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Global Trade Analysis Project

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Food and Agricultural Markets at the Advent of the next WTO Round

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Abstract

The November 2001 declaration of the 4th Ministerial Conference in Doha provides the mandate for negotiations on a range of subjects, including agriculture. Negotiations on this topic began in early 2000 and are to end by 1 January 2005. A large number of governments have already submitted a negotiating proposal and besides aspects like special and differential treatment for developing countries and non-trade concerns, the classical themes market access, export subsidies and domestic support will again be high on the agenda.

Analyzing a possible outcome of the WTO, we use the comparative-static general equilibrium GTAP (Global Trade Analysis Project) model. To allow for deeper insight, the standard version of the model is accompanied by a more specific modeling of WTO related trade instruments like tariff rate quotas and limits on subsidized exports. Additionally, instruments of the Common Agricultural Policy of the EU, e.g. production quotas and EU-budget, are also implemented in greater detail. Due to the nature of these instruments the complementarity approach of Gempack 8.0 is used.

Since full impact of possible WTO outcomes is expected to take place in 2012 a range of preparatory simulations is required including projections based on external forecasts on macroeconomic developments, Agenda 2000 and EU enlargement. Taking into account a post EU enlargement situation in 2012, different stylized WTO scenarios will be carried out reflecting proposals like cut of all import taxes, reduction of direct payments, abolishment of export subsidies and expansion of tariff rate quotas.

In the simulations, GTAP Data Base Version 5.2 will be used to generate an aggregation of 10 agricultural sectors, 7 food sectors and 3 non-agricultural sectors as well as 10 regions including beneath others EU-27, USA and CAIRNS and five production factors. Expected findings will cover impacts on trade, production and prices, and will enable us to detect sensitive sectors and regions concerning the different proposals.

1 Introduction

The November 2001 declaration of the 4th Ministerial Conference in Doha provides the mandate for negotiations on a range of subjects, including agriculture. Negotiations on this topic began in early 2000 and are to end by 1 January 2005. A large number of governments have already submitted a negotiating proposal and besides aspects like special and differential treatment for developing countries and non-trade concerns, the classical themes market access, export subsidies and domestic support will again be high on the agenda.

At the beginning of the year, the so-called Harbinson Paper was launched seeking to compromise the various proposals of the WTO trading partners. This paper assesses the results of the upcoming WTO trade negotiations. Interdependencies between agricultural sectors as well as upstream and downstream industries have to be considered. An evaluation of the proposal is very complex and thus, demands the inclusion of numerous factors. Furthermore, the nature of WTO negotiations demands for a multi-region general equilibrium approach. This analysis was therefore conducted using the general equilibrium model GTAP (Global Trade Analysis Project) which advantageously includes a detailed disaggregation of the agricultural sector.

The standard GTAP model is extended by numerous additional features. These features particularly allow for a detailed representation of the CAP (Common Agricultural Policy), like production quotas, set-aside or the EU budget. The additional focus of this analysis on international trade demands a more precise illustration of trade policies particularly affecting the EU. This comprises limitations on subsidized exports in the framework of the WTO commitments and tariff rate quotas (TRQs) where import quotas with reduced tariff rates are applied as an instrument complying with the minimum access commitment.

The following analyses emphasize the so-called Harbinson Paper which was edited for the first time on February 12, 2003 and on March 13, 2003 as a revised version. Based on the extended model in a first experiment the impact of the overall Harbinson Proposal is derived. The following experiments simulate effects of the different instruments proposed.

2 Harbinson Proposal

In March 2003 the so-called Harbinson Paper was launched, which summarizes the national/regional proposes of the WTO negotiations in the form of a modality paper.

The Harbinson Paper shows that the classic negotiation topics are still in the center of the Doha Round. These concern the fields of market access, domestic support and export subsidies. In developed countries (developing countries) 3 (4) ranges of reductions are defined according to their notified GATT commitment. For tariffs with a base level of 90 % and higher an average reduction of -60 % and a minimum reduction of -45 % is proposed. Within the range of smaller 90 % and higher than 15 % the according average and minimum rates are -50 % and -35 %. Tariff rates with a base level of smaller or equal to 15 % are to be reduced by -40 % and by -15 %. Concerning developing countries lower average and minimum reduction rates are applied.

Furthermore, the Harbinson Paper proposes an expansion of tariff rate quotas to 10 % of present domestic consumption. However, tariff rates within the tariff rate quotas envisage no changes as long as the fill rates of the tariff rate quotas exceed 65 %.

With respect to export subsidies the Harbinson Proposal calls for a 100 % cutback of the value of export subsidies and the quantity of subsidized exports.

The Harbinson Paper also favors a reduction of domestic protection of the agricultural sector cutting back the AMS by -60 % in annual equal reduction steps in developed countries. In developing countries this reduction accounts only for -40 %. At the same time it should be

assured that the AMS of individual products do not range beyond the average level of the years 1999 to 2001. According to the Harbinson Paper there exist two alternatives concerning the treatment of direct payments bound to production. First, direct payments might be limited to the notified level and then be reduced by -50 %. Secondly, direct payments might be integrated in the AMS presently notified in the GATT and then be reduced by -60 % in the course of the AMS reduction. Furthermore, it is proposed to maintain the “Green Box”. Thereby payments in the framework of environmental programs and under consideration of animal welfare aspects might be incorporated. Up to now the so-called “De Minimis” Regulation enabled subsidization of agricultural products by less than 5 % (10 %) of production value in developed (developing) countries. With respect to developed countries the Harbinson Paper hereby proposes an annual reduction of -0.5 %.

3 Methodology

3.1 Standard Model

The analyses in this paper are based on the comparative-static standard multi-regional Global Trade Analysis Project (GTAP) model. It provides an elaborate representation of the economy including the linkages between farming, agribusiness, industrial, and service sectors of the economy. The use of the non-homothetic constant difference of elasticity (CDE) functional form to handle private household preferences, the explicit treatment of international trade and transport margins, and a global banking sector which links global savings and consumption is innovative in GTAP. Trade is represented by bilateral trade matrices based on the Armington assumption. Further features of the standard model are perfect competition in all markets as well as a profit and utility maximizing behavior of producers and consumers. Usually policy interventions are represented by price wedges. They lead to different prices according to different market stages. Price differentiation adjusts via introduction or change of taxes and subsidies respectively. Quantitative restrictions or quantitatively induced price adjustments do not exist in the standard version. The framework of the standard GTAP model is well documented in the GTAP book (HERTEL, 1997) and available on the internet (<http://www.gtap.agecon.purdue.edu/>).

3.2 Model Extensions

Macroeconomic developments also occur in the absence of changes in the political environment via population growth or particularly via technical progress. In order to consider these variables corresponding trends are incorporated in the analysis at-hand. For this purpose an approach of WALMSLEY et al. (2000) was used which allows for including exogenous prospects about global development of GDP and factor endowment in a model. In the following simulations technical progress is generated endogenously by the model enabling the projected growth pattern. We would like to thank Frank van Tongeren for his help with the implementation of the projection module.

Since agricultural policy instruments are represented via price wedges in the standard model it is necessary to consider the instruments of the CAP, the EU institutions as well as the instruments important to the WTO negotiations in the model in order to conduct a detailed analysis. Therefore the Standard GTAP Model is complemented by the following elements:

- Set-aside
- Sugar and milk quotas
- EU budget
- Export limits
- Tariff Rate Quotas (TRQs)

The EU budget is introduced in the GTAP model using an innovative Social Accounting Matrix (SAM). This SAM not only covers the expenditures and revenues of already existing agents (e.g. producers, government, private household, etc.), but also of the European Agricultural Guidance and Guarantee Fund (EAGGF). As formulated in EU law (EU, 2002b), the EU budget receives 90 %¹ of the import duties for agricultural and non-agricultural products from producers, the private household, the government and the capital account. Additional revenues result from an endogenously calculated GDP related tax which flows from the regional household to the EU budget. Here, all EU member countries face an equal GDP tax rate. Revenues of the EU budget are used to cover agricultural output and export subsidies as well as direct payments. In contrast to these product specific instruments, expenditures for structural policies are not covered within the EU budget module. Due to their characteristics and specific aims, structural funds can not be allocated to certain commodities. This strongly hampers their implementation into a product specific model like GTAP.

Obviously, revenues of the EU budget from one member country are not identical with the expenditures the EU budget is spending on the same member country. A comparison of revenues and expenditures of each member state therefore shows the net transfer that takes place within the EU financial system. Analogous to capital transfer, the net transfer within the EU is part of the current account balance which makes up the difference between exports and imports of goods and services. However, the sum of net transfers of all member countries equals zero, since the EU budget is balanced via the endogenous GDP tax rate.

In the Standard GTAP Model EAGGF revenues and expenditures are organized through the regional household. All components of the EU budget are therefore introduced with the help of dummy variables allowing an easy shift from regional household to EU budget and vice versa. Consequently, a preliminary simulation is employed to move the GTAP data base from the initial situation without an EU budget to an equilibrium where the EU budget is in charge of the EAGGF (BROCKMEIER, 2003 and BROCKMEIER et al., 2001).

