Volume 5 Number 1, 2004/p. 37-42 esteyjournal.com

The Estey Centre Journal of
International Law and Trade Policy

Technical Annex

The Effects of Alternative Proposals for Agricultural Export Subsidies in the Current WTO Round

Piero Conforti
INEA, The National Institute of Agricultural Economics, Rome, Italy
Beatriz E. Velazquez
INEA, The National Institute of Agricultural Economics, Rome, Italy

This document is the technical annex to the full paper "The Effects of Alternative Proposals for Agricultural Export Subsidies in the Current WTO Round" which is available separately.

The Simulation Exercise

The GTAP model and the related database and simulation software (Hertel, 1997) were employed to study the impact of a reduction of export subsidisation in the Doha Round. The GTAP is a comparative-static, standard, multi-regional, applied general equilibrium model that represents the global economy. In each region, production is represented by a set of nested constant-returns-to-scale functions, based on the assumption of weak separability. Resource allocation among endowments, and among intermediate goods, is modeled with a constant elasticity of substitution (CES) functional form, while allocation between endowments and intermediate goods is modeled with a Leontief function that assumes fixed factor proportions. Demand is represented by a non-homothetic system that separates private demand from

government demand. Expenditure allocation between these two components is modeled through a Cobb Douglas function, while allocation within the two components is modeled through a constant difference of elasticity (CDE) functional form. The model assumes the existence of maximising representative agents in each country or region and does not include information on the distribution. The public sector is represented solely through its demand, without a budget; thus public expenditure and revenues cannot be distinguished from total income of one country or region. Foreign trade is modeled through the so-called Armington assumption, by which domestically produced and foreign goods are considered as imperfect substitutes; this allows for bilateral trade flows to be modeled. Substitution elasticities are assumed to be different among goods but homogeneous across countries. The model also includes a transport sector, based on freight data for the most important commercial routes. The model has a standard closure, in which the level of saving determines the level of investment in each period. In turn, these are determined in each country by the equalization of the marginal rates of return; equilibrium conditions assure that global savings equal global investments. The standard version of the model is based on (modifiable) assumptions of perfectly competitive markets. Policies are mostly included as price wedges among different input and output markets (Hertel, 1997).

The GTAP database employed in this application is the latest available and is known as version 5; it refers to the year 1997 (Dimaranan and McDougall, 2002). As was the case with previous versions, this version includes data for the whole global economy, in which trade flows are entirely reconciled, and made consistent with national accounts (input-output tables), domestic and trade policy data, and macroeconomic data. The current 1997 version of the database includes up to a maximum of 66 regions, 57 sectors and 5 endowments.

In the application presented here, the model was run on an aggregation of the database including 14 countries and regions, 14 products (12 of which are agricultural and food products) and 4 endowments; these are all reported in table A.1. Countries and regions were chosen by considering those that are likely to be interested by the WTO discipline on export competition, both in terms of increased export shares and in terms of increased import bills. Sectors were chosen by considering the most important agricultural and food products that are traded internationally.

Table A.1 Regions, Products and Endowments

Regions	Products	Endowments
EU15	wheat	land
CEECs[1]	other cereals	natural resources
USA	oilseeds	labour
Canada	paddy rice	capital
Australia and New Zealand[2]	processed rice	
Brazil	sugar cane & beet	
Argentina	processed sugar	
Rest of the Cairns Group[3]	raw milk	
Japan	dairy products	
India	cattle	
Mediterranean countries[4]	meats	
Sub-Saharan Africa[5]	other primary products	
China	secondary sectors	
Rest of the World	services	

Note 1. Includes Hungary, Poland and an aggregation named "rest of Central European Associates". Together with the Czech Republic, Slovakia and Slovenia, this item includes also Bulgaria and Romania, whereas it does not include Estonia, Latvia and Lithuania, which the GTAP database version 5 includes in a "former Soviet Union".

2. Includes Australia and New Zealand

3. Includes Indonesia, Malaysia, the Philippines, Thailand, Botswana, South Africa, Uruguay, Chile, the "rest of the Andean Pact" and Colombia.

4. Includes Morocco, Turkey and a "rest of North Africa" region.

5. Includes Malawi, Mozambique, Tanzania, Zimbabwe, Zambia, Uganda, "other Southern African" and "other sub-Saharan African" countries.

The sources of information employed to calculate the shifts in the exogenous variables are reported in table A.2.

Table A.2 Sources of Information

Variable	Source
GDP	International Monetary Fund
labour force	FAO - Faostat database
total factor productivity	Hertel and Martin (2000)
population	UN projections

Policy changes are implemented following mostly Conforti, Filippis and Salvatici (2002), and drawing on the previous work by Van Meijl and Van Tongeren (2000),

which introduced a set of developments in the representation of the CAP measures within the standard model, particularly concerning the intervention mechanism and its interaction with the export subsidy GATT limitations. Changes in intervention prices are modeled as changes in the ratio of domestic to import prices, while milk production quotas are introduced by fixing the output at the quota level and allowing the production tax to adjust. Finally, land set-aside provisions are not represented, since Agenda 2000 did not change the rate of the year 1997, but only established that rate as a fixed one.

The MTR package is introduced in the simulation in the market measures for cereals and rice – durum wheat is not available as a single sector in the database – and the full decoupling of direct payments for cereals and livestock (and their distribution as a flat-rate subsidy to land).

