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# Modelling the impacts of multilateral agricultural trade liberalization on the EU

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*Abstract*— The objective of this paper is to explore the implications of domestic policy reforms and trade liberalisation on EU and global agricultural markets by utilising the GTAP model. The results suggest that CAP reforms in conjunction with the removal of export subsidies and tariff reductions according to the proposals from the EU and the US in the WTO would decrease EU's production, reduce EU's exports, and increase EU's imports in almost all the examined agricultural products. For countries such as Australia, the US, and the MERCOSUR group, higher world prices stimulate domestic agricultural production, partly offsetting the EU output decline.

*Key words*— EU, WTO, tariff reductions, export subsidies, CAP reforms, GTAP model

## I. INTRODUCTION

The agricultural sector has been one of the most contentious issues in the multilateral trade negotiations that have been taking place since 2001 under the auspices of the World Trade Organisation (WTO). New rules are to be negotiated for the three pillars of the agricultural trade, which consist of export competition, domestic support and market access.

In the area of export competition, the agreement to eliminate all forms of agricultural export subsidies by 2013, as part of a new partial deal on agriculture, was already reached at the WTO Ministerial Conference in Hong Kong in December 2005. Moreover, this agreement requires a "substantial" degree of so-called 'front-loading' – with the majority of export subsidies to be phased out by 2010. Yet, it should be noted that no agreements on export competition will be implemented until the other pillars are decided.

In the domestic support arena, the challenge is to agree a formula for 'tiered' reductions in allowed trade distorting support ceilings. The principle has already been conceded that current ceilings will be reduced substantially, and that those with the highest domestic support levels such as the EU should make the biggest reductions.

The market access pillar of the negotiations has proved to be the trickiest to resolve. The principle has been established that import tariffs are to be reduced based on a 'tiered' formula, with higher tariffs being subject to bigger cuts. Although this principle is accepted as a basis for discussion, the parameters for each tier still remain subject to negotiation - as does the size of the cut to be administered in each tier. Furthermore, it has not been agreed what proportion of total import tariff lines may be designated as "sensitive products". The products that are nominated as 'sensitive products' would be shielded from the full force of the tariff reductions.

The final outcome of the Doha Round and its implementation are expected to have a significant impact on global as well as on EU agriculture. An important question for the EU agriculture is whether the recent reforms of Common Agricultural Policy (CAP) have improved its ability to adjust to more liberal trade environment. Although the reforms did not overtly deal with external trade aspects of the agricultural policy, benefits in terms of reduced subsidising of EU exports and reduction of import protection are automatically expected to follow indirectly from the policy changes in the internal market regime. In particular, the Union's decision to compound all of its agricultural domestic support system into one Single Farm Payment is expected to improve EU's ability to adjust to more liberalized agricultural markets which inevitably lies ahead.

## II. OBJECTIVES AND METHODOLOGY

This study aims to answer the question on what would be the overall effects of further trade liberalisation and the implemented CAP reforms on agricultural production, imports and exports in the EU and within the different regions of the EU. Decomposition of the different policy effects on EU's agricultural production is also examined. Our points of reference are the proposals currently on the WTO Doha Round table from the European Union (EU) and

the United States (US). Using the multi-regional numerical general equilibrium Global Trade Analysis (GTAP) model of the global economy [1], we compare impacts of these two scenarios, taking real numbers from the two proposals. The results of the simulations give estimates of the changing trade flows globally as well as within the EU. Particular attentions are paid to the production and trade positions of each country in key agricultural and food products. In the study, the EU is divided into 7 regions: Finland, France, Germany & Austria, Northern EU, Southern EU, Poland, and Rest of the EU.

The GTAP model and database are standard tools for analysis in the changing world of commodity markets [1, 2]. The standard model assumes a competitive environment where consumers and firms take prices of goods and factors of production as given. It is assumed that the outcome of the model is one of optimizing behaviour by firms and consumers restricted by their resources (land, labour, capital, natural resources), restraints (taxes etc.) and their objective functions. The GE models are thus very suitable to analyse the overall trade and welfare effects, as they offer a comprehensive assessment of cross- and inter-industry linkages, including upstream and down stream effects.

The limitations of GE methodology include its complexity, data requirements, disaggregation issues, and model sensitivity to the selection of key parameters. In particular, GE models sacrifice commodity and policy detail important in examining agricultural trade agreements and lag on policy and market information [3]. On the other hand, proper analysis of trade agreements would seem to require large-scale, dynamic, general equilibrium models. GE models force conceptual consistency on a problem and provide useful information on spatial trade flows and factor prices important to agriculture [4, 1]. They also capture feedback effects between processing sectors and agriculture that can be at best mimicked in partial equilibrium models.