An adjustment of the EU's trade regime will also affect prices on the internal market and thereby the raw milk and sugar market which are both regulated via quantitative restrictions. Whether a quota regulation leads to production restrictions is dependent on the expected price reductions. As long as market prices exceed production costs the quota is binding. When the relevant price drops below production costs the production quota is referred to as non-binding. Thus, concerning the quota modeling a formulation which allows for binding as well as non-binding quota systems is favorable. For the following simulations the present quota formulation (BROCKMEIER et al., 2001) is replaced by a formulation which is based on a complementary principle (VAN TONGEREN, 2002). This approach allows for switching endogenously from a binding to a non-binding state. Additionally the value of the quota rent is determined endogenously. This means that in the case where the tax equivalent of the quota rent is greater than zero and the difference between quota and output equals zero the quota is binding. Vice versa the quota is classified as non-binding when the tax equivalent is equal to zero and the difference between quota and output is greater or equal to zero. Without taking into account other possible taxes and subsidies the market price of

¹ This was reduced to 75 % in 2001.

commodities subject to a quota is determined by the agent's price and the quota rent. The quota rent is collected as an additional income.

The implementation of import quotas and particularly TRQs is of great importance for the simulations. The latter represent the expansion of simple import quotas. BACH and PEARSON (1996) and ELBEHRI and PEARSON (2000) introduce an innovative approach to implement TRQs in their papers. Similar to production quotas in our paper the implementation of the TRQs in the GTAP model is based on the condition of complementarity.

It is assumed that in the initial situation a supply function is valid representing the import quantity determined by the quota. Besides the quantitative restriction there is also a tariff applied within the TRQ. In contrast to the exclusive modeling of TRQs including an additional import tariff involves a differentiation between world and domestic prices of imports right from the start. In the case of a non-binding import quota a limited quantity can be imported at the corresponding world market price in addition to a reduced import tax rate² (= domestic price of in-quota imports). If the import quantity exceeds the tariff quota the import price increases for the additional quantity to the world market price plus the higher over quota tax rate (= domestic price of out-of-quota imports). A quota rent arises determined by the difference between out-of-quota and in-quota domestic prices of imports multiplied by the quantity resulting from the quota limitation. Thus, a shift in demand implies an increase of the domestic price of imports without a change in import quantity. According to the specifications the quota rent is distributed among producers or to the regional household of the export or import country.

According to their importance TRQs are not established for all sectors but only for wheat and food processing sectors. Relevant information are derived from the AMAD data base combined with additional information from other sources (GATT schedules, BMVEL, ZMP).

The export limits according to the GATT commitments are also implemented with the aid of the complementarity feature within GEMPACK 8.0. Here applies the reversed situation of import quotas. The quantity of exports which is subject to export subsidies is limited by a quota. Exports exceeding this quota do not receive any export support. If the relation between actual exports and the export limit is less than one then the domestic price for exports is lowered via an export subsidy to the world market price. In this situation a quota rent arises equal to the difference between the domestic export price and the world market price multiplied by the export limit. In the reversed situation with the relation between the actual exports and the export limit being equal or greater one the domestic export price for additional exports is equal to the world market price. Here no quota rent occurs. According to the specification the quota rent is distributed among producers or to the regional household of exporters or importers. Within our simulations export limits are only applied to the EU and the USA. Proper information on other regions were hardly available or in other cases limitations did only scarcely match our regional or sectoral aggregation. Data concerning the composition of limitations of export subsidies and their exhaustion in terms of quantities and subsidies are taken from ELBEHRI (2002) (see table A1).

² This tax rate may also be equal to zero.

3.3 Database

The data set used is the GTAP database version 5.2 with 1997 as the base year. Basically, the data base consists of bilateral trade, transport, and protection matrices that link 67 country / regional economic data bases whereas 14 out of the 67 countries are composite regions, e.g. Rest of Latin America (LAM) or Sub-Saharan Africa (SSA). Moreover, 57 sectors are covered including a very detailed agricultural sector with 12 agricultural primary sectors and 8 food processing sectors. The remaining sectoral part comprises services, manufacturers and other primaries. Finally, besides those country and sector matrices, the database also contains 5 factors, namely, land, capital, unskilled and skilled labor, and natural resources.

The version 5.2 GTAP data base is supplemented by information on export limits and corresponding degrees of bindings. Macroeconomic projections are implemented using exogenous data for all regions worldwide, which are incorporated in the model. These data are adopted from WALMSLEY et al. (2000) (see table A2).

3.4 Data Aggregation

In order to keep calculation effort in a reasonable frame the data base is combined in 10 regions and 20 sectors (see table 1). This aggregation on the one hand enables the model to solve in an adequate time frame and on the other hand allows for taking into account important trading and negotiation partners of the EU, like for example the USA and CAIRNS, as well as representing the next EU accession.

With regard to the EU Eastern enlargement the used aggregate EU-27 comprises the complete EU-15 and 12 Central and Eastern European states (Bulgaria, Estonia, Latvia, Lithuania, Poland, Romania, Slovakia, Slovenia, Czech Republic, Hungary, Malta and Cyprus.).

Table 1: Aggregation of the GTAP-Database Version 5.2

| Sectoral Aggregation | |
|-----------------------------|-------------------------------------|
| wheat | wheat |
| othcereal | other cereals |
| oilseeds | oilseeds |
| sugarraw | sugar beets and sugar cane |
| rice | rice |
| vegfruit | vegetables and fruits |
| othplants | other plants |
| cattle | cattle, goats, sheep, horses |
| othanim | other animals (incl. pigs, poultry) |
| milk | raw milk |
| beef | beef |
| othmeat | meat of other animals |
| oils/fats | vegetable oils and fats |
| dairyprod | dairy products |
| sugar | sugar |
| othfood | other food |
| drink/tab | drinks and tobacco |
| primary | other primary products |
| industry | industrial products |
| services | services |

| Regional Aggregation | |
|-----------------------------|---------------------------------------------------------------------------|
| EU-27 | member states of the EU-15 and 12 central and eastern European countries* |
| CAIRNS | CAIRNS-group |
| USA | USA |
| AIL | other industrial countries |
| CHN_TW | China, Hongkong and Taiwan |
| FSU | former Sovjet Union |
| EBA | countries of the "Everything But Arms" group |
| AAKP | other ACP countries |
| AEL | other developing countries |

* Bulgaria, Estonia, Latvia, Lithuania, Poland, Romania, Slovakia, Slovenia, Czech Republic, Malta, Cyprus and Hungary

4 Simulations

Before the actual simulations are carried out it is necessary to conduct some pre-simulations to implement the extension of the model structure and to update the protection rates (see figure 1). This comprises CAP instruments, tariff rate quotas, export limits and the Common Budget of the EU (see table A3). Additionally, the tax rates of the EU are adjusted from bound to applied rates.

Based on the results of the pre-simulation a base run is conducted, which represents a projection of the exogenous variables population, Gross Domestic Product (GDP) and factor endowment (skilled and unskilled workers, capital) up to the year 2002. For this simulation the values presented in table A2 are used. Afterwards a second projection up to the year 2005 is carried out while at the same time the AGENDA 2000 is implemented (see table A4). Accordingly, direct payments for cereals, oilseeds, raw milk and beef are adjusted.