The implementation of the EU enlargement included the elimination of trade barriers between the EU 15 and the CEECs, the alignment of output subsidies and trade measures, and an endogenous determination of a single payment per hectare, based on the expenditure commitments undertaken by the EU Council of Ministers held in Brussels in October 2002.

Direct payments are introduced in the model as *ad valorem* subsidies to factor use, i.e., as a subsidisation of land in the case of cereals and oilseeds, and as a subsidisation of capital in the case of livestock, to take into account subsidies paid per head in this sector; the slaughtering premium to bovine meat is introduced, instead, as an output subsidy. In order to represent the financial stabilisation mechanism associated with these payments – by which payments per hectare (per head) are reduced if the cultivated land (the herd size) exceeds the maximum threshold – a mechanism is added to the standard model by which the expenditure for direct payments to cereals, oilseeds and livestock is fixed, and the unit subsidy adjusts to changes in production. Moreover, since direct payments are fixed in nominal terms, payments are reduced by 2 percent per year.

The shocks implemented to represent Agenda 2000, the MTR and the EBA are summarized in table A.3. The modeling of the CAP mechanisms is oversimplified in many respects. Major limitations, which are described in more detail in Conforti, Filippis and Salvatici (2002), are in the modeling of the intervention mechanisms, which is approximated through changes in the border protection, and in the exclusion of important policy changes whose effect cannot be taken into account by the model; this is the case especially of the dynamic modulation, of the increase and modification of the rural development provisions, and of specific provisions for detailed products

like durum wheat, which are not available as single items in the model. Scenarios are summarised in table A.4.

Table A.3 Policy Changes Adopted in the 2010 Database

Measure	Shock	Sources of calculation
Agenda 2000		
introduction of a slaughtering (coupled) bovine premium	increase in the output subsidy for the livestock sector	ratio of expenditure to the value of production in AGLINK; weight of bovine on total livestock from Van Tongeren and Van Meijl (2000)
increase in the semi-decoupled premium for bovines	increase in subsidy to capital for the livestock sector	44% decrease in the premium; weight of bovine on total livestock from Van Tongeren and Van Meijl (2000)
increase in direct payment for cereals	increase in the subsidy to land in the cereal sector	+ 16%, from 54 to 63 Euro/ton
decrease in intervention price for cereals	decrease in the ratio of domestic to import price and in related export subsidies	change in market price after change in the intervention price as in Van Tongeren and Van Meijl (2000); import price as 1.55 times intervention price
decrease in direct payment for oilseeds	decrease in the subsidy to land in the oilseed sector	-33%, from 94 to 63 Euro/ton
increase in milk quotas	increase in raw milk output	2.4%
Mid-term review of the CAP		
5% reduction in the intervention price of cereals	reduction of the ratio of domestic to import prices	
50% reduction in the intervention price of rice	reduction of the ratio of domestic to import prices	
increase in the direct payment for rice growers	subsidy on value added	
35% reduction in the intervention price of butter	reduction of the ratio of domestic to import prices	
17% reduction in the intervention price of skimmed milk powder	reduction of the ratio of domestic to import prices	
increase in milk quotas	increase in raw milk output	2%
full decoupling of direct payments	endogenous flat rate *ad valorem* subsidy on land use based on exogenous (fixed) expenditure (Conforti et al., 2002)	Brussels Council expenditure decisions of October 2002)
EU Enlargement		
elimination of all trade measures between the CEECs and the EU15		
alignment of import taxes and export subsidies		
alignment of output subsidies		
establishment of a decoupled subsidy on land use	endogenous *ad valorem* rate based on exogenous (fixed) expenditure (Conforti et al., 2002)	Brussels Council expenditure decisions of October 2002)
EBA agreement		
elimination of import taxes from sub-Saharan Africa to the EU and CEECs	proxy of ACP countries	

Table A.4 Scenarios Simulated

Scenario	Baseline on which scenario is run	Experiment
A	1997, database version 5	45% reduction in expenditure for export subsidies
B	1997, database version 5	elimination of export subsidies
C	2010, updated database	45% reduction in expenditure for export subsidies
D	2010, updated database	elimination of export subsidies

Export subsidies in the GTAP are modeled as unit *ad valorem* negative subsidies on exports. Uruguay Round commitments concerning export subsidies are particularly difficult to implement, for three reasons. First, it is impossible to implement a quantity constraint in the model; second, it is not possible to take into account both subsidised and unsubsidised exports; and third, it is impossible to model the different rates of reduction that countries need to adopt in order to fulfill the commitments. A usual strategy is to reduce the unit export subsidy by a given amount.

In the case of the proposals put forward in the current negotiation round, the situation is somehow less unfavourable. The EU proposal, as seen, implies a single commitment for all commodities in terms of a reduction in the expenditure. This is represented by a (uniform) reduction in the unit subsidy that – as checked through trials and errors – reduces total expenditure by the desired amount. This does still require the assumption that expenditure will be reduced homogeneously across all interested products, but at least is not meant to be a proxy for a quantity constraint. Other proposals put forward in the negotiation are all aimed at eliminating export subsidies, and the implementation of this change is quite simple in the model.

It is useful to recall, finally, that the starting-point data on export subsidies included in the GTAP version 5 database are retrieved from the data on the volumes and expenditures on export subsidies, divided by commodity, that WTO members have been required to submit to the Secretariat from 1995. Export subsidy rates are calculated as ratios of the 1998 values of export subsidy expenditures to the FOB value of exports for 1998 retrieved by the UNCTAD trade data (Elbehri, 2001).