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# TRADE, DEVELOPMENT AND AGRICULTURE

Essays in Economic Policy Analysis

**Kym Anderson**  
*Editor*



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## Preface and Acknowledgments

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My co-authors of the included articles, in alphabetical order with their affiliation at the time the research was undertaken, are John Cockburn (Laval University, Quebec), Johanna Croser (University of Adelaide), Sallie James (University of Adelaide), Peter Lloyd (University of Melbourne), Will Martin (World Bank, Washington DC), Chantal Nielsen (University of Copenhagen and the International Food Policy Research Institute, Washington DC), Young-Il Park (University of Adelaide), Chao Yang Peng (University of Adelaide), Rod Tyers (Australian National University, Canberra) and Dominique van der Mensbrugghe (World Bank, Washington DC).

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Adelaide, Australia  
January 2012

## Agriculture in an Integrating, Growing but Distorted World Economy

Deciding what papers to include in a collection of one's writings is a bit like being asked to name one's most preferred children. In the end I decided this volume should not be made up of only papers published in the most prestigious economics journals, but rather should be illustrative of the main fields in which I have ploughed over the past 25 years. To keep the volume below 400 pages though, two areas had to be omitted, namely regional integration and wine globalization.<sup>1</sup>

Even though I grew up in the rural southeast of South Australia and spent my undergraduate years at the University of New England in rural New South Wales, where I studied agricultural economics, I did not expect to confine my research interests only to things agricultural. In particular, I was interested in working on issues that could promote development and poverty alleviation in emerging economies. However, while reviewing a new book in 1973 by D. Gale Johnson, on *World Agriculture in Disarray*, it became clear how I could make a contribution that incidentally built on my initial stock of knowledge. The thesis in Johnson's seminal study is that the world's food is grown inefficiently in the wrong places and that the trade-restricting policies causing that are lowering the mean and increasing the variance of international food prices — and contributing to income and wealth inequality and probably to global poverty. Part of the solution to reducing that disarray involves estimating empirically the effects of those price- and trade-distorting policies, understanding better the political forces that maintain or alter them, and using that to suggest politically feasible ways to

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<sup>1</sup>For regional integration, see for example Anderson and Blackhurst (1993), Anderson and Norheim (1993a, b, c), Anderson and Snape (1994) and Anderson and Tyers (1995), while for wine globalization see Anderson, Norman and Wittwer (2003), Anderson (2004, 2010c), Anderson and Nelgen (2011a, b) and Anderson, Valenzuela and Wittwer (2011). Also omitted are publications focused on the economics of GATT/WTO law in the global trading system, such as Anderson (2002), Anderson and Hoekman (2002, 2006), Anderson and Josling (2005) and Anderson, McRae and Wilson (2001).

achieve society's policy objectives more effectively and with fewer resources.

### **A. Evolving Comparative Advantages**

One of the oft-stated reasons for governments in advanced economies providing farmers with subsidies and import protection is to slow the pace at which the sector declines in the course of economic growth. The farm sector is expected to decline relatively, and eventually also absolutely as a source of employment, because of the low income elasticity of demand for food and the relatively high rate of labor-saving technological advance. While that is a fair characterization of the world as a whole, why do we not see the farm sector of at least some countries with a strong comparative advantage in agriculture maintain or even raise their share of national GDP and employment? In Article 1, I show that this rarely happens because, as incomes grow, the share of consumer spending on non-tradables tends to grow even faster, which pulls mobile resources away from farming and towards such things as services.

What determines a country's agricultural comparative advantage at a point in time and how it changes over time? Neo-classical trade theory stresses the importance of relative endowments of primary factors of production such as labor and capital, as well as natural resources. Anderson and Garnaut (1980, 1985, 1987) and Anderson and Smith (1981) drew on that theory, as espoused succinctly by Krueger (1977), to explain how comparative advantages of the various countries in the Asia-Pacific region were likely to evolve as economic growth proceeded domestically and abroad.<sup>2</sup> One consequence is strong growth in trade between resource-poor, rapidly industrializing countries and those countries relatively well endowed with natural resources per capita. Another is that, among the natural resource-rich countries, those with abundant mineral and energy resources may enjoy a mining boom as nearby resource-poor countries industrialize, but that could reduce

