



Adjusting to Bilateral Trade Liberalisation under an EPA: Evidence for Mauritius

by

Chris Milner, Oliver Morrissey and Evious Zgovu

Abstract

This paper estimates the impact and adjustment costs for Mauritius of eliminating tariffs on imports from the EU under an EPA, considering trade, revenue, welfare, production and employment effects, and considering the potential benefit of preserving preferential access to the EU market. Assuming 'immediate' complete elimination of all tariffs on imports from the EU, there is a small welfare loss (-0.17% of 2002 GDP) unless we include potential production gains (generating a welfare gain of 0.06% of GDP). Excluding up to 20% of imports as sensitive products, the overall welfare loss is -0.19% of GDP. However, potential adjustment costs are much greater than these low welfare effects suggest: tariff revenue will fall by 33-52% of 2002 levels, domestic (non-export) production will decline by almost a quarter and direct employment by 12% (about 11,000 jobs lost overall). Preferences under an EPA are unlikely to support any growth in the major export sectors (sugar and garments), so absorbing the adjustment costs will be difficult.

Key Words: EU-ACP, Economic Partnership Agreements, Mauritius

JEL Classification: F14, F15, F17



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1. INTRODUCTION

Mauritius, like other African, Caribbean and Pacific (ACP) countries, has been engaged in negotiations over an Economic Partnership Agreement (EPA) with the European Union since 2002 (in February 2004 Mauritius joined with the 16 Eastern and Southern African (ESA) countries as a negotiating group), the broad outline of which is to be agreed by the end of 2007. The EU is a major trading partner, accounting for over 30 per cent of Mauritian imports and over 60 per cent of exports, providing longstanding preferential access for Mauritian exports of sugar and garments in particular. An EPA requires the phasing out (over about ten years) of tariffs on 'substantially all' imports from the EU, which will have trade, revenue, welfare and adjustment impacts on Mauritius. Estimating these effects is the principle purpose of this paper. On the other hand, agreeing an EPA is necessary for ACP countries to continue to receive preferential access to the EU for their exports. This is especially important for the developing countries, such as Mauritius, who may only be offered GSP if there is no EPA; the least developed countries (LDCs) are entitled to largely tariff-free access even in the absence of an EPA. In evaluating the effect of an EPA, we take the impact of preferences on exports into account.

As the ACP countries are negotiating EPAs in six regional groups, most studies of the impact of EPAs have been at a regional level (e.g. Milner *et al*, 2005 on East Africa; Busse and Grossman, 2007 on West Africa; Greenaway and Milner, 2006, Busse and Luehje, 2007 on the Caribbean) or at a wide country level (e.g. Karingi *et al*, 2005 on Africa; Morrissey and Zgovu, 2007 for agriculture in ACP countries). However, Mauritius represents an interesting country to examine for a number of reasons. First, it is a relatively developed ACP country (thus not an LDC) with a relatively large manufacturing sector, including in exports. Second, and related, its exports have benefited to a significant degree from preferential access to the EU, so an EPA is potentially important to maintain preferences. Third, sufficient data were available on production and employment to permit estimates of adjustment costs.

Although EPAs will in principle ensure the continued preferential access of ACP countries to the EU market, in the case of Mauritius the value of these preferences is being eroded (because of reforms in EU regimes for sugar and garments). Mauritius has been very successful in exploiting preferential access to the EU for its exports of sugar, knitwear and

woven clothing, which account for over 80 per cent of Mauritian exports to the EU, so changes in preferences clearly pose a major challenge. If liberalisation of imports imposes a net welfare costs on Mauritius, it is not evident that there will be more than offsetting gains in export preferences. The key challenge for Mauritius is to find a set of arrangements which are not only beneficial, but do not compromise the potential for benefiting fully from multilateral developments which may follow from the Doha Round and related initiatives.

This paper assesses the capacity of Mauritius to adjust to and benefit from an EPA. Section 2 outlines the methodology; as the approach to estimating trade, revenue and welfare impacts largely follows McKay *et al* (2005) this is set out only briefly, with more detail on how we estimate production gains and adjustment effects. Section 3 presents our estimates of the effects of eliminating tariffs on imports from the EU, including a full liberalisation EPA (all tariffs eliminated) and a partial EPA where sensitive products are excluded. Section 4 considers the potential impact on exports, noting that factors independent of the EPA have reduced the value of preferences facing Mauritius for sugar and garments. Section 5 concludes; both qualitative and quantitative analysis is used to inform the appraisal and underpin our policy discussion.

2 METHODOLOGY

We apply the partial equilibrium analytical framework used by McKay *et al* (2005) and extended by Greenaway and Milner (2006) to allow for imperfect substitutability, and only outline the core features here. They estimate and report results for three effects. Consumption effects arise from increased imports at reduced prices (as tariffs are removed); if the EU is initially the dominant supplier, the EPA results in pure consumption effects only, and this is clearly beneficial to consumers. Intra-regional source substitution arises when imports from the EU displace imports from other regional (ACP) countries; assuming the EU is the more efficient producer, this increases welfare in the importing country (although producers in the exporting ACP countries lose). Extra-regional source substitution refers to a situation where the elimination of tariffs allows EU suppliers to displace more efficient producers in the rest of the world (ROW); this implies a welfare loss and is likely to arise if pre-EPA the ROW is the dominant supplier. In this paper we also estimate potential production gains, as explained below.

All our estimates are based on partial equilibrium methods; while these are limited and restrictive, they offer a number of advantages over alternative computable general equilibrium (CGE) approaches which make them attractive for our purposes. First, the data requirements are relatively simple (imports and tariffs for a representative year disaggregated by source (ACP, EU and ROW) and product, which can be linked to production and employment data), whereas CGE analysis requires a model of the structure of the economy. Second, the analysis can be conducted at a high level of product disaggregation, compared to CGE analysis which typically requires sector aggregation, which is especially useful in isolating sensitive products. Third, the estimates are quite easy to interpret as proportional effects on reference year levels, hence quite useful for policy analysis. There are limitations, although no approach is without weakness. We do have to make a number of restrictive assumptions, such as on supply and import demand elasticities, although arguably the assumptions are no more restrictive than for alternative methods (and results are quite robust to sensitivity checks). More importantly, the analysis is limited to static trade effects; it does not allow for effects through factor markets and sector adjustment. Considering such effects would require general equilibrium analysis. Furthermore, the analysis does not account for changes in partner countries (e.g. if they also reduce tariffs) or the global market (e.g. world prices or export demand); addressing these issues would require a global model. The partial equilibrium approach does estimate likely first order effects on imports, highlighting products and sectors susceptible to the largest impacts.

The net welfare benefits or costs on the import side of introducing reciprocity need to be added to the benefits of continued preferential access for exports to the EU to evaluate the overall implications of an EPA. This is still not a complete evaluation, since the issue of short-to medium term adjustment costs is abstracted from completely. These adjustment costs will depend on initial characteristics and policy conditions, but can be considered under the following headings:

(i) *Fiscal adjustment*

In order to replace any tariff revenue losses associated with the EPA, Mauritius will need to either revise or reform the structure of taxation from non-trade tax sources in order to increase revenue from these alternative sources.

(ii) *Trade facilitation and export diversification*

If the benefits of re-allocating resources (capital, labour, skills and land) away from import-competing towards new export activities (under the stimulus of greater competition on the home market from EU exporters) are to be reaped, actual and potential exporters will need support with developing export products and gaining knowledge about export market opportunities.

(iii) *Production and employment adjustment*

The increased imports from the EU will tend to induce falls in production and employment in domestic import-competing sectors. As the reallocation of displaced resources from current (pre-EPA) activities to export sectors will not be immediate and smooth, then the ACP countries will need assistance with the adjustment experienced by workers (compensation for unemployment, support for relocation and retraining) and by firms (closure, production line restructuring etc).

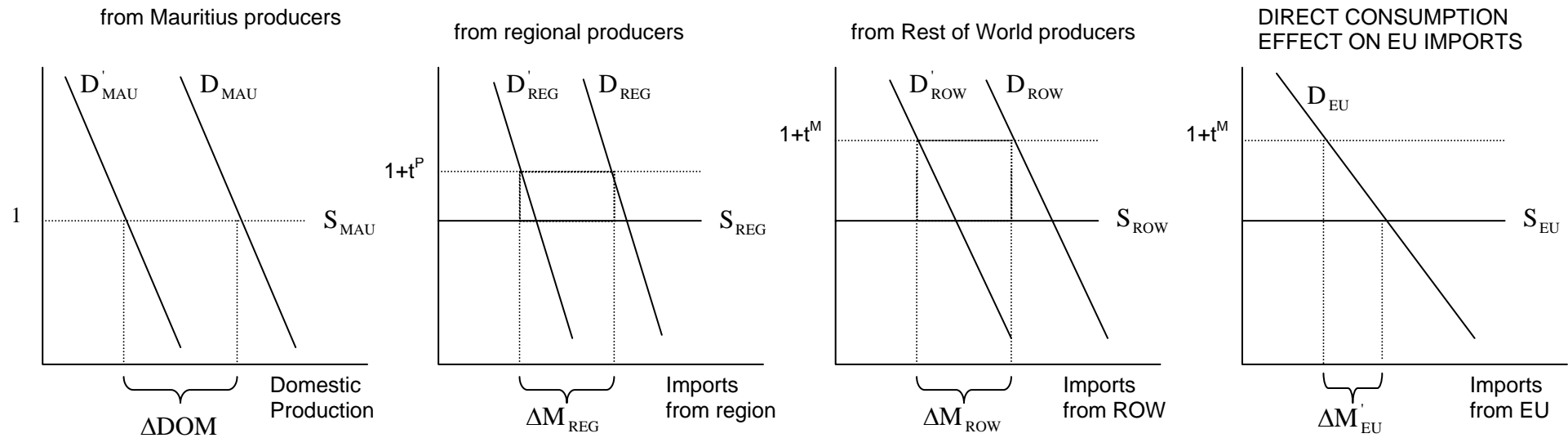
(iv) *Skills development and productivity enhancement*

The costs of adjustment (contraction of import-substitution activities and expansion of export sectors) will be reduced over time, and scope for dynamic benefits from export development will be increased, by increasing productivity levels. This requires support; through the enhancement of workers' skills, the improvement of firm's organisation and management structures and through the development of supportive economic policies and infrastructures.

This focus on the process of domestic structural changes associated with the introduction of reciprocal import liberalisation does not seek to deal with all aspects of the costs of an EPA. For example, if import liberalisation induces a rapid growth of imports in excess of growth of exports to the EU, then the EPA may induce balance of payments or foreign exchange problems. The issues of macroeconomic policy management in a post-EPA environment are not considered.

Given differences in technologies and tastes, one might view imports in a particular category as differentiated by source of supply. In our framework goods produced in Mauritius (locally) can be seen as differentiated from regional and extra-regional imports, and EU imported varieties as differentiated from extra-regional, rest of the world (ROW), varieties. Figure 1 illustrates this to show how we estimate production gains and adjustment implications.

Figure 1 Consumption effect source substitution effects towards EU producers
 (t^P = preferential tariff, t^M = MFN tariff)



For convenience, we assume that all regions are constant and equal cost suppliers (with all prices pre-tariffs set to unity). Pre-REPA import prices in Mauritius are $1+t^p$ (from preferential regional sources) and $1+t^m$ from the EU and ROW with corresponding import volumes (not shown, but each panel indicates the initial, pre-EPA, position for domestic production, regional and ROW imports). Following the REPA and the removal of t^m on imports from the EU the new equilibrium for EU varieties shifts out with EU imports increasing (in quantity terms). This increase in imports from the EU captures the direct consumption effect, with an analogous consumer welfare gain. In the other segments of the market, the fall in the price to local consumers of EU imports implies an increase in relative prices of imports from other sources. In panels (2) and (3), D_H^{REG} and D_H^{ROW} shift inwards to $D_H^{REG'}$ and $D_H^{ROW'}$ respectively. The volume of imports from the rest of the world contracts by ΔM_{ROW} and this decline captures the extra-regional trade diversion effect.