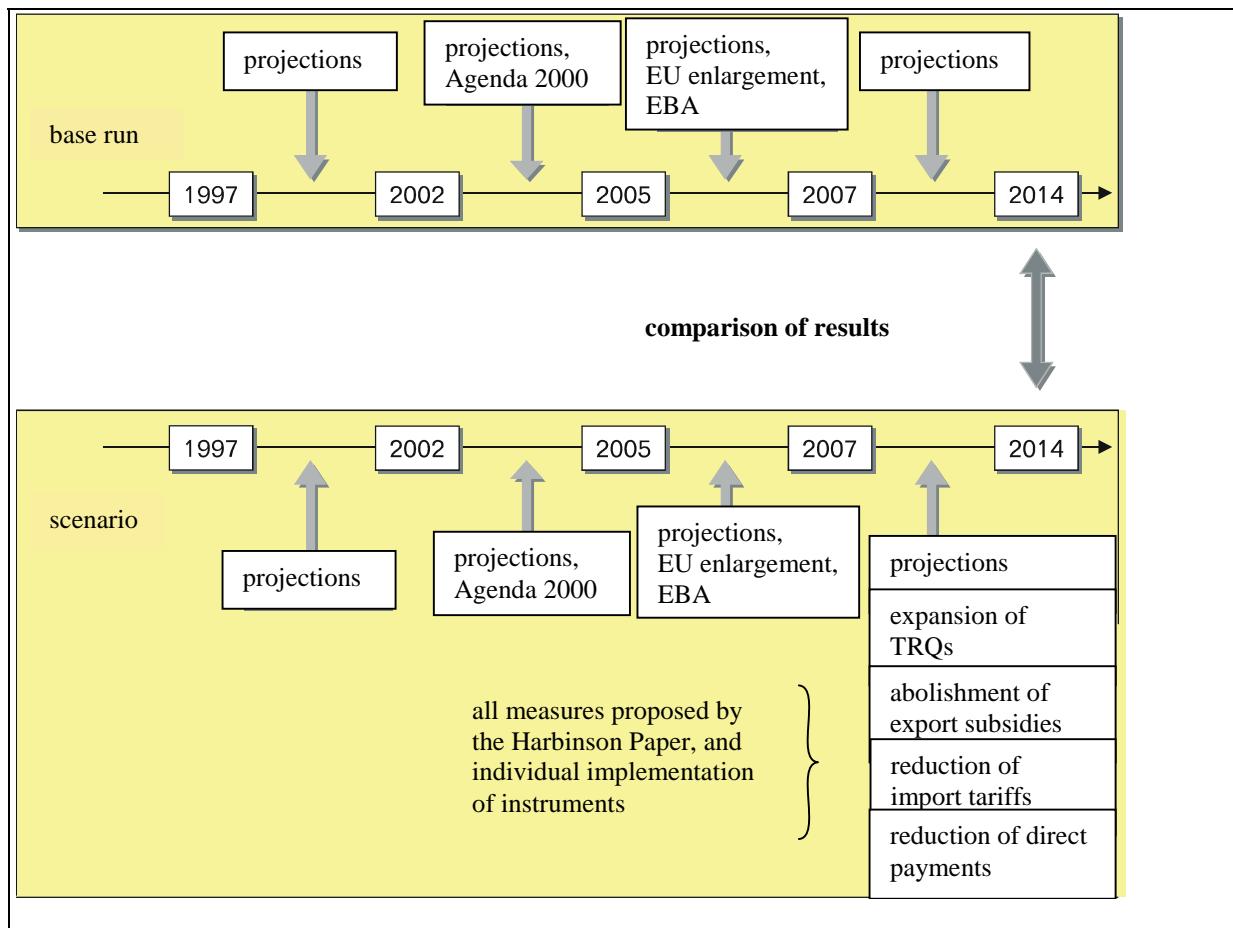
Furthermore, cutbacks of intervention prices for cereals, dairy products and beef are simulated via a reduction of protection and the milk quota is expanded by 2.4 %. In addition, the set aside rate is reduced by -5 % resulting in an increasing efficiency of land use in plant production.

Like before the third base run conducts projections of population, GDP and factor endowment development in the 2005 – 2007 period. This time the EU enlargement forthcoming in this period is incorporated in the calculations (see table A5). This includes a customs union with all bilateral trade barriers abolished between the EU-15 and the MOEL. Additionally, a common protection regime is established for all sectors. All CAP instruments are transferred to the new member states. Besides the EU enlargement this base run also considers the implementation of the Everything-But-Arms (EBA)-agreement abolishing all EU-27 tariffs applied to the imports of these countries.

Finally, the last simulation of the base run projects population, GDP and factor endowment to the year 2007 and 2014 level, respectively. Like before the information provided in table A2 are used.

The base run only considers political intervention in the EU-15 and in the candidate countries. Developments in other regions, like the Farm Bill of the USA, are not taken into account.

Figure 1: Procedure of Base Run and Simulations



4.2 Scenarios

On the basis of the pre-simulations explained in the previous section a scenario is implemented as well. It takes account of the same projections and policy shocks (Agenda 2000 and EU enlargement) as the base run. In the time period from 2007 to 2014 it additionally includes simulations related to the recent WTO round. Here, the measures proposed in the Harbinson Paper are implemented altogether and individually³. This approach allows for an impact analysis of liberalizing each single policy intervention proposed. Thus, in 2014 five different scenarios are carried out, four of them implementing a shock on one specific policy instrument:

- Implementation of the Harbinson Paper including all measures
- Abolishment of all export subsidies
- Expansion of tariff rate quotas to 10% of domestic consumption
- Reduction of import tariffs ranging from -40% to -60% (-20% to -40%) in developed (developing) countries
- Cut back of direct payments by -50%

The effects of the WTO round and the single instruments are obtained by comparing the results of the base run and the scenario in 2014.

5 Results and Interpretation

At the outset of each section analyzing effects on output, prices and trade balance a brief overview of the results generated by a full implementation of the Harbinson Proposal is provided. This is necessary in order to get an idea about the outcome of the total agenda and then by looking at each single component individually to comprehend its impact strength. Thus, for a right understanding of the results it is important to notice that the results presented here exclusively represent net effects of the individual policy intervention; i.e. effects induced by other factors, like population and GDP growth etc. are not taken into account. Furthermore the influence of all policies presently applied in the regions considered is ignored as well. These adjustments of the results enable an extraction of pure non-distorted impacts only resulting from the policy changes proposed in the Harbinson Paper alone.

The results presented in the following sections are documented according to the GTAP data base in US million \$. Hereby, a 1997 base level is assumed. Based on the version 7.0 of the software GEMPACK (General Equilibrium Modeling Software) and with the aid of the additional modules RunGTAP and AnalyseGE (compare HARRISON and PEARSON, 1996)⁴ the calculations were conducted

³ Here, it has to be considered that synergy effects arising from the interaction between the different policy instruments do not apply. Thus, the impacts of the single shocks do not completely add up to the effects of the full Harbinson Proposal. The option of generating subtotals within RunGTAP was due to technical problems not applied here.

⁴ For further information about the software and the modules compare:

GEMPACK: www.monash.edu.au/policy/gempack.htm

RunGTAP: www.gtap.agecon.purdue.edu/products/utilities/rungtap/default.asp

5.1 Effects on Output

The results presented in table 2 show that an implementation of the complete Harbinson Paper particularly affects plant production sectors, like wheat, other cereals and oilseeds. In developed third countries the strongest cutbacks in production are observed with reductions of almost -50 % in the wheat and almost -30 % in the oilseeds sector (compare table 2). Similar effects can be observed in the EU-27 where almost every agricultural sector is reduced in its output. Outstanding production expansions occur in the CAIRNS group's wheat sector (11.8 %) while smaller effects are observed in the sugar, other cereals and oilseeds sector. The two developing regions are able to expand their wheat production by 5.1 % (EBA) and 1.5 % (AEL), while they experience reduced production in all other sectors as well.

Table 2: Change in Production Resulting from the Implementation of the Total Harbinson Proposal (in %)

| sectors | EU-27 | CAIRNS | USA | AIL | EBA | AEL |
|------------|-------|--------|-------|-------|-------|------|
| wheat | -7.9 | 11.8 | -12.2 | -48.3 | 5.1 | 1.5 |
| othcereal | -13.1 | 4.1 | 0.8 | -6.5 | 0.4 | -4.3 |
| oilseeds | -5.4 | 2.6 | 4.4 | -29.9 | -1.1 | -2.5 |
| sugarraw | 0.2 | 2.5 | 0.8 | -5.5 | -4.9 | 0.2 |
| vegfruit | 3.4 | -1.3 | 8.1 | -5.8 | -1.0 | -0.6 |
| othplantpr | 0.6 | 1.7 | 2.7 | -3.8 | -2.4 | -1.7 |
| cattle | -3.9 | 2.0 | 1.5 | -6.7 | -0.2 | -0.5 |
| othanim | 0.9 | -1.6 | 3.3 | -0.4 | -0.4 | -1.0 |
| milk | -0.7 | 1.3 | 0.2 | -3.0 | -0.2 | 0.3 |
| beef | -3.9 | 2.1 | 1.1 | 0.0 | -0.8 | -1.0 |
| othmeat | 0.2 | -1.3 | 2.5 | -5.7 | -0.6 | -3.5 |
| oils/fats | -0.9 | 0.4 | 1.3 | 12.4 | -5.5 | -1.9 |
| dairyprod | -1.4 | 2.8 | 0.1 | -3.7 | -0.8 | 1.2 |
| sugar | 0.0 | 4.1 | 0.9 | -5.4 | -15.6 | -0.1 |
| othfood | -2.8 | 0.0 | 0.3 | 1.6 | -1.0 | 1.2 |
| drink/tab | 0.9 | -0.7 | 0.1 | 0.7 | 0.3 | 0.3 |
| primary | 0.1 | -0.1 | 0.1 | 0.0 | 0.2 | 0.0 |
| industry | 0.2 | -0.4 | -0.2 | 0.1 | 1.3 | 0.2 |
| services | 0.1 | -0.1 | 0.0 | 0.0 | 0.1 | 0.0 |

Source: own calculations

According to the type of policy intervention the impact size differs (see table A6). The most prominent effects on output can be observed in the case where import tariffs are cut back inducing a reduction in wheat production of more than -50 % in other developed countries (AIL). Since import tariffs are heavily used in these countries most of the outstanding results generated by this scenario occur in the AIL. Besides the enormous impacts on the wheat sector the results also show heavy cutbacks concerning production of oilseeds, other cereals, sugar, vegetables and fruits. The only sector accounting for a significant expansion is the vegetable fats and oils sector with an 11.5 % increase in production. With regard to the other developed regions EU-27, CAIRNS and USA, the effects are rather meager resulting from a relatively low base level of protection. However, other regions experiencing changes in their agricultural output performance are the countries grouped together in the "Everything But Arms" agreement (EBA). In this region the reduction of import tariffs leads to a decrease in the production of processed sugar (-9.9 %) and vegetables oils and fats (-5.8 %). It has to be taken into account that the EBA agreement established in the base line allowed for duty free imports of all products into the EU. A lowering of EU import protection for other regions leads to an erosion of the preferential situation of the EBA countries. Furthermore, these

countries have to reduce their import tariffs as well. In the case of other developing countries (AEL) the most prominent production cutbacks of -5.2 % and -4.2 % occur in the other cereals and dairy products sector, respectively. In these sectors relatively high tariff rates are applied. The results in table A6 also show that the industrial, service and primary sectors almost remain untouched. This is because these sectors are comparably bigger than the agricultural sector and experience only a very low level of protection that remains unchanged.

