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# Impact analysis of different negotiation outcomes in WTO<sup>1</sup>

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## **Abstract**

This paper presents an impact analysis of the EU negotiation offer in the WTO, and compares this to a baseline scenario where no agreement is reached and to a scenario with greater reduction commitments. Focus of the analysis is on market access. The results indicate that the impact on EU markets would be small if the EU offer is accepted, and that further tariff reduction commitments are possible without severely influencing the internal market balance.

## **1 Introduction**

On October 28, 2005, the Commission presented a negotiation offer to the WTO (Commission 2005b). The offer was a response to the G20 proposal of October 12, and contains the same principle components but with weaker protection reduction commitments for developed countries. This paper presents the results of an impact analysis of the EU negotiation offer, but also of an additional scenario which is a step towards the G20 proposal. The aim of the exercise is to investigate if a greater market access improvement commitment than that proposed by the Commission is feasible in terms of impact on the EU agricultural sector.

## **2 Scenarios**

Three scenarios are defined, all of them for 2012. The first is called the *baseline* and represents the case where *no new agreement* is reached in the WTO, so that the present policy is continued. For the EU this means a full implementation of the mid term review (MTR) agricultural policy with sugar reform added as well as the “*everything but arms*” (EBA) initiative. This is the scenario from which the two trade liberalization scenarios depart, i.e. the following two scenarios, representing two different outcomes of the WTO negotiations, contain the same assumptions as the baseline regarding MTR, sugar reform and EBA. It was assumed that the *special safeguard clause* (SSG) introduced in article five of the Agreement on Agriculture is used by USA, EU and Japan. Only the price trigger is implemented, and it is assumed that for those agents, the SSG is invoked on all occasions when the requirement on the border price (CIF-price) is satisfied.

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Table 1: Tariff reduction schedule in *EU offer*

Developed countries		Developing countries	
Threshold	Linear cut	Threshold	Linear cut
0 < AVE ≤ 30	35 %	0 < AVE ≤ 30	25 %
30 < AVE ≤ 60	45 %	30 < AVE ≤ 80	30 %
60 < AVE ≤ 90	50 %	80 < AVE ≤ 130	35 %
90 < AVE	60 %	130 < AVE	40 %
Capping: 100 %		Capping: 150 %	

Source: Commission 2005b

Table 2: Tariff reduction in *compromise*

Developed countries		Developing countries	
Threshold	Linear cut	Threshold	Linear cut
0 < AVE ≤ 30	43 %	0 < AVE ≤ 30	25 %
30 < AVE ≤ 60	53 %	30 < AVE ≤ 80	30 %
60 < AVE ≤ 90	58 %	80 < AVE ≤ 130	35 %
90 < AVE	68 %	130 < AVE	40 %
Capping: 100 %		Capping: 150 %	

Source: The EU offer plus 8 % reduction for all bands for developed countries.

In the second scenario, called *EU offer*, the negotiation offer of the EU of October 28, 2005 is accepted, and everything else remains as in the baseline. All export subsidies are abolished, and market access is improved by a four-banded reduction schedule with a cap. Each tariff line is placed in one of four *bands* depending on its ad-valorem tariff equivalent (AVE)—The higher the AVE, the higher the proposed reduction. The cap means that regardless of tariff before the reduction, the AVE after reduction is not allowed to be higher than a certain value (100% for developed countries, 150% for developing countries). The proposed reduction schemes generally foresee larger reductions for developed than for developing countries. Some simplifying assumptions are made. Regarding the domestic support part of the offer, it is assumed that the MTR is sufficient to satisfy the requirements in the offer for the EU. The same is assumed for all other regions of the world. For the market access measures, the tariff reduction scheme of the EU introduces two features that are not present in the G20 proposal, called *flexibility in the lowest band* and *sensitive products*. Neither of those both flexibilities are present in the simulations, because of the high uncertainty regarding how countries may chose to adopt them. Flexibility in the lowest band means that the reduction rates for the group of tariff lines having the smallest AVE only *on average* must equal the rate in the reduction scheme, but may deviate ten percentage units in any direction for the individual tariff lines. Sensitive products means that for up to eight percent of the tariff lines, a different reduction scheme with smaller cuts may be applied, and as a compensation, *tariff rate quotas* (TRQs) for those lines are expanded. The reduction schedule used is shown in table 1.

