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The 2005 episodes of the “banana war” serial. An empirical assessment of the introduction by the European Union of a tariff-only import regime for bananas

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Working Paper 06-02

TRADEAG is a Specific Targeted Research Project financed by the European Commission within its VI Research Framework. Information about the Project, the partners involved and its outputs can be found at <http://tradeag.vitamib.com>

The 2005 episodes of the ‘banana war’ serial. An empirical assessment of the introduction by the European Union of a tariff-only import regime for bananas.*

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Abstract

The EU Common Market Organization for bananas has been generating international controversies since its introduction in 1992. Many thought the ‘banana war’ had come to an end when, at the 2001 WTO Ministerial Conference in Doha, a Decision was taken for the EU to introduce, no later than 1 January 2006, a ‘*tariff-only regime*’ which ‘*would result in at least maintaining total market access for MFN banana suppliers*’. However, proposals by the EU for a tariff-only regime have been rejected in a two-step WTO arbitration in 2005 because they were found not to satisfy this requirement. On 1 January 2006 the EU unilaterally introduced a tariff-only regime. The paper presents the main results of a modelling effort aimed at analyzing this policy issue. The results obtained suggest that: contrary to the decision by the arbitrators, the import regime proposed by the EU in the second step of the arbitration would have satisfied the requirement stated in the WTO November 2001 Decision; moreover, even the higher MFN tariff proposed by the EU in the first step of the arbitration, had it been coupled with a duty-free quota for ACP countries, would have done so. The regime introduced on 1 January 2006 is expected to yield in 2007 MFN banana exports to the EU 400,000 t above those which would have occurred under the previous regime. If a longer time frame is considered, under a tariff-only regime MFN countries will see their exports expand, while the contrary is forecasted under the previous EU import regime.

Key words: Q17, Q18, F13, C21, C6.

1. Introduction

Over the years bananas have caused continuous headaches to the European Union (EU), both internationally and internally. Internationally, the Common Market Organization for bananas (CMOB) had been generating heated controversies ever since its introduction in 1992 (Josling, 2003; Read, 2001; Tangermann, 2003b; Thagesen and Matthews, 1997). Internally, bananas have been a very serious issue since the negotiations for the establishment of the European Economic

* I wish to thank Colin Brown, Margherita Scoppola and participants at the Iatrc (International Agricultural Trade Research Consortium) 2005 Annual Meeting (San Diego, December 4-6) for helpful comments on an earlier draft of the paper. Financial support received by the ‘Agricultural Trade Agreements (TRADEAG)’ research project, funded by the European Commission (Specific Targeted Research Project, Contract no. 513666), is gratefully acknowledged. The development of a preliminary version of the model used in this study has been financially supported by Cogea (Italy) and the European Commission. The views expressed in this paper are the sole responsibility of the author and do not necessarily reflect those of the Commission.

Community in 1957 (Tangemann, 2003a), and the CMOB has often been indicated as *the* most controversial single Common Agricultural Policy market regime.

However, many thought that the ‘banana war’ had come to an end when, at the November 2001 WTO Ministerial Conference in Doha, two Decisions were taken: for a transitional EC import regime for bananas (WTO, 2001b) and for the introduction, no later than 1 January 2006, of a ‘*tariff-only regime*’ which ‘*would result in at least maintaining total market access for MFN banana suppliers*’ (WTO, 2001c).¹ An Annex to the 14 November 2001 WTO Decision (WTO, 2001c) spelled out the details of the two-step procedure to be followed in determining the tariff equivalent to the EU import regime for bananas in place at the time. Should an ‘interested party’ consider the proposal by the EU unsatisfactory, it had the right to request an arbitration; if the arbitrator determined that the proposed regime would not ‘*result in at least maintaining total market access for MFN banana suppliers*’, the EU had the right to rectify its proposal; if its revised proposal was also considered unsatisfactory by an interested party, the same arbitrator was to determine whether the new proposal satisfied the requirement. If the decision by the arbitrator was, again, that this was not the case, the procedure ended and the WTO waiver which allows the EU to grant preferential treatment to bananas imported from ACP countries would cease to apply upon the introduction of the tariff-only import regime.

In January 2005 the EU proposed a 230 €/t tariff to be imposed on bananas imported from MFN countries, without specifying the regime under which imports from ACP countries would take place. In August 2005, the arbitrators ruled that this regime did not satisfy the requirement (WTO, 2005a). In September, the EU submitted a revised proposal, significantly lowering (187 €/t) the MFN tariff² and providing for a tariff-free tariff rate quota (TRQ) of 775,000 t for its imports from ACP countries only. In October 2005, the arbitrators ruled that this import regime too would not

¹ These Decisions follow the ‘mutually satisfactory solution’ to end the banana dispute agreed between the EU and the US, and then accepted by Ecuador, in April of the same year (WTO, 2001a).

² In both instances the EU used the ‘price gap’ methodology to calculate the tariff equivalent, for MFN exports, to its pre-2006 import regime. This is the methodology agreed upon in the Uruguay Round for the ‘tariffication’ of non-tariff barriers and is described in Annex 5 to the Agreement on Agriculture. Essentially, the tariff equivalent is calculated as the difference between observed relevant internal and external prices.

'result in at least maintaining total market access for MFN banana suppliers' (WTO, 2005b). This decision put the CMOB back on the table of multilateral international trade negotiations. In November, the EU decided, unilaterally, to adopt a tariff-only regime on 1 January 2006 which contemplates a 176 €/t MFN tariff and a 775,000 t tariff-free annual import quota reserved for imports from ACP countries. At the Hong Kong WTO Ministerial Conference in December 2005, the opposing interests of ACP and MFN banana exporters meant that no agreement was reached on bananas.³ MFN countries decided not to veto the final Declaration although their requests on bananas had remained unanswered, but no waiver was granted to allow the EU to give preferential treatment to bananas imported from ACP countries. Meanwhile, Honduras, Nicaragua and Panama had announced their intention to challenge the new tariff-only regime by initiating a new WTO dispute. The 'banana war' has been restarted.

This paper analyzes the policy issue of the replacement of the previous EU import regime for bananas with the tariff-only regime using an original model of the banana market. Would the regime proposed by the EU in the second step of the arbitration result *'in at least maintaining total market access for MFN banana suppliers'*? And the one the EU proposed in the first step? Were MFN countries right in claiming the tariffs proposed by the EU were too high, suggesting a 75 €/t tariff instead? Which tariff would result *'in at least maintaining total market access for MFN banana suppliers'*? Finally, what are the expected effects on volume traded, prices and trade flows of the new tariff-only regime the EU put in place on 1 January 2006? These are the questions addressed in this paper. The next section uses a graphical approach to discuss the expected impact of the replacement of the previous EU import regime with a tariff-only regime yielding an unchanged volume of MFN exports. Section 3 describes the structure of the model, the assumptions made and the data used. The main results of the simulations which have been conducted are presented in section 4; section 5 outlines the results obtained for some of the policy scenarios analyzed in these simulations when a medium term time horizon is considered. Section 6 briefly

³ It was only agreed to introduce a monitoring procedure for EU banana imports, in order to verify the impact of the new regime, if any, in terms of changes in trade patterns, volume imported and prices.

sums up the main results and discusses their implications.

2. What one should expect from the switch from the pre-2006 to the new tariff-only EU import regime for bananas?

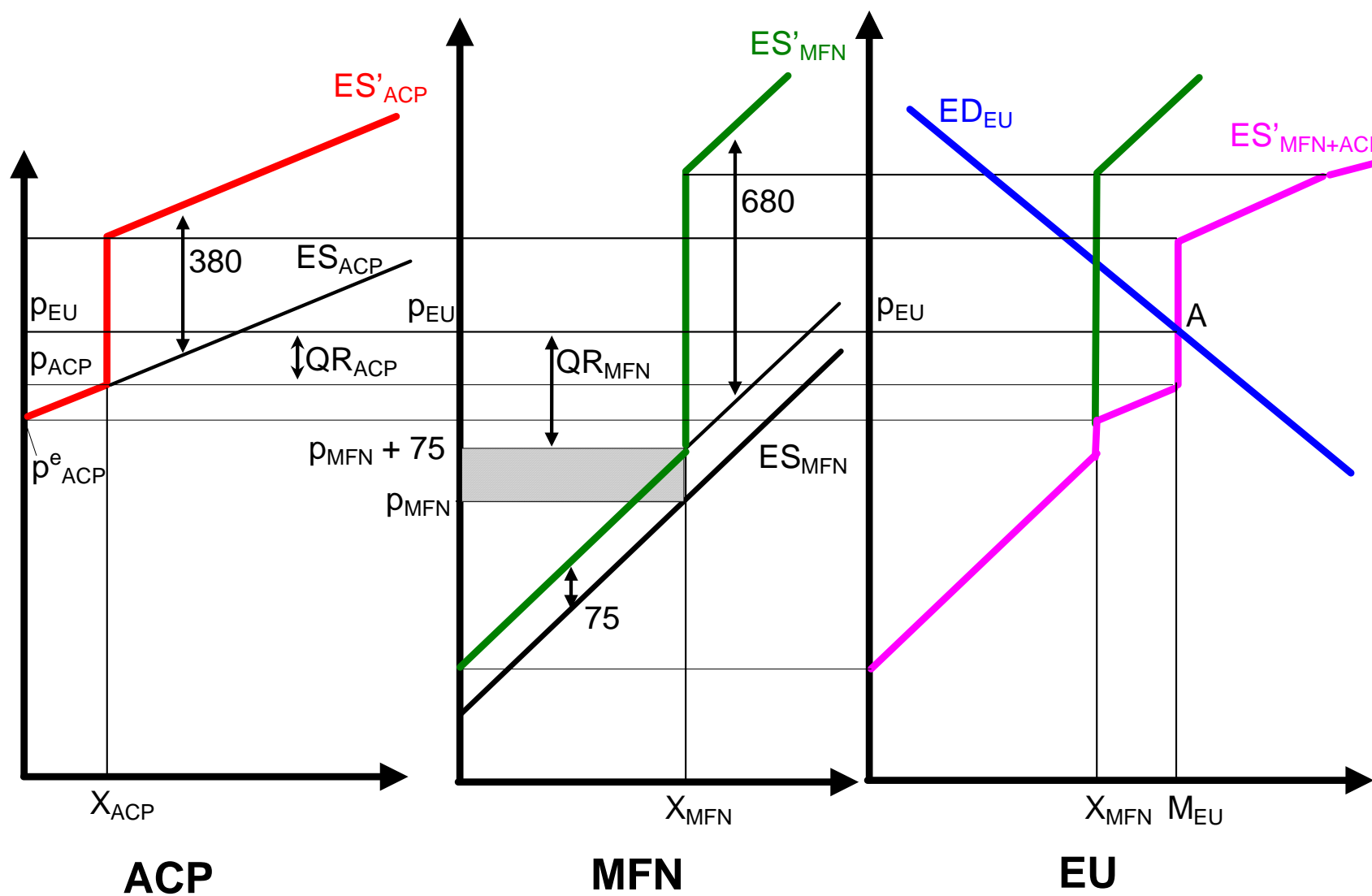
The EU import regime for bananas in place before 1 January 2006 included two TRQs, quota A/B and quota C. Quota A/B was open to all exporters, with imports from ACP countries entering duty-free and imports from MFN countries being subject to a 75 €/t tariff.⁴ Quota C was allocated to duty-free imports from ACP countries only. Out-of-quota imports were subject to a MFN import tariff of 680 €/t, those originating from ACP countries faced a preferential tariff of 380 €/t; however, both out-of-quota tariffs proved to be prohibitive.

