

Searching for a Compromise:  
A Game-Theoretic Approach to the WTO Negotiations on Agriculture

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ESTG Conference, Madrid, 15-17th September 2003

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**Abstract**

After WTO negotiations on agriculture were deadlocked for months, a joint European Commission and United States proposal for a modalities framework galvanised the process. In response, joint proposals by groups of countries and a draft Cancun Ministerial Text prepared by the WTO were circulated. The EC-US compromise and the alternative proposals are analysed with the Agricultural Trade Policy Simulation Model, a static, multi-commodity, multi-region, partial equilibrium trade model. The EC-US compromise market access formula, also adopted in the draft Cancun text, is a rather conservative approach more in line with the EC's position. The estimated annual global welfare gains are smaller in the more recent draft Cancun text simulation than in the earlier Harbinson proposal. Producers in developing and least-developed countries would be better off with a more ambitious liberalisation agreement. However, producers in highly protected developed countries stand to lose more from more ambitious scenarios. Since negotiators' positions suggest that governments attach a higher weight to producer than to consumer benefits, a possible solution to the impasse lies in switching support in developed countries from border measures to less-trade distorting measures such as direct income support. Providing compensation to current beneficiaries of European Union support in ACP countries for the erosion of preferences may assist in the search for a compromise.

*JEL classification: F13, Q17*

*Key words: agriculture, trade, modelling, negotiations*

The opinions expressed in this paper are those of the authors and do not necessarily reflect the views of UNCTAD or its members. The designations and terminology employed are also those of the authors. The contribution of funding from United Kingdom DFID to further develop ATPSM is gratefully acknowledged.

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## 1. Introduction

The Uruguay Round agreement was a significant first step towards reforming agricultural trade. It has brought agricultural products under more effective multilateral rules. The Doha Ministerial Declaration from 2001 launched new negotiations on a range of subjects, and includes the negotiations in agriculture. Agriculture is now part of the single undertaking in which virtually all the linked negotiations are to end by January 2005. One step in these negotiations was the commitment on “modalities”. Since the first deadline in March 2003 was missed, Ministers are to discuss in Cancun in September 2003 a framework for the modalities.

Because of the sensitivity of the agriculture sector, the large number of issues and options, and the far-reaching but barely predictable consequences, the multilateral negotiations are very complex. Structuring of the negotiations seems to be necessary in order to exploit the possibilities of an agreement without endangering developing and less developed countries on issues such as food security. Recognition of developing country concerns was emphasised at the Doha Ministerial Meeting in November 2001, whereupon a work program focusing on development issues was initiated.

The objective of this paper is to provide a quantitative assessment of the Framework for Establishing Modalities in Agriculture, which is an annex of the draft Cancun Ministerial Text submitted on the 24<sup>th</sup> of August. To achieve this, the preferred positions of some representative negotiating parties are analysed. A range of proposals from the conservative EC approach to the ambitious US proposal and the joint EC-US proposal is examined. Earlier, the Chairman of the WTO Committee on Agriculture, Mr. Harbinson, put forward, and subsequently revised, a compromise proposal. In order to quantify the economic effects of these proposals, they are analysed using a computable global trade model, the Agriculture Trade Policy Simulation Model (ATPSM)<sup>1</sup>. This model is a deterministic, comparative static, partial equilibrium trade model designed to analyse trade policy issues.

Of particular interest is the impact of potential negotiated outcomes on developing countries. Development issues have become more important within WTO negotiations in recent years following the absence of substantial benefits flowing to developing countries after the implementation of the Uruguay Round reforms. Indeed, developing country concerns may have contributed to the failure of the WTO Ministerial in Seattle in 1999. This paper

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<sup>1</sup> The ATPSM modelling framework was initially developed by UNCTAD and further refined by FAO and UNCTAD.

aims to analyse the EC-US compromise in order to try to predict a possible outcome of the negotiations. Furthermore, the likely economic effects of the draft Cancun text shall be analysed in order to assist developing countries to proactively influence the outcome of the negotiations. A further goal is to show how quantitative methods can be used in trade negotiations.

The paper is laid out as follows. The next two sections describe the negotiating context and the key proposals. In section 4 the computable model is described in some detail. In section 5 and 6 the compromise between the EC and the US and the draft Cancun text are analysed. The paper ends in Section 6 with policy implications, limitations and conclusions.

## 2. The state of play

The Uruguay Round agreement was a significant first step towards reforming agricultural trade. It has brought agricultural products under more effective multilateral rules. The Doha Ministerial Declaration from 2001 launched new negotiations on a range of subjects, and includes the negotiations on agriculture. Agriculture is now part of the single undertaking in which virtually all the linked negotiations are to end by January 2005.

The Chairman of the Committee on Agriculture, Mr. Harbinson, circulated in March 2003 a revised version of his first draft of modalities for the further commitments, submitted in February 2003. Many members on either side of the agricultural trade liberalization spectrum have found the Harbinson revised draft inadequate. The negotiations were deadlocked for months and only very limited progress was made. The first deadline for the agreement on modalities, agreed at Doha, was missed. In mid-August 2003, the EC and the US jointly proposed a modalities framework for further reform of agriculture. Many developing countries expressed their disappointment at the framework. However, the EC-US input galvanised the process such that several countries and country groups tabled alternative texts which modify the EC-US draft. Among these texts is a counter-proposal submitted by sixteen developing countries that found before the Ministerial meeting in Cancun in September 2003 support from four other developing countries. By the end of August

2003 a revised draft Cancun Ministerial Text from the WTO General Council was circulated. Annex A of this draft Text is a framework for further reform of agriculture. The draft Cancun Ministerial Text covers the three pillars of the Agreement on Agriculture, i.e. market access, domestic support and export competition, and is in this regard comprehensive. It contains formulas, rules and special and differential treatment provisions on each of the three pillars<sup>2</sup> but without specifying the level of ambition. The document does not contain specific figures or ranges for reductions and many issues are left for further negotiations. The document contains a section for “other” issues for which the Harbinson revised draft shall serve as a reference document.

### 3. Proposals for Reform

#### Market Access

The Uruguay Round Agreement on Agriculture tariffied and bound many non tariff barriers but did little to actually reduce tariffs. Much remains to be done, including reducing tariff peaks and tariff escalation. Tariffs in agriculture are still significant. Table 1 shows average applied and bound rates for country groups.

**Table 1: Bound and applied tariffs on agricultural products**

	<b>MFN bound bariffs</b>	<b>MFN applied tariffs</b>
	%	%
Developed Countries	51	48
Developing Countries	57	20
Least-Developed Countries	79	17

Source: UNCTAD<sup>3</sup>

<sup>2</sup> In order to ensure that developing countries benefit from the expansion of world trade most proposals include to a different extent more flexibility. In the Doha Declaration Ministers agreed “... that special and differential treatment for developing countries shall be an integral part of all elements of the negotiations [...], so as to [...] enable developing countries to effectively take account of their development needs, including food security and rural development.” (Paragraph 13).