In the case of intra-regional imports there is again a shift towards EU sources, i.e. intra-regional imports by ΔM_{REG} . Finally the fall in the relative price of EU varieties causes a shift away from local (Mauritius) varieties, i.e. from D_{MAU} to D'_{MAU} and a corresponding fall in domestic production (ΔDOM).

3 IMPACTS ON TRADE AND WELFARE

As outlined above, the concession of reciprocity in Mauritian-EU trade relations would give rise to import substitution effects, away from non-EU suppliers within the region and the rest of the world (ROW), towards EU suppliers; and to trade creation and domestic production effects. In the last case the tendency for resources in import-competing production in Mauritius to be pushed into other areas of activity or into unemployment would impose adjustment costs upon the Mauritian economy. In this section we report on the application of the empirical methodology explained previously. We begin by providing estimates of the import and welfare effects of introducing an EPA, in both full and partial (allowing for the exclusion of sensitive products) scenarios. We then consider the implications of these impacts for revenue production and employment, providing estimates of the adjustment costs. All estimates are based on Mauritian conditions (imports and tariffs) in the year 2002,

using trade elasticities from Hertel *et al* (1997); base estimates at industry (2 digit SIC categories) level are reported in the Appendix; here we provide summaries by sector (agriculture, manufacturing etc), identifying manufacturing industries where the effects appear relatively large, and for the economy as a whole.

3.1 Import Effects

Separate estimates are provided for the three types of trade effects associated with the introduction of reciprocity, namely:-

- (a) the consumption effect or direct increase in existing imports from the EU;
- (b) the switch of imports from regional to EU suppliers;
- (c) the switch of imports from rest of the world (ROW) to EU suppliers.

Summary estimates of each of these effects are provided in Table 1 (with industry-level estimates in Appendix Tables A1 and A3) in columns a), b) and c) respectively for the primary and manufacturing sectors. Column (d) presents the overall increase in imports from the EU; as (b) and (c) represent switching of the source of imports, the increase in total imports is equal to (a), the direct increase in existing imports from the EU. These trade effects are expressed in absolute amounts, namely million Mauritian Rupees (Rps) at 2002 values. Panel i) provides the estimates for ‘full liberalisation’ (all tariffs on imports from the EU are reduced to zero), while Panel ii) is a ‘partial liberalisation’ scenario, as described now.

The variation in the trade effects follows the pattern of consumption and substitution effects across industries, which reflects pre-EPA differences across industries in average tariffs, in the geographical pattern of imports and in the elasticities of demand and substitution. The full liberalisation scenario is a maximum impact, but is useful to indicate the potential magnitude of adjustment costs and the sectors in which they are likely to be greatest. ACP countries are not expected to liberalise fully immediately; they have at least ten years to eliminate tariffs and, even then, can retain tariffs on about 20% of imports from the EU (the precise percentage and how it is measured has not been determined in negotiations to date). We have to make assumptions about

which products will be treated as sensitive, and excluded from tariff reductions, to identify the partial liberalisation scenario.

Products identified by the Government of Mauritius as sensitive for the purposes of negotiating SADCC tariff provisions (provided by the Ministry of Industry and International Trade) are reported in Appendix Table A2. These sensitive products are listed at the two-digit HS code (in which there are any sensitive products) and at Chapter level, giving the proportion of imports from the EU (in 2002) that would be excluded as sensitive products. This is used to identify the partial liberalisation scenario where tariffs on imports of sensitive products from the EU are not reduced. Overall this list of sensitive products covers 18% of imports from the EU in 2002, and would result in a coverage ratio for liberalised imports of 82% (comfortably within the 'target' for EPAs). There is no chapter where all imports would be excluded, although there are some where the percentage is over 50%: chapters IV (Prepared foodstuffs etc), VII (Plastics etc), VIII (Hides and skins etc) and XIV (Jewellery). In addition there are specific two digit categories where the coverage of liberalised imports would fall to zero or close to zero, notably HS codes 17 (sugars), 24 (tobacco), 42 (leather articles) and 46 (basketware).

Considering first full liberalisation (the 'full EPA'), it is evident in Table 1 that import effects are negligible in fishing and mining, noticeable in agriculture but predominantly in manufactures; 96% of the direct increase in EU imports and 84% of the increase in total imports from the EU is accounted for by manufactures. While 75% of the total EU increase is import diversion from the ROW, this share is about 85% in agriculture and about 73% in manufactures (the share is greater than this in textiles and motor vehicles). The direct increase in EU imports accounts for about 16% of the effect in manufactures (and is a particularly high share for machinery and communications equipment, but particularly low for textiles and refined petroleum) but only some three per cent in agriculture.

Table 1: Estimated Import Effects of an EPA

i) Import Effects of a Full EPA		Estimated Trade Effects			
in million Rps, base year 2002		Increase in Existing EU Imports	Substitution from:		Overall Increase in EU Imports
Sector/Industry Description	(a)	REGION	ROW	(c)	(d)
A - Agriculture, hunting and forestry	62.1	-245.7	-1727.6		2035.4
B - Fishing	2.3	-0.8	-6.0		9.2
C - Mining and quarrying	1.4	-32.4	-5.3		39.1
D - Manufacturing (1)	1690.1	-1170.4	-7687.8		10548.3
15 Food products and beverages	150.1	-265.3	-1371.9		1787.4
17 Textiles	22.9	-18.2	-451.2		492.3
23 Refined petroleum products	1.8	-260.8	-459.7		722.3
24 Chemicals and chemical products	174.2	-144.7	-692.7		1011.7
25 Rubber and plastics products	94.6	-78.8	-382.7		556.0
26 Other non-metallic mineral products	94.5	-42.2	-641.4		778.1
29 Machinery and equipment n.e.c.	401.6	-56.4	-764.9		1222.9
32 Radio, television and comm. equip.	175.9	-18.5	-663.9		858.3
34 Motor vehicles etc	98.4	-56.5	-531.7		686.6
TOTAL	1755.8	-1449.3	-9426.7		12632.0

ii) Import Effects of a Partial EPA		Estimated Trade Effects		
Industry Description	(a)	(b)	(c)	(d)
A - Agriculture, hunting and forestry	31.0	-123.9	-1375.5	1530.5
B - Fishing	1.0	-0.8	-5.4	7.3
C - Mining and quarrying	0.6	-0.7	-4.8	6.1
D - Manufacturing (1)	1160.2	-707.2	-5164.9	7032.2
15 Food products and beverages	58.6	-75.5	-669.4	803.5
17 Textiles	8.2	-4.5	-232.4	245.1
23 Refined petroleum products	1.7	-240.1	-415.7	657.4
24 Chemicals and chemical products	65.2	-57.1	-349.9	472.1
25 Rubber and plastics products	29.9	-38.7	-201.8	270.4
26 Other non-metallic mineral products	57.7	-26.4	-422.5	506.6
29 Machinery and equipment n.e.c.	377.0	-47.5	-682.0	1106.5
32 Radio, television and comm. equip.	169.4	-14.5	-569.2	753.1
34 Motor vehicles etc	91.9	-52.0	-484.5	628.4
TOTAL	1192.8	-832.6	-6550.7	8576.1

Notes: (1) Industries identified as having a large impact are those where the total is 500 million Rps or more under 'full liberalisation' and for comparison the same are included under 'partial liberalisation'.

Diversion of trade from the region accounts for just over 11% of the total increase, and for agriculture and manufactures, but is relatively large for food products, refined petroleum and chemicals, but relatively small for textiles, for machinery and communications equipment.¹ As would be expected, excluding sensitive products tends to reduce each of the trade effects; reducing the scope for direct consumption effects and for source substitution effects. The amount of source substitution from the Region about halves (and falls by almost 75% for food products), while that from the ROW falls by about a third (with larger proportional falls in food products and textiles). In this sense, excluding sensitive products is of relatively most benefit to regional suppliers (as EPAs are negotiated by regional groups, this is to be expected). The direct increase in EU imports falls by just over 30%, with larger proportional falls in food products and textiles but only slight declines in vehicles, machinery and communications equipment.

Table 2 summarises the import effects in percentage terms for each aggregate sector and the economy overall. (These percentages could be used to provide approximate absolute estimates of the trade effects for later years than 2002.) We estimate that the overall increase in imports from the EU falls to 48% (from 71% in the full EPA case) and that imports overall (i.e. from all sources) would increase by 1.7% (compared with by 2.5% for the full EPA case). In the cases of fishing and mining (with crude petroleum excluded) there are relatively few imports and effects are small. The pattern of percentage effects is similar across agriculture and manufacturing: switches from the region fall in the 11-13% range and from the ROW in the 19-27% range. These switching or source substitution effects, when combined with the direct consumption effects on existing EU imports, produce very large overall increases in imports from the EU (75-112%) with an overall (economy-wide) increase of 70.6% (almost 13 billion Rps!). Note, however, that the increase in Mauritius' total imports from all sources is much smaller at 2.5% (or 1.78 billion Rps) for the whole economy. The switching effects alter the geographical composition but not amount of trade. The increase in the amount of imports is associated wholly with the liberalisation of imports already sourced from the EU: the values in column (a), direct consumption

¹ Source substitution may be overestimated in some industries, refined petroleum being perhaps the best example (as even tariff reductions may not make the EU competitive with regional producers). On the other hand, we underestimate the potential increase in EU imports by not allowing for consumption effects when the EU substitutes for other sources.

effect on existing EU imports, also represent the overall increase in total imports from all sources in this analysis.²

Table 2: Estimated Percentage Changes in Imports due to an EPA with EU

i) Full Liberalisation Scenario

Sector	Change in Imports from		Increase in Imports	
	Region	ROW	From EU	Overall
Agriculture	-10.6%	-18.9%	+111.7%	+0.5%
Fishing	-0.3%	-0.7%	+0.7%	+0.1%
Mining & quarrying	-3.7%	-0.4%	+6.0%	+0.1%
Manufacturing	-13.2%	-26.9%	+74.7%	+3.3%
TOTAL	-11.8%	22.5%	+70.6%	+2.5%

ii) Partial Liberalisation Scenario

Sector	Change in Imports from		Increase in Imports	
	Region	ROW	From EU	Overall
Agriculture	-5.3%	-15.0%	+84.0%	+0.25%
Fishing	-0.3%	-0.6%	+0.6%	+0.04%
Mining & quarrying	-0.1%	-0.3%	0.9%	+0.02%
Manufacturing	-8.0%	-18.1%	+49.8%	+2.3%
TOTAL	-6.8%	-16.3%	+47.9%	+1.7%

Table 2 expresses the percentage changes in imports relative to the imports of the relevant sector. One might also consider the sectoral changes relative to the economy as a whole. Considered in these terms it is important to note how the manufacturing sector dominates the economy wide effects; accounting for 96% of the direct increase in EU imports (column a in table 1), 81% of the regional source substitution effects (column b) and 82% of source substitution from ROW (column c). Under the partial EPA, these impacts are all reduced, with the greatest relative reductions in source substitution from the Region.

Clearly the overall increase in Mauritian imports has potentially significant macro-economic effects (e.g. balance of payments) and adjustment and employment effects (to be considered in the section 3.4). The substantial source substitution effects however also have significant economic and political economy implications. The

² Although one could allow for additional consumption effects in columns (b) and (c), we feel the estimates already imply quite significant trade substitution so do not do this.

resource cost (welfare) and customs revenue implications are considered next. There are also implications for Mauritius' bilateral and regional trade relations. The EPA tends for instance to offset efforts to promote intra-regional trade and integration. These political economy and policy issues are returned to in the conclusion.