An important modelling challenge in this paper is related to the CAP reform approved in the EU in 2003. In this reform most of the so called CAP payments for arable crops and livestock are decoupled from the production and a new Single Farm Payment Scheme (SFP) is set up in the Member States. Nearly 90% of all direct aid payments to farmers in the EU-25 in 2006 were decoupled from production according to the European Commission data, though the EU has given the Members States a number of options for

implementing the reform. The policy specification adopted in this study partly draws on earlier contributions. Several papers have recently introduced changes in the basic GTAP model aimed at improving policy representation, with special reference to the Common Agricultural Policy (CAP) [5, 6, 7, 8, 9].

Following the approach of Jensen and Yu [9], an additional land subsidy rate is introduced into the model that is equalised across all sectors entitled to direct payments, while budgetary outlays for total domestic support are held constant. A large part of the livestock premiums are also converted into a single farm payment in the form of a uniform land-based payment. The remaining reduced premium per head is kept as capital and output subsidies in each country. Following the argumentation of Gohin [10] as well as Jensen & Yu [9] we see it is reasonable to assume Agenda 2000 -bull premium as output subsidies since bulls can be usually grown relatively intensively to an appropriate carcass weight in order to meet market demand of meat, while slaughter premium, paid per head of all slaughtered bovine animals, and suckler cow premium contribute rather to the maintenance of the existing animal stock rather than the quantity of beef produced.

The national implementations of the CAP reform in each member country in the EU [11, 12, 13] have been taken into account very carefully. In the case of old member countries we have explicitly calculated the de-coupled and coupled part of the CAP support based on the statistics available from EU Commission. These subsidy amounts per country we have then added when calculating de-coupled land payments in each group of countries. The remaining coupled beef premiums have also been aggregated, in the cases of output and capital subsidies, and allocated to the number of animals in each farm group. In the case of new member countries (EU-10) all the CAP payments are paid for land. Hence we have simply taken into account the total sum of CAP payments, which is to gradually increase up to 2011, paid for land.

Analysis of approaches to market access liberalization also confronts some key methodological challenges. In the standard GTAP database, the applied rates in the EU are aggregated using import trade weights. Trade weights take only the relative importance of trade flows into account, and leads to an endogenous bias, as the weight for every individual tariff decreases with an increase of the tariff. Accordingly, prohibitive tariffs impeding market

access, and thereby reducing the trade volumes to zero, are not taken into account

This study draws on the detailed data on applied tariffs, notified by the EU to the WTO for the so-called ad valorem equivalents computations (AVE data). These ad valorem equivalents are calculated by working out the “unit value” of imports over the period of 1999-2001. Import values are taken from the data submitted to the WTO’s “Integrated Database” (IDB).

### III. RESULTS

The results suggest that tariff reductions accompanied by the removal of export subsidies and the reform of the CAP would decrease EU’s production in all the examined agricultural products ranging from 1% to 15% under the EU tariff reduction formula and from 2% to 23% under the US tariff reduction formula (Table 1). Moreover, the decline in

EU’s agricultural production would reduce EU’s exports of almost all the examined agricultural products ranging from 5% to 60% under the EU tariff reduction formula and from 1% to 72% under the US tariff reduction formula. Additionally, EU’s imports would increase in all the examined agricultural products ranging from 1% to 65% under the EU tariff reduction formula and from 2% to 128% under the US tariff reduction formula.

The decomposition of the policy effects of tariff reductions, export subsidies and the CAP reforms indicates that the CAP reforms is the major contributing factor for a drop in the production of wheat and dairy products whereas export subsidy abolition is the major contributing factor for a drop in the production of coarse grain and other meat products (pigmeat & poultry meat). Trade liberalisation in the form of tariff reduction is the major cause for the drop in production for sugar and beef products (Table 2).

Table 1 Change (%) in agri-food exports, imports and production of the EU by commodity under the alternative trade policy scenarios.

Product	EU proposal			US proposal		
	Exports	Imports	Production	Exports	Imports	Production
Wheat	-18	+8	-10.4	-18	+9	-11.4
Coarse road	-22	+1	-8.4	-27	+2	-11.0
Sugar	-60	+65	-14.6	-71	+128	-22.4
Beef	-57	+64	-15.4	-72	+124	-22.8
Pork and poultry	-5	+7	-1.8	+1	+16	-2.2
Dairy products	-23	+11	-7.1	-28	+33	-11.5

Table 2 Decomposition of policy effect (%) on EU production by commodity under the EU proposal.