In the third scenario, called *compromise*, all assumptions of *EU offer* are maintained, but in addition all the reduction rates for developed countries are increased by eight percent points. This results in the reduction schedule shown in table 2. To avoid confusion, the scenario names are henceforth written in *italic style*.

### 3 Model and data

The scenarios were analysed with the CAPRI modelling system. The model is described in great detail in Britz, (editor, 2005), so only a brief review is given in this paper.

CAPRI is a partial equilibrium model. This means that only agriculture and some primary processing are modelled. Regions in the EU25, Bulgaria and Romania are modelled by an optimization approach assuming profit maximising behaviours. These models contain production technological restriction including feeding and fertilization constraints, CAP direct support and quotas, and a Europe-wide young animal trade module. The existence of land-, fodder and young animal balances contribute to interconnecting production activities across subsectors and regions, thus distributing effects of policy changes both spatially and over different subsectors via capitalization and price effects. Regions other than those of EU25, Bulgaria and Rumania are modelled somewhat simpler, by behavioural functions (normalised quadratic profit function).

CAPRI also contains a multi-commodity trade module. Each pair of regions, shown in table 3, can trade bilaterally, simultaneously exporting and importing the same commodity. This is obtained using an Armington type assumption (Armington 1969). The Armington assumption means that products of different geographical origin are treated as imperfect substitutes on the demand side. The shares of products of different origins in the consumption bundle are determined by their price relation.

Table 3: Regions in the CAPRI market model

Bulgaria and Romania	Brazil	China
Rest of Europe	Chile	Japan
Russia, Belarus and Ukraine	Uruguay	Australia and New Zealand
USA	Paraguay	Mediterranean, not EU
Canada	Bolivia	LDC
Mexico	Rest of South America	ACP, not LDC
Argentina	India	Norway
Rest of world	EU10	EU15

Each *region* has a *most favoured nation* (MFN) tariff schedule, global TRQs open to all countries and a special safeguard mechanism with price trigger. The trigger prices used were those notified to the WTO (2002). It was assumed that

the SSG always is invoked when the conditions are satisfied. For each *region pair* we may specify transportation costs, tariff rate quotas with preference tariffs.

The implementation of the trade liberalization scenarios followed largely that in Britz et al (2005). Specifically, tariffs were computed from the *agricultural market access database* (AMAD), sometimes manually corrected with information from the tariff schedules, and the trade flows in CAPRI systems own database were used to compute AVEs. This differs from the procedure laid down by the WTO, which prescribe that the IDB database be used. In most cases the AVEs computed using the data in CAPRI are *higher*, thus leading to *greater* tariff reductions than would be the case if the IDB numbers were used. The main reason for the differences seem to be due to higher import prices in the IDB, though a direct comparison is made difficult due to the need to aggregate tariff lines from HS8 to the goods in CAPRI.

The SSG was implemented in CAPRI specifically for the current analysis and is not yet described elsewhere. The additional levy, expressed in share of the price trigger is graphed against the ratio CIF-price to price trigger in figure 1. The SSG influences model behaviour by two mechanisms. Firstly, it pries the prices in the baseline apart compared to the model without SSG, by the requirement that regional price differences accommodate the SSG price wedge. Consequently, some export prices are lower and import prices higher compared to standard CAPRI. Secondly, the relative trade liberalizing effect of removing tariffs is different. For the EU, simulations suggest that taking SSG into account leads to smaller effects of trade liberalization for most agricultural products.

