experiences a small fall), while each of these economies see a rise in the share of exports going to the EU which is most marked for Morocco (from 62.5% to 73.5%).

It is worth noting that small import shares are accounted for by either the PanEU countries, or by the EuroMed countries. For the latter the import share from the other EuroMeds over 1993-95 ranges from 0.8% for Israel, 2.5% for Turkey, to 7.8% for Jordan. Except for Turkey where the share rises to 4.7% by 2001, these shares remain relatively stable over time. With regard to exports there is greater variation in the share accounted for by the EuroMed countries. Hence over 1993-95 13.1% of Egyptian exports went to other EuroMed countries, while for Israel the figure was 1.02%. Over time the biggest change in these shares is experienced by Jordan (from

[1] The figures here are calculated by using the correspondance between the ISIC rev.3 and the SITC

9.2% to 14.1%), while Turkey also sees a rise (from 6.6% to 7.9%). In contrast Morocco sees a large fall (from 4.4% to 1.9%) and Tunisia a slightly smaller one (from 5.9% to 3.3%).

Table 1.4 : Trade by geographical origin

		Total Trade				Textile Trade			
		Imports		Exports		Imports		Exports	
Reporter	Partner	1994	2001	1994	2001	1994	2001	1994	2001
Egypt	EU15	37.65	32.86	44.59	30.91	29.70	17.94	66.21	57.40
	Pan-EU	5.57	4.58	2.78	1.14	3.10	0.86	2.97	1.67
	EuroMed	2.35	3.06	13.10	13.45	5.11	5.44	6.05	2.94
	Rest of World	54.43	59.50	39.52	54.50	62.09	75.76	24.76	38.00
Israel	EU15	50.94	45.63	30.18	28.53	58.77	39.66	57.13	49.73
	Pan-EU	7.75	6.59	3.87	3.27	5.46	4.19	1.05	1.05
	EuroMed	0.81	1.01	1.02	1.69	4.71	6.26	1.13	3.56
	Rest of World	40.50	46.77	64.93	66.51	31.06	49.89	40.69	45.67
Jordan	EU15	32.85	31.42	8.61	4.87	25.48	12.14	10.17	4.87
	Pan-EU	3.92	2.87	0.74	0.74	4.46	0.45	0.48	0.07
	EuroMed	7.34	7.65	9.19	14.08	11.86	35.71	8.17	16.53
	Rest of World	55.89	58.06	81.46	80.31	58.19	51.69	81.18	78.53
Morocco	EU15	54.92	57.51	62.55	73.49	84.70	87.30	80.68	92.02
	Pan-EU	3.94	2.51	2.06	1.55	1.23	0.36	0.56	0.15
	EuroMed	3.29	3.43	4.42	1.90	2.01	1.81	3.49	0.21
	Rest of World	37.85	36.56	30.97	23.05	12.05	10.54	15.28	7.61
Tunisia	EU15	72.64	70.66	77.40	80.32	93.66	91.87	81.58	90.24
	Pan-EU	2.80	2.86	1.34	0.86	0.60	0.42	0.56	0.22
	EuroMed	3.96	3.90	5.93	3.34	0.81	1.22	1.41	0.27
	Rest of World	20.60	22.59	15.33	15.49	4.92	6.50	16.45	9.27
Turkey	EU15	45.35	48.56	48.39	52.56	31.46	47.76	62.51	63.61
	Pan-EU	5.73	5.93	5.89	5.22	2.90	2.80	7.80	5.66
	EuroMed	2.48	4.70	6.58	7.91	1.84	1.40	3.52	4.87
	Rest of World	46.44	40.82	39.14	34.31	63.80	48.03	26.18	25.87

Note : For Israel the figures are for 2000. For Egypt & Jordan the figures for textiles are for 1999.