<sup>3</sup> These are simple averages at the four digit level of *ad valorem* tariff equivalents for commodities listed in table 1. Applied rates are set equal to bound rates if not specified. Tariffs are averaged over 142 countries for which data are available.

The US proposal for addressing market access issues is to reduce applied tariffs according to a harmonising Swiss Formula by which higher tariffs are reduced more than proportionately (USDA 2002). Under this formula the maximum final tariff is proposed to be 25 per cent<sup>4</sup>. This implies, for example, that a tariff of 100 per cent would be reduced by 80 per cent while an initial tariff of 10 per cent would be reduced by about 30 per cent. Other elements of the proposal include elimination of in-quota tariffs and a 20 per cent expansion in import quotas. Since this proposal focuses on applied tariffs this proposal has a significant drawback for developing countries where there is often a significant difference between applied and bound tariffs. They would be obliged to make proportionally greater cuts from their bound rates than developed countries. The approach doesn't recognise special and differentiated treatment for developing countries as agreed in the Doha Declaration. However, the harmonizing formula has the merit of reducing tariff peaks and tariff escalation.

This issue is not addressed by the EC proposal, which is a continuation of the Uruguay Round approach, a 36 per cent average cut in bound tariffs with a minimum 15 per cent cut in each tariff line (EC 2002). While the EU proposal doesn't specify the special and differentiated conditions that apply to developing countries, they are interpreted here as similar to the Uruguay Round conditions, where developing countries implemented two thirds of these reductions over a longer implementation period. The major problem with the Uruguay Round approach is the inherent flexibility. For example, a reduction in tariffs on a sensitive product from 100 to 85 per cent could be offset by reducing a ten per cent tariff to 4.3 per cent to give the required simple average cut of 36 per cent.

The Harbinson Proposal is a compromise between the harmonising and the flexible approach (WTO Committee on Agriculture 2003). Out-of-quota bound tariffs shall be reduced by a simple average for all agriculture products subject to a minimum reduction per tariff line. The formula includes bands where depending on the initial tariff average and minimum reductions are higher for higher tariffs. For developed countries the proposed average reduction is between 40 and 60 per cent and the

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<sup>4</sup> The proposed Swiss Formula is  $new\ tariff = (initial\ tariff * 25) / (initial\ tariff + 25)$ .

minimum between 25 and 45 per cent. For developing countries the reductions are between 25 and 45 per cent with a minimum between 15 and 30 per cent. Tariff quota quantities shall be expanded to 10 per cent of current domestic consumption in developed and 6.6 per cent in developing countries. Least developed countries shall not be required to undertake any reduction commitments.

The EC-UC joint proposal is to apply the Uruguay Round approach to a certain yet unspecified share of tariff lines, the Swiss formula to a further share of tariff lines and provide duty free access to a final share. The first group would include the most sensitive products. Furthermore, a maximum tariff or an equivalent additional market access is proposed. Developed countries shall provide duty free access for a certain percentage of imports from developing countries. Concerning special and differential treatment, the proposal is that developing countries may reduce tariffs by a smaller amount.

The draft Cancun Ministerial Text put forward by the General Council of the WTO adopts the EC-US blended formula for developed countries but provides two alternative possibilities for developing countries. One is the blended formula and the second is the Uruguay Round formula with three different averages and minima. Tariff reductions are to be lower and implementation periods longer in developing countries. The Uruguay Round part of the market access formula for developing countries reflects essentially the proposal by the 20 developing country coalition, although they did not propose three different tariff line groups. Even though it is not proposed, as in the Harbinson Proposal, that higher tariffs have to be reduced by a higher average and minimum, the proposal of three tariff line groups has some minor harmonising element and restricts the developing countries flexibility.

Both the Harbinson and the draft Cancun Text foresee Special Products for developing countries, a category of sensitive products for which reductions are only limited. Harbinson proposed to reduce the corresponding tariff lines by an average of ten and a minimum of five per cent. Special Products are a major demand by developing countries who want these products to be exempted from any reductions.

The draft Cancun text calls for developed countries to accept duty free all imports from least developing countries and a certain per cent of imports from developing

countries. The EC proposed already to provide duty free access for 50 per cent of all imports from developing countries and 100 per cent for least-developed countries. Apart from some exceptions, the European Union itself already meets this criteria. Among the major importers Japan would have the most difficulty meeting this standard as only a quarter of its agricultural imports from developing countries are duty free.

### **Domestic Support**

Support levels are still significant despite declarations of intent. For example in the OECD countries total agricultural production in 2000 was valued at the farm gate at \$632 billion, but to encourage this production, producers received support of \$323 billion, over \$300 per capita (OECD 2002). The major beneficiaries of this largesse are producers in the European Union (35 per cent of OECD receipts), the United States (27 per cent) and Japan, and most of the gains stem from liberalisation in these regions.

Most developing countries cannot afford substantial domestic support, and such measures in developed countries appear to increase global production forcing down world prices. This benefits net food importers in developing countries at the expense of net exporters. However, since producers in both countries are hurt, most developing countries demand marked reductions of domestic support.

In WTO terminology, subsidies are classified by “boxes”. In agriculture there are green, amber and blue boxes. Green box support must be only minimally trade distorting whereas amber box support measures are considered to distort production and trade and are subject to reductions. The blue box is for direct payments that are tied to programmes that limit production.

The US proposal for domestic support reductions is to reduce over five years the non-exempt support as defined by the Aggregate Measurement of Support (AMS) (amber box) and production-limited (blue box) support to at most 5 per cent of the average value of agricultural production. By some later date all non-exempt domestic support shall be eliminated. *De minimis* payments, i.e. support not exceeding five per cent of the total value of production shall be excluded from reductions and the later

elimination. Developing countries would have special conditions to enable them to provide additional support to facilitate development and food security.

The EC proposal involves maintaining the amber, blue and green boxes essentially unchanged and reducing the amber box Aggregate Measurement of Support by 55 per cent. The green box criteria would be expanded to encompass so-called non-trade concerns such as rural development, the environment and animal welfare. This is in contrast to the US proposal whereupon the green box criteria would not be expanded. At present the EU's AMS expenditure is not a binding constraint, but may become so. A flexible green box allows support to be switched from the non-exempt amber to the exempt green box, as decided in June 2003 by the EC in its reform of the EU Common Agricultural Policy, CAP, by increasing direct income support. Finally, the European Union proposes eliminating the *de minimis* provision in developed countries. The European Union makes less use of this provision than the United States and has less to lose from relinquishing it.

The Harbinson proposal on domestic support is to maintain green box support measures unchanged and to reduce blue box payments by 50 per cent in developed and 33 per cent in developing countries. The amber box Aggregate Measurement of Support shall be reduced by 60 per cent in developed and 40 per cent in developing countries. The *de minimis* level of 5 per cent shall be reduced to 2.5 per cent in developed and shall maintain unchanged at 10 per cent in developed countries.

