AGRICULTURAL MARKETS LIBERALIZATION AND THE DOHA ROUND

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ABSTRACT

Using a partial equilibrium model of world agriculture, we investigate the multilateral removal of all border taxes and farm programs and their distortion of world agricultural markets. These distortions have significant terms-of-trade effects. World trade is also significantly impacted by both types of distortions. Trade expansion is substantial for most commodities, especially dairy, meats, and vegetable oils. Net agricultural and food exporters (Brazil, Australia, and Argentina) emerge with expanded exports; whereas net importing countries with limited distortions before liberalization are penalized by higher world markets prices and reduced imports. The US gains significant export shares in livestock products and imports more dairy products. Without protection and domestic subsidies, the EU loses many of its livestock and dairy export markets.

Keywords: Doha, Agriculture, trade liberalization, domestic policy

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Many developing countries became disappointed with the limited accomplishments achieved by the Uruguay Round Agreement on Agriculture (URAA) of the WTO. This disappointment led them to voice their concerns largely reflected in the Doha Declaration of the WTO (Kennedy et al.; Matthews; WTO 2001). First, the lack of market access in high-income countries constrains trading opportunities for exporting developing economies via tariff rate quotas (TRQs) and other trade barriers (Anderson et al.; Martin and Winters).

Second, agricultural subsidies in high-income countries depress world market prices. Exports from some of the high-income countries are subsidized explicitly or implicitly through production subsidies and are often "dumped" on world markets. The objective of income transfer to domestic farmers is not in question, but rather, the way it is accomplished with coupled and untargeted policies, which frustrates the mercantilist aspirations of competitive exporters.

Among developing countries, policy interests are heterogeneous. Some natural exporters, such as Brazil and Argentina would benefit from trade liberalization and a multilateral removal of domestic farm programs. By contrast, net-importing countries, such as Egypt, benefit from depressed world prices and cheaper food imports. Many countries fall in between these two extremes, importing some commodities and exporting others with varying degrees of distortions.

With the URAA nearly fully implemented, heterogeneous market interventions in high-income economies still distort resource allocation and trade in agriculture. EU countries rely heavily on export subsidies and domestic support (Tangermann). Large U.S. domestic production subsidies subsidize crop exports. Both the EU and U.S. border measures in sugar and dairy markets are prohibitive. Net-importing, high-income Asian countries (Korea and Japan) use prohibitive border measures to protect their agriculture and some food sectors.

Developing countries exhibit a heterogeneous set of policies. When they subsidize their farmers, they rely on border measures. Overall, the scope for more efficient location of production, and terms-of-trade effects remains in agriculture. It is worth asking what would happen in unfettered markets.

This paper presents the key findings of an exhaustive investigation of the impact of trade and farm policies on world trade flows, prices, and market equilibrium (FAPRI 2002b). We report on the main scenario of the analysis, which considers the total removal of all domestic farm programs and border measures (TRQs, tariffs, export subsidies) distorting agriculture. We focus on terms of trade, trade flows, and relocation of production. With this scenario, we assess the policy debate mentioned in the previous sections and elucidate the claims made by various WTO members. The model covers all temperate crops, livestock products, poultry, and dairy products, for all major producers, consumers, exporters, and importers in these markets.

Our paper contributes to the new literature analyzing agricultural negotiation in the Doha Round of the WTO (Beghin, Roland-Holst, and van der Mensbrugghe; Burfisher; Francois; and World Bank). The departure of our analysis from the literature resides in its unique coverage of countries, rich disaggregation of commodities, and in the incorporation of the most recent policy information within a realistic baseline. Next, we present the policy scenario, the major assumptions incorporated into the model and baseline used in the investigation, and the simulation results. This is followed by concluding comments. Our longer paper provides extensive tables with results for several scenarios (FAPRI 2002b).

POLICY SCENARIO

We start from a reference baseline (FAPRI, 2002a). This baseline incorporates most major actual policies and policy commitments such as the URAA, the Berlin Accord on the CAP, and China and Taiwan's accession to the WTO. As the baseline was prepared in January 2002, it does not incorporate provisions of the U.S. Food Security and Rural Investment Act, but assumes a simple extension of 1996 farm legislation. The policy scenario is then presented in deviations from this baseline. FAPRI (2002b) provides a detailed list of policies changes considered in the scenario. The scenario investigates the simultaneous removal of all agricultural distortions: domestic farm programs and border measures—including all TRQ schemes, tariffs, and direct export subsidies such as in the E.U. CAP. We assume the reform is fully implemented in 2002.