Policy change	Wheat	Coarse grain	Sugar	Beef	Pork and poultry	Dairy products
CAP-reform	-6.4	-2.1	+0	-1.8	+0	-3.8
Export subsidy elimination	-3.1	-3.6	-2.1	-2.6	-1.2	-2.6
Tariff reduction	-0.9	-2.7	-12.6	-10.9	-0.6	-0.7
Total	-10.4	-8.4	-14.6	-15.4	-1.8	-7.1

## IV. CONCLUSIONS

This paper has examined the market impacts of alternative trade liberalization scenarios on EU and global agricultural markets. The evaluation is conducted with the multiregional numerical Computable General Equilibrium (CGE) model. Our contribution is twofold: (1) we modelled CAP reform taking into account options chosen at the national level, (2) we drew on the detailed data on applied tariffs instead of applying aggregated tariffs in the GTAP database. Our findings are of course conditional on the underlying model structure, as well as the other parameters employed in the CGE analysis. We do not take into account future trends in demand such as increasing demand for meat in Asia which may drive up prices and re-direct global trade flows, and possibly relieve import pressure to the EU.

The results of the paper suggest that removal of export subsidies together with tariff reductions lowers domestic prices for subsidizing countries and raises world prices, and increases world market prices for those commodities subsidies have been used most. These commodities are dairy products and beef. In the EU, trade liberalization lowers domestic prices and lowers agricultural output as productive resources are re-allocated from sectors like sugar, dairy, grains and meat into other sectors of the economy. For countries such as Australia, the US, and the MERCOSUR group, higher world prices stimulate domestic agricultural production, partly offsetting the EU output decline.

## REFERENCES

1. Hertel T. (ed.) (1997). *Global Trade Analysis: Modelling and Applications*. Cambridge: Cambridge University Press. 96 p.
2. Dimaranan B.V., Robert A., McDougall, Editors (2005, forthcoming). *Global Trade, Assistance, and Production: The GTAP 6 Data Base*, Center for Global Trade Analysis, Purdue University.
3. Westhoff P., Fabiosa J., Beghin J., Meyers W. (2004). *Challenges in Modelling the Effects of Trade Agreements on the Agricultural Sector*. Iowa State University Working Paper 04-WP 358. Available at <http://www.card.iastate.edu>
4. Goldin I., van der Mensbrugge D. (1996). *Agricultural Tariffication under the Uruguay Round*. In: Martin W., Winters L.A. (eds.). *The Uruguay Round and the Developing Countries*. Cambridge: Cambridge University Press.
5. Bach C.F., Frandsen S.E., Jensen H.G. (2000). *Agricultural and Economy-Wide Effects of European Enlargement: Modelling the Common Agricultural Policy*. *Journal of Agricultural Economics*, 51(2): 162-180.
6. Frandsen S., Gersfeld B., & Jensen H. (2002). *Decoupling Support in Agriculture: Impacts of redesigning European Agricultural Support*. Paper presented at the 5th Annual Conference on Global Economics Analysis, Taipei. Available at <http://www.gtap.agecon.purdue.edu/resources>.
7. Brockmeier M., Klepper R., Pelikan J. (2006). *A Comparison of the Most Recent Proposals for Market Access*. A paper presented at the ENARPRI Conference, June 8, 2006, Brussels, Belgium. Available at <http://www.enarpri.org/Publications/ConNo3.pdf>.
8. Jensen H.G. 2006. V6 Documentation - Chapter 16.C: Domestic Support: European Union. [https://www.gtap.agecon.purdue.edu/resources/res\\_display.asp?RecordID=1822](https://www.gtap.agecon.purdue.edu/resources/res_display.asp?RecordID=1822)
9. Jensen H., Yu, Wusheng 2006. *Reforming Agricultural Domestic Support of the EU in the Doha Round: Measurement, Feasibility, and Consequences* A paper presented at the ENARPRI Conference, June 8, 2006, Brussels, Belgium. Available at <http://www.enarpri.org/Publications/ConNo3.pdf>
10. Gohin A. (2006). *Assessing CAP Reform: Sensitivity of Modelling Decoupled Policies*. *Journal of Agricultural Economics*, 57(3), 415-440.
11. European Commission (2004a). *Commission Regulation (EC) No 796/2004 of 21 April 2004*. Available at <http://eur-lex.europa.eu/LexUriServ/site/en/consleg/2004/R/02004R0796-20050325-en.pdf>
12. European Commission (2004b). *Commission Regulation (EC) No 795/2004 of 21 April 2004*. Available at <http://eur-lex.europa.eu/LexUriServ/site/en/consleg/2004/R/02004R0795-20050101-en.pdf>.
13. European Commission (2005). *Commission Regulation (EC) No 118/2005 of 26 January 2005*. Available at <http://eur-lex.europa.eu/LexUriServ/site/en/consleg/2005/R/02005R0118-20050416-en.pdf>

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