The EC-US joint proposal also foresees to leave the green box support measures unchanged but to broaden and weaken the definition of direct blue box payments. These "new blue box" payments have to fulfil several requirements but do not have to be production limiting any more. They shall not exceed five per cent of the total value of agriculture production. The "most trade-distorting domestic support" and *de minimis* payments shall be reduced in a certain range, where countries having the higher trade distorting support making greater effort. The sum of amber and "new blue" box and *de minimis* support shall be capped at the sum of the amber and blue box and *de minimis* support level in 2004.

The draft Cancun text adopted the EC-US proposal to maintain the modification and expansion of the blue box but requires a linear cut of the corresponding payments. Green box payments shall remain under negotiation, which probably means that there will not be any changes in the next couple of years. Like in the EC-US proposal amber box and *de minimis* payments shall be reduced within a certain range.

### **Export Subsidies**

Of the current 146 WTO members, 25 countries have export subsidy commitments, volume and budgetary outlay constraints, for various groups of products. Almost 90 per cent of all agricultural export subsidies are provided by the European Union. It is perhaps not surprising that the United States proposes to eliminate export subsidies over five years whereas the European Commission suggests a modest reduction of an average 45 per cent in expenditure. As with tariff cuts, averaging provides flexibility by permitting large cuts in lightly traded or lightly protected products. Between 1995 and 2000 EU's average subsidies were \$5.5 billion, only 20 per cent lower than its final bound expenditure level of \$6.8 billion. But in 2000 and 2001 outlays decreased to \$2.5 and \$2.3 billion, respectively, and could therefore accommodate a reduction of more than 60 per cent in the total expenditure. However, several individual commodities are currently up against expenditure or volume constraints, including rice, sugar, cheese and other milk products, poultry, fresh fruits and vegetables and incorporated products. US expenditure is around \$15 million, less than three per cent of its limit.

The United States proposes, in addition to the elimination of export subsidies, that disciplines shall be placed on officially supported export credits, food aid and other forms of export support without specifying quantitative limits. Most of the export credits are provided by the US to their farmers. The EU proposes that the trade distorting elements of export credits for agricultural products should be identified and subjected to strict disciplines.

The Harbinson Proposal involves reduction of budgetary outlays and quantities to zero in developed countries and in developing countries, where the latter would have a longer time period for implementation. Export credits shall be subject to disciplines.

In their joint paper, the EC and the US propose to eliminate export subsidies, for yet unspecified products, that are of particular interest to developing countries, and to reduce export subsidies for the remaining products. Trade distorting elements of export credits should be treated in the same manner as export credits.

In the draft Cancun text the General Council adopts the EC-US approach with a view to phasing out all export subsidies and trade distorting elements of export credits<sup>5</sup>. Most developing countries, including the coalition of 20 countries, demand an elimination of all forms of export subsidies. This is one of the major concerns that developing countries and especially net food exporting countries have about the draft Cancun text.

#### **Other issues**

Further details and other elements add to the complexity of the negotiations on agriculture. Both, the EC-US joint paper and the draft Cancun text contain a paragraph of issues, which could not have been agreed and on which further work on modalities is necessary. Among these are several non-trade concerns, such as the environment, rural development, labour standard and food security, the peace clause and flexibility for certain groupings. These issues are not covered in greater detail in this paper.

## **4. Modelling agricultural reform**

UNCTAD's Agricultural Trade Policy Simulation Model (APTSM) is used to estimate the potential impacts of various proposals for reforming the agricultural trade sector, assuming they were to be implemented as specified.<sup>6</sup> The static, partial equilibrium global agricultural trade model is able to estimate the economic effects of changes in within-quota, applied and out-quota tariffs, import quotas, export subsidies and domestic support on production, consumption, prices, trade flows, trade revenues, quota rents, producer and consumer surplus and welfare.

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<sup>5</sup> Agreed disciplines on export credits shall address appropriate provisions for differential treatment in favour of least-developed and net food-importing developing countries.

<sup>6</sup> An operational version of the model, associated database and documentation are available free of charge from UNCTAD (<http://www.unctad.org/tab>).

The Uruguay Round reforms raised several modelling issues. Quotas on imports and export subsidies generate quota rents of an estimated \$10 billion and the need to assess the magnitude of the rents and their allocation.<sup>7</sup> It is assumed here that all the rent generated by the EU and US sugar policies and half of the rents from bananas are initially allocated to producers in exporting countries according to the distribution of trade.<sup>8</sup> Rents from the remaining products are initially allocated to the importing countries. Rents are diminished as out-of-quota bound tariffs are reduced but producers are assumed not to respond to changes in rents. A further simplifying assumption is that quotas are filled, either explicitly or through administrative constraints. This implies that in the model the applied tariff or out-of-quota tariff, rather than the in-quota tariff, drives the domestic prices.

A second difficult modelling issue concerns the decoupling of domestic support, that is, the production effects of changes in support. This is a complex issue concerning the method of administration, perceptions of risk, the wealth effects of direct payments and the likelihood of changes in government policies. The approach taken here is to assume that most of the domestic support is decoupled or is conflated with border support.<sup>9</sup> Thus the additional effects of removing domestic support are minimal in most cases. This assumption may bias downwards the benefits from liberalisation.

A final observation relates to limitations modelling preferential access. Data on bilateral tariffs are not included in the database, although bilateral trade flows are available. Thus, it is not possible to liberalise on a bilateral basis and directly capture the effects of preference erosion as MFN rates are brought down closer to preferential rates held by many developing and all least developed countries. However, much of the effect of diminishing preferences is captured by the depletion of quota rents allocated initially to exporters. The model structure does not allow for trade diversion from changes in rents, but where the quotas are filled this effect will be minimal, at least for small changes in prices.

### **Country and commodity coverage**

The present version of the model covers 175 countries of which the current 15 European Union members form a single region. Those countries not covered are mostly small island

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<sup>7</sup> This estimate assumes import quotas are filled.

<sup>8</sup> In a previous application of the model, reported in Vanzetti and Sharma (2002), it was assumed that the rent from all products went to producers, although this assumption is difficult to justify. The allocation of rents affects the distribution of gains from liberalisation. Here it is assumed that rents from products other than sugar are captured by importing countries.

<sup>9</sup> See de Gorter (1999) for a discussion of the methodological issues involved in measuring domestic support.

economies. Countries designated here as 'developed' are defined by the World Bank as high income countries with per capita GNP in excess of \$9266 (World Bank 2001). Another group is the 49 least-developed countries.

There are 36 commodities in the ATPSM data set. This includes many tropical commodities of interest to developing countries, although many of these have relatively little trade by comparison with some of the temperate products. Included commodities comprise meat, dairy products, cereals, sugar, edible oils, vegetables, fruits, beverages, tobacco and cotton (see appendix).