This import regime is represented in Figure 1. ES_{ACP} , ES_{MFN} and ED_{EU} represent the export supplies of ACP and MFN countries to the EU market (i.e. their export supply functions net of exports to other countries at any given price) and the import demand of the European Union, respectively. ES'_{ACP} and ES'_{MFN} are the export supplies of the two groups of countries, expressed as a function of the equilibrium price in the EU, when quotas A/B (equal to X_{MFN}) and C (equal to X_{ACP}) and the in- and out-of-quota tariffs are taken into account. $ES'_{MFN+ACP}$ in the right hand diagram is the resulting aggregate export supply of countries ACP and MFN (transportation costs are ignored). The market equilibrium is identified by point A. EU imports M_{EU} and exports from MFN and ACP countries equal quotas A/B and C, respectively. Quota A/B and C licences are allocated to traders free of charge; as a result, equilibrium prices in ACP and MFN countries equal p_{MFN} and p_{ACP} , while QR_{ACP} and QR_{MFN} in Figure 1 give the per unit quota rents. No out-of-quota exports take place and ACP countries are not competitive enough to be able to export to the EU within quota A/B (their entry price, p^e_{ACP} , is higher than the equilibrium price in the MFN countries plus the tariff). The shaded area in the central diagram in Figure 1 gives the tariff revenue collected by the European Union.

A tariff-only import regime as the one proposed by the European Union in the second step of

⁴ As regards bananas, the full implementation of the EBA (Everything But Arms) initiative took place on 1 January 2006.

Figure 1 - The pre-2006 EU import regime for bananas.



the arbitration, which results in MFN exports equal to those under the pre-2006 regime is represented in Figure 2. ES^*_{MFN} is the export supply of the MFN countries when quota A/B is removed and a higher MFN tariff is imposed such that MFN exports remain unchanged. Quota C is expanded from X_{ACP} to X^*_{ACP} ⁵ and the out-of-quota tariff faced by ACP countries is now equal to the new MFN tariff. $ES^*_{MFN+ACP}$ represents the aggregate export supply of MFN and ACP countries on the EU market as a function of the equilibrium price in the latter and point B represents the market equilibrium. The MFN tariff (t_{EQV}) is such that MFN exports and equilibrium price are unchanged with respect to those under the previous regime. ACP exports to the EU equal the enlarged quota (X^*_{ACP}). The equilibrium price in the EU drops from p_{EU} to p^*_{EU} ; EU imports (M^*_{EU}) exceed those under the previous regime by the increase in quota C. The tariff which leaves MFN exports unchanged is smaller than the sum of the in-quota A/B tariff (75€/t) and the per unit quota rent (QR_{MFN} in Figure 1) under the previous regime by the reduction in the equilibrium price in the EU (which is solely driven by the expansion of quota C). The per unit rent associated to quota C declines by a larger amount, as a result of the lower price in the EU and the higher price (p^*_{ACP}) in the ACP countries. The cross-hatched area in Figure 2 represents the tariff revenue now collected by the EU; because of the lower EU equilibrium price, this is smaller than the sum of the tariff revenue collected by the EU and the quota A/B rents enjoyed by licence holders under the previous regime.

In Figure 3 the same policy regime is represented, but now the implementation of the EU EBA initiative is taken into consideration.⁶ Banana exports from EBA countries under the previous regime have been marginal;⁷ before the implementation of the initiative, high costs of production and poor infrastructure made them uncompetitive. EBA exports can now enter the EU duty-free and

⁵ In the pre-2006 import regime quota C was equal to 750,000 t, while in the regime proposed by the EU in the second step of the arbitration and in the regime the EU introduced on 1 January 2006 quota C equals 775,000 t.

⁶ With the EBA initiative the European Union granted duty-free and unlimited market access to all exports “*but arms and ammunitions*” from Least Developed Countries (EC Regulation 416 of 28 February 2001). Full implementation of the EBA initiative for bananas occurred on 1 January 2006.

⁷ Based on the FAOSTAT data base, in 2003 total banana exports from EBA countries were equal to 42,900 t, 40,700 t being exported by Yemen alone. Data recorded in the COMTRADE data base suggests even smaller exports.

Figure 2 - A tariff-only EU import regime for bananas resulting in MFN exports to the EU equal to those under the pre-2006 regime.

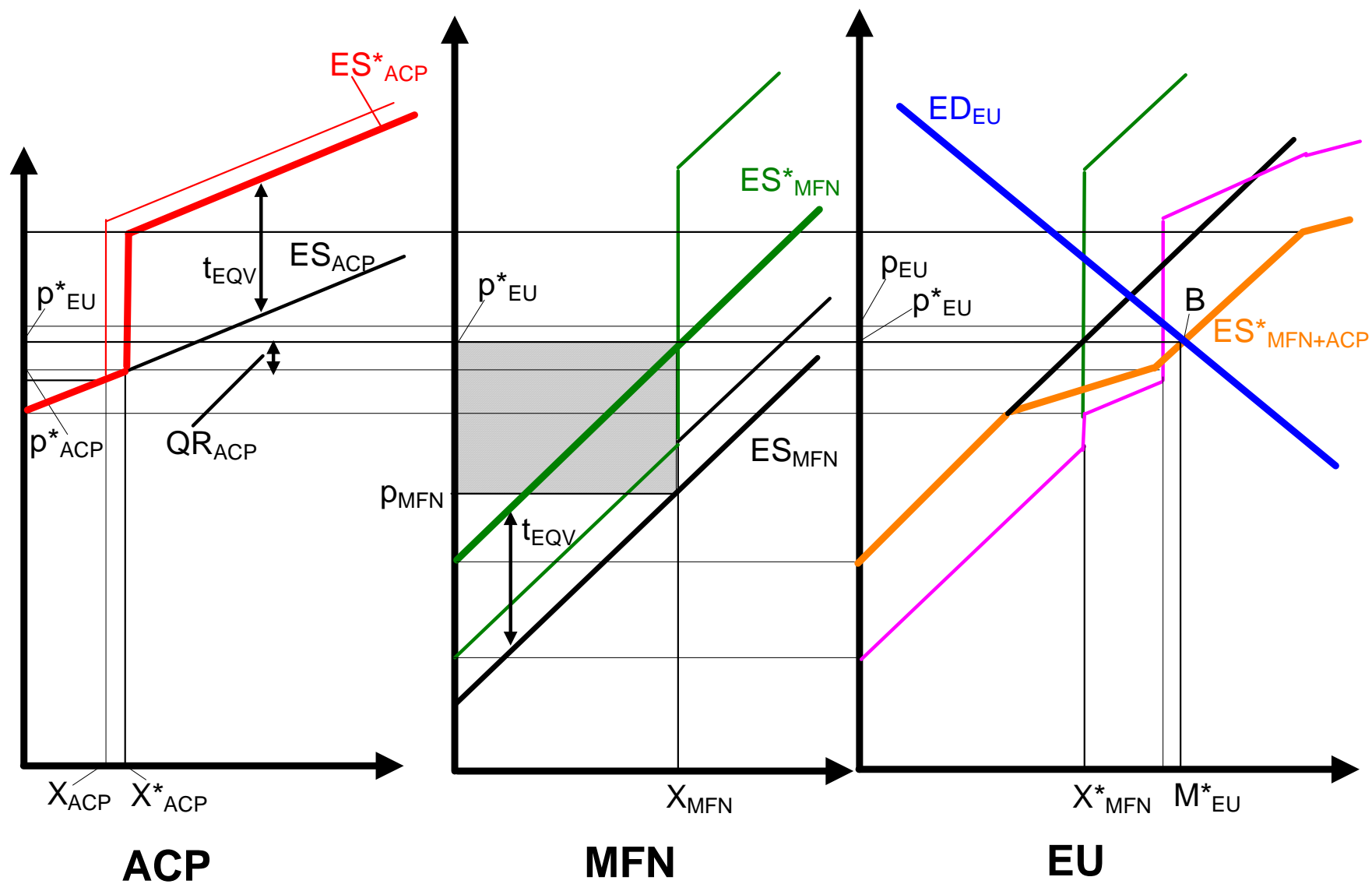
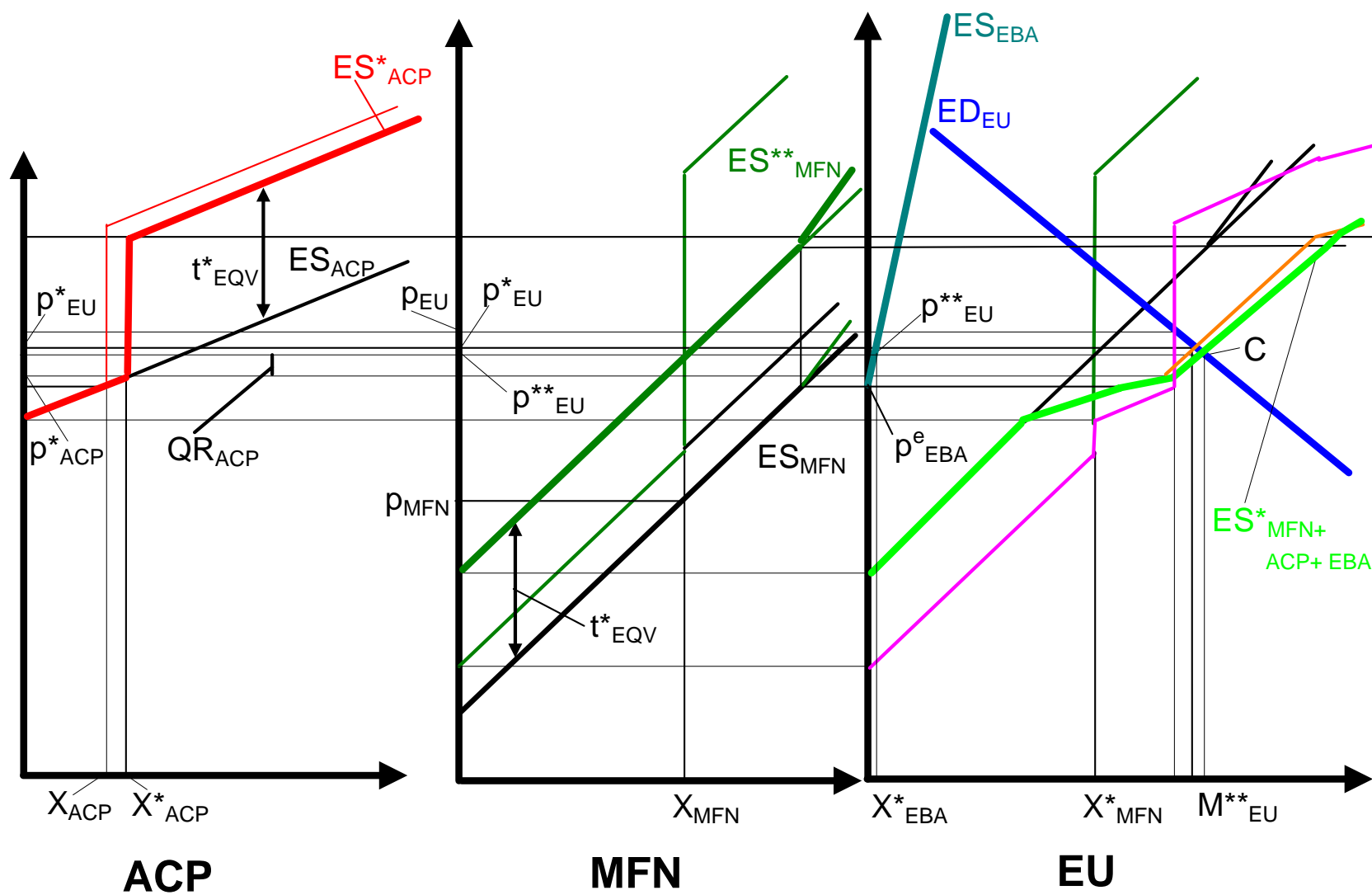