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<sup>2</sup> That theory is also embodied in efforts to empirically project the world economy, both informally as in Drysdale *et al.* (1986) and more formally using the GTAP Model as in Anderson *et al.* (1997) and Anderson and Strutt (2012) or the Linkage Model as in Anderson, Martin and van der Mensbrugghe (2006b).

the competitiveness of the agricultural sector even in countries with an abundance of farm land per capita by global standards. A third consequence for all countries is that, as their real wages and industrial capital stocks rise, their comparative advantage will move away not only from primary products but also, within each sector — and most notably in manufacturing — from unskilled labor-intensive products to those that use human and other capital more intensively.<sup>3</sup>

The textile industry is one in which the pattern of comparative advantage evolves particularly starkly. Low-wage countries often begin manufacturing with labor-intensive clothing production and then gradually move to more capital-intensive textile (and other) activities, allowing lower-wage countries to take their place (the ‘flying geese’ pattern). In the early expansion stage of that process, the comparative advantage of farmers in producing natural fibres (cotton, silk, wool) declines in that country as domestic demand for fibre grows, causing the country to switch from being a net exporter to a net importer of fibres (and other primary products). Article 2 documents those changes for Japan from the 1870s: first Japan eclipsed Europe, but then it was eclipsed by later-industrializing neighbors. Initially the latter group involved Hong Kong, Korea and Taiwan, but more recently it has been China (Anderson and Park 1989) and several Southeast and South Asian countries (Anderson 1992).

The flipside to that growth of comparative advantage in manufactures in densely populated rapidly growing economies has been their growing comparative disadvantage in primary products. For China this was expected to show up in agricultural trade as early as the mid-1980s (Anderson and Tyers 1985, 1987a; Anderson 1990). It was also expected to show up soon thereafter in trade in minerals and energy raw materials.

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<sup>3</sup> The theory of changing comparative advantage described in Krueger (1977) was explicated geometrically by Deardorff (1984) and more formally by Leamer (1987). Since then rapid globalization has been characterized by technology ‘lending’ that involves offshoring an ever-rising proportion of fragmented production processes. As Baldwin (2011) points out, this supply chain development has made industrialization potentially far less complex and far faster for late-developing countries, especially those with reliable workers, a hospitable business environment and proximity to large, more advanced industrial countries.

However, scrutiny of the trade data a decade later found that there was only weak evidence of such a transformation: China's exports of those products had dwindled, but its imports had not grown dramatically. Article 3 hints that part of the explanation was a decline in the extent to which those primary sectors were effectively taxed in various ways by the Chinese government. It took yet another decade before an in-depth empirical study revealed the full extent of that earlier heavy taxing of farmers and its gradual phase-out by the early years of the 21<sup>st</sup> century (Huang *et al.* 2009, Table 3.5).

## **B. Effects of Distortionary Policies on Agricultural Markets and Economic Welfare**

Trade patterns are determined not only by comparative advantage but also by trade-distorting policies. Most countries have some forms of taxes or quantitative restrictions on imports of some products, and many developing countries have also taxed or quantitatively restricted some of their exports. Less commonly, countries will occasionally subsidize exports or imports too. In addition, it was not uncommon before the 1990s for developing countries to operate multiple exchange rate regimes, which also had a strong anti-trade bias. And any domestic producer or consumer price subsidies or taxes on tradable products also alter volumes of trade.

During the 17<sup>th</sup>, 18<sup>th</sup> and early 19<sup>th</sup> centuries, trade policies were commonly used as a foreign policy instrument, which meant they gyrated wildly. International negotiations to reduce restrictions on trade were 'ever pending, never ending'. Frustration with that state of affairs set the stage for unilateral tariff cuts by the major economic power in the 19<sup>th</sup> century, namely Britain, with the repeal of its Corn Laws in 1846. British policymakers hoped that their European trading partners would see the benefits of unilateral liberalization and follow their example. Eventually that began to happen, triggered by the Cobden-Chevalier Treaty of 1860 between Britain and France which contained a most-favoured-nation (MFN) clause. This clause required that the agreed cut in the tariff on each item in their bilateral trade was to be applied also to their imports from other countries. It also meant that every European country that



subsequently signed a trade treaty with either Britain or France (and most had done so by 1867) signed onto MFN. The net result was a network of treaties that from 1860 to 1913 lowered hugely both the average level of tariff protection and the extent of trade discrimination in Europe. However, that bilateral treaty regime ended abruptly with the outbreak of World War I in 1914. Following that war, efforts to restore liberal trade failed to renew those trade treaties. When economic recession and low agricultural prices hit in the late 1920s, and the US introduced the Smoot-Hawley tariff hikes in June 1930, governments elsewhere responded with beggar-thy-neighbor protectionist trade policies that together helped drive the world economy into depression.