### **Data**

Volume data are from 2000 and are compiled from FAO supply utilisation accounts<sup>10</sup>. The year 2000 represents the base year for the model. The price data are also from FAO. Parameters on elasticities and feedshares are from FAO's World Food Model. These are based on a trawling of the literature and are not econometrically estimated specifically for the model. Some of the elasticities were modified by the authors where it was necessary to adjust them to the particular features of the model. In-quota tariffs, out-quota tariffs and global quotas, notified to the WTO, are obtained from the AMAD database where available and aggregated to the ATPSM commodity level.<sup>11</sup> Export subsidy data are notified to the WTO. Bilateral trade flow data relate to 1995 and are from UNCTAD's Comtrade database. These are used to allocate global quotas to individual countries. The UNCTAD TRAINS database is the source of information on applied tariffs.

An indicator of the degree of distortion is the revenue raised or government expenditure outlaid on each commodity. Most of the global protection in agriculture is on temperate products, particularly beef, wheat, maize, dairy products, vegetable oils and oilseeds. According to the ATPSM database, tariff revenues and rents for the products in the model amount to around \$45 billion, with export subsidies and production distorting domestic support accounting for an additional \$13 billion. Among the products that can be grown in tropical regions tobacco, sugar and poultry attract substantial protection. These products can also be grown in temperate regions or are close substitutes. There is relatively little tariff revenue raised on tropical products such as beverages (except chocolate) and cotton. For the products covered by ATPSM, tariff revenues amount to 17 per cent of import costs.

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<sup>10</sup> See FAOSTAT at <http://www.fao.org>.

<sup>11</sup> AMAD database <http://www.amad.org>.

The European Union and Japan raise the largest amounts of agricultural tariff revenue (over \$4 billion each) but several other countries account for over \$1 billion annually. These are Mexico, Korea, United States, United Arab Emirates, Egypt and Turkey. Indeed 50 countries gather in excess of \$100 million annually in agricultural tariff revenues. This illustrates the scope for global reform.

The major commodities attracting export subsidies are wheat, beef, dairy products and sugar. Of the \$4.6 billion attributed to commodities in the database, \$4 billion is paid by the European Union, with Switzerland, Norway and the United States responsible for much of the remainder. The European Union (\$2.3 billion) and Japan (\$1.9 billion) also provide most of the domestic support that is considered in the ATPSM database to be production distorting. Once again the United States accounts for most of the remainder. Tobacco leaf, cotton, fresh milk and beef account for the largest slices of domestic support.

Several modelling assumptions are important to note. First, ATPSM allows two way trade. This requires an additional equation to specify either exports or imports. In this version of the model the change in imports is determined through an Armington elasticity, which is 2.2. Consumers first decide how much they consume and in a second step how much domestic and how much foreign products they want to buy. Exports are determined so as to clear the market, that is, supply plus imports equals demand plus exports.

As noted earlier, where producers receive rents they do not respond by changing quantities produced. This implies for example that changes in in-quota tariffs change only quota rents, not quantities, prices or global welfare. The shifting of quota rents is a zero sum game.

The model does not have a specific time dimension. The general interpretation is that the economic effects are of a medium-term nature, with the impacts taking three to five years to work through.

### **Scenarios**

Several different simulations are undertaken to analyse the proposals on agriculture. Because of the complexity of the agricultural sector and related trade issues, using quantitative tools like ATPSM has a clear advantage. However, apart from the usual limitations of computable models, there are some further specific challenges. Firstly, the proposals comprise many elements. None of the available computable models can capture all elements. For example, ATPSM as a static model cannot capture consequences of different proposed implementation periods. Secondly, where proposals comprise flexibility for countries to self-select tariff

reductions for their products, whenever a certain average is met, assumptions about possible choices have to be made. For example the Uruguay Round formula, which is an element of the EC proposal and the draft Cancun text, gives countries the flexibility to reduce tariff lines as they want so long as the average is 36 per cent and the minimum 15 per cent. It is not possible to predict a priori which tariffs are reduced by less and which by more than 36 per cent. Thirdly, the EC-US joint proposal and the draft Cancun Ministerial text do not contain specific targets, but paragraphs like “[...] % of tariff lines shall be subject to a [...] % average tariff cut and a minimum of [...] %, ...”. In order to assess these proposals, assumptions on the numbers have to be made. Therefore, the simulations capture important – but not all – elements of the proposals and thus, they are not exact simulations of them.

Concerning the flexibility that countries might have in selecting the reduction for single tariff lines, we make the following assumption. WTO members usually want other countries to liberalise whereas they want to protect their own markets, or at least they want to have the flexibility to protect them by not having strong binding commitments. For developed countries we assume that products with high bound tariffs are (politically) sensitive products and therefore countries want to reduce these tariffs as little as possible. For the products with the highest tariffs, the minimum possible reduction is applied and lower tariffs are reduced such that the required average is met and/or other parts of a blended approach are fulfilled. For developing countries, we applied the same rule but the most sensitive products are defined to have the smallest percentage difference between out-quota bound and applied tariff rates.<sup>12</sup> Since most developing countries have much higher bound than applied tariff rates, this rule means that developing countries’ applied rates are only little affected. We have not chosen the reduction for each country such that applied rates are affected as little as possible but rather we specified a number of tariff lines that are reduced according to the minimum reduction and reduced the remaining tariffs such that required averages are met. In the Harbinson proposal, cuts depend on the initial tariff level. Although countries here also have some flexibility, since for each band there are averages and minimum cuts, the flexibility is much smaller. Therefore, when analysing this proposal we do not apply the above specified rule but cut all tariffs in each of the bands by the proposed average.

As mentioned above, for the draft Cancun text with its empty brackets, numbers have to be assumed. Since the blended market access formula was adopted from the EC-US proposal, a first natural approach is to assume for the Uruguay Round part the numbers that were proposed by the EC in its own proposal (36 per cent average reduction with a minimum cut of

15 per cent) and for the Swiss formula part the coefficient 25 which was initially proposed by the US. We assume, however, that the Swiss formula will be applied on out-quota bound rather than applied tariffs. Furthermore, we assume that the share of tariff lines subject to both the Uruguay Round and Swiss formula is twice as high as the share of duty-free tariff lines, which gives us the distribution 40-40-20. For developing countries we assume that 15 per cent of the products can be denominated to be Special Products with a reduction of 5 per cent. For the remaining 85 per cent of products, the Uruguay Round approach with a minimum of 10 per cent and an average of 24 per cent is assumed.<sup>13</sup> The tariff cuts are applied to the 36 ATPSM commodities, not at the tariff line level.

In a second simulation we assume more ambitious numbers. We distribute one third of all tariff lines to either the Uruguay Round formula, the Swiss formula and the elimination of tariffs. The minimum cut in the Uruguay Round formula part is 25 and the average 50 per cent as it was over all bands in the Harbinson proposal. For developing countries the average reduction for non-Special Products is assumed to be 32.5, also as in the Harbinson draft over all bands.