Figure 3 - A tariff-only EU import regime for bananas resulting in MFN exports to the EU equal to those under the pre-2006 regime when the implementation of the EBA initiative is taken into account.



without facing any quantitative restriction. This dramatically changes the relative competitiveness of their exports *vis a vis* MFN ones, although, even under the more favourable conditions, their capacity in the short run to profitably export bananas to the EU cannot be taken for granted. The export supply function of the EBA countries on the EU market is represented by ES_{EBA} in the diagram on the right-hand side of Figure 3. To simplify the graph, no banana exporting EBA country is assumed to belong to the ACP group; hence, only the MFN export supply is affected (and only at prices above p_{EBA}^e , the high entry price of EBA exports⁸). The MFN tariff, again, has been set at a level yielding MFN exports equal to those under the previous regime. The aggregate export supply faced by the EU is given in Figure 3 by $ES^*_{MFN+ACP+EBA}$. The equilibrium is at point C. ACP and MFN prices and exports do not change with respect to those when the implementation of the EBA initiative is ignored (Figure 2); now, however, EBA exports take place and EU imports increase by that amount. The EU equilibrium price declines to p^{**}_{EU} , which is the price of bananas in the EBA countries as well. The tariff which makes MFN exports equal those under the pre-2006 import regime (t^*_{EQV}) and the per unit quota C rent are now smaller than those when the implications of the EBA initiative are not considered.

The fact that t^*_{EQV} is smaller than the sum of the in-quota A/B tariff and the per unit quota A/B rent in the previous regime - as a result of both the increase in quota C and the implementation of the EBA initiative - has an interesting implication for the assessment of the WTO arbitration exercise. In the WTO arbitration the EU used the ‘price gap’ methodology agreed upon in the 1994 Agreement on Agriculture for the tariffication of NTBs (Non-Tariff Barriers to trade) to calculate the tariff equivalent for MFN exports to its pre-2006 import regime, this being the only methodology which, having been approved by WTO members, could not be questioned by the other parties. However, as has been shown above, because of the enlargement of quota C and the implementation of the EBA initiative, in this case this approach yields a tariff level above the ‘equivalent’ one, i.e. a tariff which would have *not* resulted ‘*in at least maintaining total market*

⁸ At this price EBA exports to the EU were unprofitable under the pre-2006 import regime.

access for MFN banana suppliers’.

Finally, were the MFN tariff set below t^*_{MFN} , ES^{**}_{MFN} would shift downwards and this would induce a parallel shift to the right of $ES^*_{MFN+ACP+EBA}$ which would make point C shift downward along ED_{EU} . MFN exports to the EU would now increase and EBA exports decline; however, within a certain range of values of t^*_{MFN} ⁹ ACP exports and price would not be affected.

3. The model

3.1 Assumptions made and data used

The model used is a single commodity, spatial, partial equilibrium, mathematical programming model (Takayama and Judge, 1971). Domestic and trade policy instruments are modelled individually and explicitly, rather than implicitly through wedges between prices. The fact that the model is ‘spatial’ – i.e. that it is able to reproduce bilateral trade flows, in addition to net trade positions, while ‘non spatial’ models generate net trade positions only – makes it particularly apt to represent, without having to make unrealistic assumptions, policies which apply different regimes to imports from different countries; this is case with the current and previous EU trade regimes for bananas as well as with the two tariff-only regimes which have been the focus of the WTO arbitration, all of which include TRQs applied on imports originating in specific groups of countries and preferential tariffs.

Single commodity, non spatial, partial equilibrium models of the banana market have been proposed by Borrell (1997), Guyomard, Laroche and Le Mouél (1999a, 1999b), Guyomard and Le Mouél (2003), Guyomard *et al.* (2005), and Vanzetti *et al.* (2005). In the model developed by Vanzetti *et al.* (2005) bilateral trade flows are generated by imposing the ‘Armington assumption’, i.e. by assuming that consumers are able to differentiate bananas by their country of origin. Spatial models have been used to analyze the banana market by Kersten (1995), Lorca *et al.* (2004) and Spreen *et al.* (2004).

The model developed in this study is the only one I am aware of which attempts to simulate

⁹ As long as the reduction in t^*_{MFN} leaves the resulting equilibrium price in the EU above p^*_{ACP} in Figure 3.

the implications of the introduction of the EU tariff-only import regime for bananas taking into account the implementation of the EU EBA initiative, to assess the budget implications for the EU of the changes in its import policy regime and to model the financial stabilizer mechanism included in the EU ‘compensatory aid’ domestic support policy.

The model considers three sources of domestic supply in the EU, fourteen exporting and eight importing countries/regions.¹⁰ Per unit international transaction costs - defined as the sum of all costs incurred by the operators in moving bananas from border to border, including transportation and handling costs - are assumed to be constant, i.e. not to change either with the volume exchanged or over time. The matrix of the transaction costs has been generated by expanding the available information regarding transportation costs, and imposing internal coherence as well as consistency with observed trade.

The base model time reference is 2002. Import demand and export supply functions, as well as domestic supply functions in the EU, are assumed to be linear, or to be well approximated by linear functions in the portion relevant for the simulations conducted. Import demand and export supply functions in the base year are obtained from observed imported and exported quantities, observed import and export prices, and import demand and export supply price elasticities at the equilibrium in each country/region (Table 1); EU supply functions are obtained analogously from observed quantities produced and relevant prices. Net imports, net exports and average import and export unit values have been computed from information in the FAOSTAT database.¹¹

¹⁰ EU domestic production takes place in France (Martinique and Guadelupe), Spain (Canary islands), and in Other EU-15 countries (Portugal and Greece). Five ACP (Ivory Coast; Cameroon; Dominican Republic, Belize and Suriname; Jamaica, Windward Islands and Other ACP non-EBA countries; ACP EBA countries), and nine non-ACP exporting countries/regions (Ecuador; Colombia; Costa Rica; Panama; Honduras; Brazil; Guatemala; other MFN exporting countries; non-ACP EBA countries) are considered in the model. The importing countries/regions are: EU-15, Czech Republic, Slovakia, Poland, Hungary, Other EU new member states, USA, and Other importers.

¹¹ From a preliminary analysis of the statistical information to be used in the model three data issues emerged. These were related to the average per unit import value for Hungary and to the average per unit export value for Cameroon and Brazil; all three values appeared to be unrealistically low. The average per unit import value for Hungary was 243.4 \$/t, compared, for example, with 446.3 \$/t for Poland, 458.4 \$/t for Slovakia and 495.7 \$/t for the Czech Republic. The average per unit export values for Cameroon and Brazil were 189.7 \$/t and 139.3 \$/t, respectively, compared, for example, with 223 \$/t for Ecuador, 283.7 \$/t for Colombia and 289.1 \$/t for Ivory Coast. The analogous values calculated based on the information provided in the United Nations Statistics Division’s Commodity Trade Statistics Database (COMTRADE) were equal to 391.5 \$/t for Hungary, 217.1 \$/t for Cameroon and 156.1 \$/t for Brazil. As a result, the average per unit import and export values obtained from the COMTRADE data base have been

The €/£ exchange rate used in the 2002 base model is 0.95 , the average exchange rate in that year.

The representation of the EU-15 import regime in the 2002 base model includes:

- a) quota A/B: a 2,653,300 t import quota, with all exports occurring on a non-preferential basis subject to a 75 €/t tariff (ACP exports can enter quota A/B duty-free);
- b) quota C: a 750,000 t quota allocated to duty-free imports from ACP countries only;
- c) an out-of-quota MFN import tariff of 680 €/t (380 €/t for imports from ACP countries).

In the 2002 base model Hungary, ‘Other EU new member states’ and ‘Other importers’ impose a 20% , 3% and 7% tariff on their banana imports, respectively.

The EU ‘compensatory aid’ domestic policy regime for bananas is modelled as a ‘fully coupled’ deficiency payment. The per unit payment is calculated as the difference between the given reference price and the market price; this means that, as long as the domestic market price remains below the reference price, the relevant domestic producer price in the EU (market price + per unit ‘compensatory aid’) does not change and domestic production does not adjust to changes in the EU domestic market price; what does change with the latter is the per unit ‘compensatory aid’ paid to producers. In the model compensatory payments are made subject to the existing ‘stabilization’ mechanism.¹²

In modelling the banana market, the assumptions made - explicitly or, more often, implicitly - on where quotas A/B and C rents end up are crucial (FAO, 2005; Guyomard *et al.*, 2005). In this study quota rents are endogenously determined and are assumed to be captured by international traders. This means that quota rents are assumed not to ‘show’ either in export or import prices, but to be part of the difference between observed EU import prices and export prices in ACP and MFN

used in the model for Hungary, Cameroon and Brazil. However, these prices too appear to be lower than expected and should be treated with caution; all this implies that, everything else held constant, the model is expected to somehow *underestimate* banana imports and consumption in Hungary, and *overestimate* banana exports from Cameroon and Brazil.

¹² If total domestic production exceeds the sum of the maximum guaranteed volumes of bananas in each of the producing countries, then a cut in the volume of bananas on which the aid is paid applies in the countries where production exceeded the maximum guaranteed volume; this cut is calculated taking into account the difference between maximum guaranteed volume and production in the countries where this difference is greater than zero.