The first attempts to reverse that growth in protection were discriminatory, benefitting colonies at the expense of other trading partners. Thus between 1929 and 1938 the share of imports from colonies rose from 30 to 42 percent for Britain, from 12 to 27 percent for France, and from 20 to 41 percent for Japan (Anderson and Norheim 1993a, b). By the end of the 1930s protectionism was far more entrenched than in the late 19<sup>th</sup> century when only non-discriminatory tariffs had to be grappled with. The efforts in the later 1940s to create an International Trade Organization to complement the International Monetary Fund and World Bank were unsuccessful, but a General Agreement on Tariffs and Trade (GATT) was signed in 1947 by 23 trading countries — 12 developed and 11 developing — which at the time accounted for nearly two-thirds of the world's international trade. The GATT provided not only a set of multilateral rules and disciplines but also a forum to negotiate tariff reductions and changes in rules, as well as a mechanism to help settle trade disputes. Eight so-called rounds of negotiations took place in the subsequent 46 years, as a result of which many tariffs on at least manufactured goods were progressively lowered in most high-income countries. The last of those rounds culminated in numerous Uruguay Round agreements, including one to convert the GATT Secretariat into the World Trade Organization (WTO) in January 1995, the membership of which now accounts for more than 97 percent of world trade (Anderson 2013).

The Uruguay Round provided an opportunity to further reduce trade barriers over the subsequent decade, including in agriculture. Past

GATT agreements had failed to make progress in lowering agricultural trade barriers and farm subsidies, and those distortions had grown considerably. Anderson and Tyers (1984, 1986, 1987b, 1990, 1991) and Tyers and Anderson (1986, 1988a, 1992) used a model of world food markets to begin to estimate the effects of current distortions in the European Union, Japan and other high-income countries on those economies, and on traditional agricultural exporters such as Australia and many developing countries.

The issue of the consequences for developing countries is controversial, however. That is because that country group comprises both food-surplus and food-deficit countries, so national economic welfare effects of reform for the two sub-groups from a consequent change in international food prices can have opposite signs. In Article 4, this issue is analyzed more thoroughly, showing how developing countries that are not yet net exporters of food could nonetheless gain from global liberalization of agricultural trade if that made them switch sufficiently into a food-surplus situation or if their policies discriminated against their own farm exporters.

By the time all the Uruguay Round agreements were implemented, the WTO had launched a new round of negotiations, known as the Doha Development Agenda. A key demand by developing countries was that agricultural subsidies be reduced. However, research by Anderson, Martin and Valenzuela (2006) estimated that export subsidies and domestic farm support programs accounted for only 7 percent of the global cost of the distortions to agricultural incentives that were under negotiation in the Doha Round, and the other 93 percent was due to import restrictions. That finding encouraged developing countries to increase their demands for a more comprehensive opening of agricultural markets in high-income countries. Anderson, Martin and van der Mensbrugghe (2006) report that an estimated two-thirds of the economic welfare gains to the world, and also to developing countries, from removing all goods trade barriers would come from farm policy reforms — even though agriculture accounts for only 6 percent of global trade and 3 percent of global GDP. Thus agriculture needs to be high on the Doha Development Agenda if the round is going to add significantly to world development. To that end a major empirical exercise was

undertaken by a team of experts commissioned by the World Bank to examine key aspects of those agricultural negotiations (Anderson and Martin 2006). A summary of that project is provided in Article 5, and the empirical implications for developing countries of the proposals as of 2005 to multilaterally liberalize both farm and non-farm merchandise trade under a Doha Round agreement are reported in Article 6.