3.2 Net Welfare Assessment

As outlined in Section 2, we quantify four components of the net welfare effect:

- (a) the consumption gain for Mauritian consumers associated with the additional imports consumed at the lower post-EPA price of imports from the EU
- (b) the production gain for the Mauritian economy associated with domestic specialisation induced by liberalised EU imports driving Mauritian resources (capital, labour etc) away from less to more competitive activities (more likely to be reaped in the longer term than short-term, i.e. post-adjustment to the EPA and with the re-employment of resources in alternative activities)
- (c) the resource gain from diverting imports post-EPA from less efficient, preferential suppliers in the region to more efficient (duty free) EU suppliers
- (d) the resource loss from diverting imports post-EPA from more efficient global (ROW) suppliers to less efficient preferred EU suppliers.

Table 3 reports on the individual welfare effects (a to d) described above in value terms (million Rps at 2002 values) for each of the sectors and selected industries for which the impact is relatively large (full results are in Appendix Tables A4 and A5). For the economy as a whole, in the case of a full EPA (panel i), the large welfare loss from ROW import substitution is just offset by the combined welfare gains a) to c) above. This produces an estimated overall net welfare gain from a full EPA of 55 million Rps. Like many trade policy reforms, this constitutes a relatively small net welfare effect.

Table 3: Estimated Welfare Effects of an EPA with EU

i) Welfare Effects of a Full EPA		Estimated Welfare Effects:				
in million Rps, 2002		Consumer	Production	Regional	ROW	Net Effect
Industry Description	Gain	Gain (1)	Substitution	Substitution	(a+b+c+d)	
	(a)	(b)	(c)	(d)	(e)	
A - Agriculture, hunting and forestry	2.20	0.41	15.68	-58.91	-40.62	
B - Fishing	0.00	0.00	0.00	0.00	0.00	
C - Mining and quarrying	0.00	0.00	16.33	-0.01	16.33	
D - Manufacturing (2)	72.74	273.48	35.29	-302.44	79.07	
15 Food products and beverages	7.51	58.92	12.96	-68.59	10.79	
16 Tobacco products	6.74	170.43	0.13	-3.75	173.55	
24 Chemicals and chemical products	7.26	0.00	4.70	-28.89	-16.93	
25 Rubber and plastics products	5.30	0.00	2.40	-21.44	-13.75	
29 Machinery and equipment n.e.c.	13.44	1.42	0.73	-25.61	-10.02	
32 Radio, television and comm. equip.	10.45	2.47	0.31	-39.45	-26.22	
TOTAL	74.94	273.89	67.30	-361.36	54.78	

ii) Welfare Effects Partial EPA		Estimated Welfare Effects:				
		Consumer	Production	Regional	ROW	Net Effect
Industry Description	Gain	Gain (3)	Substitution	Substitution	(a+b+c+d)	
	(a)	(b)	(c)	(d)	(e)	
A - Agriculture, hunting and forestry	1.63	0.00	12.28	-52.16	-38.24	
B - Fishing	0.00	0.00	0.00	0.00	0.00	
C - Mining and quarrying	0.00	0.00	0.02	-0.01	0.01	
D - Manufacturing	44.88	0.00	18.33	-199.56	-136.34	
15 Food products and beverages	2.93	0.00	3.69	-33.47	-26.85	
16 Tobacco products	0.16	0.00	0.06	-3.29	-3.08	
24 Chemicals and chemical products	2.72	0.00	1.86	-14.59	-10.02	
25 Rubber and plastics products	1.68	0.00	1.18	-11.30	-8.45	
29 Machinery and equipment n.e.c.	12.62	0.00	0.61	-22.83	-9.60	
32 Radio, television and comm. equip.	10.06	0.00	0.24	-33.82	-23.52	
TOTAL	46.51	0.00	30.63	-251.73	-174.57	

Notes: Figures may not all add up due to rounding.

- (1) based on assuming greater specialisation and re-employment of labour in alternative sectors.
- (2) Industries identified as having a large impact are those where the total is 10 million Rps or more under 'full liberalisation' and for comparison the same are included under 'partial liberalisation'.
- (3) Set to zero on assumption that sensitive products excluded gives full coverage and protection for domestic production.

If the sensitive products excluded are determined by a desire to protect uncompetitive (relative to the EU) domestic (and regional) sectors, the adjustment impact of an EPA on the tradeable goods sectors is significantly lowered. The corollary of this, however, is that the EPA would bring smaller specialisation benefits to the Mauritian economy; i.e. there would be less liberalisation induced reallocation of resources out of uncompetitive import-competing activities (lower production gains). This will

mean that the net welfare-effects of an EPA will tend to be more negative. Indeed, although the welfare loss from ROW import substitution is reduced by a third, the (assumed) elimination of production gains and the reduced welfare gains from direct effects and substitution from the region imply a net welfare loss of 174 million Rps. For the economy as a whole the consumption gain falls from 75 to 47 million Rps, the Regional substitution gain falls from 67 to 31 million Rps. By contrast the ROW substitution loss falls from 361 to 252 million Rps and if there is no production adjustment then the specialisation gain of 274 million Rps associated with the full EPA is lost. The small, overall net welfare increase from a full EPA turns into an overall net welfare loss for the partial EPA, although this net effect remains small relative to GDP.

In Table 4 we express this net, economy-wide effect relative to overall GDP for the economy. At 2002 values a full EPA is shown to produce a net welfare gain equivalent to only 0.06% of GDP. Indeed this would be revised to a small net loss if we were to exclude the production specialisation gain (the net effect falls to -0.17% of GDP). (One might exclude the specialisation gain in the short term at least on the grounds that resources released from the (EU) import-competing sector in Mauritius are not immediately re-deployed to more efficient uses in other sectors.) The individual components or welfare effects are both absolutely and relatively more important. Take the case of the welfare costs of ROW import substitution. A full EPA would impose a resource cost from this trade effect on the economy as a whole of about 370 million Rps. For the economy as a whole this is equivalent to about 0.3% of GDP, and for manufacturing only to about 1.1% of GDP from that sector. Note again that the major welfare effects of a full EPA would be experienced for manufacturing goods or in the manufacturing sector. The bulk of the consumption gains would be on manufacturing goods (about 73 out of 75 million Rps). Similarly nearly all the specialisation gains (analogous the adjustment costs discussed in chapter 5) would correspond with production effects within the manufacturing sector.

Although excluding sensitive products reduces slightly the negative welfare loss for agriculture (to -0.47% of sector GDP), the gain for mining is eliminated and the net welfare gain in manufacturing turns into a loss of -0.48% of sector GDP (however, this is less than the loss under the full EPA if production gains were excluded). The

overall net welfare loss of excluding sensitive products is -0.19% of GDP (note that we assume no production gains under the partial EPA, as these sectors are assumed to continue receiving protection). One might think of this as relatively small net welfare losses in the short term and relatively small net welfare gains in the longer term (including production gains). But, as with all net welfare analysis, one must recognise that there are much larger gross effects involved. The EPA would have much more substantial redistributive implications than implied by the net welfare effect measures. An EPA would redistribute significantly from the government (reduced tax revenue) and producers (reduced producer surplus) towards consumers. We have not quantified the gross changes in producer and consumer surplus here, but it is inevitably the case that they would be substantial. Consumers have an unambiguous interest in the elimination of tariffs on EU imports. Import-competing producers will have no such interest, unless they see opportunities also for export enhancement following the concession of reciprocity.

Table 4: Estimated Welfare Effects of EPA (% GDP, 2002)

Sector (% sector GDP)	Consumer Gain	Regional Substitution	ROW Substitution
Agriculture etc & Fishing	+0.03%	+0.20%	-0.74%
Mining & Quarrying	0 %	+21.7%	0%
Manufacturing	+0.26%	+0.12%	-1.06%
Total (% GDP)	+0.06%	+0.05%	-0.28%

Sector (% sector GDP)	Production Gain (G)	Net Welfare Effect		
		With (G)	no (G)	Partial EPA
Agriculture etc	+0.01%	-0.50%	-0.51%	-0.47%
Mining & Quarrying	0%	+21.4%	+21.4%	0%
Manufacturing	0.96%	+0.28%	-0.68%	-0.48%
Total (% GDP)	+0.22%	+0.05%	-0.17%	-0.19%

A word of caution about the consumer gains associated with an EPA is required. The government may well respond to a decline in customs revenue by altering other taxes in order to recoup the revenue losses (see below). This could involve a range of indirect and direct tax changes, but a current major source of marginal tax revenue is VAT. If this was raised so as to fully offset the customs revenue loss associated with the EPA, there would be at least some offsetting of the consumer gains referred to

above (depending on the VAT rate increase required and the relative incidence of the tax on consumers).

4 ADJUSTMENT IMPLICATIONS: REVENUE, PRODUCTION AND EMPLOYMENT

Using the estimated trade effects from the previous section, we now consider the implications of these impacts for revenue, production and employment. This allows us to provide estimates of the adjustment costs. Again, all estimates are based on Mauritian conditions in the year 2002.

4.1 Revenue Impacts

Given information on existing imports and import changes estimated in the previous section, we can identify three sources of customs revenue loss: on imports already imported from the EU, on imports previously imported (pre-EPA) from the region at the preferential tariff and from the ROW at the standard tariff. The estimated revenue effects of an EPA are set out in Table 5 (with detailed estimates in Appendix Tables A6 and A7) at the sector level and overall in value terms. These estimates are expressed in percentage terms (relative to 2002 revenue) in Table 6.

It seems that a full EPA would reduce customs revenue (directly) by over 1.6 billion Rps (at 2002 values), equivalent to a 52% reduction. Given the importance of EU imports prior to an EPA, the loss of revenue on existing imports from the EU is the dominant source of the revenue loss. This accounts for 1.04 billion Rps out of the 1.6 billion Rps overall loss, i.e. for about two-thirds of the overall revenue loss. The bulk of this is on imports from the EU of manufactured goods (959 million Rps). As Table 6 emphasises, a full EPA eliminates (-100%) all customs revenue on existing imports from the EU. The heavy dependence on manufactured imports from the EU in particular means, however, that there are substantial differences in the direct revenue loss between manufacturing sectors (Table A6).

Table 5: Estimated Customs Revenue Effects of an EPA

i) Full EPA Revenue effects million 2002 Rps				
Industry Description	Direct	Indirect		Total
	Existing EU Imports (a)	Imports from: Region (b)	RoW (c)	(a)+(b)+(c) (d)
A – Agriculture etc	-78.1	-15.7	-63.3	-157.1
B - Fishing	-1.8	0.0	0.0	-1.8
C - Mining and quarrying	-0.9	-16.3	-0.1	-17.3
D - Manufacturing	-958.7	-35.3	-432.8	-1426.8
TOTAL	-1039.5	-67.3	-496.2	-1603.0

ii) Partial EPA effects million 2002 Rps				
Industry Description	Direct	Indirect		Total
	Existing EU Imports (a)	Imports from: Region (b)	RoW (c)	(a)+(b)+(c) (d)
A – Agriculture etc	-40.3	-12.3	-56.4	-109.0
B - Fishing	-0.8	0.0	0.0	-0.8
C - Mining and quarrying	-0.4	0.0	-0.1	-0.5
D - Manufacturing	-580.2	-18.3	-306.2	-904.7
TOTAL	-621.7	-30.6	-362.8	-1015.0

Although the direct revenue effect on existing imports from the EU dominates, it is important to account for other revenue effects induced by source substitution (towards the EU). Almost 600 million Rps of lost revenue is associated with a full EPA due to these indirect effects; almost 500 million Rps on imports shifted from the rest of the world and almost 70 million Rps on imports shifted from the region. The losses due to switches from the ROW are bigger in both absolute and percentage terms (36% of revenue from ROW is potentially lost, compared to 10% of revenue from the region). The ROW is a more import source of supply overall and more imports would be switched from the ROW (than the region) by an EPA. The average preferential tariff on imports from the Region is also lower than the average tariff applied to imports from the ROW.