For export subsidy and domestic support reductions in the draft Cancun text, we assume the same as for the Harbinson proposal. Since average reductions are proposed, this flexibility causes similar modelling problems like the flexibility concerning tariff reductions whenever the average is met. Here, it is assumed that the rates are binding and that countries do not take advantage of flexibility to vary the reductions across different commodities. This assumption thus overstates the likely impacts from reform, as is the case in all simulations where subsidies are not eliminated entirely. Additionally, the draft Cancun text distinguishes between subsidies on products of particular interest for developing countries and other products, an element that we do not capture here.

The compromise scenario is similarly problematic. In the Harbinson proposal many details are specified that cannot be captured by ATPSM. For example, the proposal includes the flexibility to reduce export subsidies in different steps. The proposed expansion of import quotas depends on current quotas and countries have some flexibility as an average expansion within certain limits is considered. Furthermore, a possibility to assure preferential schemes

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<sup>12</sup> In developed countries the difference between bound and applied rates is small so that for these countries this rule does not make sense.

<sup>13</sup> In the draft Cancun text, three tariff line groups with possibly different minimum and average reductions are proposed. Since the reductions are not proposed to depend on initial tariffs, this restricts developing countries flexibility only a little bit and therefore we do not distinguish between these groups.

and several other special and differential treatment issues are proposed. Since it is not possible to model all the elements of the Harbinson proposal, the compromise simulation is only similar to the proposal capturing important, but not all, aspects. Nonetheless, the simulation reflects the major characteristics, the implications drawn from it are likely to be robust.

Table 2 specifies the scenarios with which the US, EC, Cancun and Harbinson proposals are simulated. Tariff reductions and averages are calculated at the 4 digit ATPSM level. Most sensitive products for developed countries are defined to be the products with the highest out-quota bound tariff rate and for developing countries the products with the highest percentage difference between bound and applied rates.

**Table 2: Alternative liberalisation scenarios**

<b>Label</b>	<b>Description</b>
<b>Ambitious</b>	A reduction in applied out-quota tariffs according to the Swiss formula $t_1=(t_0*25)/(t_0+25)$ , elimination of in-quota tariffs, a 20 per cent expansion of import quotas, elimination of domestic support and export subsidies in all countries and all commodities.
<b>Conservative</b>	A reduction in bound out-quota tariffs of the 10 per cent most sensitive products of 15 per cent, a 44.1 per cent reduction of remaining products, a 55 per cent reduction in domestic support and 45 per cent reduction of export subsidy equivalent in developed countries with two thirds of these cuts in developing countries. No reductions in least developed countries.
<b>Moderate Cancun</b>	Developed countries: 40% of tariff lines are subject to the Uruguay Round formula, where bound out-quota tariffs of the 4 most sensitive products are reduced by 15 per cent and the next 10 most sensitive products by 44.4 per cent (average 36%), 40% of tariff lines are subject to the Swiss formula with a coefficient of 25, 20% of tariff lines with the lowest initial bound values are reduced to zero; export subsidies are reduced by 80%, domestic support by 60 per cent. Developing countries: 14% most sensitive tariff lines are reduced by 5% (Special Products), next 14% most sensitive products are reduced by 10 per cent and remaining products by 26.7% (average of last two categories 24%); export subsidies are reduced by 70%, domestic support by 20 per cent. Least developed countries: no reductions.
<b>Ambitious Cancun</b>	Developed countries: 33% of tariff lines are subject to the Uruguay Round formula, where bound out-quota tariffs of the 4 most sensitive products are reduced by 25 per cent and the next 8 most sensitive products by 62.5 per cent (average 50%), 33% of tariff lines are subject to the Swiss formula with a coefficient of 25, 33% of tariff lines with the lowest initial bound values are reduced to zero; export subsidies are reduced by 80%, domestic support by 60 per cent.

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Developing countries: 14% most sensitive tariff lines are reduced by 10% (Special Products), next 14% most sensitive products are reduced by 15 per cent and remaining products by 35.9% (average of last two categories 32.5%); export subsidies are reduced by 70%, domestic support by 20 per cent.

Least developed countries: no reductions

**Compromise** A reduction in bound out-quota tariffs of 60 per cent where the initial tariff is higher than 90 per cent, 50 (initial tariff between 15 and 90), 40 (initial tariff smaller than 15), a 80 per cent reduction of export subsidies, a 60 per cent reduction of domestic support in developed countries. In developing countries: a 40 per cent reduction where the initial tariff are higher than 120 per cent, 35 (initial tariff between 60 and 120), 30 (initial tariff between 20 and 60), 25 (initial tariff smaller than 20), a 70 per cent reduction of export subsidies, a 20 per cent reduction of domestic support. A 20 per cent expansion of import quotas in developed and developing countries. No changes in least developed countries.

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The ambitious scenario is relatively straightforward. The US proposal emphasises tariff cuts from applied rather than bound rates and with a Swiss formula coefficient of 25 per cent.

The compromise scenario is even more problematic. In the Harbinson proposal countries have the flexibility to reduce certain tariff lines by a minimum amount whenever the average equals the above stated reductions. Developing countries can declare some commodities as strategic products for which no reductions are required.

## 5. The EC-US Compromise

The initial proposals in the Doha Round from the two major trade powers are very different in their level of ambition. The US proposal comprises much more liberalisation than the EC proposal. Liberalisation would seem to favour industrialised countries with a share of population depending on agriculture of less than five per cent. However, it can be argued that politicians want to realise welfare benefits without derogating the important group of farmers.<sup>14</sup> This would explain why the EC favours a less liberalising approach.

Considering the impact on producers, table 1 shows that a more conservative proposal is better for the EU than an ambitious approach. It is exactly the other way around for the US. Furthermore, the increase in export revenue is much higher under an ambitious liberalisation scenario. The reason is the different structure of the agriculture sectors. Although both countries protect their markets and provide distorting subsidies, the US agriculture sector is

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<sup>14</sup> Almost all economic studies about the Common Agriculture Policy in the EU have shown that it benefits the small group of farmers while it hurts the much larger group of consumers.

more competitive on world markets than the EU sector. The initial export revenue in the US is about twice as high as in the EU even though subsidies in the EU are much higher. Overall welfare gains for the EU result from removing support to farmers so that taxpayers benefit from reduced subsidy expenditures, and tariff reductions, which lead to lower *consumer* prices.

**Table 1: Results for initial EC and US proposals relative to base**

	EU		US	
	Conservative Proposal	Ambitious Proposal	Conservative Proposal	Ambitious Proposal
	\$ b	\$ b	\$ b	\$ b
Consumer Surplus	13.3	29.2	-2.2	-9.9
Producer Surplus	-13.8	-26.8	2.2	11.4
Government Revenue (change)	3.2	3.9	0.3	0.1
Export Revenue (change)	-4.5	-4.3	1.9	8.6
Welfare	2.8	6.3	0.3	1.6

*Source:* ATPSM simulations.