In dairy markets, the removal of domestic policies includes the elimination of EU intervention for butter and SMP and production quotas, the removal of Canadian milk marketing quotas and support prices for milk, butter, and SMP, the elimination of U.S. milk support prices and Commodity Credit Corporation (CCC) stocks for butter and SMP the elimination of milk marketing quotas in Hungary, Japan, and Slovakia; and in Poland, the elimination of milk marketing quotas, milk support prices, and intervention stocks for butter and SMP.

In the meat market, limited TRQs, high border duties, subsidized exports, and price support intervention schemes employed by many countries are removed, including the 38.5% beef duty and the specific duty implied by the "gate price" policy of pork in Japan, the 40% beef duty in South Korea and the Philippines, and China duties of 12 to 20% and 12 to 15% on beef and pork. South America, a natural exporter of meat, has a zero duty for intra-MERCOSUR trade, the dominant share in their meat markets. EU TRQ, out-quota duties, and subsidized exports are eliminated and the EU. Beef intervention scheme is terminated, with its stocks released to the market. Canada's poultry TRQ and out-of-quota duties in poultry are removed.

In the EU, industrial rapeseed production on the set-aside land is cancelled and the set-aside land is returned to regular production. Without subsidies, we assume that crush demand for industrial rapeseeds is eliminated. The assumptions for the E.U. sunflower sector are similar to those of rapeseed. The demand for sunflower oil is reduced by the quantity of oil produced from sunflowers grown on set-aside area in the baseline. This, however, covers about 50% of the industrial oil use. Therefore, we assume that 50% of the baseline industrial oil consumption is an unsubsidized market demand.

All distortions on world grain markets are eliminated, including the E.U. set-aside program. Accounting for small-farm exemption, mandatory set-aside area is 7.6% of the total cereal and oilseed area potentially released for production. The removal of the set-aside area leads to a significant potential increase of the total E.U. crop area although returns are reduced with the removal of trade protection and domestic support. We assume a 10%-decrease in yields on the area that returns to production from set-aside. We also remove EU rice intervention prices, tariffs, export subsidies, and direct payments, which results in domestic prices often twice as high as world prices. In China, we remove TRQs schemes on corn, rice, and wheat with in-quota rates of 1% and out-quota rates of 68%. In addition, procurement prices for wheat, corn, and rice are eliminated. Mexican corn farmers are still protected under the NAFTA regime by a combined system of TRQ and tariff but with a phasing out of tariffs by 2007. We set the latter to zero in 2002. We remove India's export subsidies used in recent years to reduce its large amount of stocks. U.S. crops are subsidized through price-conditioned payments (loan deficiency payments [LDPs]) and so-called fixed (decoupled) payments based on historical production on an individual farm. In the baseline, soybeans, cotton, and rice are the only crops for which LDP programs provided any benefits.

The international cotton trade is relatively free, but domestic markets are distorted in many countries. For the EU CAP, we remove support payments to ginners, which are passed on in the form of higher prices to growers. We also remove U.S. LDPs and production flexibility contract (PFC) payments to cotton growers, and export and consumption subsidy programs known as Step 2. In Turkey, we eliminate the premium payment calculated on the basis of seed cotton deliveries to either cooperatives or private ginners. In Egypt, we remove a small marketing subsidy paying the difference between selling and purchase prices to farmers. In Brazil, we remove the government-set support price. Finally, in Mexico, assistance to growers is also removed. We do not consider the high distortions in textile and apparel markets.

MODELING APPROACH

The FAPRI modeling system is a multimarket, world agricultural model. The model is extensive in terms of both its geographic and commodity coverage. Functionally, the modeling system is organized into modules according to major commodity groupings—grains, other crops, oilseeds, livestock, and dairy—with country submodels. The system captures important linkages between dairy, livestock, grain, and oilseed markets. Feed prices impact dairy and livestock supply decisions, and animal inventories have an impact on milk and meat production. Both dairy and livestock animal numbers are used to determine demands for feed, which ultimately influence feed prices. Oilseed markets are linked to livestock markets through oilseed meal demand. Vegetable oils are substitutes and compete in final consumption for consumers' income.

The FAPRI model solves for world prices by equating excess supply and demand in the world market. As explained in the scenario section, the FAPRI model is driven by two major groups of exogenous shifters. First, policy instruments are parameterized in the model and can be altered for policy analysis. Second, the model incorporates forecasts of macroeconomic variables, such as gross domestic product, inflation rates, exchange rates, and population. For the scenario, policy parameters are changed and a new baseline is computed for the same outlook period. The two trajectories are then compared in deviation.