We saw earlier that the exclusion of sensitive products from an EPA has the effect of reducing the amount of existing EU imports that are liberalised and reducing the amount of imports switched from other sources to EU suppliers. Both of these reduce the customs revenue losses of an EPA. The summary results in Table 6 show that customs revenue overall falls directly by 33% with a partial EPA compared with the predicted fall of 52% for the full EPA (about 1 billion Rps compared with 1.6 billion

Rps at 2002 values). The government revenue implications are still substantial, but with sensible negotiation of exclusions of sensitive products the revenue losses can be significantly reduced. (It should be noted, however, that the sensitive products list used may well be more strongly motivated by domestic production and employment protection considerations than by revenue considerations.)

Table 6: Estimated Percentage Changes in Customs Revenue due to EPA

Sector	Change in Revenue on:		
	Existing EU Imports	New EU Imports Switched from Region	ROW
Agriculture	-100%	-5.8%	-32.2%
Fishing	-100%	0.0%	0.0%
Mining & quarrying	-100%	-5.0%	-0.3%
Manufacturing	-100%	-14.9%	-38.0%
Total	-100%	-10.4%	-36.2%

Sector	Revenue Effects (% 2002 revenue)	
	Full EPA	Partial EPA
Agriculture	-43.6%	-30.3%
Fishing	-33.3%	-14.8%
Mining & quarrying	-4.5%	-0.1%
Manufacturing	-61.1%	-38.7%
Total	-52.0%	-33.0%

Note, of course, that the focus here is on impact effects and on customs revenue effects only. There are likely to be other than impact effects, with any changes in macro-economic activity induced by an EPA affecting fiscal revenue from other than trade taxes. Similarly since the overall amount of imports is predicted to rise following an EPA, there will be other than custom revenue changes that will affect overall fiscal yield; imported goods being subject to other indirect taxes. Note also that government has the option to respond to loss of customs duty revenue by altering tax rates on other indirect (and direct) taxes.

The above estimates of the fiscal effects of an EPA omit considerations that might upwardly or downwardly bias them. We do not, for example, allow for the effects of custom duty exemptions. Rather we consider what could be collected at prevailing tariff rates with and without EPA. In practice there are currently non-negligible duty

exemptions, and these are likely to exist post-EPA as well. The non-allowance for duty exemptions tends to upwardly bias our estimates. By contrast we also do not allow for the fact that VAT on imported goods is levied on the tariff-inclusive value of imports. This tends to downwardly bias our estimates.

4.2 Production and Employment Adjustment Implications

In addition to trade and revenue effects, the liberalisation of EU imports would also have the effect of switching demand by Mauritian consumers away from domestically to EU produced goods. This would mean that local production for the domestic market would tend to fall, at least for those producers who compete directly with EU imports, releasing resources for production in import-substitution activity for non-tradeables or export production. Applying the method set out in Section 2 we estimate the local production effects of a full EPA. These are set out in value terms by sector and the economy as a whole in Table 7 (with details in Appendix Table A8) and in percentage terms for sectors and the economy as a whole in Table 8.

Table 7: Estimated Production and Employment Effects of a Full EPA

Industry Description	Production (1)	Employment Effect (2)		
	Effect	Male	Female	Total
	(mill. 2002 Rps)	(change in numbers employed)		
	(a)	(b)	(c)	(d)
A - Agriculture, etc	-39.76	-439	-62	-501
B - Fishing	0.00	0	0	0
C - Mining and quarrying	0.00	0	0	0
D - Manufacturing (3)	-4001.15	-5388	-866	-6254
15 Food products and beverages	-1767.79	-2190	-341	-2530
16 Tobacco products	-839.89	-157	-90	-248
22 Publishing, printing	-214.59	-314	-118	-432
26 Other non-metallic mineral products	-613.04	-586	-65	-651
36 Furniture; manufacturing n.e.c.	-112.95	-1349	-3	-1352
TOTAL	-4040.91	-5827	-928	-6755

Notes: (1) change in production in manufacturing relates to large establishments only

(2) change in non-EPZ employment

(3) the listed industries have relatively large effects defined as production declining by more than 200ml Rps or employment declines by at least 500.

Note that these figures relate to production by non-EPZ firms, which would compete on differential terms post an EPA in the local and perhaps regional market. EPZ firms are assumed to produce predominantly for export markets, and not be significantly affected directly by the introduction of reciprocity into Mauritian-EU trade relations. Thus, these are potential serious adjustments for Mauritius to accommodate, with potential knock-on effects for production, employment, social conditions and for the government budget. We explore the scope for amelioration of these effects through less than a full EPA below. In order, however, to illustrate just the potential direct employment losses of a full EPA, we take current average employment-gross output ratios to derive the employment impacts corresponding to the production effects reported in Table 7. (The estimates are biased to the extent that marginal employment output ratios diverge in either direction from these average ratios.)

Table 8: Estimated Percentage Changes in (non-EPZ) Production and Employment due to Full EPA (by sector and overall)

Sector	Value of Production for Domestic Market	Changes in:		
		Male	Female	Total
Agriculture	-7.2%	-6.2%	-7.0%	-6.3%
Fishing	0%	0%	0%	0%
Mining & quarrying	0%	0%	0%	0%
Manufacturing	-24.6%	-5.2%	-17.1%	-15.5%
Total	-24.0%	-12.0%	-13.9%	-12.2%

The results indicate that production for the domestic market in the primary and manufacturing sectors would fall by about 24%, if the EPA was implemented in full immediately (Table 8). This is equivalent to a loss of just over 4 billion Rps worth of gross production at 2002 values (Table 7). The bulk of this production loss would be experienced in the manufacturing sector, with particularly significant loss in food manufacturing (SIC 15), tobacco products (SIC 16) and other non-metallic mineral products (SIC 26).

Based on the average employment-output ratios, we predict the full EPA to lower both male and total employment in domestic production by about 12%, and female employment by about 14% (Table 8); male (female) employment falls by 5% (17%) in manufacturing and 6% (7%) in agriculture. This is equivalent to almost 6,800 jobs

lost overall directly, and of course to more than this if indirect employment effects are allowed for. Given that it is employment in the non-EPZ manufacturing sector that is affected most, the larger absolute numbers of job losses are predicted to fall on male than female workers; particularly large job losses being in food products (SIC 15), the miscellaneous category (SIC 36) and in non-mineral products (SIC 26).

It is evident however that the balance of payments and other macro-economic effects of the EPA would be lessened by the exclusion of sensitive products. Of particular concern will be the reduced adjustment and employment impact of a partial EPA. We do not have detailed production data to match up the coverage of sensitive or excluded products with domestic production. In the extreme and as all domestic production is covered by the sensitive product exclusions then all of the production and employment adjustments identified for the full EPA case will be avoided. As coverage or protection by exclusion from the EPA diminishes, then production and employment effects would be experienced as a proportion of the effects identified earlier for the full EPA.

There are a number of aspects of the analysis that may mean that the estimates of the employment and production adjustments of an EPA thus far reported understate the scale of the adjustment problem. Firstly, it should be recognised that the estimates of the source substitution elasticities, in particular those relating to the displacement of domestic production by imports from the EU, are borrowed from other studies. They are not actual parameters estimated for Mauritius, because data constrains this. They may therefore be biased, and if downwardly biased generate underestimates of the direct production and employment effects of an EPA.

Secondly, it should be considered whether the protection-reducing effects of EU import liberalisation is understated by using the fall in average tariffs on current imports from the EU. Given that the average tariff for each industry is measured for all imports of goods corresponding with an industry, there is a risk that we are measuring the average tariff on competing final goods, non-competing final goods and on intermediate imports. Strictly it is the average tariff on competing final imported goods that should be used to estimate the production and employment

effects. It is quite possible that the fall in this average tariff on imports from the EU is larger than the one used in the earlier empirical analysis.

Thirdly, it needs also to be recognised that the earlier empirical analysis used data relating only to employment in large scale enterprises. Given that there is a significant amount of employment in small scale enterprises, we are underestimating the total employment effects of an EPA. It is reasonable to assume that the EPA would affect small scale enterprises, either because they supply goods to larger firms that would face increased competition from EU producers or because they would directly compete with EU imports on the domestic market. Of course in some sectors this direct competition may be constrained by the distance of EU firms from the Mauritian market and the tendency for specific products to be non-traded. One might include certain types of tailoring activity or furniture products for example in this category of products. Without detailed product level data this is impossible to ascertain. However for illustrative purposes we apply the same percentage employment falls identified for large scale enterprises to the small scale sector, matching the sector in which small scale employment is present in Mauritius with the two digit SIC industries reported above. The resulting estimated employment loss in small scale manufacturing for the full EPA case is some 3100 jobs (mostly in furniture, tailoring and food products). Note, of course, that these are upwardly biased to the extent that the effects of an EPA are reduced by sensitive product exclusions, and to the extent that small producers are not competing with imports from the EU.

Finally, it should be acknowledged that the empirical analysis thus far has captured only direct employment effects. Reductions in production and incomes in the sectors directly impacted by an EPA will also lead to further indirect employment losses. Given that the traded goods sector (directly affected by the EPA) absorbs intermediate goods and services from other sectors of the Mauritian economy, any reduction in production in the directly EPA-affected sectors will reduce demand for goods and services in other sectors and in turn induce indirect employment adjustment in the Mauritian economy. In an earlier study of the Mauritian economy [Maxwell Stamp, 1992] it was estimated that for every thousand jobs directly created in the manufacturing sector there were about another 174 jobs created by manufacturing production in the non-manufacturing sector of the economy. Taking our earlier base

estimates of the effects of a full EPA on employment in large enterprises (the loss of some 6800) plus the impact on small enterprises identified above (the loss of some 3100 jobs), then this would imply on the basis of the above direct-to-indirect job ratio that the full EPA would cause a further 1700 loss of jobs on other sectors. The estimated effect of the full EPA on direct and indirect employment adjustment in large and small scale enterprises therefore constitutes a combined threat to over 11,600 jobs (if the base parameter values are adopted).

To some extent we may be overestimating the adverse production and employment effects as firms that import intermediate inputs will benefit from lower prices as tariffs are reduced. Although it is EPZ firms that may have the highest share of imported inputs, and these are omitted from the estimates as they are not import-competing (see Section 4 for a discussion of potential export effects), many non-EPZ firms will import inputs. In fact, the firms that compete with imported final goods are perhaps most likely to require imported inputs (as production should be to higher quality standards). To the extent that such firms benefit from cheaper imports, the estimated trade effects will be lower (as they are better able to compete with final products) while production and employment losses will be lower than estimated, and in some industries there may be firms that become more competitive.

5 EXPORT EFFECTS: ARE THERE POTENTIAL GAINS?

The preferences granted to ACP countries have been especially important because they offer quota and duty-free access for many goods from certain developing countries. In principle, only the least developed countries obtain greater preferences (in practice, there may be no difference). We attempt neither to review nor assess the full range of EU preferences (see Panagariya, 2002). Rather, we assess whether these preferences have been of benefit to Mauritius, how they are being eroded and the impact of an EPA on preference margins.