For developing country farmers to benefit from further opening of agricultural markets, policies of developing countries themselves need to be conducive to supply responses. In the past at least, those countries' policies had a distinctive anti-agricultural and anti-trade bias, not least because of export taxes, and indirectly because of manufacturing protectionism and overvalued exchange rates (Krueger, Schiff and Valdés 1988, 1991). Article 7 compares those results to the mid-1980s with the findings of a more recent World Bank study that covers twice as many developing countries (plus all high-income countries and the main transition economies) and an extra two decades of newly compiled policy evidence. Those more recent results<sup>4</sup> reveal that there has been a substantial reduction in distortions to agricultural incentives in developing countries over the past two to three decades. They also reveal, however, that progress has not been uniform across countries and regions, and that — contrary to some earlier claims (for example from Jensen, Robinson and Tarp 2002) — the reform process is far from complete. More specifically, many countries still have a wide dispersion in Nominal Rates of Assistance (NRAs) for different farm industries and in particular still have a strong anti-trade bias in the structure of assistance within their agricultural sector; and some countries have “overshot” in the sense that they have moved from having an average rate of assistance to farmers that was negative to one that is positive, rather than stopping at the welfare-maximizing rate of zero. Moreover, the variance in rates of assistance across farm industries within each

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<sup>4</sup> A global overview of the results is provided in Anderson (2009), and the detailed country case studies are reported in four regional volumes covering Africa (Anderson and Masters 2009), Asia (Anderson and Martin 2009), Latin American (Anderson and Valdés 2008), and Europe's transition economies (Anderson and Swinnen 2008). The underlying methodology is outlined in Anderson *et al.* (2008) and background papers and databases are freely available at [www.worldbank.org/agdistortions](http://www.worldbank.org/agdistortions).

country, and in aggregate sectoral rates across countries, remains substantial.

The main policy indicators used in that World Bank study are the NRA to farmers and the Consumer Tax Equivalent (CTE).<sup>5</sup> Weighted averages of those traditional measures of a country's agricultural policies can be poor indicators of the trade restrictiveness and economic welfare losses associated with them, especially if a country's farm support or tax estimates vary a lot across the product range. Certainly estimates of trade and welfare effects of price supports or border measures can be obtained from sectoral or economy-wide models, but such models are very intensive in their needs for data and parameter (e.g., price elasticity) estimates, and the results can be contentious if there is no consensus on what model specification and parameter estimates to use. Also, they are typically calibrated to just one past year, and so are not well suited to providing timely ongoing annual monitoring or long time-series historical analysis of policy developments. Article 8 provides a new methodology that, if one is willing to accept simple assumptions about price elasticities, can generate indicators of the trade and welfare restrictiveness of agricultural policies using no more than the price and quantity data needed to generate NRAs and CTEs. The methodology draws on the earlier Trade Restrictiveness Index work of Anderson and Neary (2005), but adapts it to better deal with the types of distortions found in agricultural and food markets. We call the new indicators the Trade Reduction Index and the Welfare Reduction Index (TRI and WRI), and illustrate their usefulness by generating estimates for a sample of 75 countries (documented in a freely accessible database — see Anderson and Croser 2009).

In a parallel paper we also generate global TRIs and WRIs for each of 24 key products (Croser, Lloyd and Anderson 2010), and additional papers provide indications of how much agricultural policies have

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<sup>5</sup> NRAs and CTEs are similar to the OECD Secretariat's Producer and Consumer Support Estimates (PSEs and CSEs), except that they are expressed as a percentage of the undistorted price whereas PSEs and CSEs are expressed as a percentage of the distorted price (and the CSE has the opposite sign to the CTE). In practice the PSE may also include a broader range of measures. See OECD (2010).

restricted world trade in farm products over the past half-century (Anderson and Croser 2010) and have reduced trade and welfare of the individual member countries of the OECD and other EU27 members (Anderson and Croser 2011), as well as of the main countries of Sub-Saharan Africa (Croser and Anderson 2011a). That African paper reveals the considerable extent of policy reform over the past two decades in Sub-Saharan Africa, especially through reducing export taxation, but it also reveals that national policies continue to reduce trade and economic welfare much more there than in Asia or Latin America. These new indexes thus provide helpful supplements to the currently used policy monitoring measures.<sup>6</sup>

The upward spikes in international food prices in 2008 and again in 2010–2011 were a reminder of a point made by Johnson (1973) that farm and food policies affect not only the mean but also the variance of agricultural product prices in international markets. In their quest to keep domestic farm and food prices from gyrating, national government tend to insulate their domestic market from international price fluctuations. The extent of such insulation in the 1980s was considerable (Tyers and Anderson 1988b), and since then it has not diminished (Anderson and Nelgen 2012a, b). Article 9 points out, though, that when both exporting and importing countries seek to insulate by altering their trade restrictions, their efforts tend to cancel out in terms of their impacts on domestic prices and global trade volumes, but they exacerbate the spike in international prices. If only multilateral agreement could be reached to collectively desist from varying national trade restrictions for this purpose and instead use more efficient domestic measures such as generic social safety nets, there would be far less volatility in world food markets.