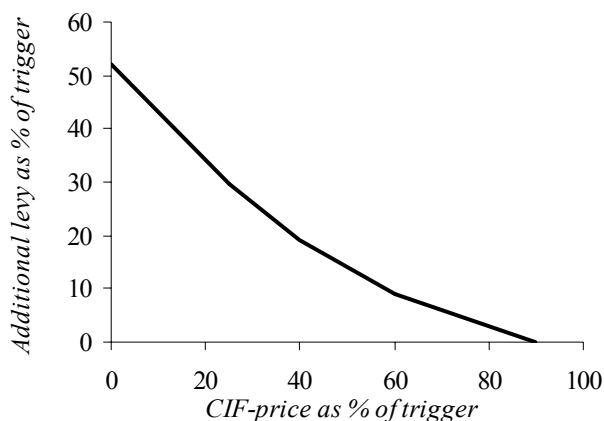


Figure 1: Graph of additional levy due to SSG used in CAPRI, expressed as share of trigger price graphed against CIF-price to trigger ratio.

Given that the scenarios are similar to those in Britz et. al. and that the same model is used, one would expect similar results. This is not the case for all sec-

tors, for several reasons. Apart from the scenarios being somewhat different, the new feature of SSG is probably the main reason for deviations. Other reasons are some different input data on trade flows, prices and tariffs, as well as different assumptions regarding the integration of calves raising in the beef production sector, causing beef production to react more strongly to price changes in this analysis than is the case with “standard CAPRI”.

## 4 Results

In this section, the impact on each sector is described in terms of changes of prices, production and income. All results refer to the year 2012, and in the cases when the text speaks of “changes”, it is thereby meant changes *relative to the baseline, not to the present situation*. In that way, the effects of the policy change are isolated. Before proceeding with the sectoral results, we present some results on budgetary outlays and welfare effects. A summary of price and production changes for the main product aggregates is presented in table 6 at the end of the paper.

### 4.1 CAP budget outlays

Expenditure within the first pillar of CAP decreases following the liberalisations, due to the disappearance of export subsidies. This is partially counteracted by increased costs of intervention. However, the greatest share of expenditure is the single farm payment, which is not influenced at all in the analysed scenarios. Britz et. al (2005) reached the same conclusion. The annual expenditure modelled in CAPRI decreased by 1.3 billion euro in both *EU offer* and *compromise*.

Table 4: CAP first pillar budget in 2012, Commission and Council, billion euro

	2004 prices	2012 prices	Modulation subtracted
Commission	42.506	49.413	48.425
Council	41.047	47.717	46.763

*Note: Commission 2005a, Council 2005, proposals for first pillar expenditure in 2012. Proposals have been converted to numbers comparable to CAPRI by adding inflation 1.9 % and subtracting modulation 2 %.*

Total expenditures in the first pillar of the CAP (billion euro) were 46.66 in *baseline* and 45.33 and 45.35 in *EU offer* and *compromise* respectively. This fits in the CAP first pillar budget for 2012 in the most recent proposals for new financial perspective that were available, shown in table 4. The first column shows the proposals in 2004 currency. In the second column the numbers have been inflated by 1.9% (rate used in CAPRI), and in the third column the compulsory modulation, assumed to be two percent of total first pillar, has been subtracted.

#### 4.2 Welfare effects

Welfare in CAPRI is computed as the economic impact on consumers (change in *money metric*), producers (gross value added at factor cost), primary processing industry profits and tax payers. The total welfare change for EU25 according to this measure is shown in table 5. The computations indicate that the trade liberalization is a welfare gain, and the greater gain is achieved in the *compromise*. The generally lower prices in the EU cause a consumer gain, a producer loss, increased processing industry profits, lower tariff revenues and lower CAP expenditure in the first pillar. The welfare gain is due to efficiency increases when goods to a greater extent are produced where they can be produced at lowest cost.

Table 5: Welfare effects, million euro change from baseline

Position	EU offer	Compromise
Total	6531	7191
Consumer welfare	16264	19268
Agricultural income	-11329	-13282
- Premiums	-38	-38
- EAA Output	-16399	-19399
- Output crops	-8305	-9841
- Output animals	-8094	-9558
- Output rest	0	0
- EAA Input	-5108	-6155
- Crop specific Input	-347	-414
- Animal specific Input	-4205	-5069
- Other Input	-555	-672
Profit of dairies	-19	11
Profit of other processing	2164	2473
Tariff revenues	-1884	-2589
CAP budget outlays first pillar	-1335	-1311

Source: CAPRI simulations. EAA output and EAA input are output and input values defined as in the Economic Accounts for Agriculture (EAA).