Table 1 - Base model input data and model calibration (2002).

| Country/Region | Base Net imports ¹ (000 t) | Estimated Net imports (000 t) | % difference | Base Net exports ^{2 3} (000 t) | Estimated Net exports (000 t) | % difference | Import price (\$/t) | Export price (\$/t) | Export supply price elasticities | Import demand price elasticities | Domestic demand income elasticities |
|--|---|--|-----------------|---|--|-----------------|------------------------|------------------------|---|---|--|
| EU-15 | 4059,7 | 4248,9 | 4,7 | | | | 588,6 | | | -0,50 | 0,5 |
| Czech Republic | 99,6 | 103,0 | 3,4 | | | | 495,7 | | | -0,75 | 1 |
| Slovakia | 46,0 | 46,4 | 0,9 | | | | 458,4 | | | -0,80 | 1 |
| Poland | 232,0 | 233,3 | 0,6 | | | | 446,3 | | | -0,80 | 1 |
| Hungary | 101,6 | 75,5 | -25,7 | | | | 391,5 | | | -0,75 | 1 |
| Other EU new member states | 60,3 | 60,8 | 0,8 | | | | 549,3 | | | -0,80 | 1 |
| USA | 3490,4 | 3410,1 | -2,3 | | | | 272,4 | | | -0,40 | 0,4 |
| Other importers | 4510,3 | 4432,1 | -1,7 | | | | 375,0 | | | -0,80 | 0,5 |
| Spain | | | | 376 | 376,0 | 0,0 | | 408,1 | 1,0 | | |
| France | | | | 435,8 | 435,8 | 0,0 | | 246,5 | 1,0 | | |
| Other EU-15 | | | | 34,1 | 34,1 | 0,0 | | 325,2 | 1,0 | | |
| Ivory Coast | | | | 256,0 | 247,5 | -3,3 | | 289,1 | 1,5 | | 0,5 |
| Cameroon | | | | 238,4 | 231,1 | -3,1 | | 217,1 | 1,5 | | 0,5 |
| Dominican Republic, Belize and Suriname | | | | 179,2 | 171,7 | -4,2 | | 404,5 | 1,0 | | 0,5 |
| Jamaica, Windward Islands and other ACP non-EBA | | | | 156,2 | 97,0 | -37,9 | | 455,1 | 1,0 | | 0,5 |
| ACP EBA exporters | | | | 2,6 | 2,6 | 0,0 | | 205,1 | 1,5 | | 0,5 |
| Ecuador | | | | 4199,2 | 4323,3 | 3,0 | | 223,0 | 1,3 | | 0,5 |
| Colombia | | | | 1418,1 | 1349,0 | -4,9 | | 283,7 | 1,3 | | 0,5 |
| Costa Rica | | | | 1873,2 | 1864,5 | -0,5 | | 264,3 | 1,0 | | 0,5 |
| Panama | | | | 403,9 | 399,7 | -1,0 | | 270,9 | 1,0 | | 0,5 |
| Honduras | | | | 437,2 | 441,6 | 1,0 | | 246,4 | 1,5 | | 0,5 |
| Brazil | | | | 241 | 267,2 | 10,9 | | 156,1 | 1,0 | | 0,5 |
| Guatemala | | | | 974,0 | 983,0 | 0,9 | | 221,7 | 1,5 | | 0,5 |
| Other MFN exporters | | | | 1327,9 | 1339,8 | 0,9 | | 186,4 | 1,0 | | 0,5 |
| EBA non-ACP exporters | | | | 47,1 | 46,2 | -1,9 | | 190,6 | 1,5 | | 0,5 |

¹: For EU-15 apparent consumption (imports + domestic production - exports).

²: For Spain the volume of production which is not consumed locally in the Canary Islands; for Guadalupe, Martinique, and "Other EU-15" the volume of production.

³: For "Other MFN exporters" net exports adjusted for the difference in FAOSTAT data between total country exports and total country imports .

Table 2 - Time shifts impact under different parameter assumptions. Net imports and exports in 2005 at the observed 2002 prices (000 t)

| Country | 2002 imports or exports | 2005 imports or exports [unadjusted parameters] | 2005 imports or exports [adjusted parameters] | unadjusted per cent yearly increase in | | | adjusted* per cent yearly increase in | | |
|---|-------------------------------|--|--|---|-------------------------|--------------|--|-------------------------|----------|
| | | | | population | per capita income | yields | population | per capita income | yields |
| Spain | 376 | 396,2 | 396,2 | | | 1,05 | | | 1,05 |
| France | 435,8 | 508,4 | 508,4 | | | 3,13 | | | 3,13 |
| Other EU-15 | 34,1 | 30,6 | 34,1 | | | -2,15 | | | 0 |
| Ivory Coast | 256,0 | 289,0 | 288,9 | 2,7 | -3,28 | 2,38 | 2,7 | -3 | 2,38 |
| Cameroon | 238,4 | 0** | 215,0 | 2,5 | -2,6 | -8,28 | 2,5 | -2,6 | 0 |
| Dominican Republic, Belize and Suriname | 179,2 | 112,3 | 112,3 | 1,6 | 4,34 | 0,36 | 1,6 | 4,34 | 0,36 |
| Jamaica, Windward Islands and other ACP non-EBA countries | 156,2 | 124,9 | 142,1 | 2 | -0,25 | -1,17 | 2 | -0,25 | 0 |
| ACP EBA exporters | 2,6 | 0** | 2,6 | 2,5 | 0,37 | -0,24 | 0 | 0 | 0 |
| Ecuador | 4199,2 | 4885,8 | 4846,6 | 1,8 | -4,16 | 2,3 | 1,8 | -3 | 2,3 |
| Colombia | 1418,1 | 1420,0 | 1419,4 | 1,8 | -6,54 | 0,02 | 1,8 | -3 | 0,02 |
| Costa Rica | 1873,2 | 1803,3 | 1843,8 | 2,1 | 13,75 | 0,26 | 2,1 | 7 | 0,26 |
| Panama | 403,9 | 364,9 | 378,0 | 1,7 | 4,62 | -0,51 | 1,7 | 4,62 | 0 |
| Honduras | 437,2 | 0** | 248,2 | 2,8 | 6,83 | -8,84 | 2,8 | 6,83 | 0 |
| Brazil | 241 | 1649,3 | 424,1 | 1,4 | -11,57 | 0,45 | 1,4 | -3 | 0,45 |
| Guatemala | 974,0 | 1440,2 | 1245,1 | 2,6 | 2,11 | 8,03 | 2,6 | 2,11 | 5 |
| Other MFN exporters | 1327,9 | 701,8 | 701,8 | 1,7 | 1,04 | 1,77 | 1,7 | 1,04 | 1,77 |
| EBA non-ACP exporters | 47,1 | 0** | 47,1 | 2 | 5,11 | -2,12 | 0 | 0 | 0 |
| EU-15 | 4059,7 | 4339,8 | 4339,8 | 0,3 | 2,08 | | 0,3 | 2,08 | |
| Czech Republic | 99,6 | 104,0 | 104,0 | -0,1 | 0,97 | | -0,1 | 0,97 | |
| Slovakia | 46,0 | 48,8 | 48,8 | 0,1 | 1,08 | | 0,1 | 1,08 | |
| Poland | 232,0 | 287,0 | 287,0 | 0 | 4,35 | | 0 | 4,35 | |
| Hungary | 101,6 | 116,2 | 116,2 | -0,2 | 2,93 | | -0,2 | 2,93 | |
| Other EU new member states | 60,3 | 68,4 | 68,8 | -0,5 | 3,54 | 5,49 | -0,5 | 3,54 | 5 |
| USA | 3490,4 | 4093,8 | 4093,8 | 1,2 | 5,04 | 3,17 | 1,2 | 5,04 | 3,17 |
| Other importers | 4510,3 | 3699,3 | 3699,3 | 1,1 | 0,44 | 3,44 | 1,1 | 0,44 | 3,44 |

*: per cent yearly yield changes above 5% replaced by 5%, below 0% by 0%; per cent yearly per capita income changes above 7% replaced by 7%, below -3% by -3% .

ACPEBA and EBANACP per capita income and population per cent yearly changes have been set equal to zero to put these regions in a relatively more favourable export condition.

** : the country/region becomes a net importer.

countries. Were this assumption not to hold, the model would *underestimate* EU imports from countries previously subject to a quota. Perfect competition conditions are assumed to hold both in domestic and international markets.¹³

Simulations have been generated with reference to 2007, the first year in which the market effects of the adjustment in production decisions as a result of an EU policy change introduced on 1 January 2006, and announced immediately before this date, could be observed,¹⁴ and 2013, which has been identified as an adequate time horizon to assess the medium term implications of the policy changes considered.

The 2002 base model has been ‘extended’ to 2007:

- a) by modelling the 2004 enlargement of the EU-15 to the 10 new member states;
- b) by modelling the implementation of the EBA initiative;
- c) by modifying import demand and export supply functions in all countries/regions as a result of expected shifts in domestic demand and supply functions; and
- d) by assuming a €/ \$ exchange rate equal to 1.15.¹⁵

Import demand and export supply functions shift depending on expected changes in the quantities produced and consumed in each country/region. Consumption has been assumed to change over time according to the per cent yearly change in population between 1990 and 2003, and the per cent yearly change in the per capita income between 1997-1999 and 2000-2002 (in both cases the data source is the World Bank); the value used of domestic demand income elasticities are provided in Table 1. Production in each country/region is assumed to change over time depending on the per cent yearly change in banana yields between 1991-1993 and 2000-2002 (FAOSTAT). FAOSTAT was the source used for production and consumption in 2002 in all countries/regions.

¹³ Although few firms control a very large share of the banana market (Taylor, 2003), empirical analyses (Deodhar and Sheldon, 1996; Herrmann and Sexton, 2001; McCorriston, 2000) are not univocal in suggesting they exert market power.

¹⁴ The production cycle of bananas is around 9 months.

¹⁵ This is the exchange rate the EU assumes in its medium term forecasts for 2007. For the new member states it has been assumed that the exchange rates between their currencies and the US dollar change with the €/ \$ exchange rate (i.e., their exchange rates with respect to the euro remain constant).

An exploratory analysis was conducted to assess the time shifts implied by the parameters described above. Table 2 presents these parameters and net imports and exports for all countries/regions in 2005 which have been generated keeping prices at the ‘observed’ 2002 levels; in other words, changes in exports and imports reported in Table 2 are those solely due to the shifts in export supply and import demand functions driven by the changes in domestic consumption and production as a result of the expected changes over time in population, incomes and yields.¹⁶ Some of the parameters governing these shifts have been judged to be unsustainable over time; in particular, this was the case for (a) negative and (b) very high rates of change in yields, and (c) for extreme (both, positive and negative) rates of change in per capita incomes. As a result, per cent yearly yield changes above 5% have been replaced by 5%, and below 0% by 0%; per cent yearly per capita income changes above 7% have been replaced by 7%, and below -3% by -3% . The use of the observed per cent changes in population and per capita income in the EBA countries, both ACP and non-ACP ones, would have had a marked negative effect on their export supply over time, leading to decreased or to no exports. In order to make these countries more responsive to the preferential treatment from the structural change associated with the implementation of the EBA initiative than could be predicted on past performance, the rates of change of both variables for ACP and non-ACP EBA exporters have been set equal 0. Forecasted imports and exports in 2005 for all countries/regions under the parameters adjusted as specified above, everything else held constant, are presented in Table 2 along with those obtained by using the original unadjusted parameters.

The 2004 EU enlargement has been modelled by removing barriers to trade between the 10 new member states and the EU-15 and by extending to the new member states the more protectionist trade regime in place in the EU-15; quota A/B has been increased by 460,000 t .¹⁷ Banana exports from EBA countries are assumed to enter the EU tariff-free and are not subject to

¹⁶ For a given set of parameters, the difference between the magnitude of the expected changes in country exports (imports) crucially depends on the difference in the share of their production (consumption) which is exported (imported).

¹⁷ In 2005 imports within this additional 460,000 t were constrained to enter the EU-25 through a new member state (although no constraint existed on the point of sale or consumption within the EU-25). However, this constraint has not been imposed in the model under the assumption that by 2007 it will no longer exist because of its inconsistency with the rules governing the EU single market.

any constraint.