Mauritius has been a longstanding beneficiary of preferential access to the EU market granted to ACP countries under the Lomé Conventions. Although these were replaced by the Cotonou Agreement it was for a limited period and preferences are being eroded on a number of fronts, principally as they come under challenge within the

WTO. The greatest benefit derived by Mauritius comes from the duty and quota free status of its clothing exports and from the provisions of the Sugar Protocol. The EU is by far the most important export destination, accounting for about two-thirds of total exports (this share fell slightly in the late 1990s, reflecting a decline in the euro value of sugar exports, driving the decline in total exports) and absorbing a wider range of exports than do other countries. By the early 2000s the US became a more important destination, accounting for about a fifth of exports, with Madagascar the only other significant destination (about five per cent of exports). Exports to the EU are dominated by sugar, knitwear and woven clothing. Sugar alone accounts for a fifth of Mauritian exports to the EU, but knitwear products amount to over 40% and woven clothing almost 20% (2000 figures). Preferential access has clearly been important: it has been a factor in ensuring the continued viability of the sugar sector in Mauritius, has underpinned the growth of the clothing sector and influenced the attractiveness of Mauritius for FDI (Milner, 2001).

We consider the two sectors – sugar and clothing – in turn, beginning with a brief evaluation of the importance to Mauritius of Lomé preferences, and then assessing the costs of preference erosion. The aim is to provide qualitative estimates of the contribution of these two sectors' exports to the Mauritian economy. This is *not* an estimate of the benefit of preferences: as preferences account for only part of the performance of these sectors, we infer the share of benefits attributable to preferences. Furthermore, we believe it is preferable to err on the side of *overestimating* the benefits, as this avoids the danger of underestimating possible adjustment costs.

5.1 The Sugar Sector

The Sugar Protocol (SP) of the Lomé Convention gave indefinite duty free access for agreed quantities of sugar at guaranteed (protected domestic EU) prices, typically above the world price, to specific ACP Protocol countries, as an integral part of the EU Sugar Regime. The benefits of the SP to Mauritius thus have two elements (for a general overview, see Morgan, 2001). First, the guaranteed quota for exports to the EU ensured that a known volume of sugar could be exported (a volume guarantee, which provides the major benefit). Second, this volume was at a guaranteed price; the additional benefit is the difference between the EU and world price. These benefits

must be evaluated against some benchmark. We assume that in the absence of the SP Mauritius could have sold all of its sugar exports to the EU at the prevailing world price, providing an order of magnitude of the benefit to Mauritius.

Milner *et al* (2004) use data on the value and volume of sugar exports to the EU in 2001 to estimate the benefits of the SP to ACP countries. Mauritius is the single largest beneficiary: its sugar exports to the EU of \$300 million imply an income transfer component (valuing the above benefits) of \$180 million (2001 prices), equivalent to 37% of the income transfer to all SP countries. The total transfer for Mauritius is 60% of the prevailing value of sugar exports to the EU, equivalent to 12% of total exports. In other words, for every dollar's worth of sugar exports to the EU, the EU pays about 60 cents over the prevailing world price of raw sugar (or each dollar's worth of sugar exported to the EU would only generate about 40 cents if sold at the world price). In 2001 Mauritius had a substantial trade deficit of US\$404m, but this would have increased by 44%, to US\$584m, in the absence of the sugar income transfer. This is a valuable preference, equivalent to 4% of GDP or \$150 per capita in 2001 (way above the average and the highest per capita for any SP country).

The income transfer is equivalent to 50% of gross production (at EU prices) or 140% of gross production at world prices. Estimates for Mauritius in 2002 suggest that some 17,615 were employed in the sugar sector. Taking the estimated gross value of sugar production in world prices and the current income transfer (difference between value at world and EU prices), the average value of gross production per worker is about \$7,400, while the income transfer per sugar worker implied is \$12,200 (because the EU price was considerably above the world price). This must have been a significant production, employment and profit benefit to the sugar sector in Mauritius. An additional benefit is that the SP sheltered Mauritius (and all SP countries) from the often dramatic volatility of world sugar prices (Morgan, 2001).

In September 2002 Australia and Brazil filed complaints and requests for consultations with the EU at the WTO concerning the nature of the EU sugar market. The complaint is that the volumes of EU subsidised exports of sugar exceed the levels the EU had committed itself to under the Uruguay Round Agreement. As the complaint was accepted, the EU is obliged to reform the Sugar Regime (and there all

also reforms as part of general reforms to the Common Agricultural Policy), with reductions in protected EU import prices and therefore in the value of income transfer to SP exporters. From 2005 the EU implemented a 30% reduction in the guaranteed sugar price, and further reductions are likely to follow – one extreme scenario is to assume that EU prices fall to the world level (of course, what this level may be is uncertain, especially as biofuel demand could increase the world price for sugar from current levels). The current EU proposal is to withdraw the guaranteed price after 2012 but in conjunction to increase the quotas for SP countries after 2009 (and ultimately to remove them completely). In principle, Mauritius (like other SP countries) will continue to get unlimited access to a protected European market for the foreseeable future, and the EPA would ensure this.

Whatever reforms are implemented, Mauritius can expect to suffer a net income loss greater than the overall SP loss because Mauritius has relatively low non-EU sugar exports (it is heavily dependent on the EU market, and faces increasing competition in other markets). On the basis of rough estimates from the benefits outlined above, if the EPA negotiations preserve ‘maximum preferences’ (similar to a scenario where the guaranteed price does not fall further than the 30% reduction announced), the losses to Mauritius could be confined (in sugar) to over one per cent of total exports, 0.4 per cent of GDP or \$15 per capita. At the other extreme, the cost to Mauritius of full liberalisation of trade in sugar is 4.4% of GDP or \$166 per capita. Reflecting the dependence of Mauritius on exports of sugar, especially to the EU, the potential cost is greater than for SP countries on average. This would impose a heavy adjustment cost on the sugar sector, although this may be offset in the current environment if Mauritius can shift to bio-fuel uses – there is no doubt potential to use sugar to produce ethanol. Overall, an EPA is unlikely to prevent Mauritius suffering revenue and volume losses on sugar, and ensuring preferences only reduces the loss, it does not generate a gain.

4.2 The Garment Sector

Trade in textiles and clothing was restricted under the Multi-fibre Arrangement (MFA), replaced in the Uruguay Round by the Agreement on Textiles and Clothing (ATC) which can fully into effect from 2005. Tariff and quota free access to the EU

market was a major factor driving the Mauritian clothing sector's growth and attracting foreign investment since the 1980s (Durbarry, 2001). The sector was the stalwart of the Export Processing Zone (EPZ), employing over 80,000 people in 1999. By 1998, the EPZ contributed 13% of GDP and some 70% of exports (Durbarry, 2001: 118-9). Furthermore, in principle Mauritius was able to export to the EU at a higher price than would otherwise have been the case, as many competitors faced tariffs. Assuming Mauritius 'priced up to the tariff' this benefit amounted to some 11% of the value of clothing exports to the EU in 2000. This is an upper estimate, as Mauritius had to compete with other duty-free suppliers, but is indicative of the potential benefit.

Further liberalising of the EU trade regime for clothing will happen, but it is difficult to quantify the potential impact on Mauritius. Partly, this is because so much of current trade patterns are determined by integration of suppliers in 'global value chains', in which Mauritian firms appear to be well positioned (especially as they have an established reputation for quality). The EU has changed its trade regime in two respects. First, quotas have largely been eliminated, and this increased the competition faced by Mauritius. Second, and off-setting this, previously quota-constrained suppliers now face tariffs that are higher than those faced by Mauritius, an advantage that would be maintained under an EPA. This can preserve the current competitive position of Mauritius if preference margins are retained in an EPA. However, employment in the garment sector appears to be declining in recent years, reflecting increased global competition.

There is a broader effect of the EU reducing restrictions on imports of clothing. If the average tariff is lowered, import prices fall and the volume of imports may increase. Price elasticities for the clothing sector are relatively high, above (negative) unity, compared to other (manufacturing) sectors, possibly due to the presence of numerous alternative suppliers and the low fixed costs of entry. Hence, any reduction in tariffs by the EU could lead to substantial volume effects. However, there is relatively little evidence on price competition between supplying countries, so at best an EPA may prevent Mauritius from suffering losses – there are unlikely to be export gains.

6 CONCLUSIONS AND POLICY IMPLICATIONS

Our analysis suggests that the impact of full reciprocity on imports into Mauritius is likely to be significant. The overall impact would be relatively modest, about a 2.5 per cent increase in total imports, but this will aggravate Mauritius' trade deficit. There would be very substantial changes in composition with switching of sources away from other regional and world suppliers to the EU, especially in manufactures. With a fully implemented EPA, there would of course be shifts in consumption away from local producers to EU imports. As a consequence of this, we estimate that production for the domestic market of manufactures and primary products would decline by 24 per cent (of 2002 values), with the bulk being in manufacturing. In turn this will result in a fall in employment in large scale (non-EPZ) enterprises of around 12 per cent, with the bulk of this again being in manufactures and the main impact being felt by female employment. The adjustment impact increases allowing for effects on small scale enterprises and indirect employment effects. When a range of sensitive items accounting for 18 per cent of imports from the EU in 2002 are excluded from any EPA, total imports would increase by 1.7 per cent rather than 2.5 per cent, with commensurately lower production and employment effects.

Given that customs duties remain an important source of government revenue, it is vital to assess the potential effects of an EPA on customs collections. Our analysis suggests that a full EPA would reduce customs revenue by some 52 per cent (33% if sensitive products excluded) against 2002 collections. Most of this derives from increased imports of manufactures in the EU, which would follow full reciprocity. Clearly, to sustain existing levels of government expenditure, fiscal diversification would have to take place to ameliorate the impact of this reduction. The final long-term distributional effects of an EPA will be fashioned by any taxation adjustments induced by the customs revenue losses induced by an EPA.

Against such potential adjustment costs have to be set potential welfare benefits. Gains can arise from three possible sources: gains to Mauritian consumers from lower priced imports; specialisation gains associated with more efficient deployment of domestic resources; gains associated with diverting imports from less efficient (regional) to more efficient (EU) suppliers. Against these need to be offset any

resource losses associated with diverting imports from more efficient global suppliers to EU sources. For the economy as a whole we estimate large welfare losses from extra-regional import substitution. However, these are offset by the sources of gains identified above, so there is an overall welfare gain, albeit a modest one, of 0.06% of 2002 GDP. This gain is of course contingent upon full adjustment taking place, so that the benefits of specialisation are realised, otherwise a small welfare loss of -0.17 per cent of GDP actually results. If sensitive sectors are excluded, overall net welfare effects remain modest, relative to GDP, but the lower increase in EU imports, less intra-regional source substitution and the constraint on specialisation gains associated with excluding sensitive products means that overall the change is -0.19 per cent of 2002 GDP.

Current preferences clearly affect Mauritian exports to the EU in a number of areas, notably sugar and made-up clothing. The former benefits from the Sugar Protocol and its interaction with the EU Sugar Regime; the latter did benefit from the MFA. The value of Sugar Protocol preferences to ACP countries has been very substantial, and this is particularly so for Mauritius: it receives a price premium of up to 60 cents over the world price. This results in very substantial income transfers that have at their maximum been worth as much as 4 per cent of GDP, equivalent to \$150 per capita per annum. Clearly, reduction of these benefits, through erosion of preferences and/or reforms of the EU sugar regime, implies an economic loss to Mauritius. Under a scenario where the EPA retains maximum preferences, losses to Mauritius would amount to around 1 per cent of total exports, 0.4 per cent of GDP or \$15 per capita. If we assume the EU price falls to the world price, the fall in GDP for Mauritius would be around 4.4 per cent, equivalent to losses of \$166 per capita. Although this scenario may be unlikely, it provides an estimate of the maximum cost to Mauritius of major liberalisation in the sector. Clearly this would have major adjustment consequences.