#### 4.3 Cereals

The improved market access leads to lower prices of cereals: -4.3% in *EU offer* and -5.0% in *compromise*. The lower prices are mainly due to increased imports at the lower tariffs, 1.7 and 2.7 million tons annually in the respective scenarios. The lower prices impact on market intervention. It switches from annual net sales to intervention buying, with 50 respectively 267 thousand tons annually. The lower prices also lead to slightly lower cereals production in the EU, with 0.2% and 0.3% decrease of net production in the scenarios. This decrease may seem small in relation to the price decrease of about 5%. The reason for the small net response is that the price decrease is partially compensated for by reduced compe-

tition for land — less fodder production due to fewer grazing animals, less fruit and vegetables production, and the cancelled export subsidies for sugar all contribute to reduce land rents.<sup>2</sup> The decreased competition for land is an important driver also in other sectors with annual crops.

#### 4.4 Oilseeds

Oilseeds prices remain almost unchanged in both scenarios. In combination with the aforementioned decreased competition for land, that leads to a production increase of 2.4% in *EU offer* and 2.7% in *compromise*. The increased production leads to a reduction of imports of oilseeds to the EU.

#### 4.5 Fruit, vegetables and permanent crops

Areas planted with fruit, vegetables and permanent crops decrease in both *EU offer* and *compromise*. The main reason is import competition in the sector “other vegetables”, containing all vegetables except tomatoes. Land allocated to “other vegetables” decreases by 7.6% in *EU offer* and 9.1% in *compromise*. All other fruits and permanent crops are less affected, the greatest effect observed for “apples pears and peaches”, with area decreases of 1.7% and 2.0%, “other fruit” and “citrus fruit” with decreases of 1.6% and 1.9% in the simulations.

The impact is greater on “other vegetables” because of the border protection. For “other vegetables”, the MFN tariff is applied already in *baseline*, whereas there is some water in the tariffs for the other products. Still, there are price decreases of considerable size for all fruit and vegetables, ranging between 9% and 16% for the products mentioned.

Apart from the increased import pressure, there is also more export of fruit and vegetables from the EU thanks to the lower, more competitive prices and the opening of market opportunities outside of the union. For “apples, pears and peaches” exports increase 80% in *EU offer* and 100% in *compromise*, “citrus”, “other fruits” and “other vegetables” by similarly large numbers. The large percentages are not only due to comparably low exports in *baseline*, but also in absolute numbers the exports are significant, especially for “apples, pears and peaches” where they amount to around 10% of production.

#### 4.6 Other arable crops

Due to a reduced numbers of ruminants, the fodder production decreases by 67 and 99 thousand hectares respectively in *EU offer* and *compromise* compared to *baseline*. The decrease corresponds merely to 0.4% and 0.6% of the total fodder area on arable land. The sugar beet area also decreases, as mentioned in the sec-

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<sup>2</sup> The maximum of 1.3 million tons of subsidised sugar exports was used in the baseline, and an export decrease of similar size was assumed a consequence of putting that quantity to zero.

tion on cereals. Voluntary set-aside, fallow land and non-food production on set-aside increase, due to the lower competition for land, with the relative largest change for voluntary set-aside, increasing by 5.0% and 5.7% in *EU offer* and *compromise* respectively. The increase in the sum of fallow land and voluntary set-aside, i.e. the total amount of land taken out of production following the reform, amounts to 180 and 200 thousand hectares for EU25 in the respective scenarios.

#### 4.7 Beef

Imports of beef to the EU increase by 195 thousand tons in *EU offer* and by 256 thousand tons in *compromise*, due to reduced border protection. Exports are also reduced, by 130 and 120 thousand tons respectively, because of the removal of export subsidies. Those two forces lead to increased pressure on the EU market, so that EU production of beef is reduced and prices depressed. Beef prices drop by 16% in *EU offer* and 19% in *compromise* compared to *baseline*. The lower prices lead to less production of beef, with 329 thousand tons (4.1%) and 391 thousand tons (4.9%) in the trade liberalisation scenarios.