While the import tariff reduction accounts for some outstanding effects the cut of direct payments by -50 % leads to a wide distribution of relatively strong impacts across all regions considered. At a sectoral level the reduction of direct payments mainly affects the wheat, other cereals and oilseeds sector. Strong impacts can be observed in the cereals sector especially for wheat in the EU-27 and the USA where production is curbed by -6 % and -14 %, respectively. Therefore, import demand for wheat is growing and production is significantly extended by 7 % in CAIRNS. The production of oilseeds decreases in other developed countries (AIL) by -18 %. However, due to a low total production quantity this has only minor impacts. This sector accounts for the highest rate of direct payments on land applied in the group of other developed countries so that it gets hit hard by the cut in direct payments. This situation is reversed in the USA, since here the oilseed sector is only subject to a relatively low protection rate. In spite of this expansion tendencies, the USA also have to cut back their agricultural production particularly in the wheat sector. Resulting from a very high base level of protection the USA reduce their wheat production by -14 % along with the EU-27 showing a reduction of -6 %. At the same time wheat output increases in all the other remaining areas by up to 7 %. The heavy cut in direct payments particularly affects plant production in developed regions (EU-27, USA, CAIRNS, AIL) since this policy instrument is only applied here. Accordingly output of those highly protected products is reduced at most.

While the production of wheat, other cereals and oilseeds in the EU-27 and the USA is reduced both regions experience output expansions in the vegetables and fruits, and in other plant production sectors resulting from positive allocation effects. For the developing countries the only sector showing positive effects by the cut in direct payments is the wheat sector.

In the next scenario all export subsidies and export taxes formerly imposed on agricultural export commodities are completely abolished. This policy shock particularly affects the EU-27. Indirectly the abolishment of export subsidies effects also the CAIRNS group and the countries of the EBA group. In the EU-27 basically all sectors experience a reduction in output. The most significant cutback is given in the production of other cereals and oilseeds decreasing by -7.5 % and -2.3 %, respectively. In contrast to the EU-27's reduction tendency the CAIRNS group is able to expand agricultural production in various sectors. In this region the strongest output expansions concern other plant products (5.7 %), sugar (4.2 %) and dairy products (4 %). A look at the developing countries (EBA, AEL) shows that these regions predominantly experience decreasing output values, but the corresponding changes are rather marginal. However, a heavy reduction of -8.2 % occurs in the EBA countries' sugar sector due to the preferential access to the EU domestic market where prices experience a fall of -13 % (see next section). At the same time the group of other developing countries is able to expand its dairy production by 5.3 %.

The last policy intervention considered represents an expansion of the tariff rate quotas according to the Harbinson Proposal. This policy shock accounts for the smallest effects. Plant production decreases by less than -1 % and output in the beef sector by -1.2 % in the EU-27, while the impacts appearing in the remaining regions are even smaller.

Generally, the policy intervention of direct payments yields the most significant effects mostly in form of a production decrease (compare table A6). These effects particularly occur in plant production, like e.g. wheat and oilseeds. Furthermore strong impacts in plant

production can also be observed in the case of reduced import tariffs. Hereby, the effects almost exclusively appear in the group of other developed (AIL) and other developing countries (AEL) and in the EBA countries. The abolishment of export subsidies only shows significant effects in the EU-27 and other industrial countries (AIL) as well. From a sectoral perspective it becomes obvious that plant production sectors particularly wheat, other cereals, oilseeds and sugar are the most affected sectors while primary, industrial and service sectors mainly remain untouched.

5.2 Effects on Market Prices

With respect to changes in market prices induced by the implementation of the full Harbinson Proposal it is again plant production accounting for the strongest effects (compare table 3). In the EU-27 the wheat and the other cereals sector experience heavy price increases – both approximately by 10 % - while in the sugar production sector the market price gets eroded with a -26.2 % decrease. Similarly in the CAIRNS group and the USA the wheat and the other cereals sector also show increased market prices. With respect to both developing regions (EBA, AEL) almost every sector suffers due to price erosion. However, the most prominent price effects occur on the factor market; i.e. on the land market (see figure 2). Except for the CAIRNS region the Harbinson Proposal leads to heavy land price erosions ranging from almost -55 % in the EU-27 to -5.6 % in the group of other developing countries (AEL). The USA and the other developed countries experience a decrease of each more than -20 %.

Table 3: Change in Market Prices Resulting from the Implementation of the Total Harbinson Proposal (in %)

| sectors | EU-27 | CAIRNS | USA | AIL | EBA | AEL |
|------------|-------|--------|------|-------|------|------|
| wheat | 10.4 | 5.1 | 15.1 | -6.8 | -0.3 | -0.6 |
| othcereal | 10.9 | 3.6 | 8.6 | 3.0 | -1.7 | 1.6 |
| oilseeds | 0.7 | 2.8 | -1.9 | -0.1 | -2.9 | -3.0 |
| sugarraw | -2.3 | 2.4 | -3.9 | -1.7 | -3.8 | -2.0 |
| vegfruit | -4.8 | 1.5 | -4.2 | -3.3 | -2.3 | -2.0 |
| othplantpr | -4.5 | 2.1 | -6.4 | -3.3 | -2.1 | -2.7 |
| cattle | 5.5 | 2.4 | 1.4 | -1.6 | -1.9 | -1.3 |
| othanim | -1.5 | 1.5 | -1.2 | -0.8 | -2.0 | -1.4 |
| milk | -1.2 | 2.0 | 2.1 | 1.3 | -2.9 | -1.6 |
| beef | 1.9 | 1.4 | 1.0 | -0.8 | -1.4 | -0.8 |
| othmeat | -0.6 | 1.0 | 0.1 | -1.2 | -1.3 | -1.2 |
| oils/fats | -0.5 | 0.8 | -1.1 | -15.9 | -1.9 | -2.1 |
| dairyprod | -0.3 | 1.0 | 1.2 | 0.7 | -1.2 | -0.7 |
| sugar | -26.2 | 1.3 | -1.5 | -6.0 | -1.7 | -0.9 |
| othfood | -0.7 | 0.9 | 0.6 | -1.9 | -1.0 | -1.2 |
| drink/tab | -0.9 | 0.4 | -0.1 | -0.6 | -0.8 | -0.5 |
| primary | 0.3 | 0.2 | 0.1 | 0.3 | 0.2 | 0.3 |
| industry | 0.2 | 0.3 | 0.3 | 0.2 | -0.3 | 0.2 |
| services | 0.1 | 0.4 | 0.3 | 0.2 | -0.3 | 0.1 |

Source: own calculations

The results presented in table A7 show that similar to the development of output the impacts of each single Harbinson component differ. Like already observed in the previous section (compare 5.1) the strongest effects regarding market prices are induced by a cut in direct payments. The sectors predominantly affected are represented by the wheat and other cereals sector experiencing price increases ranging from 0.8 % to 12.7 % across all regions

considered. This is a result of the cut of the production subsidies which lead to higher production costs reflected by an increase of market prices. In the developed regions the cattle, beef and milk sectors experience significant price increases while the vegetable and fruit sector along with the sugar and other plant production sector suffers due to falling market prices.

The reduction of import tariffs shows its strongest effects in the category of other industrial countries (AIL) with significant price decreases in agriculture. Along with the heavy reduction in wheat output this policy change also accounts for a remarkable wheat price decrease of -9 %. Nevertheless the heaviest price cut of almost -15 % induced by the import tariff cut occurs in the vegetable oils and fats sector. In the remaining developed regions the price effects are rather marginal apart from the price decrease of almost -13 % affecting the EU-27's sugar sector and the price increase of 6 % in its milk sector. With regard to the developing regions (EBA and AEL) the reduction of import tariffs induces price decreases ranging from -0.5 % up to -3 % in the whole agricultural sector.