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<sup>6</sup> In a further paper using these new indicators, Croser and Anderson (2011b) strengthen the conclusion of Anderson, Martin and Valenzuela (2006) concerning the relative importance of trade measures as compared with subsidies in distorting global agricultural markets. The TRI and WRI also reveal that it has been restrictions not only on imports but also on exports that have contributed to national and global trade and welfare consequences of price-distorting food and agricultural policies, and that declines in export taxes contributed nearly as much as cuts in import protection to the global welfare benefits from agricultural policy reforms since the 1980s.

### C. Effects of Trade-Distorting Policies on 'Non-Trade' Concerns

As well as distorting agricultural markets and reducing national economic welfare, trade-related policies can have non-trivial impacts on such 'non-trade' concerns as natural resources and the environment, food safety, food security, income inequality and poverty. Environmental concerns about trade expansion were first raised in the late 1960s/early 1970s, but they were overwhelmed on political agendas by the economic turmoil associated with the abandoning of the gold standard in 1971 and the surge in commodity prices in 1973–1974. Those concerns for the environment resurfaced as the GATT's multilateral Uruguay Round negotiations got underway in the late 1980s, especially once it was clear that agriculture would remain high on the agenda of those negotiations for the first time. This prompted researchers at the GATT Secretariat to convene a group to explore this issue (Anderson and Blackhurst 1992). For agriculture in particular, environmental groups were siding with agricultural protection groups in Europe and elsewhere, claiming that liberalizing farm trade would increase global environmental damage, not least by encouraging agricultural land expansion via deforestation in tropical countries. Article 10 sought to provide a more comprehensive picture, pointing out, among other things, that (a) farm-support programs in Europe and Japan meant far more chemicals were being used to produce food there than would be the case in lower-cost locations under free trade, and (b) expansion would take place mostly on existing farm land in less densely populated countries, rather than through felling more tropical forests.<sup>7</sup> A subsequent paper sought to explore empirically the impacts on the environment in a large developing country, namely Indonesia (Anderson and Strutt 2000).

While environmental and also labor policies are not new to trade policy fora, they are likely to have a more prominent role in the years ahead for the new World Trade Organization now that they have

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<sup>7</sup> Similarly, it has been shown that subsidized coal mining of Europe's deep mines was far more pollutive of groundwater there than would occur in lower-cost coal-exporting countries (Anderson and McKibbin 2000). Most of those coal mining subsidies have since been removed and Europe's most heavily pollutive mines have since been closed down.

become common to the newer preferential trade agreements between the EU or US and developing countries. Article 11 points out that many developing countries perceive the entwining of these social issues with trade policy as a threat to both their sovereignty and their economies, while significant groups in high-income economies consider it unfair, ecologically unsound, even immoral to trade with countries adopting much lower social standards than theirs. The perceived need for international rules and institutions to address environmental and labor concerns arises from two sources. One is the long-standing problem that, since cross-country differences in standards affect the international competitiveness of firms, they give rise to claims of 'unfair' trade. Such claims can undermine support for the GATT/WTO rules-based global trading system unless those rules are widely perceived to be well designed for today's circumstances. The other source of concern has to do with international spillovers leading to such things as ozone depletion and global climate change. In addition, many would claim that other considerations are also worthy of attention, with respect to not only the environment and labor standards but also, for example, animal welfare and workers' rights.