The quantity changes, again, come out rather small, given the significant price changes. The main reason is that part of the loss is passed on to the dairy cows via the calves, and the number of dairy cows remains bound by the milk quota. The decreased demand for calves thence can be satisfied by a smaller number of suckler cows, and so this activity decreases by 8.2% in *EU offer* and 9.7% in *compromise*. Another, albeit less important reason for the conservative reaction, has already been indicated, namely the decreased demand for fodder, translating into lower feeding costs and less fodder production.

#### 4.8 Pork

The pork sector gains from the trade liberalisations. The internationally already competitive sector profits from improved market access, and consequently exports from the EU increase; by 21% in *EU offer* and 26% in *compromise*. Indigenous production increases by 1.3% and 1.7% respectively. The increased production is not primarily driven by the increased export demand, but most of all depends on the lower feed prices resulting from lower cereals prices. Thus, pork prices remain all but unchanged (+0.1%), whereas the feeding costs decrease by 2.8% in *EU offer* and by 3.3% in *compromise*.

#### 4.9 Poultry

The imports of poultry meat increases by 11% in *EU offer* and 14% in *compromise*, creating price pressure on the EU market. The prices of poultry meat drop by 2.3% and 2.8% respectively. On the other hand, the poultry fattening sector

profits from lower cereals prices, which manifest in lower feeding costs. The net effect on production is a decrease in meat output of 1.2% and 1.6% respectively.

For the egg sector the situation is similar, but here the price decrease is of the same size as the cost reduction, so that no change in production occurs.

#### 4.10 Dairy products

The most pronounced impact on the dairy market is a sharp drop of about 25% of the butter price due to the combined effects of export subsidies removal and increased import pressure. Other products are affected more indirectly: the lower butter price leads to a surplus of milk fats, which makes all other products containing much fat cheaper to produce. The industry shifts production into cream, concentrated milk and whole milk powder. The lower cost for milk fat leads to lower cost for producing those products and thus also lower market prices, about 15% for cream and 2.5-3% for the other products. Production of those products increases by about 3.5%, 4.5% and 15%, the changes being similar in *EU offer* and *compromise*. The new product mix requires more milk protein, which comes in fixed relation to milk fat in the raw milk. Therefore, the production of skimmed milk powder decreases and its price rises.

For the producer, all those changes lead to lower milk prices, with 4.35% reduction in *EU offer* and 4.93% in *compromise*. For most regions, this reduction is buffered by the milk quota rent, so that the number of dairy cows for the EU as a whole remains constant.

## 5 Conclusions and discussion

The main research question was whether a greater reduction of market protection than that proposed by the Commission on October 28 is feasible. The answer is *yes*. Indeed, *EU offer* would, if implemented, result in a welfare gain, and a greater gain is obtainable if world trade is further liberalised, as in *compromise*. From a budgetary point of view, it makes no difference which reform is adopted. Cereals intervention increases in both liberalisation scenarios, albeit the impact is small. This indicates that the intervention price is not internationally competitive.

Even though both scenarios show welfare gains, they also indicate income losses for the agricultural sector, borne equally by crop and animal sectors. Primary processing, on the other hand, generally profits from lower raw material prices.

It can be noted that rather large price reductions caused by the tariff reductions translate into relatively small changes of agricultural production in the EU. There are several explanations to this outcome. First of all, a substantial part of the current protection of and support to the EU agriculture are capitalized in land values and quota rents. The tabled proposals in the WTO negotiations suggest an overall reduction of agricultural tariffs. If the level of protection is *generally* lowered in

the EU, there will be only *minor redistribution* between agricultural sectors, instead falling land values and reductions of quota rents will absorb a substantial part of the price reductions induced by the lower tariff levels.

Secondly, agriculture is a sector with many linkages between production activities. Those linkages can moderate the output response of policy changes, and this is especially the case when a reform is carried out across the whole sector. For example, as described above, despite a relatively large drop in beef prices, the production of beef decreases moderately. One reason is that two thirds of the calves in beef production are derived from the dairy sector. Since the level of dairy production does not decrease to any significant extent due to the proposals, the dairy sector will continue to deliver roughly the same amount of calves to beef sector as before. Hence, although farmers specialized in beef production will reduce production, the inflow of calves from dairy farmers will cushion the total output response in beef production. For the dairy farmers the reduction in calf price will result in an additional reduction of the milk quote rent. A strength with the CAPRI model is that this kind of linkages are explicitly included in the model.