For this reason unilateral liberalisation in the EU is welfare enhancing but producers are a little better off if others liberalise as well. The overall welfare in the EU is also higher in a multilateral liberalisation scenario, although the difference is negligible. However, the US has much more to gain from multilateral liberalisation because it gains more from improved market access than from domestic reform.

The EC and the US tried to bridge their differences and agreed on a compromise that combines the ambitious Swiss formula and the conservative Uruguay Round approach. After submitting their joint paper both countries stressed that the missing numbers should be ambitious. The blended market access formula, however, gives countries so much flexibility that it seems to be much more in line with the conservative EU approach. The reason for that is that the fallback option for the WTO negotiations is the status quo. Since agreements are based on consensus the concerns of the most protectionist countries like Bulgaria, Chinese Taipei, Iceland, Japan, Norway and Switzerland have to be taken into account.<sup>15</sup>

<sup>15</sup> All these countries had proposals in August 2003, in which they welcomed the EC-US proposal but demanded more flexibility their own agricultural market liberalisation.

**Table 2: Unilateral and multilateral reform relative to base**

	EU conservative		US ambitious	
	\$ b	\$ b	\$ b	\$ b
	Multilateral Liberalisation	Unilateral by EU	Multilateral Liberalisation	Unilateral by US
Consumer Surplus	13.3	15.1	-9.9	4.5
Producer Surplus	-13.8	-15.7	11.4	-3.9
Government Revenue (change)	3.2	3.4	0.1	0.3
Export Revenue (change)	-4.5	-5.4	8.6	0.03
Welfare	2.82	2.80	1.6	0.9

*Source:* ATPSM simulations.

However, since there is an enormous pressure once a majority including the big trading countries supports a draft, it is not that the case that speed is determined by the slowest mover. And in addition, WTO members' ministers already agreed at Doha to liberalise the agricultural trade sector. Therefore, it could be argued, a continuation of the Uruguay Round is the fallback position if negotiations fail. In multilateral negotiations bargaining power is mainly determined by the possibilities to form coalitions and by the fallback positions. The possibilities to form coalitions are similar for the EC and the US. Since the position of the EC is closer to the fallback option than the position of the US, it is not surprising that the two countries came out with a rather conservative approach. From the discussion about the fallback option it can be expected, that the EC-US approach is at least slightly more ambitious than a Uruguay Round continuation.

The Uruguay Round part in the proposed blended formula would be a kind of "escape clause" for developed countries in an agreement. The countries can choose to reduce the highest tariffs by the minimum required reduction, e.g. 15 per cent as in the Uruguay Round. The next highest tariffs may be reduced applying a linear cut such that the agreed average cut is met. The Swiss formula may be applied to smaller tariffs and the smallest tariffs may be eliminated to account for the duty free access part of the blended formula. Applying this rule with the assumption that 45 per cent of tariff lines shall be subject to a linear cut with an average of 36 and a minimum of 15 per cent (as in the EC proposal), 45 per cent subject to the Swiss formula with a coefficient of 25 (as proposed by the US, but here applied on bound rates) and the remaining 10 per cent of tariff lines shall be duty-free, gives average reductions

of only 29 per cent in the EU, 22 per cent in the US and 27 per cent in Japan.<sup>16</sup> Both tariff peaks and tariff escalation would not be reduced by the blended formula.<sup>17</sup> Since the higher tariffs tend to be at the higher stage of processing, the approach limits the scope for value added industries in developing countries.

## **6. Analysis of the draft Cancun text**

Before Cancun, countries expressed their disappointment with the draft Ministerial text. Developed Cairns Group members want to see a less flexible and more ambitious round, whereas countries like Japan, Norway and Switzerland want more flexibility and less ambition. Most developing countries want the developed countries to liberalise but for rural development and food security reasons are reluctant to open their own markets. Some developed countries such as the European Union do not want to eliminate export subsidies, one of the most trade distorting policy instruments. There is unlikely to be an agreement unless the United States and the European Union agree. Hence the importance of the EC-US joint proposal. This has influenced considerably the draft Cancun text and thus it is important to analyse its consequences for others and especially for developing countries.

The two variants of the draft text are analysed according to their economic effects and in relation to previous proposals, mainly the Harbinson proposal that was favoured by several developing countries and which was the basis for discussion before the EC-US proposal was submitted.

Average price change provide an indication of the level of ambition of the various proposals. The trade weighted price increases are 2.2 per cent in the conservative Cancun simulation, 2.7 per cent in the ambitious Cancun and 3.1 per cent in the Compromise simulation. This compares with a weighted increase of 1.4 per cent in the Conservative and 5.8 per cent in the Ambitious scenario. Comparing world prices across the commodities confirms that the more highly protected sectors such as dairy products, sheepmeat, sugar, beef and vegetable oils are most affected in all scenarios. Price changes are lower for tropical than temperate products. In the conservative Cancun scenario the trade weighted average increase for tropical products is

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<sup>16</sup> Calculations are based on ad valorem equivalents at the six digit HS classification level. Source: UNCTAD.

<sup>17</sup> The draft Cancun text comprises a yet unspecified proposal to address tariff escalation. The calculation does not include initial zero duty tariff lines since it is not clear whether developed countries will have the flexibility to include tariffs that are already zero in the category of duty free access.

1.3 per cent compared with 2.8 per cent for temperate products. About half of the world prices increase can be attributed to the reduction of export subsidies and domestic support.

The changes in world prices have major distributional effects, both between countries and among different economic agents. Exporters gain from increasing world prices whereas importers are hurt by rising prices. Net food exporting countries benefit from more ambitious liberalisation scenarios and the reduction of subsidies. On the other hand, net food importing developing countries are expected to lose from a multilateral agreement because of the higher prices. In fact, 83 per cent of all net food-importing countries in the ATPSM dataset lose from the conservative Cancun scenario in terms of total welfare. The net food importing countries which do not lose from trade liberalisation are mostly those developed countries that benefit from reduced subsidies.

Considering the groups of consumers, producers and taxpayers, the results show that gains and losses are differently distributed among various country groups. In developed countries consumers gain and producers lose from reduction in domestic prices (tables 3 and 4). However, this result is strongly influenced by the EU numbers. Due to decreasing domestic prices in the EU there is huge consumer surplus that exceeds the negative producer surplus. The third component of the total welfare, government revenue (table 6) is on average positive in developed countries because of reduction in export revenue expenditure. In the US domestic prices rise and hence consumers are worse off whereas producers are better off under trade liberalisation.

**Table 3 Consumer surplus impacts from Cancun scenarios**

	<b>Moderate Cancun</b>	<b>Ambitious Cancun</b>	<b>Compromise</b>
	\$b	\$b	\$b
Developed	20'735	26'435	34'735
Developing	-18'524	-20'571	-18'023
Least Developed	-1'602	-2'041	-2'455
World	609	3'824	14'256
Group of 20	-11'080	-12'561	-11'558
Cairns	-5'799	-6'847	-7'090
European Union	18'997	21'391	23'940
United States	-3'706	-4'024	-4'950

*Source:* ATPSM simulations.