World trade in textiles and clothing was restricted for 40 years, for the most part by the MFA, but for Mauritius the arrangement was actually beneficial to the start-up and development of a large scale, export oriented clothing industry. Preferential access to the EU market effectively meant that Mauritian exporters were able to price up to the EU tariff-distorted price. The direct benefit of this price advantage could have amounted to around 10 per cent of the value of clothing exports to the EU.

Liberalisation of the EU clothing market is continuing and predicting the impact of changes on Mauritius is difficult. A major concern for Mauritius will be preserving preferential (tariff-free) access to the EU for garments under the EPA, but this is only likely to sustain the sector – it is unlikely to support export growth.

Our analysis suggests that full implementation of an EPA would result in almost 7,000 workers being displaced in contracting sectors, mainly in food products, furniture, non-metallic mineral products and agriculture, with little prospect of export, production or employment growth in the main export sectors (sugar will decline, garments may stay still). A key issue for adjustment is how to facilitate absorption of these workers in expanding sectors like tourism and financial services. In general, financial services require higher skills than would generally be found in released workers; at best, allowing for re-training, the sector could only absorb half of the released workers. Tourism continues to expand and is clearly a vital sector to the economy, with a better potential fit with the skills of released workers. Whilst it is possible that financial services and tourism can absorb the released workers, both would be competing for the more skilled workers and the age structure of Mauritius means that there are many new, typically educated, entrants to the labour market each year. Investment in up-grading generic and job specific skills will therefore be required even to maintain employment levels.

REFERENCES

- Busse, M. and H. Grossman (2007), 'The Trade and Fiscal Impact of EU/ACP Economic Partnership Agreements on West African Countries', *Journal of Development Studies*, Vol. 43, no. 5, pp. 787–811.
- Busse, M. and S. Luehje (2007), 'Should the Caribbean Countries Sign an Economic Partnership Agreement with the EU? Challenges and Strategic Options', *Journal of Economic Integration*, 22: 3, 598-618
- Durbarry, R. (2001), 'The Export Processing Zone', in R. Dabee and D. Greenaway (eds), *The Mauritian Economy*, London: Palgrave, pp. 105-29.
- Greenaway, D. and C. Milner (2006), 'EU Preferential Trading Agreements with the Caribbean: A Grim REPA?' *Journal of Economic Integration*, 21 (4), pp. 657-80.
- Hertel, T. W. (ed) (1997), *Global Trade Analysis: Modelling Implications*, Cambridge: Cambridge University Press.
- Karingi, S., R. Lang, N. Oulmane, R. Perez, M. Sadni and H. Ben Hammouda (2005), *Economic and Welfare Impacts of the EU-Africa Economic Partnership Agreements*, Addis Ababa: UNECA, available at www.uneca.org/trid.
- McKay, A., C. Milner and O. Morrissey (2005), 'Some Simple Analytics of the Welfare Effects of EU-ACP Economic Partnership Agreements', *Journal of African Economies*, vol. 14, no. 3: 327-358.
- Milner, C.R. (2001) "International Trade and Trade Policy" in R. Dabee and D. Greenaway (eds), *The Mauritian Economy*, Palgrave, Basingstoke and New York.
- Milner, C., W. Morgan and E. Zgovu (2004), 'Would All ACP Sugar Protocol Exporters Lose from Sugar Liberalisation', *European Journal of Development Research*, 16: 4, 790-808.
- Morgan, C.W. (2001), "Agriculture and Sugar" in R. Dabee and D. Greenaway (eds), *The Mauritian Economy*, London: Palgrave, pp. 166-184.
- Morrissey, O. and E. Zgovu (2007), 'The Impact of Economic Partnership Agreements on ACP Agriculture Imports and Welfare', University of Nottingham, School of Economics: *CREDIT Research Paper 07/xx*.
- Panagariya, A. (2002), 'EU PTAs and Developing Countries', *The World Economy*, 25: 10, 1415-1432.

APPENDIX

Table A1: Estimated Import Effects of a Full EPA with EU

Import Effects of a Full EPA in million Rps, base year 2002		Estimated Trade Effects			
		Direct Increase in Existing EU Imports	Substitution/switch from:		Overall Increase in EU Imports
			REGION to EU	ROW to EU	
SIC	Industry Description	(a)	(b)	(c)	(d)
A - Agriculture, hunting and forestry					
01	Agriculture, hunting and related	42.0	-144.4	-1202.1	1388.5
02	Forestry, logging and related service activities	20.2	-101.3	-525.5	646.9
	sector total	62.1	-245.7	-1727.6	2035.4
B - Fishing					
05	Fishing, operation of fish hatcheries etc	2.34	-0.84	-6.05	9.2
	sector total	2.3	-0.8	-6.0	9.2
C - Mining and quarrying					
10	Coal and lignite; extraction of peat	0.0	-31.6	0.0	31.6
11	Crude petroleum and natural gas (1)	0.0	0.0	0.0	0.0
12	Mining of uranium and thorium ores	0.0	0.0	0.0	0.0
13	Mining of metal ores	0.0	0.0	0.0	0.0
14	Other mining and quarrying	1.4	-0.8	-5.3	7.5
	sector total	1.4	-32.4	-5.3	39.1
D - Manufacturing					
15	Food products and beverages	150.1	-265.3	-1371.9	1787.4
16	Tobacco products	22.1	-2.2	-28.9	53.2
17	Textiles	22.9	-18.2	-451.2	492.3
18	Wearing apparel etc	3.8	-0.7	-42.7	47.3
19	Tanning and dressing of leather; etc	22.0	-2.0	-115.0	139.1
20	Wood and of products of wood	2.5	-25.0	-180.5	208.0
21	Paper and paper products	33.9	-77.4	-201.2	312.5
22	Publishing, printing and reproduction	19.7	-2.5	-36.0	58.2
23	Refined petroleum products (1)	1.8	-260.8	-459.7	722.3
24	Chemicals and chemical products	174.2	-144.7	-692.7	1011.7
25	Rubber and plastics products	94.6	-78.8	-382.7	556.0
26	Other non-metallic mineral products	94.5	-42.2	-641.4	778.1
27	Basic metals	9.1	-39.0	-68.4	116.4
28	Fabricated metal products	44.8	-29.1	-144.0	217.9
29	Machinery and equipment n.e.c.	401.6	-56.4	-764.9	1222.9
30	Office & computing equipment	51.9	-5.5	-154.6	212.0
31	Electrical machinery and apparatus	127.5	-21.4	-149.5	298.4
32	Radio, television and comm. equip.	175.9	-18.5	-663.9	858.3
33	Medical & optical instruments etc	68.9	-8.7	-189.8	267.3
34	Motor vehicles etc	98.4	-56.5	-531.7	686.6
35	Other transport equipment	12.6	-1.1	-109.8	123.4
36	Furniture; manufacturing n.e.c.	57.5	-14.3	-307.3	379.1
	sector total	1690.1	-1170.4	-7687.8	10548.3
TOTAL		1755.9	-1449.3	-9426.7	12632.0

Note: (1) although some crude petroleum imports from the EU are reported, we assumed the EU would not be able to displace alternative suppliers of this product, but allow for possible effects on refined petroleum.

Table A2: Sensitive Products (as reported in SADCC negotiations)

HS <i>DESCRIPTION</i>	Coverage of Mauritian Imports from EU (2002)	
	Sensitive Products	EPA Liberalised
(I) LIVE ANIMALS; ANIMAL PRODUCTS	1%	99%
02 Meat and Edible Meat Offal	2%	98%
04 Dairy Produce; Birds' Eggs; Natural Honey; Edible Products of Animal Origin, n.e.s. / n.e.i.	6%	94%
(II) VEGETABLE PRODUCTS	3%	97%
08 Edible Fruit and Nuts; Peel of Citrus Fruit or Melons	0%	100%
09 Coffee, Tea, Maté and Spices	59%	41%
11 Products of the Milling Industry; Malt; Starches; Inulin; Wheat Gluten	2%	98%
(III) ANIMAL OR VEGETABLE FATS AND OILS AND THEIR CLEAVAGE PRODUCTS; PREPARED EDIBLE FATS; ANIMAL OR VEGETABLE WAXES	73%	27%
15 Animal or Vegetable Fats and Oils and Their Cleavage Products; Prepared Edible Fats; Animal or Vegetable Waxes	73%	27%
(IV) PREPARED FOODSTUFFS; BEVERAGES, SPIRITS AND VINEGAR; TOBACCO AND MANUFACTURED TOBACCO SUBSTITUTES	53%	47%
16 Preparations of Meat, of Fish or of Crustaceans, Molluscs or Other Aquatic Invertebrates	62%	38%
17 Sugars and Sugar Confectionery	98%	2%
18 Cocoa and Cocoa Preparations	96%	4%
19 Preparations of Cereals, Flour, Starch or Milk; Pastry Cooks' Products	25%	75%
20 Preparations of Vegetables, Fruit, Nuts or Other Parts of Plants	36%	64%
21 Miscellaneous edible preparations	45%	55%
22 Beverages, spirits and vinegar	78%	22%
23 Residues and waste from the food industries; prepared animal fodder	8%	92%
24 Tobacco and manufactured tobacco substitutes	98%	2%
(V) MINERAL PRODUCTS	3%	97%
25 Salt; sulphur; earths and stone; Plastering materials, lime and cement	18%	82%
(VI) PRODUCTS OF THE CHEMICAL OR ALLIED INDUSTRIES	21%	79%
28 Inorganic chemicals; Organic or inorganic compounds of precious metals, of rare-earth metals, of radioactive elements or of isotopes	4%	96%
31 Fertilisers	70%	30%
32 Tanning or dyeing extracts; tannins and their derivatives; dyes, pigments and other colouring matter; paints and varnishes; putty and other mastics; inks	19%	81%
33 Essential oils and resinoids; perfumery, cosmetic or toilet preparations	71%	29%
34 Soap, organic surface-active agents, washing preparations, lubricating preparations, artificial waxes, prepared waxes, polishing or scouring preparations, candles and similar articles, modelling pastes, "dental waxes" and dental preparations with a basis of plaster	91%	9%
35 Albuminoidal substances; modified starches; glues; enzymes	22%	78%
36 Explosives; pyrotechnic products; matches; pyrophoric alloys; certain combustible preparations	58%	42%
38 Miscellaneous chemical products	9%	91%