RESULTS

Results are reported as average annual changes over the outlook period (2002–2011) in deviation from the baseline, unless otherwise noted. FAPRI (2002b) reports detailed tables.

The wheat price (U.S FOB Gulf) is up 4.8% with full liberalization. World wheat trade increases by 7.9%. The removal of EU set-aside requirements frees a much larger expansion of wheat and induces a substantial increase in E.U. wheat exports of 6.4 million metric tons (mmt). Chinese wheat imports decrease. Without export subsidy, Indian wheat exports vanish and India becomes a net importer in 2003. The corn price goes up by 5.7%. World corn trade increases by 3.5 mmt. The increase in the corn price is sustained by increased demand for feed in the United States (US) and from other major (feed-fed) meat exporters. Chinese, net corn imports increase as domestic production decreases. E.U. corn imports increase because of much lower domestic prices. Mexican imports increase the most in the first half of the projection period when the NAFTA tariff is still present in the baseline.

The increase in world rice prices, 10.3%, is the highest among the grains. This price increase can be explained by high tariffs on rice and a thin and reactive world market. Rice trade increases by around 29%. Most of this trade increase is captured by China, India, and Vietnam, followed by Thailand. U.S. exports decrease by 98.3%, eventually turning the US into a net importer. The removal of barriers in Japan, Korea, and the Philippines leads to higher imports despite higher world prices. Brazilian imports decrease because of the higher world price. Brazil is the main export market for Argentine rice; Argentine exports decrease. The removal of distortions results in a significant increase in both EU consumption and stocks. EU Rice area withers from 400 to 25 thousand hectares. EU rice imports reach 2.6 mmt, supplying most of the EU consumption.

Soybean world price increases by 3.1%. The removal of the EU set-aside requirement mitigates the price increase. Soybean world production remains unchanged, but production and processing locations shift with Argentina and Brazil expanding their production. Importers with tariffs (China, Japan) reduce their soybean production and crush. U.S. soybean area is reduced in early years but it recovers in later years as the world price remains above the loan rate. Brazil crushes more and consumes more meal (7.3%); the additional domestic production does not cover this increase entirely, and meal exports are actually reduced slightly (0.7%). Brazilian soybean oil exports increase by 11%. In contrast, in Argentina, the additional production of 1.2 mmt is exported entirely. Argentina's oil production and export contract, because its crushing industry loses protection from the export tax on beans. It misses the opportunity to expand value-added exports. Chinese soybean meal production is reduced and utilization expands with lower domestic prices; more imports (32%) are needed. The Chinese oil sector exhibits similar patterns; oil imports increase by 6%. Japanese soybean production drops dramatically. Trade distortion removal leads to lower oil prices and higher oil consumption and imports, but the elimination of domestic subsidies partially reverses these changes. Korea's soybeans production falls by 23%, and utilization decreases 9%, leading to an 11% increase in imports. In aggregate, world meal exports decrease because the US and Brazil consume more domestically, and Argentina and India crush less. World trade in soy oil increases by 4.8%. China, Japan, India, Korea, FSU, and Eastern Europe (EE) import more (due to substitution of domestic production), while the US and Brazil export more.

All traditional rapeseed exporters expand area, benefiting from the higher world market prices. The EU, India, and China lose rapeseed acreage because of lower domestic prices. Crush margins fall in countries that have protective tariffs on rapeseed meal and/or oil (The EU, FSU, and Japan) and their crush consumption falls. As a result, the FSU exports more rapeseed and the EU and Japan import less. Canada and Australia's additional production goes mostly into exports. China decreases domestic production by 0.6% but increases crush 0.8%, requiring 8.5% of additional imports. India becomes a rapeseed importer (287 thousand metric tons [tmt]). Domestic meal prices fall in all countries. Canada, India, and China increase their use of rapeseed meal; all other countries decrease their use (driven by livestock and cross-price effects). The world rapeseed meal trade expansion (26%) is driven by the relative movements of domestic crush and use in individual countries. The rapeseed oil world price increases strongly (11%), driven by strong demand growth in India. Domestic prices fall in the FSU, Japan, and India, boosting their domestic consumption by 1.4%, 1.8%, and 11.9%, respectively. In all the other countries, consumption shrinks because their domestic prices rise along with the world price.