3.2 A detailed description of the model

The model is solved by maximizing a ‘quasi-welfare’ function, W , subject to a set of constraints (Samuelson, 1952; Takayama and Judge, 1971):¹⁸

$$\begin{aligned} \text{Max } W(x_{ij}, x_{ab_{ie}}, x_{c_{ie}}, x_{nabc_{ie}}) = & \sum_j \int_0^{q_j^d} p_j^d(m) dm - \sum_i \int_0^{q_i^s} p_i^s(r) dr - \\ & - \sum_i \sum_j (TC_{ij} + T_{ij}) x_{ij} - \sum_i \sum_e (x_{ab_{ie}} abqtusdl_{ie} + x_{c_{ie}} cqtusdl_{ie} + x_{nabc_{ie}} nqtusdl_{ie}) , \quad (1) \end{aligned}$$

where¹⁹: i is an index for the exporting countries and the sources of domestic supply in the EU; j is an index for the importing countries; e is an index for the importing EU member states (EU-15 in the 2002 base model, EU-25 in 2007 and 2013; $e \subset j$); x_{ij} is the trade flow from country i to country j (t); $x_{ab_{ie}}$ is the in-quota A/B trade flow from country i to EU member state e (t); $x_{c_{ie}}$ is the in-quota C trade flow from country i to EU member state e (t); $x_{nabc_{ie}}$ is the out-of-quotas trade flow from country i to EU member state e (t); T_{ij} is the per unit import tariff imposed by country j on its imports from country i ($\$/t$); TC_{ij} is the per unit international transaction cost for shipments from country i to country j (border to border) ($\$/t$); $abqtusdl_{ie}$ is the per unit in-quota A/B import tariff imposed by EU member state e on its imports from country i ($\$/t$); $cqtusdl_{ie}$ is the per unit in-quota C import tariff imposed by EU member state e on its imports from country i ($\$/t$); $nqtusdl_{ie}$ is the per unit out-of-quotas A/B and C import tariff imposed by EU member state e on its imports from country i ($\$/t$); $p_i^s(r)$ is country i ’s inverse export supply function ($\$/t$); $p_j^d(m)$ is country j ’s inverse import demand function ($\$/t$); q_j^d is country j ’s total imports (t); and q_i^s is country i ’s total exports (t).

Subject to:

$$q_i^s = \sum_j x_{ij} , \quad (2)$$

$$q_j^d = \sum_i x_{ij} , \quad (3)$$

¹⁸ The model is solved using GAMS (Brooke, Kendrick and Meeraus, 1997).

¹⁹ Exogenous parameters are in capital letters.

$$\text{forcons}_i = \text{APPCONS}_i ((1 + (\text{PCYPOPC}_i/100))^N) ((1 + \text{YDE}_i (\text{PCYINCC}_i/100))^N) , \quad (4)$$

where: forcons_i is the forecasted base consumption in country i in year $2002+N$ (t) ; APPCONS_i is the apparent consumption in country i in base year (2002) (t) ; PCYPOPC_i is the per cent yearly change in population in country i between 1990 and 2003; PCYINCC_i is the per cent yearly change in per capita income in country i between 1997-99 and 2000-02; YDE_i is the income demand elasticity of country i ; and N is the time shift with respect to the base year, in years (in 2002 $N=0$).

$$\text{forpr}_j = \text{PROD}_j (1 + (\text{PCYYLDC}_j/100))^N , \text{ for } j = \text{OTHERNMS, USA and OTHIMP - i.e.} \\ \text{for banana producing importing countries,} \quad (5)$$

where: forpr_j is the forecasted base production in country j in year $2002+N$ (t); PCYYLDC_j is the per cent yearly change in banana yields in country j between 1991-93 and 2000-02; and PROD_j is production in country j in 2002 (t).

$$\text{bdqfor}_j = \{ \text{for } j \neq \text{OTHERNMS, USA and OTHIMP (i.e. for importing countries} \\ \text{with no banana production): } \text{BDQ}_j ((1 + (\text{PCYPOPC}_j/100))^N) ((1 + \\ (\text{YDE}_j (\text{PCYINCC}_j/100)))^N) ; \\ \text{for } j = \text{OTHERNMS, USA and OTHIMP (i.e. for banana producing} \\ \text{importing countries): } \text{APPCONS}_j ((1 + (\text{PCYPOPC}_j/100))^N) ((1 + \\ (\text{YDE}_j (\text{PCYINCC}_j/100)))^N) - \text{forpr}_j \}^{20} , \quad (6)$$

where: bdqfor_j is the forecasted base net imports²¹ by country j in year $2002+N$ (t); APPCONS_j is the apparent consumption in country j in base year (2002) (t); BDQ_j is country j 's net imports²² in base year (2002) (t); PCYPOPC_j is the per cent yearly change in population in country j between 1990 and 2003; PCYINCC_j is the per cent yearly change in per capita income in country j between 1997-99 and 2000-02; and YDE_j is the income demand elasticity of country j .

$$\text{bsqfor}_i = \text{PROD}_i ((1 + (\text{PCYYLDC}_i/100))^N) - \text{forcons}_i ,^{23} \quad (7)$$

where: bsqfor_i is the forecasted base net exports by country i in year $2002+N$ (t) ; PROD_i is production in country i in 2002 (t); and PCYYLDC_i is the per cent yearly change in banana yields in

²⁰ For $j = \text{OTHERNMS, USA and OTHIMP}$, when $N=0$ bdqfor_j equals bdq_j .

²¹ For EU-15 it is the forecasted base consumption.

²² For EU-15 it is the apparent consumption.

²³ When $N=0$ bsqfor_i equals BSQ_i , country i 's net exports in base year (2002) (t).

country i between 1991-93 and 2000-02.

$$ss_i = (BSP_i (EURDOL_i / EURDOLB_i)) (1/(bsqfor_i ES_i)) , \quad (8)$$

where: ss_i is country i 's export supply slope; BSP_i is country i 's export price (fob) in base year (2002) (\$/t); ES_i is country i 's export supply elasticity in base year (2002); $EURDOL_i$ is the Euro/US\$ exchange rate (it is equal to 1 for all countries but for EU member states; 1 Euro = $EURDOL_i$ US\$); and $EURDOLB_i$ is the Euro/US\$ exchange rate in base year (2002) (it is equal to 1 for all countries but for EU member states; 1 Euro = $EURDOLB_i$ US\$).

$$si_i = (BSP_i (EURDOL_i / EURDOLB_i)) - (ss_i bsqfor_i) , \quad (9)$$

where si_i is country i 's export supply intercept.

$$p_i^s = si_i + ss_i q_i^s , \quad (10)$$

where p_i^s is country i 's (fob)border price.

$$ds_j = (BDP_j (EURDOL_j / EURDOLB_j)) (1/(bdqfor_j ED_j)) , \quad (11)$$

where: ds_j is country j 's import demand slope; BDP_j is country j 's import price (cif) in base year (2002) (\$/t); ED_j is country j 's import demand elasticity in base year (2002); $EURDOL_j$ is the Euro/US\$ exchange rate (it is equal to 1 for all countries but for EU member states; 1 Euro = $EURDOL_j$ US\$); and $EURDOLB_j$ is the Euro/US\$ exchange rate in base year (2002) (it is equal to 1 for all countries but for EU member states; 1 Euro = $EURDOLB_j$ US\$).

$$di_j = (BDP_j (EURDOL_j / EURDOLB_j)) - (ds_j bdqfor_j) , \quad (12)$$

where di_j is country j 's import demand intercept.

$$p_j^d = di_j + ds_j q_j^d , \quad (13)$$

where p_j^d is country j 's (cif) border price.

$$impt_{ij} = (IMPTPC_{ij} / 100) * (p_i^s + TC_{ij}) ,^{24} \quad (14)$$

²⁴ The problem of the endogeneity of $impt_{ij}$ has been overcome by solving the model using a recursive procedure; in the first iteration p_i^s is replaced by BSP_i .

where: impt_{ij} is the specific-equivalent applied import tariff imposed by country j on its imports from country i (\$/t) ; and IMPTPC_{ij} is the ‘ad valorem’ applied import tariff imposed by country j on its imports from country i .

$$\text{abqtusdl}_{ie} = \text{ABQTEURO}_i \text{ EURDOL}_{\text{EU15}} , \quad (15)$$

where abqtusdl_{ie} is the per unit in-quota A/B import tariff imposed by EU member states on their imports from country i expressed in \$/t ; and ABQTEURO_i is the per unit in-quota A/B import tariff imposed by EU member states on their imports from country i ²⁵ expressed in Euro/t.

$$\text{cqtusdl}_{ie} = \text{CQTEURO}_i \text{ EURDOL}_{\text{EU15}} , \quad (16)$$

where cqtusdl_{ie} is the per unit in-quota C import tariff imposed by EU member states on their imports from country i expressed in \$/t; and CQTEURO_i is the per unit in-quota C import tariff imposed by EU member states on their imports from country i ²⁶ expressed in Euro/t.

$$\text{nqtusdl}_{ie} = \text{NQTEURO}_i \text{ EURDOL}_{\text{EU15}} , \quad (17)$$

where nqtusdl_{ie} is the per unit out-of-quotas A/B and C import tariff imposed by EU member states on their imports from country i expressed in \$/t; and NQTEURO_i is the per unit out-of-quotas A/B and C import tariff imposed by EU member states on their imports from country i expressed in Euro/t.

$$\sum_i \sum_e x_{ab_{ie}} \leq \text{TRQAB} , \quad (18)$$

where TRQAB is the EU ‘A/B’ tariff rate quota (t).

$$\sum_i \sum_e x_{c_{ie}} \leq \text{TRQC} , \quad (19)$$

where TRQC is the EU ‘C’ tariff rate quota (t).

$$x_{ie} = x_{ab_{ie}} + x_{c_{ie}} + x_{nabc_{ie}} ; \quad (20)$$

$$p_{\eta}^s = \{ \text{if } \text{REFPR} > (p_{\text{EU15}}^d / \text{EURDOL}_{\text{EU15}}), \text{ then } p_{\eta}^s = \text{REFPR} ; \\ \text{otherwise, } p_{\eta}^s = s_{\eta} + s_{\eta} q_{\eta}^s \} , \quad (21)$$

where: η is an index for EU banana producing member states (France, Spain and Other EU-15

²⁵ EU within quota A/B ‘imports’ from Spain, France and Other EU-15 member states and imports from EBA countries in 2007 and 2013 are inhibited by artificially setting in-quota tariffs for these sources at a prohibitive level.