Similar to the effects on production output the expansions of the tariff rate quotas lead to very meager impacts. Like on the production side there are some little price changes in the EU-27 concerning some plant production sectors. The strongest effect occurs in the milk sector with market prices increasing by 1.2 %.

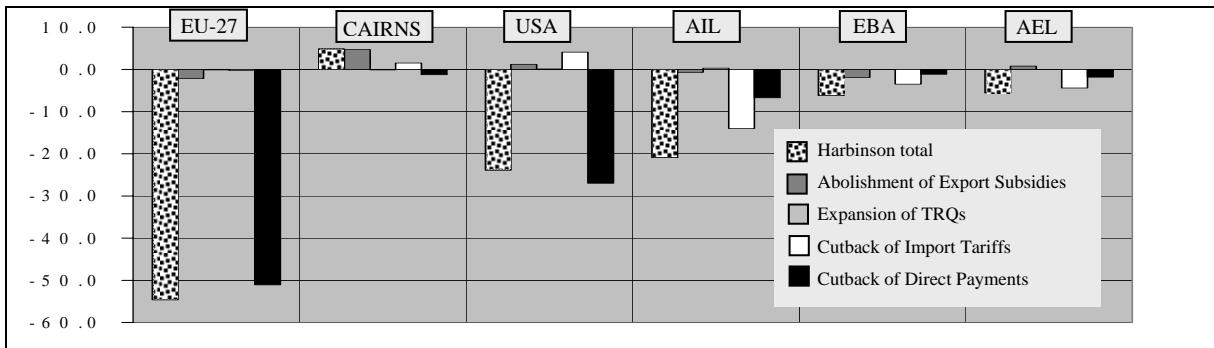
The CAIRNS group represents the region with the most positive effects in the case of reduced export subsidies and export taxes respectively. Here this policy intervention leads to a rise in market prices up to 2.9 % of exclusively all products. In contrast in the EU-27 almost every sector experiences a price fall, whereas the changes are rather marginal. Except for the sugar sector which shows an enormous price fall of -13 %. This pattern results from the fact that in the CAIRNS group no export subsidies are applied while in the EU-27 agricultural exports are subject to a relatively high export support. Thus, in the EU-27 the reduction of support now leads to lower market prices and then consequently to a lower supply. The situation is reversed in the CAIRNS group.

In spite of some outstanding results on the product market the most significant effects can be observed with respect to factor markets; i.e. the land market (see figure 2). Similar to the impacts concerning the product market the cut in direct payments induces the strongest effects. With direct payments mostly representing land support payments the market price for land decreases by more than half in the EU-27 and by -27 % in the USA. In contrast to those regions there occur only little price falls in the developing regions (EBA and AEL) since direct payments do hardly find application in these countries. In the CAIRNS group prices generally increase.

Similarly, the reduction of import tariffs predominantly leads to price erosions on the land market. Thereby this policy intervention shows its strongest effects in other developed countries (AIL) inducing a decrease in land prices by -14 %. In contrast to the cut in direct payments in the EU-27 this policy change results in a very meager price fall of -0.2 %. However, this time the USA and the CAIRNS group experience increases in land prices of 4.1 % and 1.5 %, respectively. With the reduction of import tariffs influencing market prices in the developing regions (EBA and AEL) the land price erosion is more than two times stronger than in the case where direct payments are reduced.

The land market in the CAIRNS group is the one that is influenced the most when it comes to a reduction of export subsidies. The CAIRNS group's land prices rise by almost 5 % while the EU-27, the other developed countries and the EBA group experience price erosions (see figure 2). Hereby the EU-27 accounts for the strongest price reduction showing a price fall of -2.1 %.

Figure 2: Change in Land Market Prices (in %)



Source: own calculations

With regard to each policy change's effects on product and factor prices it can be stated that the cut in direct payments leads to the most prominent impacts on both markets (compare table A7 and figure 2). In particular this concerns land and plant product prices in the EU-27 and the USA. The import tariff cut mainly affects the EBA group and the categories of other developing (AEL) and developed countries (AIL). Like in the case of a cut in direct payments price erosions predominantly occur in plant production sectors, like wheat, other cereals and vegetable oils and fats, and on the land market. Additionally, the import tariff cut results into heavy price falls in the EU-27's sugar sector. This is also the case when export subsidies are abolished with the sugar sector again accounting for an outstanding price fall. Except for the EU-27 and the CAIRNS group the change in export subsidies and tariff rate quotas only shows meager effects on the product markets. However, concerning the land market heavy price falls in the EU-27 and the other developed countries can be observed along with price increases in the USA and the CAIRNS group. What concerns the non-agricultural sectors there are no relevant price effects observed in the primary, industrial and service sectors.

5.3 Effects on Trade Balance

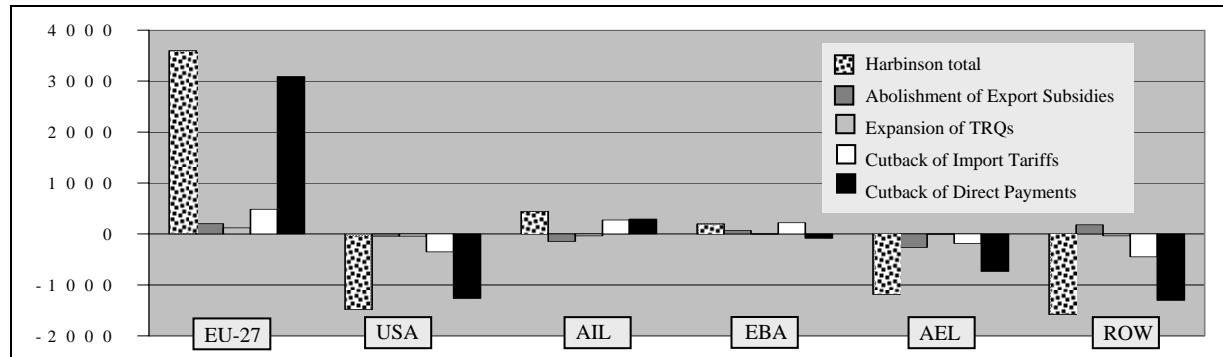
Finally, looking at the trade balance shows that the EU-27 represents the region with the strongest positive change in trade balance resulting from the implementation of the full Harbinson Proposal. The EU-27 experiences a trade balance increase by more than 3.5 billion US \$. The sectors predominantly contributing to this positive trade balance effects are the non-agricultural sectors (industrial and service sector). With regard to agriculture the vegetable and fruits sector shows a very positive development while the other food sector accounts for a big trade balance loss. Other regions experiencing a gain in trade balance are the group of other developed countries (444 million US \$) and the EBA region (205 million US \$). The remaining regions experience a loss in trade balance (see figure 3).

The effects of the various policy changes on the trade balance show a very strong distribution among the different countries. Like in the case of changes in production and prices the strongest effects occur after the cut in direct payments. The EU-27 experiences an increase in trade balance of more than 3 billion US \$ particularly determined by gains in non-agricultural sectors, like the industrial and service sector. But also agricultural sectors show a positive contribution with the vegetable and fruits and the other plant production sectors experiencing strong trade balance increases. The overall positive development in trade balance is the result of allocative effects with the now less profitable agricultural sector discharging inputs for use in more profitable sectors. All other regions experience a negative development of their trade balance particularly the USA with a loss of more than -1 billion US \$. In contrast to the situation in the EU-27 here the non-agricultural sectors account for the

major negative balance particularly the industrial sector. The trade balance decrease after the cut in direct payments in both developing regions is rather of modest size. However, these regions experience a similar pattern like the EU-27 with losses occurring predominantly in agricultural sectors and trade balance increases in the industrial and service sector.

The other policy interventions do not lead to such outstanding impacts on the regions' trade balance. Generally, one can say that the EU-27 and the AIL experience trade balance increases while the USA and the other developing countries (AEL) only show negative effects on their trade balance.

Figure 3: Change in Trade Balance (in US million \$)



Source: own calculations

6 Conclusion and Qualifications

The results generated by the policy changes proposed in the Harbinson Paper are strongly influenced by the structure of protection before and after the implementation of the measures. In general, a production sector subject to a low base level of protection gets less affected by the policy changes as a sector which has been experiencing high support. Furthermore, the interaction of the different policy measures shows a parallel character in most of the cases. This means that the different policy changes show similar effects in a specific sector of a country.

From the split-up of the Harbinson Proposal into the single policy components it becomes obvious that the outcome of this proposal is predominantly determined by the cutback of direct payments. This is because with the cereal sectors of the EU-27 and the USA a big production quantity is affected. Thus, since here direct payments are applied at most the cutback of this support not only influences the two regions themselves but also indirectly leads to expansions in cereal production and changes in the remaining sectors in the other regions. In the EU-27 and the USA allocative effects generate production increases in other plant production sectors.