The increased rapeseed oil demand in India and Japan requires additional imports of about 177 tmt and 53 tmt annually, respectively. The E.U. exports shrink by 11.6%. Fewer imports by China; additional Australian, Canadian and EE exports provide a market adjustment for rapeseed oil. The removal of distortions has a big impact on the Indian rapeseed complex: the domestic price falls by 26%, production decreases by 5.2%, the crush margin improves, and crush expands, resulting in imports. Domestic consumption of meal increases by 9.4%, and there is a trade reversal from export to import of meal. The domestic oil price declines 26%, while domestic consumption increases 12%, and rape oil imports increase 364%. The EU rapeseed area (food and industrial) decreases by 21%, but total crush is reduced even more (25%). These changes reduce EU dependence on world markets. The EU rapemeal sector also is severely influenced because industrial crush residue that could be used as feed is no longer available. The cancellation of the industrial oilseed program reduces output by about 1 mmt. EU rapeseed oil production is exogenously reduced by the amount of the industrial production. Consumption is decreased by the same amount. Since the crush margin is reduced, food oil production decreases further and oil exports fall by 11.6%.

The world sunflower price rises 4.3%. World production responds by increasing 1.2%, and crush consumption in the world rises 1.9%. Production and consumption locations shift, causing a 21.7% expansion of sunflower seed trade in the world. E.U. sunflower production decreases by 4.4%; crush declines by 18%, reducing imports by 56%. The aggregate reduction of tariffs is much more severe for oil than for meal, driving world oil demand up disproportionately. Crush responds to this increased oil demand and, because of the fixed-proportion technology, meal price is driven down. Because of the deterioration of the crush margin and removal of industrial production, sunflower meal production falls by 18% in the EU. The domestic price falls along with the world price by 9.7%, boosting consumption by 2.9%. This requires 35% additional net imports of sunflower meal into the EU. World sunflower production changes according to the resulting movements of domestic prices. Production increases in Argentina and the FSU with the higher world price. Countries with high tariffs (EE, China) have lower domestic prices and lower area when the tariff is removed. The crush consumption increases in the EE because of former high tariffs on seeds. All other countries decease their crush because of lower crush margins. Counties with lower production export less (Canada, EE). Argentina and the FSU pick up the slack. These big exporters substitute raw material exports for domestic crush. The domestic prices of sunflower meal falls everywhere. Consumption expands in all countries except EE, where animal numbers decrease 6.4%. In Argentina, the decrease in sunflower crush is equal to meal production; the increase in use leads to lower meal exports. As a result, there is a shift into sunflower seed exports from meal exports. In the EU, crush decreases leading to fewer seed imports, while meal use increases, requiring higher meal imports. Domestic sunflower oil prices in Canada, and EE, (countries with high protection) fall, and so their domestic consumption increases. EE also produces more and in the net, it imports less. China becomes an oil importer. The traditional exporters export less oil; with reduced crush, they export more seeds. Overall, oil trade is down. Consuming countries shift into the trade of raw material and crush.

World cotton prices increase about 15% above baseline levels. As the U.S. loan program, step 2 payments, and export subsidies are removed, U.S. cotton production, consumption, and net export decline by 11%, 2%, and 13%, respectively. E.U. cotton production falls by about 79.0%, and cotton net import increases by 143.1%. As world cotton prices rise, Africa, a large cotton-exporting region, increases its cotton exports by 12.3% above baseline. Benefiting from both types of reforms, cotton exports from Uzbekistan increase by 5%. A similar story arises in the FSU. Both are natural exporters of cotton. China's cotton imports decline by 25% because of low protection assumed in the baseline with China's WTO accession. India cotton producers also benefit. India's cotton net imports decline by 14%.

Dairy. Net trade of all dairy products (butter, cheese, SMP, and WMP) increases relative to baseline levels. Argentina, Australia, and New Zealand gain market share. India is likely to gain significant market share in butter and SMP markets. The EU loses market share in all dairy products compared to the baseline. E.U. butter and SMP exports decrease significantly as the elimination of milk production quotas and intervention buying results in lower milk production, lower domestic prices, less butter and SMP production, and more domestic consumption of all dairy products.

World butter prices increase by 39.6%. World total butter trade increases by 8.7%. E.U. net exports decrease dramatically, by 96.4% (107 tmt) with some trade reversals. The US and Canada increase their imports of butter. U.S. and Canadian imports increase by 8.7% (47.8 tmt) and 2,033% (41.7 tmt) respectively. Argentina, Australia, and New Zealand increase their net exports of butter by 128.8%, 27.6%, and 9.1%, respectively. India becomes a net exporter. —A trade pattern reversal, from about 20 tmt annual net imports in the baseline to 54 tmt net exports. Butter consumers in the EU and US benefit from lower prices, down 6% and 21%, while consumers in net exporting countries (Australia and New Zealand) are penalized by higher prices, up 27%.