If we look at textile trade the EU is the principal source of imports over both 1993-95 and 1999-2001 for Israel, Morocco and Tunisia – with the Moroccan and Tunisian shares being as high as 84.7% and 93.7% respectively in the earlier period, and 80.1% and 81.6% respectively in the latter period. The EU is also the principal export market over the period for Egypt, Israel, Morocco, Tunisia, and Turkey. Once again the

rev.3 at the SITC 5-digit level of classification.

shares of imports and exports with the other PanEU countries, and with the EuroMed countries is extremely low. Interesting also are the changes over time. Egypt, Israel and Jordan all see a substantial reorientation of textile trade away from the EU and either towards the rest of the world (for Egypt and Israel) or towards the other EuroMed countries (for Jordan). In contrast Morocco, Tunisia and Turkey all see a reorientation of textile trade towards the EU and this is generally true of both imports and exports. Noticeable also is the decline in imports coming from other EuroMed countries for Morocco and Turkey, and the decline in exports going to the EuroMed area for Egypt, Morocco, Tunisia and Turkey.

2. The Model and Data

The underlying model which we employ here is based on a standard model of international trade under imperfect competition. Hence textile producers are assumed to produce differentiated textile products, and to operate under conditions of increasing returns to scale. On the demand side we model consumer preferences using a Dixit-Stiglitz love of variety approach. From a country point of view we disaggregate the model into five country groupings: Morocco, the Southern Mediterranean (which includes Tunisia, Egypt, Turkey, Israel, Cyprus and Malta).

As discussed earlier the objective of this paper is to model sectors and thus sectoral adjustment in more detail than is typically allowed for in a CGE framework. In particular within a given sector – in this case textiles and clothing – we wish to distinguish between different firm "types". Those differences may be with respect to both underlying characteristics and with respect to the underlying behavioural assumption. In order to achieve this we require accurate and detailed sectoral level data. The data set that we use is the FACS (note this data set and key features of the underlying data are discussed in a companion paper to this one also being presented at this conference). In summary the FACS data set contains extremely detailed data for over 850 Moroccan firms across 8 sectors of industrial activity. In terms of our sector of interest the FACs survey covers approximately x% of total textile and clothing production. We use the detail provided in the FACS data to inform our underlying choices concerning the key sectoral characteristics.

Consider table 2.1 which summarises key features of the clothing industry, the textile industry, and for comparative purposes that of chemicals. In the table we distinguish between "exporting" firms and "domestic" firms – where this is based on the information in the FACS database. Domestic firms comprises those firms who reported that they produce only for the domestic market and do not export at all. In contrast the exporting firms lists all those who are involved in at least some export activity. With regard to these two groups or "types" we report on some summary statistics.

Table 2.1: Key Sectoral Characteristics

	Clothing		Textiles		Chemicals	
	Domestic	**Exporter**	**Domestic**	**Exporter**	**Domestic**	**Exporter**
No. of firms	56	248	69	128	19	57
Total no. of employees	2007.50	54556.50	4418.00	21651.00	2233.50	3578.00
Ave. no. of employees	35.85	219.99	64.03	169.15	39.18	188.32
Ave.gross profit margin	-0.15	0.02	-0.05	0.02	0.03	0.11
Wtd gross profit margin	-0.27	0.00	-0.06	0.05	0.07	0.07
Ave. labour productivity	25.40	37.21	83.73	70.85	0.03	0.11
Weighted ave. labour prod	25.40	36.61	96.71	64.71	126.39	249.14
No. of competitors	211.31	338.16	67.14	93.25	59.73	16.50
Weighted no. of comp.	145.88	219.99	79.01	94.18	40.50	5.34

The first row gives the total number of reporting firms by type. From this it can be seen that for each industry the majority of firms report that they are involved in some export activity. Not surprisingly then the total number of employees is significantly higher for the exporting firms. Looking at the average number of employees it can be readily seen that the exporting firm is typically much bigger than a domestic firm. Hence for Garments, the average no. of employees per exporting firm is 220, and the average no. per domestic firm is 36. A similar pattern emerges when looking at Textiles, or Chemicals.

The fourth row of the table gives the average gross profit margin. This is calculated as (total revenues – total costs)/total revenues. The fifth row gives the weighted gross profit margin where the weights are simply the size of each firm. These rows indicate that profits tend to be higher (and positive) for the larger exporting firms, whereas

they tend to be lower (for chemicals) or negative (for textiles and clothing) for the smaller domestic firms. The next two rows supply information on productivity across firm types where again we give the unweighted and weighted averages. These figures indicate that productivity tends to be higher among the larger firms for clothing and for chemicals, though (perhaps surprisingly) this is not the case for textiles. Finally, the last two rows give the average (again weighted and unweighted) number of competitors that each firm *perceives* that it has. Hence, here firms were asked to report on the number of competitors for their products they perceived were in the market. Perhaps surprisingly the exporting firms for both textiles and clothing perceived a larger number of competitors than the domestic firms. One obvious explanation for this is that the exporting firms took into account all possible domestic and non-domestic firms with whom they might be competing with, whereas this was not the case for the domestic firms.