²⁶ EU within quota C imports from all sources but ACP countries are inhibited by artificially setting in-quota tariffs at a prohibitive level.

member states) ($\eta \in i$) ; and REFPR is the ‘reference price’ used to calculate the ‘compensatory aid’ deficiency payment (Euro/t).

$$\begin{aligned} \text{compaid} = \{ & \text{if } \text{REFPR} > (p_{\text{EU15}}^d / \text{EURDOL}_{\text{EU15}}), \text{ then } \text{compaid} = \text{REFPR} - (p_{\text{EU15}}^d / \\ & \text{EURDOL}_{\text{EU15}}) ; \\ & \text{otherwise, compaid} = 0 \} , \end{aligned} \quad (22)$$

where compaid is the per unit ‘compensatory aid’ paid to banana producers in the EU (Euro/t).

$$\text{overprod} = \sum_{\eta} q_{\eta}^s - \sum_{\eta} \text{FINSTMAX}_{\eta} , \quad (23)$$

where overprod is the difference between total production in EU member states and the overall maximum volume of production entitled to receive ‘compensatory aid’ payments, because of the financial stabilizer mechanism contained in the EU domestic policy scheme (t); and FINSTMAX_{η} is the maximum quantity member state η is entitled to receive ‘compensatory aid’ payments for (t).

$$\begin{aligned} \text{finstcoef}_{\eta} = \{ & \text{if } \text{overprod} < 0 , \text{ then } \text{finstcoef}_{\eta} = 0 , \forall \eta ; \\ & \text{otherwise: if } q_{\eta}^s \leq \text{FINSTMAX}_{\eta} , \text{ then } \text{finstcoef}_{\eta} = 0 ; \\ & \text{otherwise, finstcoef}_{\eta} = 1 \} , \end{aligned} \quad (24)$$

where: finstcoef_{η} is equal to 1 if in member state η the ‘compensatory aid’ is to be paid on part of the production only as a result of the financial stabilizer mechanism, 0 otherwise.

$$\begin{aligned} \text{eubudgexp} = & \text{compaid} ((\sum_{\eta} (1 - \text{finstcoef}_{\eta}) q_{\eta}^s) + (\sum_{\eta} \text{finstcoef}_{\eta} q_{\eta}^s ((\sum_{\eta} \text{finstcoef}_{\eta} q_{\eta}^s - \\ & \text{overprod}) / (\sum_{\eta} \text{finstcoef}_{\eta} q_{\eta}^s)))) , \end{aligned} \quad (25)$$

where eubudgexp is EU budget expenditure for the ‘compensatory aid’.

$$x_{ij} , x_{ab_{ie}} , x_{c_{ie}} , x_{nabc_{ie}} , p_i^s , p_j^d \geq 0 . \quad (26)$$

The 2002 base model calibration appears satisfactory (Table 1). The simple average percentage difference, in absolute value, between observed and predicted exports in 2002 is 4.3%; the analogous value for imports is 5%. If the exports- and imports-weighted average per cent differences, in absolute value, are considered instead, the average differences drop to 2.7% and 3.0%, respectively.

In the 2002 base model solution both EU-15 TRQs - quotas A/B and C - are binding and no

imports take place at the above-the-quota tariff rates. ACP exports to the EU-15 equal the C quota (750,000 t) and no ACP exports occur within quota A/B; exports to the EU-15 by non-ACP countries are equal to the A/B quota (2,653,000 t).

4. Simulation results (2007)

The main results of the simulations are presented in Table 3.

The ‘Pre-2006 regime’ column presents the forecasted market equilibrium in 2007 under the EU import regime in place before 1 January 2006; it includes the impact of (i) the May 2004 EU enlargement, (ii) the implementation of the EBA initiative, (iii) the higher €/£ exchange rate, and (iv) the shifts in the import demand and export supply functions as a result of the changes in domestic supply and demand in each country/region. These shifts are driven by the parameters describing the expected changes in population, per capita income and yields (Table 3) and by the assumptions made with respect to the income elasticities of the demand functions (Table 1). As a result of the joint effect of these factors, everything else held constant, banana aggregate export supplies expand both for MFN and EBA countries, while this is not the case for ACP countries. Not only is there a change in the relative aggregate competitiveness of exports of the different groups of countries, but also in the relative competitiveness of countries within each group. Within the MFN country aggregation, Ecuador, Guatemala and Brazil see the largest downward shifts in export supplies; among the ACP countries export supply expands in Ivory Coast only.

Seven simulations, representing different EU banana import regimes, have been performed:

SIM1: the EU imposes a 187 €/t MFN tariff on its imports of bananas, while granting preferential duty-free access within a 775,000 t TRQ to its imports from ACP countries (out-of-quota ACP exports to the EU are subject to the MFN tariff).

SIM2: the EU imposes a 230 €/t MFN tariff on its imports of bananas, while granting preferential duty-free access within a 775,000 t TRQ to its imports from ACP countries (out-of-quota ACP exports to the EU are subject to the MFN tariff).

SIM3: the EU imposes a 230 €/t MFN tariff on its imports of bananas, while granting unlimited

Table 3 - Simulation results (2007).

| | Pre-2006 regime [includes enlargement, implementation of EBA, demand and supply time shifts and Euro/\$ exchange rate = 1.15] | SIM1 $t_{MFN} = 187 \text{ €/t}$; duty free ACP-specific TRQ = 775000 t | SIM2 $t_{MFN} = 230 \text{ €/t}$; duty free ACP-specific TRQ = 775000 t | SIM3 $t_{MFN} = 230 \text{ €/t}$; $t_{ACP} = 0 \text{ €/t}$ | SIM4 $t_{MFN} = 75 \text{ €/t}$; $t_{ACP} = 0 \text{ €/t}$ | SIM5 equivalent t_{MFN} (264 €/t) ; duty free ACP-specific TRQ = 775000 t | SIM6 equivalent t_{MFN} (200 €/t) ; $t_{ACP} = 0 \text{ €/t}$ | SIM7 $t_{MFN} = 176 \text{ €/t}$; duty free ACP-specific TRQ = 775000 t |
|--|---|---|---|---|--|---|---|---|
| EU-25, total imports (t) | 3996200 | 4346500 | 4163300 | 4184700 | 4816000 | 4018500 | 4306900 | 4393300 |
| EU-25, total consumption (t) | 4934800 | 5285100 | 5102000 | 5123400 | 5754700 | 4957200 | 5245500 | 5332000 |
| EU-15 import price (€/t) | 583,3 | 505,6 | 546,2 | 541,5 | 401,4 | 578,3 | 514,3 | 495,2 |
| EU-25 imports from MFN countries (t) | 3113000 | 3473100 | 3271800 | 2868300 | 4138200 | 3112600 | 3114100 | 3524600 |
| EU-25 imports from ACP non-EBA countries (t) | 750000 | 775000 | 775000 | 1201900 | 626100 | 775000 | 1090500 | 775000 |
| EU-25 imports from EBA countries (ACP + non-ACP) (t) | 133200 | 98400 | 116600 | 114400 | 51700 | 131000 | 102300 | 93700 |
| MFN countries, total exports (t) | 10842900 | 11132600 | 10970600 | 10646000 | 11667900 | 10842500 | 10843800 | 11174000 |
| EU tariff revenue (million €) | 233,5 | 649,5 | 752,5 | 659,7 | 310,4 | 821,7 | 622,8 | 620,3 |
| EU "Compensatory aid" budget expenditure (million €) | 243 | 309,4 | 274,7 | 278,8 | 398,5 | 247,3 | 301,9 | 318,3 |
| Quota AB per unit rent (\$/t) | 223,0 | --- | --- | --- | --- | --- | --- | --- |
| Quota C per unit rent (\$/t) | 174,5 | 78,2 | 124,9 | --- | --- | 161,8 | --- | 66,2 |

preferential duty-free access to its imports from ACP countries.

SIM4: the EU imposes a 75 €/t MFN tariff on its imports of bananas, while granting unlimited preferential duty-free access to its imports from ACP countries.

SIM5: the EU imposes a MFN tariff on its imports of bananas such that its imports from MFN countries equal those which would occur under the pre-2006 EU import regime; ACP countries are granted preferential duty-free access within a 775,000 t TRQ (out-of-quota ACP exports to the EU are subject to the MFN tariff).

SIM6: the EU imposes a MFN tariff on its imports of bananas such that its imports from MFN countries equal those which would occur under the pre-2006 EU import regime; ACP countries are granted unlimited preferential duty-free access.

SIM7: the EU imposes a 176 €/t MFN tariff on its imports of bananas, while granting preferential duty-free access within a 775,000 t TRQ to its imports from ACP countries (out-of-quota ACP exports to the EU are subject to the MFN tariff).

SIM1 is the regime the EU proposed in the second step of the arbitration. In SIM2 and SIM3 the MFN tariff is the one the EU proposed in January 2005, which was the focus of the first step of the arbitration (at the time the EU did not provide an explicit indication of the trade regime it intended to apply to its imports from ACP countries). MFN countries reacted to the proposals by the EU claiming that the ‘equivalent tariff’ could not exceed 75 €/t, the tariff considered in SIM4. SIM7 is the EU import regime for bananas in place since 1 January 2006.

Under the pre-2006 EU trade policy regime, in 2007 both quotas A/B and C would still be binding; however, the EU would now import 133,200 t of bananas out of quotas A/B and C from EBA countries. EU-25 imports in 2007 under the pre-2006 regime are predicted to be smaller than those in 2002 (Table 1) by 59,000 t. This is the result of increased domestic production²⁷ and of lower consumption and imports in the new member states because of the increased prices in these countries resulting from the extension to them of the more restrictive EU import regime, only partly

²⁷ As a result of increased yields, EU domestic production is forecasted to increase between 2002 and 2007 by 93,000 t.

compensated by increased consumption and imports by EU-15 countries.²⁸ Per unit quota rents predicted by the model for 2007 are significantly higher than those in 2002; quota A/B rent equals 223 \$/t (was 94.8 \$/t in 2002) and that for quota C 174.5 \$/t (was 56.1 \$/t).²⁹ This is the result of several factors: the increased €/£ exchange rate, increased import prices in the EU-25 and the downward shifts in MFN countries and Ivory Coast export supply functions.

Under the trade regime proposed by the EU in the second step of the arbitration (SIM1), MFN exports to the EU are forecasted to increase by 360,100 t, from 3,113,000 to 3,473,100 t. However, total exports of MFN countries increase by a smaller amount (+289,700), as they divert to the EU part of their exports which were previously directed elsewhere. Contrary to the decision by the arbitrators, based on the results obtained, the trade policy regime for bananas proposed by the EU in September 2005 *‘would result in at least maintaining total market access for MFN banana suppliers’*. ACP exports to the EU-25 equal the (expanded) TRQ (775,000 t); the per unit quota rent (78.2 \$/t) is now significantly lower than under the pre-2006 regime, mostly as a result of the lower prices in the EU. Exports by EBA countries are lower than under the pre-2006 regime (they decline from 133,200 to 98,400 t) because of the increased competition from MFN exports, which are no longer constrained by a quota. EU import prices decline; consumption increases by 7.1%, from 4,934,800 to 5,285,100 t. As a result of the ‘compensatory aid’ deficiency payment scheme, EU domestic production does not change, but, because of the lower domestic price, the budgetary cost of the policy increases by 62.1 million euro. The elimination of quota A/B implies transforming most of the quota rents under the pre-2006 regime into tariff revenue for the EU; the transfer of wealth from the holders of the quota licenses to the member state budgets equals 416 million euro.

In determining the MFN tariff that *‘would result in at least maintaining total market access for MFN banana suppliers’*, the regime imposed by the EU on its imports from ACP countries does matter. If the EU imposes a 230 €/t MFN import tariff, as proposed in January 2005, and allows

²⁸ This means that part of the expansion of quota A/B as a result of the enlargement is forecasted to have ended up in increased MFN imports by EU-15 countries.