**Table 4 Producer surplus impacts from Cancun scenarios**

	<b>Moderate Cancun</b>	<b>Ambitious Cancun</b>	<b>Compromise</b>
	\$b	\$b	\$b
Developed	-17'688	-19'836	-24'403
Developing	18'217	20'612	19'204
Least Developed	1'451	1'857	2'230
World	1'980	2'632	-2'970
Group of 20	11'183	12'742	12'097
Cairns	6'669	8'122	8'900
European Union	-19'602	-20'904	-22'399
United States	4'054	4'690	5'845

Source: ATPSM simulations.

**Table 5 Welfare impacts from Cancun scenarios**

	<b>Moderate Cancun</b>	<b>Ambitious Cancun</b>	<b>Compromise</b>
	\$b	\$b	\$b
Developed	7'140	9'068	11'983
Developing	-425	-322	1'040
Least Developed	-134	-163	-199
World	6'581	8'583	12'824
Group of 20	174	215	920
Cairns	1'071	1'394	2'027
European Union	3'714	4'525	5'623
United States	485	677	846

Source: ATPSM simulations.

In developing and least developed countries consumers lose as a group and producers gain because the rise in world prices lifts domestic prices. The government revenue changes only slightly, between 1 and 2 per cent. In both Cancun scenarios the total welfare for developing and least developed countries is negative. This is influenced to a large degree by the reduction of export subsidies, which increases prices for temperate products, and somewhat by a reduction in quota rents on sugar received by a significant number of developing countries. Developing countries gain more from more ambitious scenarios like the Compromise scenario which require them to make significant reductions in applied tariffs, giving rise to allocative efficiency gains. Least developed countries, with a higher proportion of net food importing countries, lose more from more ambitious trade liberalisation. However, as in developing countries, producers gain more from the more ambitious scenario. Table 7 shows for all three scenarios that the least-developed countries have the highest percentage increase in export revenues, although from a low base. The merit of each proposal thus depends on whether policymakers emphasize the gains to producers, exporters, consumers or taxpayers.

**Table 6 Government revenue impacts from Cancun scenarios**

	Moderate Cancun		Ambitious Cancun		Compromise	
	\$b	%	\$b	%	\$b	%
Developed	4'093	34	2'469	21	1'652	14
Developing	-119	-1	-363	-2	-140	-1
Least Developed	17	1	21	1	26	2
World	3'992	12	2'127	6	1'538	4
Group of 20	72	1	34	0	381	4
Cairns	200	7	118	4	217	8
European Union <sup>18</sup>	4'319	3'214	4'038	3'005	4'081	3'037
United States	138	19	11	2	-49	-7

Source: ATPSM simulations.

**Table 7 Export revenue impacts from Cancun scenarios**

	Moderate Cancun		Ambitious Cancun		Compromise	
	\$b	%	\$b	%	\$b	%
Developed	-1'935	-2%	-380	0%	1'189	1%
Developing	11'624	12%	13'816	14%	16'557	17%
Least Developed	822	20%	1'072	26%	1'254	30%
World	10'510	5%	14'508	7%	19'001	10%
Group of 20	7'569	15%	8'980	17%	10'951	21%
Cairns	5'735	7%	7'154	9%	8'297	10%
European Union	-6'988	-29%	-6'595	-27%	-6'039	-25%
United States	2'607	7%	3'091	8%	3'941	10%

Source: ATPSM simulations.

From the observed policies it seems obvious that governments attach greater weight to producer rather than consumers.<sup>19</sup> Quite often there are internal political reasons for this. In developing countries the argument goes that in order to achieve development needs the poor rural population, where a large share depends on the agricultural sector, must be sponsored. The negotiation strategy of many developing countries, namely to demand improved access to developed countries' markets and eliminations of trade distorting subsidies and to protect their own markets, is consistent with this goal. It has, however, via rising domestic food prices, drawbacks for these countries' consumers.

<sup>18</sup> EU's initial government revenue is negative: -\$134 million.

<sup>19</sup> In section 5 this was discussed concerning the European Commission and the United States. Another example is the African Group opinion (34 of the 52 African countries are least-developed countries): "each Round of agriculture negotiations should aim at incremental reform, both in values and rule-making." (Initial remarks by the African Group to the joint EC-US paper on agriculture, WTO document TN/AG/GEN/8)

For the Group of 20 developing countries who formed a coalition and supported a counter-proposal to the EC-US joint proposal and for the Cairns Group the qualitative results are similar to the results for the group of developing countries: Producers gain slightly more than consumers lose and overall they gain more from more ambitious scenarios.

The estimated annual global welfare gains are \$6.6 and \$8.6 billion in the two Cancun scenarios compared to \$12.8 billion under the Compromise Scenario. Estimated global gains in the Conservative and the Ambitious scenario are \$5.3 and \$21.7 billion, respectively. Thus, the flexibility given to developed countries by the blended market access formula waters down the welfare gains. Even though the blended formula contains one tariff harmonizing Swiss formula component with a rather ambitious coefficient of 25, implementing the Uruguay Round numbers for the linear cut part of the blended formula gives almost the same overall welfare effects as a Uruguay Round continuation. Assuming the same smaller export subsidy and domestic support reductions in the conservative Cancun scenario as in the Compromise scenario (that is, reducing export subsidies by 55 per cent and domestic support by 45 per cent) gives global welfare gains of only \$6.2 billion. If in the Cancun scenario numbers like those proposed by Harbinson are assumed the global welfare gain is still only about two-third of the gain in the Compromise scenario. Therefore, the flexibility inherent in the blended formula gives developed countries wishing to protect their uncompetitive producers an advantage at the expense of agricultural exporting countries and developing countries as a group.

## **7. Conclusions**

In the negotiations on agriculture WTO members could not yet agree on modalities for further commitments. For the 5th Ministerial meeting at Cancun the General Council prepared a draft framework for establishing modalities in agriculture. Since the draft does not contain specific targets, it is difficult to judge the text and to assess its economic effects. In this paper we assume possible numbers drawn from previous proposals including the one from the Chair of the Committee on Agriculture, Mr. Harbinson. Global welfare benefits from liberalising the agricultural trade system are estimated to be less than those of the Harbinson proposal. It is shown that even with relatively ambitious numbers, the flexibility inherent in the blended formula, which was adopted from the joint EC-US paper, effectively waters down the proposal.