The overall picture which emerges then is that the exporting firms tend to be larger, tend to have higher productivity (though not for textiles), they also tend to be more profitable, and would appear to perceive themselves as operating in a more competitive environment.

3. Results

In the first set of experiments we do not differentiate between firms at all. Hence here we are assuming that the textile and clothing industry is composed of a number of equal sized firms all with identical characteristics. The experiment is thn to reduce Moroccan tariffs on imports from the EU by 50%. At the base these (average) tariffs are 32%, hence we are reducing these to 16%. Note also that from Table 1.4 the EU is by far the largest importer into the Moroccan market. Nevertheless, however, the majority of domestic consumption still derives from domestic sources. The domestic share in total consumption is x%. The second row of the table indicates the changes in production arising from this experiment. The textile and clothing sector in Morocco declines by 62.9%, which is largely driven by the expansion of production of 4.6% in the EUMed countries (Spain, France, Italy and Greece). Interestingly also there is a decline in production of 3.2% in the rest of the EU. What appears to be happening

here is that both the EU and the EUMed firms witness an expansion of their exports and therefore production to Morocco. As the EUMed is by far the larger exporter to Morocco the relative advantage experienced by EUMed firms is greater than that experienced by the remaining EU firms. Hence the EUMed firms move further down their average cost curves, which in turn gives them a greater advantage in the rest of the EU, the SMC economies and the rest of the world.

Table 3.1: Symmetric firms – 50% reduction in tariffs

% change in:	SMC	Morocco	EUMed	EU	ROW
output / firm	0	0.82	0.14	-0.15	-0.08
output (quantity)	-0.21	-62.61	4.61	-3.17	-0.08
no. of firms	-0.21	-62.91	4.47	-3.02	0
Exports	-0.36	-63.12	5.88	-3.3	-0.03
Moroccan X's by destination	-62.9	-62.5	-63.19	-62.89	-62.96
EUMed X's by destination	4.52	346.93	3.71	4.55	4.34
EU X's by destination.	-2.97	316.87	-3.73	-2.95	-3.15

This is confirmed through an examination of the first row of the table which indicates that output per firm has risen in the EUMed countries while it has fallen in the remaining EU countries. Output per firm also rises in Morocco. This occurs as there is substantial exit from the industry which allows remaining firms expand the scale of output. These changes in Moroccan output are then reflected also in the changes in exports to each of the countries in the model. Similarly for the EUMed and the rest of the EU.

The changes in output in the preceding table are substantial. This is perhaps not very surprising as the experiment involves solely the assymmetric abolition of tariffs and does not allow for any concomittant or induced changes to occur in the Moroccan economy. However, in reality the process of trade liberalisation is to be phased in over a period of several years, and the expectation is that the process will lead both to changes within the Moroccan economy (such as changes in technology and productivity, increases in foreign direct investment etc), but will also be accompanied by improved market access to the EU. In textiles Moroccan firms do not experience completely tariff free access under the GSP, and it is a sector where there are notable other barriers to trade (such as restrictive rules of origin). For the second experiment

we thus again reduce Moroccan tariffs by 50%, but also allow for a 25% reduction in the costs of access or Moroccan firms to the EU market.

Table 3.2: 50% reduction in Moroccan tariffs, 25% reduction in costs of market access.