²⁹ Estimates of pre-2006 quota rents vary between zero and over 250 €/t (FAO, 2005; Guyomard *et al.*, 2005). This wide variation depends on differences in approach, data and assumption used (the most common approaches being those based on using available information on the price of the licenses, price gap calculations and model simulations).

unconstrained duty-free access to bananas originating in ACP countries (SIM3), ACP exports will enjoy a marked increase in their competitive advantage on the EU market *vis a vis* MFN ones. In fact, ACP exports to the EU will increase from 750,000 to 1,201,900 t , while exports from MFN countries will drop below the 3,113,000 t mark, to 2,868,300 t . However, if the 230 €/t MFN tariff is coupled with a 775,000 t duty-free TRQ reserved for imports from ACP countries only (SIM2), EU imports from MFN countries will increase to 3,271,800 t, while those from the ACP countries will equal the TRQ. In both scenarios EBA exports to the EU will decline because of the increased competition with respect to the pre-2006 regime.

At the other end of the spectrum, if the EU allows duty-free access to bananas from ACP countries while imposing, as suggested by Latin American countries, a 75 €/t MFN import tariff (SIM4), it is now the turn for MFN countries to enjoy a strong increase in their competitive advantage on the EU market *vis a vis* the ACP ones. ACP exports to the EU decline from 750,000 to 626,100 t , while MFN exports increase by more than one million tons, from 3,113,000 to 4,138,200 t. As ACP exports to the EU-25 in SIM4 remain below 775,000 t, the same market equilibrium would occur if the EU were to impose a 75 €/t MFN tariff on its imports of bananas while limiting duty-free access to its imports from ACP countries to 775,000 t.

What is the value of the tariff that would result '*in at least maintaining total market access for MFN banana suppliers*'? If duty-free ACP exports to the EU are limited to 775,000 t (SIM5) the MFN tariff which would yield in 2007 MFN exports to the EU equal to those which would take place under the pre-2006 regime is 264 €/t. If, however, the EU grants ACP exports unconstrained duty-free access (SIM6), the equivalent tariff drops to 200 €/t . While from the point of view of MFN countries these two trade regimes are equivalent, this is not the case for the other countries. When no TRQ is in place, ACP exports to the EU are 316,000 t higher and EBA ones 29,000 t lower, EU imports are 288,000 t higher, the 'compensatory aid' budgetary expense increases and the tariff revenue declines.

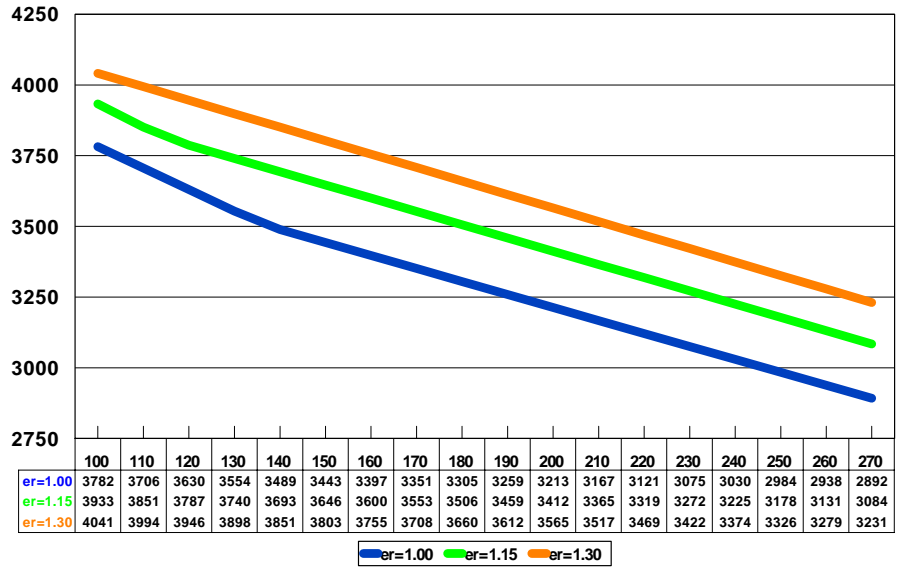
Finally, when the current EU import regime for bananas is considered (SIM7), the model

predicts EU imports from MFN countries in 2007 to equal 3,524,600 t, more than 400,000 t above their expected volume under the regime in place before 1 January 2006. ACP and EBA exports to the EU equal the TRQ and 93,700 t, respectively. EU budget revenue is now lower than that which would be collected under the two trade regimes proposed in the arbitration, while the budget expenditure for the ‘compensatory aid’ domestic support policy is higher.

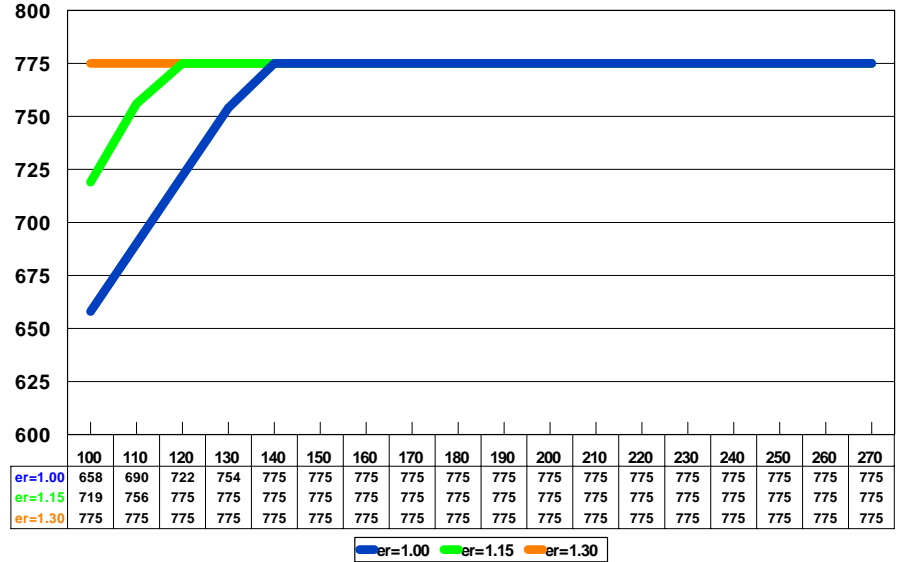
As the EU banana regime is likely to be the focus of a new WTO dispute, it is worth considering additional possible policy regimes. In Figure 4 EU-25 imports from MFN, ACP and EBA countries are represented as a function of the MFN tariff when the 775,000 t TRQ for ACP exports is in place, considering three different €/£ exchange rates; the medium line in the three diagrams represents EU imports from these three sources when the exchange rate is the one used so far (1 £ = 1.15 \$). MFN exports to the EU-25 increase as the MFN tariff declines, while those from the EBA countries decline, as they become worse off as a result of increased competition from MFN countries. On the contrary, ACP exports to the EU are not affected by changes of the MFN tariff; only when values of the MFN tariff below 130 €/t are considered, is the decline of the relative competitiveness of ACP exports *vis a vis* MFN ones such that they no longer fill the TRQ.

The results obtained proved to be robust with respect to the assumptions made for the most relevant parameters in the model. Sensitivity analyses have been performed for the assumptions made on the €/£ exchange rate, the price and income elasticities of the demand function in the EU-15, and some of the export supply elasticities. Due to space constraints, only the results for SIM1 are presented here. The effectiveness of the trade regime proposed by the EU in the second step of the arbitration in ‘*maintaining total market access for MFN banana suppliers*’ appears very robust to changes in the assumptions made. When the €/£ exchange rate is set equal to 1, instead of 1.15, MFN exports to the EU-25 equal 3,272,900 t; even under an extremely pessimistic assumption such as the €/£ exchange rate being 0.95 (the exchange rate observed in 2002 and used in the base model), MFN exports to the EU-25 are still forecasted to remain above the 3,113,000 t mark (they equal 3,192,300 t). However, this is not the case if an exchange rate equal to 0.9 is used, as MFN

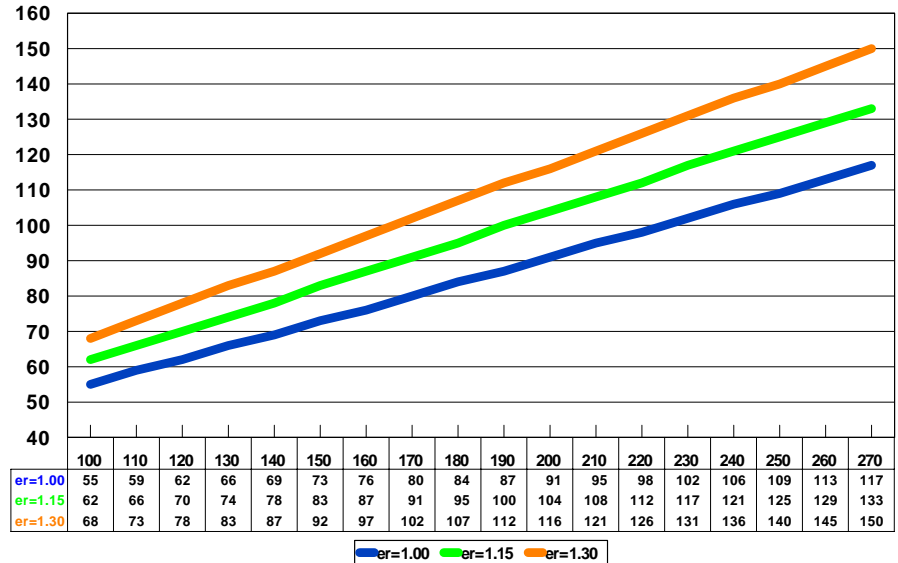
Figure 4 – EU-25 imports from MFN, ACP and EBA countries as a function of the MFN tariff and the euro/\$ exchange rate, with a 775,000 t tariff-free TRQ for ACP exports in place (2007)



(EU-25 imports from MFN countries)



(EU-25 imports from ACP countries)



(EU-25 imports from EBA countries)

exports to the EU-25 would now equal 3,102,900 t . In Figure 4 expected MFN, ACP and EBA exports to the EU-25 as a function of the MFN tariff when the exchange rate equals 1 and 1.3 are represented.

If, instead of being -0.5, the price elasticity of the demand function in the EU-15 is set equal to -0.3 and -0.1, banana consumption in the EU-25 declines from 5.285 to 5.128 and 4.966 million t, respectively, while imports from MFN countries equal 3.317 and 3.155 million t, remaining above the 3.113 million t mark. The same is true if the income elasticity of the same demand function is lowered from 0.5 to 0.3 or 0.1; in this case banana consumption in the EU-25 remains above 5 million t and MFN exports to the EU-25 are forecasted to equal 3.381 and 3.291 t, respectively. Finally, sensitivity analyses have been performed assuming different values of both elasticities of the EU-15 demand function. When the price elasticity is equal -0.3 and the income elasticity 0.3, EU-25 imports from MFN countries equal 3.227 million t; however, if the elasticities are set equal -0.1 and 0.1, then they equal 2.980 million t (consumption in EU-25 is now forecasted to equal 4.8 million t).

The results are very stable with respect to the values used for the export supply elasticities. If those for Cameroon and Ivory Coast are both set equal 5 (instead of 1.5) ACP aggregate exports to the EU remain constrained by the TRQ; the increased price responsiveness of Cameroon and Ivory Coast is not large enough to overcome the gap in competitiveness at MFN conditions between their exports and those of Latin American producers; this only brings about an increase in their exports at the expense of those of other ACP countries, and an increase in the quota rent. If export supply elasticities of all MFN countries are set equal 0.8 (in the model they range between 1 and 1.5) their total exports remain almost unchanged, with only minor changes observed in their country distribution.