The developing regions (EBA and AEL) experience the main impacts after the cutback of import tariffs. This policy change affects their trade balance as well as production output. Since according to the WTO negotiations they have to liberalize their markets too the agricultural sector faces harder competition from outside which leads to output reductions in both regions. Furthermore, with the EU liberalizing market access to all third countries the preferential conditions of EBA and AEL get eroded. As a consequence the AEL experience a loss in their trade balance.

The two remaining policy interventions; i.e. the abolishment of export subsidies and expansion of tariff rate quotas, do not lead to any major changes. Across all countries considered there occur only very small effects regarding the trade balance. However, on the production side the abolishment of export subsidies shows some relatively strong changes in

agricultural output. In the EU-27 particularly production of wheat, other cereals and oilseeds is cut back. In the other regions except for the CAIRNS group production is slightly restricted in most sectors. In the CAIRNS group the situation is reversed with the majority of the agricultural sectors expanding.

The expansion of tariff rate quotas does not have any significant effects neither directly on the EU nor indirectly on any other region.

For the interpretation of the results generated by the single policy shocks it still has to be taken into account that synergy effects between the different policy instruments are neglected in the simulations. However, regarding the full implementation of the Harbinson Proposal interactions between the different policy interventions take place which can be of either compensating or enhancing nature. Since these interdependencies are not considered in the single policy experiments the sum of these results hereby obtained do not represent the effects of the full Harbinson Proposal.

The results presented here reflect the impacts of a certain constellation of national and international agricultural policy framework conditions as well as of fixed global and country specific economic developments. However, the representation of national and international agricultural policy instruments and the implementation of economic developments in model systems might not always be under laid with optimal information. Generally there exists further need for additional research within the following fields:

- Information for a further update of agricultural framework conditions (e.g. Farm Bill, Mid-Term-Review of the EU)
- Information about further already existing preferential trade agreements
- Information about applied tariff rates to replace the notified tariff rates in the GTAP database (see FRANCOIS, VAN MEIJL and VAN TONGEREN, 2003a and 2003b)
- Modeling of the prevailing agricultural instruments in third countries
- Creation of a database comprising information about developments of economic indicators at a global and national level

Apart from that the results are also significantly influenced by the assumptions about the development of the CAP. It is worthy for further discussions whether at the time of a full implementation of the Doha Round in 2014 the sugar and milk quotas in the EU are still existent or whether this kind of production limitation is already obsolete because of a reform of the CAP.

Furthermore, with regard to the WTO negotiations it might be useful to incorporate existing considerations concerning the liberalization of global trade of non-agricultural products.

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8 Appendix

Table A1: Composition of Limitations of Export Subsidies and their Exhaustion in Terms of Quantities and Subsidies

| Agricultural Products | Land/Region | Notified Export Subsidies (Mill. US\$) | Value Share WTO Agreements (%) | Value Share WTO Agreements (%) |
|-----------------------|----------------|----------------------------------------|--------------------------------|--------------------------------|
| Wheat | EU | 560.3 | 29.5 | 83.3 |
| | Hungary | 0.0 | 0.1 | 0.1 |
| | South Africa | 0.0 | 0.0 | 0.0 |
| Rice | EU | 28.7 | 58.3 | 99.0 |
| | EU | 855.8 | 60.1 | 123.3 |
| Other Cereals | Hungary | 9.8 | 412.6 | 81.3 |
| | Hungary | 0.0 | 0.0 | 0.0 |
| Oilseeds | Hungary | 0.0 | 0.0 | 0.0 |
| | EU | 0.0 | 0.0 | 0.0 |
| | Turkey | 1.0 | | 5.1 |
| Sugar | Columbia | 4.4 | | 80.6 |
| | EU | 890.2 | 134.1 | 111.5 |
| | Poland | 13.0 | 34.2 | 119.0 |
| | Slovakia | 0.6 | 24.3 | 100.0 |
| | Canada | 0.0 | 0.0 | 0.0 |
| Dairy Products | Czech Republic | 59.4 | | 41.6 |
| | EU | 2271.7 | | 73.9 |
| | Norway | 80.0 | | 121.5 |
| | Slovakia | 11.7 | | 76.7 |
| | Switzerland | 275.6 | 78.8 | 79.7 |
| | USA | 145.3 | | 90.3 |
| | Hungary | 0.0 | 0.0 | 0.0 |
| Cattle | Switzerland | 0.3 | 1.1 | 4.0 |
| | EU | 720.0 | 42.3 | 76.1 |
| Other Animals | Iceland | 0.0 | 0.0 | 0.0 |
| | Norwegen | 14.2 | | 808.6 |
| | EU | 3662.2 | | 11.0 |
| Meat of other Animals | Hungary | 18.0 | | |
| | Switzerland | 0.0 | | 78.2 |
| | Columbia | 14.8 | | 126.7 |
| | EU | 35.4 | 50.4 | 93.0 |
| | South Africa | 0.0 | | 0.0 |
| Fruits and Vegetables | Switzerland | 21.3 | | 69.1 |
| | Turkey | 5.2 | | 10.5 |
| | Columbia | 0.9 | | 91.4 |
| | Cypris | | 91.7 | 181.5 |
| | EU | 815.8 | | 56.8 |
| Other processed Food | Hungary | 1.1 | 12.9 | 1.5 |
| | Norway | 6.2 | | |
| | South Africa | 0.0 | | |
| | Switzerland | 141.8 | | |

Source: ELBEHRI (2002).

Table A2: Exogenous Assumptions Used in the Projections (in %)

| | | 2005 | 2007 | 2014 | | | 2005 | 2007 | 2014 |
|--------|----------------|-------|-------|-------|--------|----------------|-------|-------|-------|
| EU15 | GDP | 8.14 | 5.2 | 13.69 | CHN_TW | GDP | 22.35 | 14.51 | 40.3 |
| | Unsk. Labor | -0.45 | -0.03 | -0.05 | | Unsk. Labor | 4.19 | 1.98 | 4.07 |
| | Sk. Labor | 0.12 | -0.49 | -2.45 | | Sk. Labor | 11.09 | 7.15 | 19.93 |
| | Capital | 7.79 | 5.35 | 14.68 | | Capital | 26.7 | 16.79 | 46.73 |
| | Land/Nat. Res. | 0 | 0 | 0 | | Land/Nat. Res. | 0 | 0 | 0 |
| MOEL | GDP | 14.38 | 9.79 | 26.43 | FSU | GDP | 15.98 | 10.67 | 28.85 |
| | Unsk. Labor | 0.63 | 0 | -0.53 | | Unsk. Labor | 2.26 | 1.41 | 2.72 |
| | Sk. Labor | 1.63 | 0.17 | 0.19 | | Sk. Labor | 3.27 | 1.58 | 3.47 |
| | Capital | 10.14 | 7.71 | 24.07 | | Capital | 4.1 | 4.19 | 16.31 |
| | Land/Nat. Res. | 0 | 0 | 0 | | Land/Nat. Res. | 0 | 0 | 0 |
| CAIRNS | GDP | 13.01 | 8.57 | 23 | EBA | GDP | 13.47 | 9.04 | 24.43 |
| | Unsk. Labor | 3.98 | 2.36 | 5.1 | | Unsk. Labor | 9.28 | 5.79 | 14.92 |
| | Sk. Labor | 14.22 | 7.48 | 18.96 | | Sk. Labor | 12.33 | 7.06 | 18.71 |
| | Capital | 9.81 | 7.06 | 20.62 | | Capital | 9.14 | 6.98 | 21.72 |
| | Land/Nat. Res. | 0 | 0 | 0 | | Land/Nat. Res. | 0 | 0 | 0 |
| USA | GDP | 7.78 | 5.2 | 14.07 | AAKP | GDP | 11.72 | 7.86 | 21.07 |
| | Unsk. Labor | 2.95 | 1.93 | 4.23 | | Unsk. Labor | 6.06 | 3.68 | 8.96 |
| | Sk. Labor | 2.97 | 1.37 | 1.87 | | Sk. Labor | 17.34 | 8.32 | 21.92 |
| | Capital | 11.19 | 6.66 | 14.7 | | Capital | 11.24 | 7.77 | 21.83 |
| | Land/Nat. Res. | 0 | 0 | 0 | | Land/Nat. Res. | 0 | 0 | 0 |
| AIL | GDP | 6.73 | 4.43 | 11.94 | AEL | GDP | 14.28 | 9.44 | 25.46 |
| | Unsk. Labor | -0.35 | -0.38 | -1.27 | | Unsk. Labor | 6.15 | 3.91 | 9.33 |
| | Sk. Labor | -1.64 | -2.15 | -6.24 | | Sk. Labor | 15.65 | 8.52 | 21.88 |
| | Capital | 6.11 | 4.08 | 10.8 | | Capital | 10.41 | 7.57 | 22.53 |
| | Land/Nat. Res. | 0 | 0 | 0 | | Land/Nat. Res. | 0 | 0 | 0 |

1) For explanation of the abbreviations of regions used view table 1

Source: WALMSLEY et al. (2000), own calculations.