% change in:	SMC	Morocco	EUMed	EU	ROW
output / firm	-0.01	1.79	0.1	-0.09	-0.05
output (quantity)	-0.08	3.05	0.41	-0.31	-0.05
no. of firms	-0.06	1.24	0.31	-0.22	0
Exports	-0.24	108.82	1.12	-0.34	-0.1
Moroccan X's by destination	1.28	-31.66	127.73	128.67	1.23
EUMed X's by destination	0.35	201.79	-0.09	0.28	0.3
EU X's by destination.	-0.17	201.38	-0.62	-0.25	-0.23

As can be seen from Table 3.2 the outcome is now somewhat different. The increased access to EU markets has resulted in a substantial increase in exports to the EU of the order of 127%. This expansion of production occurs with a much bigger increase in output per firm (1.79%), and results in a net expansion of the sector by 3.05%. There is still a reduction in the amount sold domestically (31.66%), and this accounted for by the 200% rise in EU exports to the Moroccan market. As before the EUMed firms benefit more than the rest of the EU firms, and witness a small increase in output per firm which thus again increases the competitiveness vis-à-vis the other EU countries firms but to a much smaller extent than previously.

The preceding experiment assumed that all firms with the industry were identical. Based on the data in table 2.1, and on the discussion earlier in this paper, the remaining two experiments repeat the preceding but this time allow for differentiation between firm types. Here we have distinguished between exporting firms and domestic firms similarly to table 2.1. The distinction is, however, slightly amended as we have allowed the domestic firms to export – but to a much smaller extent than the exporting firms. The exporting firms are assumed to be twice as big (on average) than the domestic firms, and to export approximately 80% of their output. In contrast the domestic firms are much smaller and export approximately 10% of their output. There are two further differences which we introduce. The larger firms are assumed to have larger economies of scale, and we also allow for small positive profits at the base

equilibrium. Tables 3.3 and 3.4 then report on the results of the same experiments reported on earlier. In the tables the top panel gives the results for the exporting firms, the middle panel the results for the domestic firms, and the bottom panel gives the aggregate results.

Table 3.3: 50% reduction in tariffs, two different firm types:

% change in:	**SMC**	**Morocco**	**EUMed**	**EU**	**ROW**
Exporting Firms					
output / firm	0	-56.16	-0.02	0.02	-0.11
output (quantity)	-0.32	-99.96	-0.66	2.01	-0.11
no. of firms	-0.32	-99.96	-0.63	1.99	0
Exports	-0.54	-99.96	-0.68	2.14	-0.3
Moroccan X's by destination	-99.96	-99.98	-99.96	-99.96	-99.96
EUMed X's by destination	-0.61	87.33	-0.81	-1.2	-0.87
EU X's by destination.	2.16	93.45	2.07	1.67	2
% change in:	**SMC**	**Morocco**	**EUMed**	**EU**	**ROW**
Domestic Firms					
output / firm	0	-47.07	0.12	-0.13	-0.05
output (quantity)	-0.05	-63.91	3.75	-2.48	-0.05
no. of firms	-0.05	-64.11	3.63	-2.35	0
Exports	-0.22	-78.93	5.52	-2.52	-0.16
Moroccan X's by destination	-72.34	-68.68	-79	-78.85	-78.84
EUMed X's by destination	3.63	389.42	2.84	3.55	3.62
EU X's by destination.	-2.34	361.99	-3.09	-2.42	-2.36
% change in:	**SMC**	**Morocco**	**EUMed**	**EU**	**ROW**
Total					
Output (quantity)	-0.15	-77.16	1.49	-0.3	-0.11
no. of firms	-0.1	-71.28	2.78	-1.48	0
Exports	-0.45	-99.48	1.78	-0.66	-0.24
Moroccan X's by destination	-99.31	-70.92	-99.48	-99.48	-99.48
EUMed X's by destination	1.07	218.94	1.28	0.69	0.91
EU X's by destination.	-0.55	264.81	-1.03	0.31	-0.62

The results are quite striking. The exporting firms they appear to be virtually completely eliminated by the 50% reduction in tariffs, while the domestic firms see a reduction in output of 63.9%. The aggregate reduction in output is slightly greater at 71.2% than when we modelled the industry symmetrically. The decline in output for the exporting firms is as before driven by the increase in EU export to Morocco. What

appears to be happening here is that both domestic and exporting firms now face increased competition from the EU. The larger (exporting) firms have a larger share of the market at the base and therefore higher price-cost margins. The pro-competitive impact of the process of liberalisation is therefore that much greater for these firms than for the dometic firms who are already in a largely highly competitive market. The greater reduction in mark-ups for the larger firms, results in a larger decrease in output which forces these firms higher up their average costs curves and makes them less competitive. To some extent this might be attenuated by the exit of firms but on balance these larger firms appear to experience a much greater negative impact from the process of liberalisation.