World cheese prices increase about 22% and world cheese trade increases 5.6%. E.U. net exports decrease by 40%, as the EU uses more milk for cheese because of the elimination of intervention buying for butter and SMP. Exports from EE increase for Romania, the Slovak Republic, and the Czech Republic, while Poland's exports decrease. The quality of dairy products in these countries has improved, including in Poland. Hence, these predictions are tentative. Canadian and Japanese net imports increase by 64 tmt and 11 tmt respectively. Argentina and Australia increase their exports by 258 and 13% respectively because of their decreased domestic consumptions. New Zealand exports increase by only 3%.

Finally, the EU cheese price decreases by 10%, while U.S., Australian, and New Zealand prices increase by about 4%, 13%, and 13%, respectively.

World SMP prices increase by 30%. World total SMP trade increases by 6%. Exports increase in Argentina (32%), Australia (29%), New Zealand (16%), and the US (62%). E.U. net exports disappear. Without domestic support and despite higher world prices, the EU becomes a marginal exporter of SMP. Canada becomes a net importer, with import levels of about 46 tmt. Brazil becomes a marginal exporter with the removal of all distortions. Imports in South Korea and Indonesia increase (21 tmt and 14.8 tmt respectively), the elimination of import tariffs more than offsetting higher world SMP prices. Domestic prices of SMP increase in the EU (6%), Australia (28%), and New Zealand (28%). The world WMP market follows similar patterns but with smaller trade impacts on exporters. The E.U. WMP price decreases by 7%, while Australian and New Zealand prices increase 12% and 29% respectively.

Livestock markets experience higher prices following an expansion in demand. Lower feed prices reduce livestock production costs and stimulate livestock production and mitigate the livestock price increases. The removal of beef intervention stocks in the EU further limits potential livestock price increases in the short run. Some of the beef stock ends up in the export market, increasing the excess supply of beef. Consequently, the world beef price decreases in 2002 by 1.6%. This triggers a beef price path that reflects the cycles inherent in this sector. World trade expands as well for all three meats; pork has the largest increase, at 28.4%, followed by poultry at 18.9%, and beef at 9.1%. Traditional exporters such as Argentina, Brazil, and the US increase meat exports because of higher world prices. EU exports increase slightly in 2002 as beef intervention stock is released to the export market. Thereafter, E.U. exports decline by around 500 tmt annually as support both in the beef and dairy sectors is terminated. Removing border distortions results in lower domestic prices in most high-cost exporting countries, leading to a reduction in domestic production and an increase in domestic consumption of meat products. Importing countries (Japan, Korea, and the Philippines) increase their demand for meat products as domestic production declines, while consumption increases with the decrease in domestic prices after border opening. Some importing countries (Mexico and Hong Kong) with already low duties reduce their meat imports, as the increase in world prices more than offsets the reduction of their duties.

The average annual increase in the Nebraska fed steer price is 3.8%, with the largest increases occurring in the early years due to high excess demand together with lower excess supply. In the following years, buildup of inventory caused by the price increases eventually pushes the beef price down below baseline levels in 2007–09. The beef price rises again and ends at 2.8% above the reference level in 2011. The pork price increases relative to the baseline throughout the simulation period, with an average annual increase of 10.3%. The broiler price also increases by 7.46%.

CONCLUSIONS

Following the removal of all distortions affecting agriculture, terms-of-trade effects are substantial but heterogeneous. Most world prices increase, except for oilseed meals. Dairy prices exhibit the highest increases, followed by meat, cotton, and crops prices.

Trade flows are significantly affected by distortions. Substantial changes in trade occur in highly protected markets such oilseed and oil markets in India and meat markets in the Philippines, resulting in big gains for consumers. Net trade of all dairy products increases. Argentina, Australia, and New Zealand expand exports. EU exports of all dairy products decrease drastically. Canada becomes a net importer of all dairy products because of the increased consumption and decreased milk production. Dairy producers in the EU, Canada, and, to some extent, the US lose.

Significant production expansions occur in countries that are natural exporters, such as Brazil, Argentina, Australia, and other countries competing with the US on world markets. There is a shift from feed-grain trade to feed-intensive, value-added product trade and to increased feed use among traditional meat exporters. Argentina, Brazil, Canada, Thailand, and the US expand their meat and/or poultry production and exports significantly.

Net agricultural consumers in low-duty countries are worse off because price increases are substantial. Their net agricultural consumption is taxed under the new terms of trade. However, the many consumers in highly protected net-importing countries (Philippines, Japan and Korea) are better off, as the unit cost of most food items decreases.

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