Table A3: Overview of Pre-Simulations

| | |
|------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Pre-Simulation: | <p>Introduction of CAP instruments</p> <ul style="list-style-type: none"> • direct payments for land and animals • production restrictions <ul style="list-style-type: none"> - fixation of output quantities are fixed for milk and sugar via a quota (assumption: data base represents production quotas) - no change with respect to set-aside (assumption: data base represents set aside rate of 15 %) <p>Introduction of the EU's Common Budget</p> <ul style="list-style-type: none"> - 90 % of tariff revenues as well as a share of GDP to the EU budget; determination of a uniform endogenous GDP rate - payment of expenses in the framework of the EAGGF via the Common Budget - implementation of net transfers between EU member states <p>Introduction of instruments necessary for the modeling of the WTO negotiations</p> <ul style="list-style-type: none"> • TRQs • export limits |
|------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|

Table A4: Overview of AGENDA 2000 Measures in the Base Run

| | |
|------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Base Run: | Implementation of AGENDA 2000 |
| cereals: | <ul style="list-style-type: none"> • reduction of intervention prices by -15 % • unification of direct payments for cereals, oilseeds and protein plants • reduction of set-aside rate from 15 % to 10 % |
| beef: | <ul style="list-style-type: none"> • reduction of intervention prices by -18 % • no change in direct payments (assumption: increase in direct payments is compensated by a lower output) |
| milk: | <ul style="list-style-type: none"> • reduction of intervention prices by -15 % • retention of quota regulation • increase of quota by 2.4 % |

Table A5: Overview of Measures of the EU enlargement in the Simulations

| Base run: | EU enlargement |
|------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| | Creation of customs union: |
| | <ul style="list-style-type: none"> • EU-15 and MOEL abolish all bilateral trade barriers • MOEL establish trade protection of the EU-15 • production quotas for milk and sugar are fixed at the current production level of the MOEL • no set-aside in the new member countries • direct payments in the EU-15 remain unchanged • 100 % of the current land and animal premiums in the EU-15 are transferred to the new member states (standard procedure) • fixation of plafonds for direct payments with endogenous adjustment of the premium rate for land and animals in the EU-15 |
| | Common Budget: |
| | <ul style="list-style-type: none"> • complete integration of MOEL in the Common Budget of the EU: 90 % of tariff revenues as well as a share of GDP to the EU budget • payments in the framework of the EAGGF in the MOEL via the Common Budget • implementation of net transfers between the EU-15 and the MOEL |

Table A6: Change in Production Resulting from the Different Policy Interventions (in %)

| | Abolishment of Export Subsidies | | | | | | Expansion of Tariff Rate Quotas (TRQs) | | | | | |
|------------|---------------------------------|--------|------|-------|------|------|----------------------------------------|--------|-------|-------|------|------|
| sectors | EU-27 | CAIRNS | USA | AIL | EBA | AEL | EU-27 | CAIRNS | USA | AIL | EBA | AEL |
| wheat | -2.2 | 0.6 | 0.7 | 1.0 | 0.3 | 0.5 | -0.2 | 1.6 | -0.3 | 0.1 | 0.0 | 0.1 |
| othcereal | -7.5 | 0.5 | 1.2 | 1.7 | 0.1 | 1.1 | 0.0 | 0.0 | 0.2 | 0.0 | 0.0 | 0.0 |
| oilseeds | -2.3 | 3.2 | -2.0 | -0.4 | -0.1 | -0.7 | 0.0 | 0.1 | 0.0 | -0.1 | 0.0 | 0.0 |
| sugarraw | 0.0 | 2.5 | 0.1 | 0.2 | -2.5 | 0.0 | 0.0 | -0.1 | -0.4 | 0.1 | 0.0 | 0.0 |
| vegfruit | 0.4 | -0.5 | 0.1 | 0.2 | 0.1 | -0.1 | 0.0 | 0.0 | -0.1 | 0.0 | 0.0 | 0.0 |
| othplantpr | -2.1 | 5.7 | -1.8 | -0.5 | -0.8 | -0.7 | 0.0 | 0.0 | -0.1 | 0.0 | 0.0 | 0.0 |
| cattle | -1.1 | 0.3 | 0.2 | -0.2 | -0.1 | 0.1 | -0.9 | 0.6 | 0.3 | 0.0 | 0.0 | 0.0 |
| othanim | 0.3 | -0.3 | -0.1 | 0.8 | -0.1 | 0.1 | -0.1 | -0.6 | 0.3 | 0.0 | 0.0 | 0.0 |
| milk | -0.9 | 1.6 | 0.2 | -1.9 | 0.0 | 0.8 | 0.1 | -0.9 | 0.3 | 0.4 | 0.0 | 0.0 |
| beef | -1.9 | 0.3 | 0.4 | 0.2 | -0.3 | 1.2 | -1.2 | 1.2 | 0.3 | 0.0 | -0.1 | -0.1 |
| othmeat | -0.2 | -0.1 | 0.4 | -1.0 | -0.2 | 0.4 | 0.0 | -1.8 | 1.0 | 0.0 | -0.1 | 0.0 |
| oils/fats | -0.6 | 0.6 | -0.1 | -0.1 | 0.3 | -0.3 | 0.0 | 0.0 | 0.0 | 0.1 | 0.2 | 0.0 |
| dairyprod | -2.2 | 4.0 | 0.2 | -2.6 | 1.1 | 5.3 | 0.3 | -2.2 | 0.3 | 0.6 | 0.1 | 0.1 |
| sugar | 0.0 | 4.2 | 0.1 | 0.2 | -8.2 | -0.5 | 0.0 | 0.0 | -0.4 | 0.2 | 0.0 | 0.0 |
| othfood | -0.5 | 0.0 | 0.2 | -0.2 | 0.1 | 0.3 | 0.0 | -0.1 | 0.0 | 0.0 | 0.0 | 0.0 |
| drink/tab | 0.7 | -0.6 | -0.1 | 0.0 | 0.1 | -0.2 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| primary | 0.0 | -0.1 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| industry | 0.1 | -0.3 | 0.0 | 0.1 | 0.3 | 0.0 | 0.0 | 0.1 | 0.0 | 0.0 | 0.0 | 0.0 |
| services | 0.0 | -0.1 | 0.0 | 0.0 | 0.1 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| | Cutback of Import Tariffs | | | | | | Cutback of Direct Payments | | | | | |
| sectors | EU-27 | CAIRNS | USA | AIL | EBA | AEL | EU-27 | CAIRNS | USA | AIL | EBA | AEL |
| wheat | 0.3 | 3.8 | 2.0 | -53.0 | 0.3 | -2.0 | -6.1 | 7.2 | -14.2 | 5.9 | 4.5 | 3.0 |
| othcereal | -1.4 | 0.6 | 1.0 | -7.0 | -0.6 | -5.2 | -6.0 | 3.2 | -1.0 | -3.1 | 0.8 | 0.5 |
| oilseeds | 0.6 | 0.9 | 1.4 | -14.6 | -1.0 | -1.1 | -3.7 | -1.3 | 4.9 | -18.2 | 0.0 | -0.5 |
| sugarraw | 0.0 | -0.2 | -0.5 | -5.4 | -3.2 | 0.3 | 0.1 | 0.0 | 1.0 | -0.3 | 0.0 | 0.0 |
| vegfruit | -0.1 | 0.2 | 0.5 | -5.2 | -0.1 | 0.0 | 2.7 | -0.9 | 6.5 | -0.6 | -0.8 | -0.7 |
| othplantpr | -0.3 | -0.2 | -3.9 | -1.9 | 0.8 | 0.6 | 2.8 | -3.8 | 7.8 | -1.4 | -2.6 | -1.7 |
| cattle | -0.1 | 0.9 | 0.5 | -4.4 | -0.2 | -1.3 | -2.5 | 0.7 | 0.5 | -1.6 | 0.2 | 0.6 |
| othanim | 0.6 | -0.8 | 0.1 | 1.5 | -0.3 | -0.8 | 0.0 | -0.3 | 3.0 | -2.3 | -0.1 | -0.3 |
| milk | 0.1 | -0.6 | 0.4 | 0.2 | -0.1 | -0.5 | -0.1 | 0.1 | -0.1 | -0.8 | 0.1 | 0.0 |
| beef | -0.6 | 1.3 | 0.5 | 0.9 | -0.7 | -2.5 | -1.2 | 0.6 | 0.1 | -1.2 | 0.4 | 0.1 |
| othmeat | 0.5 | -1.2 | 1.7 | -4.1 | -0.1 | -4.0 | 0.1 | 0.0 | 0.3 | -0.4 | 0.0 | -0.1 |
| oils/fats | 0.0 | 0.0 | -1.3 | 11.5 | -5.8 | -1.4 | -0.3 | -0.5 | 2.5 | 0.5 | 0.1 | 0.0 |
| dairyprod | 0.6 | -1.5 | 0.4 | 0.4 | -1.0 | -4.2 | -0.1 | 0.1 | -0.2 | -0.9 | 0.2 | 0.1 |
| sugar | 0.0 | -0.2 | -0.6 | -5.4 | -9.9 | 1.0 | 0.0 | 0.0 | 1.0 | -0.3 | 0.0 | -0.1 |
| othfood | -2.1 | -0.3 | 0.0 | 1.9 | -1.1 | 1.1 | -0.1 | 0.1 | 0.1 | -0.3 | 0.1 | -0.3 |
| drink/tab | 0.5 | -0.2 | -0.1 | 0.7 | 0.2 | 0.6 | -0.1 | 0.0 | 0.3 | 0.1 | 0.1 | -0.1 |
| primary | 0.1 | 0.0 | 0.0 | 0.0 | 0.1 | 0.0 | 0.1 | 0.0 | 0.1 | 0.0 | 0.0 | 0.0 |
| industry | 0.0 | -0.1 | -0.1 | 0.0 | 0.7 | 0.1 | 0.1 | 0.1 | -0.1 | 0.1 | 0.4 | 0.1 |
| services | 0.0 | -0.1 | 0.0 | -0.1 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |

Source: own calculations

Table A7: Change in Market Prices Resulting from Different Policy Interventions (in %)

| | Abolishment of Export Subsidies | | | | | | Expansion of Tariff Rate Quotas (TRQs) | | | | | |
|------------|---------------------------------|--------|------|------|------|-----|----------------------------------------|--------|------|------|-----|-----|
| sectors | EU-27 | CAIRNS | USA | AIL | EBA | AEL | EU-27 | CAIRNS | USA | AIL | EBA | AEL |
| wheat | -1.3 | 1.2 | 0.5 | -0.1 | -0.6 | 0.4 | -0.1 | 0.3 | 0.0 | 0.0 | 0.0 | 0.0 |
| othcereal | -2.9 | 1.6 | 0.4 | 0.1 | -0.5 | 0.5 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| oilseeds | -1.2 | 2.0 | -0.1 | -0.2 | -0.8 | 0.1 | -0.1 | -0.1 | 0.1 | 0.1 | 0.1 | 0.0 |
| sugarraw | -0.3 | 2.0 | 0.3 | -0.1 | -1.5 | 0.3 | -0.1 | -0.1 | -0.1 | 0.0 | 0.0 | 0.0 |
| vegfruit | -0.2 | 1.4 | 0.3 | -0.1 | -0.7 | 0.3 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| othplantpr | -0.5 | 2.9 | -0.1 | -0.2 | -0.7 | 0.0 | 0.0 | 0.0 | 0.1 | 0.1 | 0.0 | 0.0 |
| cattle | -0.7 | 1.3 | 0.3 | 0.2 | -0.6 | 0.2 | 0.0 | 0.1 | 0.1 | 0.0 | 0.0 | 0.0 |
| othanim | -0.6 | 1.2 | 0.1 | -0.1 | -0.6 | 0.3 | 0.0 | -0.2 | 0.0 | 0.0 | 0.0 | 0.0 |
| milk | -1.5 | 1.5 | 0.2 | -0.2 | -0.9 | 0.5 | 1.2 | -0.1 | 0.0 | 0.1 | 0.0 | 0.0 |
| beef | -0.3 | 0.8 | 0.2 | 0.0 | -0.4 | 0.2 | -0.1 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| othmeat | -0.3 | 0.9 | 0.1 | 0.1 | -0.4 | 0.2 | 0.0 | -0.2 | 0.0 | 0.0 | 0.0 | 0.0 |
| oils/fats | -0.6 | 0.7 | -0.1 | -0.4 | -0.4 | 0.0 | 0.0 | 0.0 | 0.1 | 0.0 | 0.0 | 0.0 |
| dairyprod | -0.4 | 0.8 | 0.2 | 0.6 | -0.4 | 0.3 | 0.3 | -0.2 | 0.0 | -0.1 | 0.0 | 0.0 |
| sugar | -13.0 | 1.0 | 0.2 | 0.3 | -0.7 | 0.2 | 0.1 | 0.0 | -0.1 | 0.0 | 0.0 | 0.0 |
| othfood | -0.5 | 0.7 | 0.0 | 0.1 | -0.4 | 0.3 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| drink/tab | -0.6 | 0.3 | 0.0 | -0.1 | -0.3 | 0.0 | -0.1 | -0.1 | 0.0 | 0.0 | 0.0 | 0.0 |
| primary | 0.0 | -0.1 | -0.1 | 0.0 | 0.0 | 0.0 | 0.1 | 0.0 | 0.0 | 0.0 | 0.0 | 0.1 |
| industry | 0.0 | 0.0 | 0.0 | -0.1 | -0.2 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| services | -0.1 | 0.0 | 0.0 | 0.0 | -0.1 | 0.0 | 0.0 | 0.0 | 0.0 | 0.1 | 0.0 | 0.0 |

| | Cutback of Import Tariffs | | | | | | Cutback of Direct Payments | | | | | |
|------------|---------------------------|--------|-----|-------|------|------|----------------------------|--------|------|------|------|------|
| sectors | EU-27 | CAIRNS | USA | AIL | EBA | AEL | EU-27 | CAIRNS | USA | AIL | EBA | AEL |
| wheat | 0.2 | 1.1 | 1.6 | -9.1 | -1.1 | -1.6 | 11.6 | 2.7 | 12.7 | 3.5 | 1.4 | 0.8 |
| othcereal | -0.4 | 0.7 | 1.0 | -3.3 | -1.2 | -3.0 | 12.4 | 1.3 | 7.0 | 7.1 | 0.0 | 4.5 |
| oilseeds | 0.2 | 0.6 | 1.4 | -4.5 | -1.8 | -2.2 | 1.7 | 0.0 | -2.8 | 5.6 | -0.3 | -0.7 |
| sugarraw | 0.0 | 0.4 | 0.9 | -2.3 | -2.3 | -1.6 | -1.9 | -0.2 | -4.9 | 0.8 | -0.3 | -0.5 |
| vegfruit | 0.0 | 0.6 | 1.1 | -2.4 | -1.3 | -1.5 | -4.4 | -0.5 | -5.3 | -0.8 | -0.5 | -0.7 |
| othplantpr | 0.1 | 0.4 | 0.1 | -2.4 | -0.8 | -1.5 | -3.8 | -1.2 | -6.3 | -0.8 | -0.8 | -1.2 |
| cattle | 0.5 | 0.6 | 0.8 | -6.4 | -1.2 | -1.7 | 6.4 | 0.4 | 0.5 | 4.9 | -0.2 | 0.2 |
| othanim | -0.2 | 0.2 | 0.5 | -2.3 | -1.2 | -1.8 | -0.5 | 0.0 | -1.7 | 1.5 | -0.1 | 0.2 |
| milk | 5.8 | 0.4 | 0.7 | -2.9 | -1.7 | -1.8 | 0.3 | 0.2 | 1.3 | 4.6 | -0.5 | -0.1 |
| beef | 0.1 | 0.3 | 0.5 | -2.9 | -1.0 | -1.2 | 2.3 | 0.3 | 0.3 | 2.2 | -0.1 | 0.3 |
| othmeat | -0.1 | 0.0 | 0.3 | -1.9 | -0.9 | -1.5 | 0.0 | 0.2 | -0.2 | 0.7 | -0.1 | 0.1 |
| oils/fats | -0.2 | 0.0 | 0.7 | -14.8 | -1.4 | -1.9 | 0.2 | 0.1 | -1.5 | -1.0 | -0.1 | -0.2 |
| dairyprod | 2.4 | 0.0 | 0.4 | -1.6 | -0.9 | -1.1 | 0.2 | 0.2 | 0.7 | 1.8 | 0.0 | 0.1 |
| sugar | -12.8 | 0.2 | 0.4 | -6.5 | -1.1 | -1.1 | -0.1 | 0.1 | -1.9 | 0.3 | -0.1 | 0.2 |
| othfood | -0.4 | 0.1 | 0.2 | -2.4 | -0.9 | -1.9 | 0.3 | 0.1 | 0.4 | 0.5 | 0.1 | 0.6 |
| drink/tab | -0.5 | 0.0 | 0.0 | -0.7 | -0.5 | -0.7 | 0.1 | 0.1 | 0.0 | 0.0 | 0.0 | 0.2 |
| primary | 0.2 | 0.1 | 0.1 | 0.3 | 0.2 | 0.2 | 0.2 | 0.1 | 0.0 | 0.2 | 0.2 | 0.2 |
| industry | 0.1 | 0.0 | 0.1 | 0.0 | -0.2 | 0.0 | 0.2 | 0.1 | 0.2 | 0.1 | 0.0 | 0.2 |
| services | 0.0 | 0.1 | 0.1 | 0.0 | -0.2 | -0.1 | 0.1 | 0.2 | 0.3 | 0.2 | 0.1 | 0.2 |

Source: own calculations