We now turn to the final experiment where we allow for the same differentiation between firms but as before as well as assuming a 50% reduction in Moroccan import tariffs we also reduce the costs of access to EU markets by 25%. The results are given in table 3.4.

Here the results are extremely interesting. The increase in access to EU markets has, perhaps not surprisingly, greatly benefited the exporting firms. Whereas previously these were almost completely driven from the market, we now see a net expansion of production of just under 50%. This is entirely driven by an increase in exports to the EU, while these firms still experience a declining domestic market share. In contrast the reduction in market access does much less for the domestic firms who export very little at the base. Indeed these firms still experience a decline in production of a similar order of magnitude as before, and similar patterns of decline in exports.

Table 3.4: 50% reduction in tariffs, 25% reduction in market acces, two different firm types:

% change in:	SMC	Morocco	EUMed	EU	ROW
Exporting Firms					
output / firm	0	-47.12	-0.02	0.02	-0.06
output (quantity)	0.19	49.63	-3.53	3.74	-0.06
no. of firms	0.19	48.94	-3.51	3.72	0
Exports	-0.01	71.6	-3.63	3.96	-0.37
Moroccan X's by destination	42.14	-28.74	77.81	76.84	37
EUMed X's by destination	-3.5	62.54	-3.6	-4.15	-3.58
EU X's by destination.	3.88	75.57	3.89	3.3	3.91
% change in:	**SMC**	**Morocco**	**EUMed**	**EU**	**ROW**
Domestic Firms					
output / firm	0	-47.06	0.1	-0.11	0.13
output (quantity)	0	-64.58	7.43	-6.44	0.13
no. of firms	0	-64.78	7.32	-6.33	0
Exports	-0.03	-72.89	9.49	-6.54	0.02
Moroccan X's by destination	-72.86	-69.3	-71.85	-71.55	-79.19
EUMed X's by destination	7.31	404.5	6.37	7.48	7.51
EU X's by destination.	-6.34	341.07	-7.16	-6.18	-6.16
% change in:	**SMC**	**Morocco**	**EUMed**	**EU**	**ROW**
Total					
Output (quantity)	0.04	-36.99	1.89	-1.41	0.01
no. of firms	0.04	-42.04	5.16	-4.32	0
Exports	-0.02	68.29	1.58	-2.35	-0.21
Moroccan X's by destination	39.43	-66.39	74.4	73.44	34.34
EUMed X's by destination	0.79	211.52	2.1	0.47	0.82
EU X's by destination.	-2.26	244.99	-2.74	0.16	-2.14

For the EU the overall pattern of results is similar to that described earlier. That is to say that the EUMed firms tend to better from this process of liberalisation than do the firms in the rest of the EU. However, there are some interesting differences across the experiments. The largest expansion of production for the EUMed firms comes in the last experiment where there is both a reduction in Moroccan tariffs, and a reduction in the costs of access to the EU market. However, at the same time the EUMed exporting firms see a much bigger negative impact on their production than before. This arises from the increased exports by the Moroccan firms to the EU market.

4. Summary and Conclusions

In this paper we have considered the potential impact of the Barcelona process on the textile industry in Morocco and to a lesser extent for the EU. There are a number of important conclusions that appear to emerge from the analysis.

- In modelling an industry it is important to consider carefully the underlying characteristics of that industry and whether it is reasonable to "aggregate" or not. We have run experiments both where we work with an industry aggregate, and where we work with a slightly more disaggregated set of data but for the same industry.

- The results indicate that such disaggregation may be very important in considering the impact of policy changes. This is relevant both with respect to understanding the aggregate results and to understanding the potential nature of structural adjustment which may be taking place.

- Looking at the overall impact of the second policy experiment the aggregate results suggested a net expansion of production of the textile and clothing industry (of the order of 3.5%), while the differentiated or disaggregated results suggested a net decline of 37%.

- Similarly when looking at the decomposition we see that while large exporting firms might experience a net positive impact arising from the experiment modelled here, this does not apply to small domestic firms.

Clearly for policy making purposes a thorough understanding of the way in which policy changes might impact upon sectors is extremely important. The analysis in this paper suggests that we need to think much more carefully about the way in which we model policy impacts and industrial change.