The missing numbers in the EC-US proposal makes it difficult to assess its level of ambition but it seems more in line with the limited liberalisation goal of the EU. It is shown that given the EC puts a sufficiently higher weight on producer surplus they should favour a more conservative approach. In the US producers gain more from an ambitious approach and since agricultural tariffs are already rather low in the US a tariff harmonizing formula like the Swiss formula would not decrease their tariffs much more than a linear cut. This picture fits with the revealed preferences by the US to favour a more ambitious round. However, for two reasons it is understandable that the EC and the US agreed on a flexible approach. Firstly, the fallback position is either the status quo, or given the Doha Declaration, a limited liberalisation scenario such as a continuation of the flexible Uruguay Round formula. This increases the EU's bargaining power. Secondly, both countries are better off with a multilateral agreement than with a unilateral step. This is true in both regards, total welfare and producer surplus. Thus, these two countries want an agreement, not only in agriculture but even more in the other negotiating areas not analysed here, including non-agricultural market access and services, of the Doha Round single undertaking.

The resulting compromise between the EC and the US is at the expense of net food exporting countries, producers in developing countries and global welfare gains. A result that was shown before for other liberalisation scenarios (see for example Vanzetti and Peters 2003) and also using different computable equilibrium models is that developing countries gain – as a group – more from a more ambitious liberalisation scenario because positive allocative efficiency effects start to outweigh the negative terms of trade effects. However, least-developed countries and net food importing developing countries are worse off if tariffs and subsidies are ambitiously reduced. Tariff cuts reduce quota rents to countries with preferential access and reductions in exports subsidies raises prices of temperate products that are imported rather than exported by many of these countries.

Since there are efficiency gains from liberalisation, finding an agreement is a question of compensating the losers. This is true within a country and among country groups. A solution to the current impasse is for developed countries to switch support from output-related to direct income support. By decoupling domestic support from production levels, the EU CAP reform is a step in the right direction. However, it is unlikely that this is a big enough step to encourage other countries to follow. If production levels could be reduced sufficiently for export subsidies to be eliminated, a successful agreement is much more likely. On a multilateral level, the World Bank and the IMF could play a role in compensating losing countries, although this is beyond the bounds of the WTO system. The EC could also

compensate ACP countries who lose from the erosion of preferences, just as it compensates its own producers for reductions in output related support.

Limitations to the analysis should be kept in mind. Our conclusions are based on the simulation of several proposals for an agreement on agriculture. However, not all elements of the proposals could be captured adequately. To simulate the draft Cancun Ministerial text assumptions about the bracketed numbers had to be made. Thus, the results have to be interpreted with care.

There are further limitations of the analysis that were mentioned above. One is the lack of knowledge of the distribution of quota rents. A second is the assumption in the model that domestic prices are determined by the higher out-quota tariff, in spite of the number of observed unfilled import quotas. Limitations that apply to all models of this nature are that estimated annual gains are static rather than dynamic, and, that adjustment costs are not taken into account. A more ambitious scenario causes higher adjustment costs, which are likely to be higher in developing countries than in developed countries. Finally, data quality is an issue, especially when considering the results for a particular country or sector.

In spite of these limitations, the results provide a useful indication of the possible impacts of an agreement on a framework like the draft Cancun Ministerial text. It is likely that the modalities will not be very ambitious. However, if developing countries push for a more ambitious round, they would benefit from undertaking some liberalisation themselves. Least developed countries and net food importing countries should be aware of the negative impacts of rising food prices. Furthermore, developing countries should address the flexibility that a blended formula gives developed countries.

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## Appendix

### Country coverage in ATPSM

Developed	Developing	Developing (cont.)	Least developed
Australia	Albania	Latvia	Afghanistan
Brunei	Algeria	Lebanon	Angola
Canada	Argentina	Libya	Bangladesh
China Hong Kong	Armenia	Lithuania	Benin
China Taiwan	Azerbaijan	Macedonia	Burkina Faso
Cyprus	Bahamas	Madagascar	Burundi
European Union	Barbados	Malawi	Central African Rep.
French Polynesia	Belarus	Malaysia	Cambodia
Iceland	Belize	Malta	Cape Verde
Israel	Bolivia	Mauritius	Comoros
Japan	Bosnia Herzegovina	Mexico	Congo
Kuwait	Botswana	Moldova	Congo Dem. Rep.
Macao	Brazil	Mongolia	Djibouti
Neth. Antilles	Bulgaria	Morocco	Eritrea
New Zealand	Cameroon	Namibia	Ethiopia
Norway	Chad	Nicaragua	Gambia
Slovenia	Chile	Nigeria	Guinea
Switzerland	China	Pakistan	Guinea Bissau
U. A. Emirates	Colombia	Panama	Haiti
United States	Costa Rica	Papua New Guinea	Lao PDR
	Croatia	Paraguay	Lesotho
	Cuba	Peru	Liberia
	Czech Rep.	Philippines	Maldives
	Dominica	Poland	Mali
	Dominican Rep.	Romania	Mauritania
	Ecuador	Russia	Mozambique
	Egypt	Saudi Arabia	Myanmar
	El Salvador	Seychelles	Nepal
	Estonia	Slovakia	Niger
	Fiji	South Africa	Rwanda
	Gabon	Sri Lanka	Sao Tome
	Georgia	St. Lucia	Senegal
	Ghana	St. Vincent	Sierra Leone
	Grenada	Suriname	Solomon Islands
	Guatemala	Swaziland	Somalia
	Guyana	Syria	Tanzania
	Honduras	Tajikistan	Togo
	Hungary	Thailand	Uganda
	India	Trinidad Tobago	Vanuatu
	Indonesia	Tunisia	Yemen
	Iran	Turkey	Zambia
	Iraq	Turkmenistan	
	Ivory Coast	Ukraine	
	Jamaica	Uruguay	
	Jordan	Uzbekistan	
	Kazakhstan	Venezuela	
	Kenya	Viet Nam	
	Korea DPR	Yugoslavia	
	Korea Rep.	Zimbabwe	
	Kyrgyzstan		

*Note:* Among the 49 least developed countries, Bhutan, Chad, Equatorial Guinea, Kiribati, Madagascar, Malawi, Samoa, Somalia, Sudan, Togo and Tuvalu are not included in the model.

## Commodities in ATPSM

<b>Meat</b> 01100 Bovine meat 01210 Sheepmeat 01220 Pigmeat 01230 Poultry	<b>Vegetables</b> 05420 Pulses 05480 Roots, tubers 05440 Tomatoes
<b>Dairy products</b> 02212 Milk, fresh 02222 Milk, conc. 02300 Butter 02400 Cheese	<b>Fruit</b> 05700 Apples & pears 05710 Citrus fruits 05730 Bananas 05790 Other tropical fruits
<b>Cereals</b> 04100 Wheat 04400 Maize 04530 Sorghum 04300 Barley 04200 Rice	<b>Beverages</b> 07110 Coffee green bags 07120 Coffee roasted 07131 Coffee extracts 07210 Cocoa beans 07240 Cocoa butter 07220 Cocoa powder 07300 Chocolate 07410 Tea
<b>Sugar</b> 06100 Sugar	<b>Tobacco and cotton</b> 12100 Tobacco leaves 12210 Cigars 12220 Cigarettes 12230 Other tobacco - mfr. 26300 Cotton linters
<b>Oils</b> 22100 Oil seeds 42000 Vegetable oils	