(VII) PLASTICS AND ARTICLES THEREOF; RUBBER AND ARTICLES THEREOF		64%	36%
39	Plastics and articles thereof	79%	21%
40	Rubber and articles thereof	6%	94%
(VIII) RAW HIDES AND SKINS, LEATHER, FURSKINS AND ARTICLES THEREOF; SADDLERY AND HARNESS; TRAVEL GOODS, HANDBAGS AND SIMILAR CONTAINERS; ARTICLE OF ANIMAL GUT (OTHER THAN SILK-WORM GUT)		66%	34%
42	Articles of leather; saddlery and harness; travel goods, handbags and similar containers; articles of animal gut (other than silk-worm gut)	99%	1%
(IX) WOOD AND ARTICLES OF WOOD; WOOD CHARCOAL; CORK AND ARTICLES OF CORK; MANUFACTURES OF STRAW, ESPARTO, OTHER PLAITING MATERIALS; BASKETWARE AND WICKERWORK		8%	92%
44	Wood and articles of wood; wood charcoal	8%	92%
46	Manufactures of straw, of esparto or of other plaiting materials; basketware and wickerwork	100%	0%
(X) PULP OF WOOD OR OF OTHER FIBROUS CELLULOSIC MATERIAL; RECOVERED (WASTE AND SCRAP) PAPER OR PAPERBOARD		27%	73%
48	Paper and Paperboard; articles of paper pulp, of paper or of paperboard	53%	47%
49	Printed books, newspapers, pictures and other products of the printing industry; manuscripts, typescripts and plans	0%	100%
(XI) TEXTILES AND TEXTILE ARTICLES		5%	95%
56	Wadding, felt and nonwovens; special yarns; twine, cordage, ropes and cables & articles thereof	27%	73%
57	Carpets and other textile floor coverings	22%	78%
61	Articles of apparel and clothing accessories, knitted or crocheted	0%	100%
62	Articles of apparel and clothing accessories, not knitted or crocheted	81%	19%
63	Other made up textile articles; sets; worn clothing and worn textile articles; rags	11%	89%
(XII) FOOTWEAR, HEADGEAR, UMBRELLAS, SUN UMBRELLAS, WALKING-STICKS, SEAT-STICKS, WHIPS, RIDING-CROPS AND PARTS THEREOF; PREPARED FEATHERS AND ARTICLES MADE THEREWITH; ARTIFICIAL FLOWERS; ARTICLES OF HUMAN HAIR		16%	84%
64	Footwear, gaiters and the like; parts of such articles	20%	80%
66	Umbrellas, sun umbrellas, walking-sticks, seat-sticks, whips, riding-crops and parts thereof	89%	11%
(XIII) ARTICLES OF STONE, PLASTER, CEMENT, ASBESTOS, MICA OR SIMILAR MATERIALS; CERAMIC PRODUCTS; GLASS AND GLASSWARE		3%	97%
68	Articles of stone, plaster, cement, asbestos, mica or similar materials	9%	91%
70	Glass and glassware	4%	96%
(XIV) NATURAL OR CULTURED PEARLS, PRECIOUS OR SEMI-PRECIOUS STONES, PRECIOUS METALS, METALS WITH PRECIOUS METAL, ARTICLES THEREOF; IMITATION JEWELLERY; COIN		55%	45%
71	Natural or cultured pearls, precious or semi-precious stones, precious metals, metals clad with precious metal, and articles thereof; imitation jewellery; coin	55%	45%
(XV) BASE METALS AND ARTICLES OF BASE METAL		28%	72%
72	Iron and steel	1%	99%
73	Articles of iron or steel	42%	58%
76	Aluminium and articles thereof	21%	79%

82	Tools, implements, cutlery, spoons and forks, of base metal; parts thereof of base metal	10%	90%
83	Miscellaneous articles of base metal	30%	70%
(XVI)	MACHINERY AND MECHANICAL APPLIANCES; ELECTRICAL EQUIPMENT; PARTS THEREOF; SOUND RECORDERS AND REPRODUCERS, TELEVISION IMAGE AND SOUND RECORDERS AND REPRODUCERS, AND PARTS AND ACCESSORIES OF SUCH ARTICLES	6%	94%
84	Nuclear Reactors, Boilers, Machinery and Mechanical Appliances; Parts Thereof	7%	93%
85	Electrical machinery and equipment and parts thereof; sound recorders and reproducers, TV image and sound recorders and reproducers, and parts and accessories of such articles	4%	96%
(XVII)	VEHICLES, AIRCRAFT, VESSELS AND ASSOCIATED TRANSPORT EQUIPMENT	3%	97%
87	Vehicles Other Than Railway or Tramway Rolling-Stock and Parts and Accessories Thereof	3%	97%
89	Ships, Boats and Floating Structures	16%	84%
(XVII)	OPTICAL, PHOTOGRAPHIC, CINEMATOGRAPHIC, MEASURING, CHECKING, PRECISION, MEDICAL OR SURGICAL INSTRUMENTS AND APPARATUS; CLOCKS AND WATCHES; MUSICAL INSTRUMENTS; PARTS AND ACCESSORIES	0%	100%
90	Optical, photographic, cinematographic, measuring, checking, precision, medical or surgical instruments and apparatus; parts and accessories thereof	0%	100%
(XIX)	ARMS AND AMMUNITION; PARTS AND ACCESSORIES THEREOF	0%	100%
(XX)	MISCELLANEOUS MANUFACTURED ARTICLES	45%	55%
94	Furniture; bedding, mattresses, mattress supports, cushions and similar stuffed furnishings; lamps and lighting fittings, not elsewhere specified or included; illuminated signs, illuminated name-plates and the like; prefabricated buildings	66%	34%
95	Toys, games and sports requisites; parts and accessories thereof	7%	93%
96	Miscellaneous manufactured articles	33%	67%
(XXI)	WORKS OF ART, COLLECTORS' PIECES AND ANTIQUES	0%	100%
TOTAL IMPORTS		18%	82%

Table A3: Estimated Import Effects of a Partial EPA with EU (excluding Sensitive Products) (in million 2002 Rps)

Import Effects of a Partial EPA ISIC Industry Description	Estimated Trade Effects			
	Direct Increase in Existing EU Imports	Substitution/switch from:		Overall Increase in EU Imports
		REGION to EU	ROW to EU	
	(a)	(b)	(c)	(d)
A - Agriculture, hunting and forestry				
01 Agriculture, hunting and related	12.2	-27.0	-871.6	910.7
02 Forestry, logging and related service activities	18.8	-96.9	-504.0	619.7
Sector total	31.0	-123.9	-1375.5	1530.5
B - Fishing				
05 Fishing, operation of fish hatcheries etc	1.0	-0.8	-5.4	7.3
Sector total	1.0	-0.8	-5.4	7.3
C - Mining and quarrying				
10 Mining of coal and lignite; extraction of peat	0.0	0.0	0.0	0.0
11 Crude petroleum and natural gas	0.0	0.0	0.0	0.0
12 Mining of uranium and thorium ores	0.0	0.0	0.0	0.0
13 Mining of metal ores	0.0	0.0	0.0	0.0
14 Other mining and quarrying	0.6	-0.7	-4.8	6.1
Sector total	0.6	-0.7	-4.8	6.1
D - Manufacturing				
15 Food products and beverages	58.6	-75.5	-669.4	803.5
16 Tobacco products	0.5	-0.8	-10.8	12.1
17 Textiles	8.2	-4.5	-232.4	245.1
18 Wearing apparel etc	0.5	-0.4	-17.7	18.6
19 Tanning and dressing of leather; etc	2.1	-1.0	-57.6	60.7
20 Wood and of products of wood	2.1	-17.7	-123.4	143.2
21 Paper and paper products	16.0	-55.0	-117.8	188.8
22 Publishing, printing and reproduction	14.7	-1.9	-28.6	45.2
23 Refined petroleum products (1)	1.7	-240.1	-415.7	657.4
24 Chemicals and chemical products	65.2	-57.1	-349.9	472.1
25 Rubber and plastics products	29.9	-38.7	-201.8	270.4
26 Other non-metallic mineral products	57.7	-26.4	-422.5	506.6
27 Basic metals	4.4	-27.3	-46.0	77.7
28 Fabricated metal products	30.4	-17.1	-97.4	144.9
29 Machinery and equipment n.e.c.	377.0	-47.5	-682.0	1106.5
30 Office & computing equipment	48.2	-5.1	-139.6	192.9
31 Electrical machinery and apparatus	95.9	-14.2	-112.7	222.8
32 Radio, television and comm. equip.	169.4	-14.5	-569.2	753.1
33 Medical & optical instruments etc	51.8	-5.7	-143.1	200.6
34 Motor vehicles etc	91.9	-52.0	-484.5	628.4
35 Other transport equipment	11.7	-1.0	-100.0	112.7
36 Furniture; manufacturing n.e.c.	22.3	-3.7	-142.8	168.9
Sector total	1160.2	-707.2	-5164.9	7032.2
TOTAL	1192.8	-832.6	-6550.6	8576.1

Table A4: Estimated Welfare Effects of a Full EPA with EU (in mill. 2002 Rps)

Welfare Effects of a Full EPA		Estimated Welfare Effects:				
		Consumer Gain	Production Gains ⁽¹⁾	Intra-Region Substitution	Extra-Region Substitution	Net Effect (a+b+c+d)
ISIC	Industry Description	(a)	(b)	(c)	(d)	(e)
A - Agriculture, hunting and forestry						
01	Agriculture, hunting and related	0.65	0.41	3.54	-18.56	-13.96
02	Forestry, logging and related service activities	1.55	0.00	12.14	-40.35	-26.67
sector total		2.20	0.41	15.68	-58.91	-40.62
B - Fishing						
05	Fishing, operation of fish hatcheries etc	0.00	0.00	0.00	0.00	0.00
sector total		0.00	0.00	0.00	0.00	0.00
C - Mining and quarrying						
10	Mining of coal and lignite; extraction of peat	0.00	0.00	16.33	0.00	16.33
11	Crude petroleum and natural gas (1)	0.00	0.00	0.00	0.00	0.00
12	Mining of uranium and thorium ores	0.00	0.00	0.00	0.00	0.00
13	Mining of metal ores	0.00	0.00	0.00	0.00	0.00
14	Other mining and quarrying	0.00	0.00	0.02	-0.01	0.01
sector total		0.00	0.00	16.33	-0.01	16.33
D - Manufacturing						
15	Food products and beverages	7.51	58.92	12.96	-68.59	10.79
16	Tobacco products	6.74	170.43	0.13	-3.75	173.55
17	Textiles	0.10	0.00	0.14	-2.04	-1.80
18	Wearing apparel etc	0.04	0.24	0.01	-0.40	-0.11
19	Tanning and dressing of leather; etc	0.77	0.87	0.04	-4.01	-2.33
20	Wood and of products of wood	0.08	1.48	1.64	-6.09	-2.88
21	Paper and paper products	1.36	2.36	1.93	-8.04	-2.40
22	Publishing, printing and reproduction	0.62	4.50	0.03	-1.13	4.01
23	Refined petroleum products (1)	0.03	0.03	4.80	-8.03	-3.18
24	Chemicals and chemical products	7.26	0.00	4.70	-28.89	-16.93
25	Rubber and plastics products	5.30	0.00	2.40	-21.44	-13.75
26	Other non-metallic mineral products	6.32	27.33	1.39	-42.89	-7.86
27	Basic metals	0.10	0.33	2.13	-0.78	1.79
28	Fabricated metal products	1.11	0.00	0.68	-3.56	-1.76
29	Machinery and equipment n.e.c.	13.44	1.42	0.73	-25.61	-10.02
30	Office & computing equipment	1.04	0.01	0.04	-3.11	-2.02
31	Electrical machinery and apparatus	4.05	0.71	0.21	-4.75	0.22
32	Radio, television and comm. equip.	10.45	2.47	0.31	-39.45	-26.22
33	Medical & optical instruments etc	2.16	0.00	0.09	-5.95	-3.70
34	Motor vehicles etc	2.35	0.26	0.64	-12.71	-9.45
35	Other transport equipment	0.29	0.00	0.01	-2.55	-2.24
36	Furniture; manufacturing n.e.c.	1.62	2.13	0.27	-8.68	-4.66
sector total		72.74	273.48	35.29	-302.44	79.07
TOTAL		74.94	273.89	67.30	-361.36	54.78

⁽¹⁾ assuming greater specialisation and re-employment of labour in alternative sector

Table A5: Estimated Welfare Effects of a Partial EPA with EU (excluding sensitive products) (in million 2002 Rps)