When people want to influence the actions and policies of other countries for the sake of the environment or to improve workers' conditions, a considerable degree of complexity is added to international relations, not least because that motive can be used to disguise a traditional commercial motive for trade protectionist intervention. Article 11 assesses the above concerns and their implications for the WTO and other multilateral institutions. It examines the need for altering WTO rules or at least promoting the appropriateness of existing rules to ensure that the global trading system is perceived as 'fair'. It argues that the role for the WTO is very limited, especially with respect to labor standards, but again that there is a need to make it much more widely known as to why. The International Labor Organization is a more appropriate body to address labor market concerns, notwithstanding its difficulties with enforcement. Likewise, even in the absence of a World Environment Organization there is ample scope for solutions to international environmental problems via single-issue multilateral environment agreements. To encourage membership and compliance, such agreements have sometimes included trade provisions (for example,

the Montreal Protocol on ozone-depleting CFCs and the CITES agreement on endangered species). An important role for the WTO is to establish firm guidelines for the inclusion of such provisions and to be involved in the negotiating of such agreements to ensure they do not reduce welfare through undermining the global trading system, including via the settlement of disputes.

Another area of contention has to do with technical barriers to trade. Within agriculture the most contentious are import restrictions and bans for quarantine reasons or, in WTO jargon, sanitary and phytosanitary (SPS) measures. Article 12 points out that the WTO's SPS Agreement that resulted from the Uruguay Round focuses only on damage that imported products might cause to domestic production conditions and hence to farmers, while ignoring the benefit that imports bring to consumers in terms of lower prices, a greater variety of products, out-of-season products, and so on. In the example analyzed in Article 12, on the ban on banana imports into Australia, it is shown that under plausible empirical assumptions the gains to Australian consumers by allowing imports from disease-free regions could well exceed the losses to producers even if the entire Australian banana industry was wiped out.

A third area of contention, also from agriculture, concerns agriculture's so-called 'multifunctionality'. In some countries, farm lobbies have sought to justify agricultural protectionist policies because they claim to add to security of food supplies, to protect the environment, and to improve the economic viability and security of rural areas. The governments discussing these three items are characterizing them as positive externalities and in some cases public goods that are jointly produced along with food and fibre. Hence their use of the word 'multifunctionality' to describe these features of farm production. Article 13 seeks to address two questions raised by these concerns. First, to what extent are agricultural policy reforms consistent with meeting such domestic policy objectives, and second, if and where trade policy reforms would counter those goals, what domestic policy actions and/or WTO rules changes are appropriate? In the process of addressing these questions, the article examines the claim that agriculture deserves more price support and import protection than other sectors because of the non-marketed externalities/public goods it produces jointly in the process of producing marketable food and fibre. Do these unrewarded positive



externalities exceed the negative externalities from farming by more than the net positive externalities produced by other sectors? If so, to what extent if any are those farmer-produced externalities under-supplied? And where there is under-provision, what are the most efficient ways to boost their production to the socially optimal levels? These concerns are not really new, but they have been packaged a little differently for the WTO's Doha Round than in the past. A key question at stake is: do they require exceptional treatment or are current WTO provisions sufficient to cater for them, for example via the Agreement on Agriculture's 'green box' subsidies? The article concludes that current WTO provisions are adequate for dealing with the main cases raised.

Environmental concerns were also one of the reasons that many countries, particularly in Western Europe, opposed crop varieties that may contain genetically modified organisms (GMOs). It is thought by some that such varieties could contaminate traditional varieties or lead to pesticide-resistant weeds. Another concern with GMOs, though, is that their consumption by animals or humans was thought by some to be unsafe. Rather than letting consumers decide whether to take that (so-far-unfounded) risk by appropriately labelling products that may contain GMOs, the European Union and some other governments imposed a moratorium on imports of food from countries that may have GMOs in their food chain. Article 14 reports results from a simulation model of the global economy that provide some indication of the likely price, trade and economic welfare consequences in different parts of the world of using such blunt instruments as bilateral trade restrictions.

The adverse implications of foregoing the adoption of this new technology can be very costly in terms of productivity growth and lower domestic food prices, particularly in Sub-Saharan Africa (Anderson and Jackson 2005a). For countries such as Australia and New Zealand, the sign of the national economic welfare consequence is less obvious: it depends on the share of their agricultural exports destined for moratorium countries versus countries not restricting imports that may contain GMOs (Anderson and Jackson 2005b).

With GM rice varieties already successfully field-tested, it is only a matter of time before one of the large rice-producing countries such as China decides to approve commercial plantings of such varieties. Once that happens, it is likely others such as India will follow suit, generating