Thirdly, the CAPRI model comprises the available knowledge regarding how farmers in the past have reacted to price changes. Hence, if the simulations could be regarded as conservative, one reason is that farmers have tended to react conservatively in the past.

Finally, to investigate possibility that the model yet delivers too weak an output response with regard to the price declines, sensitivity analyses of the results were carried out. In short, it was found that of the factors in the model that were considered most uncertain, changes in the marginal cost of increasing the share of voluntary set-aside has the strongest influence on results. However, since the area of voluntary set-aside is small compared to the total areas cultivated in the EU, changes in the propensity to turn fields into voluntary set-aside in response to price changes has a limited impact on the overall land use in the current simulations, even though it certainly has a strong effect on the absolute amount of set-aside.

## References

- Armington, Paul, (1969), A Theory of Demand for Products Differentiated by Place of Production, IMF Staff Papers 16, 159-76.
- Britz, W. (Editor) (2005). CAPRI modelling system documentation. Available online under [http://www.agp.uni-bonn.de/agpo/rsrch/capri/capri\\_e.htm](http://www.agp.uni-bonn.de/agpo/rsrch/capri/capri_e.htm)
- Britz, Wolfgang, Thomas Heckelei, Franziska Junker, Ignacio Pérez och Christine Wieck (2005). How sustainable is the latest CAP reform under possible trade liberalisation outcomes of the Doha Round? Paper presented at the IATRC summer symposium in Sevilla, Spain, June 19-21.

Commission (2005a). Commission Working Document SEC (2005) 494 Final, Brussels.

Commission (2005b). Making Hong-Kong a success: Europe's contribution. European Commission negotiation offer of October 28.

Council (2005). Financial perspective 2007-2013, Council of the European Union, 15915/05 CADREFIN 268, Brussels, 2005.

## Appendix 1

Table 6: Summary of market prices and production changes in simulations

	<i>Baseline</i>	<i>EU offer</i>	<i>% diff.</i>	<i>Compromise</i>	<i>% diff.</i>
<i>Prices (EUR/t)</i>					
- Cereals	108.8	104.2	-4.3	103.4	-5.0
- Oilseeds	144.2	144.3	0.0	144.0	-0.2
- Other arab. field crops	110.7	113.0	2.1	112.5	1.7
- Veg. and perm. crops	604.9	563.9	-6.8	556.4	-8.0
- Beef	1874.6	1583.7	-15.5	1525.3	-18.6
- Pork meat	1499.1	1500.0	0.1	1500.6	0.1
- Poultry meat	2618.4	2557.6	-2.3	2545.8	-2.8
- Eggs	1223.3	1210.3	-1.1	1207.5	-1.3
- Raw milk	270.9	259.1	-4.4	257.5	-4.9
- Butter	2533.9	1910.0	-24.6	1856.9	-26.7
- Skimmed milk powder	2227.3	2370.4	6.4	2376.2	6.7
<i>Production (1000 t)</i>					
- Cereals	254890.5	254297.9	-0.2	254101.1	-0.3
- Oilseeds	19216.6	19670.5	2.4	19725.7	2.6
- Other arab. field crops	58549.5	60156.7	2.7	60135.4	2.7
- Veg. and perm. crops	106959.2	103255.5	-3.5	102545.3	-4.1
- Beef	7956.7	7627.8	-4.1	7566.0	-4.9
- Pork meat	22682.2	22986.8	1.3	23057.4	1.7
- Poultry meat	11389.4	11257.4	-1.2	11230.4	-1.4
- Eggs	7042.9	7034.1	-0.1	7029.9	-0.2
- Butter	2071.2	1941.4	-6.3	1931.7	-6.7
- Skimmed milk powder	1307.7	1191.6	-8.9	1175.9	-10.1

*Source: Simulations with CAPRI. "% diff." denotes percentage difference to baseline.*