Welfare Effects of a Partial EPA	Estimated Welfare Effects:				
	Consumer Gain	Production Gain ⁽¹⁾	Intra-Region Substitution	Extra-Region Substitution	Net Effect (a+b+c+d)
SIC Industry Description	(a)	(b)	(c)	(d)	(e)
A - Agriculture, hunting and forestry					
01 Agriculture, hunting and related	0.19	0.00	0.66	-13.45	-12.60
02 Forestry, logging and related service activities	1.45	0.00	11.62	-38.70	-25.64
sector total	1.63	0.00	12.28	-52.16	-38.24
B - Fishing					
05 Fishing, operation of fish hatcheries etc	0.00	0.00	0.00	0.00	0.00
sector total	0.00	0.00	0.00	0.00	0.00
C - Mining and quarrying					
10 Mining of coal and lignite; extraction of peat	0.00	0.00	0.00	0.00	0.00
11 Crude petroleum and natural gas	0.00	0.00	0.00	0.00	0.00
12 Mining of uranium and thorium ores	0.00	0.00	0.00	0.00	0.00
13 Mining of metal ores	0.00	0.00	0.00	0.00	0.00
14 Other mining and quarrying	0.00	0.00	0.02	-0.01	0.01
sector total	0.00	0.00	0.02	-0.01	0.01
D - Manufacturing					
15 Food products and beverages	2.93	0.00	3.69	-33.47	-26.85
16 Tobacco products	0.16	0.00	0.06	-3.29	-3.08
17 Textiles	0.04	0.00	0.04	-1.05	-0.98
18 Wearing apparel etc	0.00	0.00	0.01	-0.17	-0.15
19 Tanning and dressing of leather; etc	0.07	0.00	0.02	-2.01	-1.92
20 Wood and of products of wood	0.07	0.00	1.16	-4.16	-2.93
21 Paper and paper products	0.64	0.00	1.37	-4.71	-2.70
22 Publishing, printing and reproduction	0.46	0.00	0.02	-0.90	-0.41
23 Refined petroleum products (1)	0.03	0.00	4.42	-7.26	-2.82
24 Chemicals and chemical products	2.72	0.00	1.86	-14.59	-10.02
25 Rubber and plastics products	1.68	0.00	1.18	-11.30	-8.45
26 Other non-metallic mineral products	3.86	0.00	0.87	-28.25	-23.53
27 Basic metals	0.05	0.00	1.49	-0.52	1.02
28 Fabricated metal products	0.75	0.00	0.40	-2.40	-1.25
29 Machinery and equipment n.e.c.	12.62	0.00	0.61	-22.83	-9.60
30 Office & computing equipment	0.97	0.00	0.04	-2.81	-1.80
31 Electrical machinery and apparatus	3.04	0.00	0.14	-3.58	-0.40
32 Radio, television and comm. equip.	10.06	0.00	0.24	-33.82	-23.52
33 Medical & optical instruments etc	1.62	0.00	0.06	-4.48	-2.80
34 Motor vehicles etc	2.20	0.00	0.59	-11.58	-8.79
35 Other transport equipment	0.27	0.00	0.01	-2.32	-2.04
36 Furniture; manufacturing n.e.c.	0.63	0.00	0.07	-4.03	-3.33
sector total	44.88	0.00	18.33	-199.56	-136.34
TOTAL	46.51	0.00	30.63	-251.73	-174.57

⁽¹⁾ set to zero on assumption that sensitive products excluded gives full coverage and protection for domestic production.

Table A6: Estimated Customs Revenue Effects of a Full EPA with EU
(in million 2002 Rps)

Customs Revenue Effects of a Full EPA		Estimated Revenue Effects:			Total
		Direct	Indirect		
		On Existing EU Imports	On imports switched from:		(a)+(b)+(c)
ISIC	Industry Description	(a)	Region (b)	RoW (c)	(d)
A - Agriculture, hunting and forestry					
01	Agriculture, hunting and related	-50.8	-3.5	-18.6	-72.9
02	Forestry, logging and related service activities	-27.4	-12.1	-44.7	-84.2
sector total		-78.1	-15.7	-63.3	-157.1
B - Fishing					
05	Fishing, operation of fish hatcheries etc	-1.8	0.0	0.0	-1.8
sector total		-1.8	0.0	0.0	-1.8
C - Mining and quarrying					
10	Mining of coal and lignite; extraction of peat	0.0	-16.3	0.0	-16.3
11	Crude petroleum and natural gas	0.0	0.0	0.0	0.0
12	Mining of uranium and thorium ores	0.0	0.0	0.0	0.0
13	Mining of metal ores	0.0	0.0	0.0	0.0
14	Other mining and quarrying	-0.9	0.0	-0.1	-1.0
sector total		-0.9	-16.3	-0.1	-17.3
D - Manufacturing					
15	Food products and beverages	-156.6	-13.0	-43.1	-212.7
16	Tobacco products	-31.0	-0.1	-2.1	-33.2
17	Textiles	-15.5	-0.1	-3.7	-19.3
18	Wearing apparel etc	-2.1	0.0	-3.7	-5.8
19	Tanning and dressing of leather; etc	-10.9	0.0	-14.5	-25.5
20	Wood and of products of wood	-2.1	-1.6	-4.4	-8.1
21	Paper and paper products	-27.1	-1.9	-4.7	-33.8
22	Publishing, printing and reproduction	-15.8	0.0	-1.9	-17.7
23	Refined petroleum products (1)	-1.1	-4.8	-13.4	-19.3
24	Chemicals and chemical products	-129.5	-4.7	-31.5	-165.7
25	Rubber and plastics products	-50.7	-2.4	-35.6	-88.7
26	Other non-metallic mineral products	-55.4	-1.4	-43.9	-100.7
27	Basic metals	-5.5	-2.1	-2.4	-10.0
28	Fabricated metal products	-23.9	-0.7	-7.3	-31.9
29	Machinery and equipment n.e.c.	-174.3	-0.7	-53.3	-228.3
30	Office & computing equipment	-16.6	0.0	-5.3	-21.9
31	Electrical machinery and apparatus	-54.2	-0.2	-9.5	-64.0
32	Radio, television and comm. equip.	-60.6	-0.3	-89.6	-150.5
33	Medical & optical instruments etc	-28.3	-0.1	-12.0	-40.4
34	Motor vehicles etc	-48.5	-0.6	-26.5	-75.7
35	Other transport equipment	-5.6	0.0	-5.1	-10.7
36	Furniture; manufacturing n.e.c.	-43.4	-0.3	-19.3	-62.9
sector total		-958.7	-35.3	-432.8	-1426.8
TOTAL		-1039.5	-67.3	-496.2	-1603.0

Table A7: Estimated Customs Revenue Effects of a Partial EPA with EU (excluding sensitive products) (in million 2002 Rps)

Customs Revenue Effects of a Full EPA	Estimated Revenue Effects:			
	Direct	Indirect		Total
	On Existing	On imports switched from:		
	EU Imports	Region	RoW	(a)+(b)+(c)
ISIC Industry Description	(a)	(b)	(c)	(d)
A - Agriculture, hunting and forestry				
01 Agriculture, hunting and related	-14.7	-0.7	-13.5	-28.9
02 Forestry, logging and related service activities	-25.6	-11.6	-42.9	-80.1
sector total	-40.3	-12.3	-56.4	-109.0
B - Fishing				
05 Fishing, operation of fish hatcheries etc	-0.8	0.0	0.0	-0.8
sector total	-0.8	0.0	0.0	-0.8
C - Mining and quarrying				
10 Mining of coal and lignite; extraction of peat	0.0	0.0	0.0	0.0
11 Crude petroleum and natural gas	0.0	0.0	0.0	0.0
12 Mining of uranium and thorium ores	0.0	0.0	0.0	0.0
13 Mining of metal ores	0.0	0.0	0.0	0.0
14 Other mining and quarrying	-0.4	0.0	-0.1	-0.5
sector total	-0.4	0.0	-0.1	-0.5
D - Manufacturing				
15 Food products and beverages	-61.1	-3.7	-21.0	-85.9
16 Tobacco products	-0.7	-0.1	-1.9	-2.6
17 Textiles	-5.5	0.0	-1.9	-7.5
18 Wearing apparel etc	-0.3	0.0	-1.5	-1.8
19 Tanning and dressing of leather; etc	-1.0	0.0	-7.3	-8.3
20 Wood and of products of wood	-1.7	-1.2	-3.0	-5.9
21 Paper and paper products	-12.8	-1.4	-2.8	-17.0
22 Publishing, printing and reproduction	-11.8	0.0	-1.5	-13.3
23 Refined petroleum products (1)	-1.0	-4.4	-12.1	-17.5
24 Chemicals and chemical products	-48.5	-1.9	-15.9	-66.2
25 Rubber and plastics products	-16.0	-1.2	-18.8	-36.0
26 Other non-metallic mineral products	-33.8	-0.9	-28.9	-63.6
27 Basic metals	-2.6	-1.5	-1.6	-5.7
28 Fabricated metal products	-16.2	-0.4	-5.0	-21.6
29 Machinery and equipment n.e.c.	-163.6	-0.6	-47.5	-211.7
30 Office & computing equipment	-15.4	0.0	-4.8	-20.2
31 Electrical machinery and apparatus	-40.8	-0.1	-7.2	-48.1
32 Radio, television and comm. equip.	-58.3	-0.2	-76.9	-135.4
33 Medical & optical instruments etc	-21.3	-0.1	-9.0	-30.4
34 Motor vehicles etc	-45.3	-0.6	-24.2	-70.1
35 Other transport equipment	-5.3	0.0	-4.6	-9.9
36 Furniture; manufacturing n.e.c.	-16.8	-0.1	-9.0	-25.9
sector total	-580.2	-18.3	-306.2	-904.7
TOTAL	-621.7	-30.6	-362.7	-1015.0

Table A8: Estimated Production and Employment Effects of a Full EPA with EU

Production and Employment Effects of a Full EPA		Production ⁽¹⁾ Effect (mill. 2002 Rps)	Employment Effect Male Female (change in numbers)		Total employed
SIC	Industry Description	(a)	(b)	(c)	(d)
A - Agriculture, hunting and forestry					
01	Agriculture, hunting and related	-39.76	-439	-62	-501
02	Forestry, logging and related service activities	0.00			
sector total		-39.76	-439	-62	-501
B - Fishing					
sector total		0.00	0	0	0
C - Mining and quarrying					
sector total		0.00	0	0	0
D - Manufacturing					
15	Food products and beverages	-1767.79	-2190	-341	-2530
16	Tobacco products	-839.89	-157	-90	-248
17	Textiles	0.00			
18	Wearing apparel etc	-38.51	-157	-78	-236
19	Tanning and dressing of leather; etc	-37.59	-154	-56	-210
20	Wood and of products of wood	-65.82	-174	-24	-198
21	Paper and paper products	-88.46	-66	-25	-91
22	Publishing, printing and reproduction	-214.59	-314	-118	-432
23	Refined petroleum products ⁽¹⁾	-2.17	-2	-1	-3
24	Chemicals and chemical products	0.00			
25	Rubber and plastics products	0.00			
26	Other non-metallic mineral products	-613.04	-586	-65	-651
27	Basic metals	-43.81	-26	-3	-29
28	Fabricated metal products	0.00			
29	Machinery and equipment n.e.c.	-63.50	-99	-8	-107
30	Office & computing equipment	-0.70	0	0	-1
31	Electrical machinery and apparatus	-33.40	-51	-25	-76
32	Radio, television and comm. equip.	-62.44	-33	-27	-60
33	Medical & optical instruments etc	0.00			
34	Motor vehicles etc	-16.48	-28	-2	-30
35	Other transport equipment	0.00			
36	Furniture; manufacturing n.e.c.	-112.95	-1349	-3	-1352
sector total		-4001.15	-5388	-866	-6254
TOTAL		-4040.91	-5827	-928	-6755

⁽¹⁾ change in production in manufacturing relates to large establishments only

⁽²⁾ change in non-EPZ employment