As is always the case when attempts are made to model the many forces at work in the real world to forecast what may be the outcomes of alternative economic policy choices, the results reached depend, to a certain extent, on the information used and the assumptions made. An effort

has been made in this paper to provide readers with all the elements needed to make their own informed judgement. The main issues to keep in mind when considering the results of a model like the one used in this paper seem to be: data quality; the assumption that the relevant actors apart from the EU – i.e. multinationals involved in banana production and trade, and other countries – behave competitively and will not change their behaviour once the new regime, which will radically change the structure of the market, is in place; bananas being assumed to be a homogeneous product; the supply of transportation services being assumed to be infinitely elastic (i.e. banana trading not to be constrained by transportation capacity, and transportation and other transaction costs not to vary as a function of the volume traded or over time). The assumption that the banana market is perfectly competitive seems particularly sensitive, despite the fact that it has been used in all analyses of policy issues in this market so far, that there is no definite evidence of multinationals exerting market power, and that the sign of the impact of the tariff-only regime on the structure of the banana market remains *a priori* ambiguous (will the elimination of quota A/B licences make the banana market more or less competitive?).

5. Simulation results (2013)

Results from medium term (2013) simulations for three of the policy scenarios considered above (SIM1, SIM2 and SIM7) are presented in Table 4.

For each policy regime the differences between the results in the two time horizons are determined by the expected shifts between 2007 and 2013 of domestic demand and supply functions in each country/region.

If the pre-2006 EU import regime for bananas were kept, EU-25 imports from ACP and MFN countries would in 2013 still be constrained by quotas C and A/B, with no over-the-quota imports from these countries taking place. EBA countries would take advantage of the constraints faced by exports from the other two groups and their exports to the EU would increase from 133,200 in 2007 to 160,700 t . Although the volume of their exports to the EU-25 would not change, total MFN exports would decline between 2007 and 2013; this results from the significant reduction in banana

Table 4 - Simulation results (2007 and 2013; Euro/\$ exchange rate = 1.15).

| | Pre-2006 regime | | SIM1 | | SIM2 | | SIM7 | |
|--|---|----------|---|----------|---|----------|---|----------|
| | [includes enlargement, implementation of EBA, demand and supply time shifts and Euro/\$ exchange rate = 1.15] | | t _{MFN} = 187 €/t ; duty free ACP-specific TRQ = 775000 t | | t _{MFN} = 230 €/t ; duty free ACP-specific TRQ = 775000 t | | t _{MFN} = 176 €/t ; duty free ACP-specific TRQ = 775000 t | |
| | 2007 | 2013 | 2007 | 2013 | 2007 | 2013 | 2007 | 2013 |
| EU-25, total imports (t) | 3996200 | 4023700 | 4346500 | 4754500 | 4163300 | 4551900 | 4393300 | 4806300 |
| EU-25, total consumption (t) | 4934800 | 5091200 | 5285100 | 5822000 | 5102000 | 5619400 | 5332000 | 5873900 |
| EU-15 import price (€/t) | 583,3 | 644,6 | 505,6 | 498,6 | 546,2 | 539,1 | 495,2 | 488,2 |
| EU-25 imports from MFN countries (t) | 3113000 | 3113000 | 3473100 | 3884200 | 3271800 | 3663500 | 3524600 | 3940700 |
| EU-25 imports from ACP non-EBA countries (t) | 750000 | 750000 | 775000 | 775000 | 775000 | 775000 | 775000 | 775000 |
| EU-25 imports from EBA countries (ACP + non-ACP) (t) | 133200 | 160700 | 98400 | 95200 | 116600 | 113400 | 93700 | 90600 |
| MFN countries, total exports (t) | 10842900 | 10544100 | 11132600 | 11186600 | 10970600 | 11002700 | 11174000 | 11233600 |
| <i>Ecuador</i> | 4803700 | 5235200 | 4941200 | 5573800 | 4864300 | 5476900 | 4960900 | 5598600 |
| <i>Colombia</i> | 1307400 | 1222400 | 1339100 | 1288400 | 1321400 | 1269500 | 1343600 | 1293200 |
| <i>Costa Rica</i> | 1789300 | 1642400 | 1823200 | 1710900 | 1804200 | 1691300 | 1828100 | 1715900 |
| <i>Panama</i> | 364900 | 311000 | 371700 | 323700 | 367900 | 320000 | 372700 | 324600 |
| <i>Honduras</i> | 240800 | 34900 | 248200 | 34900 | 244000 | 34900 | 249200 | 34900 |
| <i>Brazil</i> | 452300 | 635900 | 465600 | 678000 | 458200 | 665900 | 467500 | 681100 |
| <i>Guatemala</i> | 1201200 | 1462300 | 1242200 | 1577000 | 1219200 | 1544100 | 1248000 | 1585400 |
| <i>Other MFN</i> | 683300 | 0 | 701600 | 0 | 691300 | 0 | 704200 | 0 |
| ACP countries, total exports (t) | 750000 | 750000 | 775000 | 775000 | 775000 | 775000 | 775000 | 775000 |
| <i>Cameroon</i> | 236000 | 241400 | 246400 | 251000 | 246400 | 251000 | 246400 | 251000 |
| <i>Ivory Coast</i> | 307100 | 406800 | 317600 | 419900 | 317600 | 419900 | 317600 | 419900 |
| <i>Other ACP</i> | 206900 | 101800 | 211000 | 104100 | 211000 | 104100 | 211000 | 104100 |
| EU tariff revenue (million €) | 233,5 | 233,5 | 649,5 | 726,3 | 752,5 | 842,6 | 620,3 | 693,6 |
| EU "Compensatory aid" budget expenditure (million €) | 243 | 190,7 | 309,4 | 315,4 | 274,4 | 280,8 | 318,3 | 342,3 |
| Quota AB per unit rent (\$/t) | 223,0 | 306,8 | --- | --- | --- | --- | --- | --- |
| Quota C per unit rent (\$/t) | 174,5 | 215,1 | 78,2 | 39,7 | 124,9 | 86,2 | 66,2 | 27,8 |

imports by ‘Other importers’ (due to their increased capacity to satisfy their consumption with domestically produced bananas (Table 2), only partially compensated by increased imports by the United States and by “Other MFN” countries not exporting bananas any more.

On the contrary, under all three tariff-only regimes considered in Table 4 MFN exports – both total and to the EU-25 – increase between 2007 and 2013; without the quota limitation MFN exports benefit from an expanding EU-25 demand for bananas and can exploit their increased competitiveness over time. For example, under the current regime (SIM7) MFN exports to the EU are forecasted to increase between 2007 and 2013 from 3.525 to 3.941 million t (the increase in MFN total exports, from 11.174 to 11.234 million t, however, is less pronounced). Ecuador, Brazil and Guatemala appear to be able to benefit the most from the EU tariff-only regime in the medium term.

Under the three tariff-only policy regimes considered ACP exports do not change between 2007 and 2013; the lower aggregate relative competitiveness of their exports with respect to those from MFN countries translates only in a reduction in the per unit quota rent. However, Cameroon and Ivory Coast see their exports increase over time at the expense of the other ACP countries. Finally, when quota A/B is replaced by a tariff EBA exports are expected to decline slightly between 2007 and 2013 as their increased *absolute* competitiveness is not large enough to avoid a reduction of their *relative* competitiveness with respect to MFN exports.

6. Conclusions

There seem to be six main conclusions which can be drawn from the study presented in this paper.

First, based on the results of the simulations performed, the import regime for bananas proposed by the EU in the second step of the arbitration would have satisfied the requirement of ‘*at least maintaining total market access for MFN banana suppliers*’ dictated by the 14 November 2001 WTO Decision (WTO, 2001c). A MFN tariff equal to 187 €/t coupled with a tariff-free 755,000 t TRQ for exports originating in ACP countries would have led to MFN countries exporting to the EU-25 in 2007 360,000 t in excess of what they would have exported under the

pre-2006 regime. ACP exports to the EU-25 would have expanded with respect to those predicted under the pre-2006 regime by the increase in the quota volume, from 750,000 to 775,000 t. No out-of-quota ACP exports would have occurred, but EBA exports to the EU would have been close to 100,000 t. The current EU import regime for bananas, which includes the same preferential quota for ACP countries and a lower MFN tariff, will obviously yield an even larger volume of EU imports from MFN countries.

Second, the MFN tariff proposed by the EU in the first step of the arbitration, had it been coupled with a tariff-free 775,000 t TRQ for ACP countries, would also have satisfied the conditions spelled out in the November 2001 Decision.

Third, the existence of a duty-free 775,000 t TRQ for imports originating in ACP countries is crucial in assessing the impact of a MFN tariff to replace quota A/B. When the MFN tariff is set equal to 187 €/t, it would satisfy the requirement both with the TRQ in place and without it, although this would no longer be the case when set equal 230 €/t (with no TRQ in place, the equivalent tariff suggested by the model is 200 €/t). The TRQ has the effect of ‘isolating’ MFN exports to the EU from competition by exports from ACP countries. With the quota in place, under the new regime a wide range of downward shifts in ACP export supply functions - due to changes in the €/£ exchange rate or to productivity gains in the most competitive among them - does not translate into increased competition for MFN exports on the EU market (the shifts end up in increased quota rents instead). Analogously, with the quota in place, within a wide range of values, ACP exports remain unaffected by the level of the MFN tariff; this means that, while for MFN countries both the existence and volume of the quota for ACP countries and the level of the MFN tariff were sensitive issues in the definition of the new tariff-only EU import regime, for ACP countries, once the decision of the inclusion in the new regime of a preferential quota had been taken, the level of the tariff imposed on EU MFN imports was, within a wide range of values, irrelevant and should not have constituted a source of friction between the two sets of developing countries.

Fourth, when the MFN tariff, as suggested by the MFN countries, is set equal to 75 €/t the model predicts an increase in their exports to the EU by over one million tons with respect to those which would occur under the pre-2006 regime. ACP exports decline and the capacity of less competitive ACP countries to export bananas to the EU becomes uncertain; while the impact of the introduction of the tariff-only regime on ACP countries finds no reference in the November 2001 Decision and, as a result, has not been an issue in the arbitration, it has certainly been an important factor in the definition of the proposals put forward by the EU and, then, in the choice of the current regime.

Fifth, the introduction of a tariff-only regime has relevant implications when its effects are assessed in a medium term perspective. In fact, while under the previous regime total MFN banana exports are forecasted to decline and benefits from productivity gains over time in MFN countries to be captured by quota A/B licence holders, under a tariff-only regime MFN exports are expected to expand and the benefits from increased productivity are enjoyed by EU consumers and MFN producers.

Sixth, because (a) under the tariff-only regime which was the focus of the second step of the arbitration quota C is larger than under the previous regime and (b) on 1 January 2006 the EBA initiative was fully implemented for bananas, the tariff yielding after this date the same volume of MFN exports than under the previous regime is smaller than the ‘equivalent’ tariff obtained by applying the ‘price gap’ approach to pre-2006 information (the sum of the in-quota A/B tariff and the per unit quota A/B rent). This means, that, under the circumstances, the use of the ‘price gap’ approach as defined in Annex 5 of the URAA, which the EU used in the arbitration to demonstrate the ‘equivalence’ of the tariffs it had proposed, would in theory have yielded a tariff which would have *not* resulted ‘*in at least maintaining total market access for MFN banana suppliers*’.

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