Finishing Global Farm Trade Reform

Implications for Developing Countries

Kym Anderson

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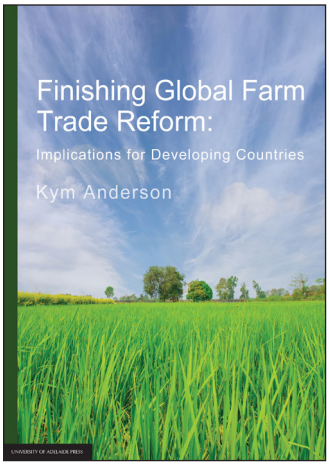

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Finishing Global Farm Trade Reform:

Implications for Developing Countries

Kym Anderson

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Finishing Global Farm Trade Reform:

Implications for Developing Countries

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Anderson has published around 400 articles and 40 books, including *The Political Economy of Agricultural Protection* (with Yujiro Hayami, 1986), *Australian Protectionism* (with Ross Garnaut, 1987), *Disarray in World Food Markets* (with Rod Tyers, 1992), *Agricultural Trade Reform and the Doha Development Agenda* (with Will Martin, 2006) and, during 2008-10, a set of four regional and three global books on *Distortions to Agricultural Incentives*. His publications have received a number of awards from professional organisations, including the Australian, European and American Agricultural and Applied Economics Associations. In 2015 he was appointed a Companion of the Order of Australia (AC).

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PREFACE

In the late 1990s, as members of the World Trade Organization (WTO) began preparing themselves for the next round of multilateral trade negotiations, the Australian Government commissioned a study on *The Impact of Agricultural Trade Liberalisation on Developing Countries* (Freeman et al. 2000). Its purpose was to provide a better understanding of the specific concerns of developing countries in the farm trade policy space.

Since then, following the launch of the WTO's so-called Doha Development Agenda (DDA) in late 2001, some developing country members have sought to keep certain agricultural trade matters high on the negotiating agenda. They have not been able to reach a consensus with other WTO members on several of those matters, however. Certainly some progress was made at the biennial Trade Ministerial Meetings in Bali in late 2013 and Nairobi in late 2015, but for many WTO members there is no longer an expectation that a comprehensive single undertaking will emerge from the DDA process.

The purpose of this study is to review how matters have developed in recent years and, in the light of that, to explore ways in which further consensus might be reached so as to progress multilateral or plurilateral farm trade policy reforms on Doha issues, and in ways that ensure welfare is improved in developing countries, especially for those food-insecure households still suffering from poverty, hunger and malnutrition.

The study was launched at a Cairns Group Farm Leaders' Seminar at the WTO Secretariat in Geneva, 11 November 2016. The author is grateful to WTO Ambassadors and their staff for their helpful comments at that seminar. He also wishes to thank the Australian Department of Foreign Affairs and Trade (DFAT) for financial support, and Joe Glauber, who as part of this project prepared a short issues paper for DFAT in August 2016 entitled 'Unfinished Business in Agricultural Trade Liberalisation', on which Chapters Six and Seven build.

Kym Anderson
November 2016

ABBREVIATIONS

AMS	Aggregate Measure of Support (to farmers, as reported to WTO)
ASEAN	Association of South East Asian Nations
BOTE	Back-of-the-envelope (model)
CGE	Computable general equilibrium (model)
CSE	Consumer support estimate (or earlier, consumer subsidy equivalent)
CTE	Consumer tax equivalent
DCs	Developing countries
DDA	Doha Development Agenda (of WTO multilateral trade negotiations)
EEC	European Economic Community (predecessor to the EU)
ERA	Effective rate of assistance
EU	European Union
EU15	The 15 western European members of the EU prior to May 2004
EU25	From May 2004, the EU15 plus 8 central European countries (Czech Republic, Estonia, Hungary, Latvia, Lithuania, Poland, Slovak Republic and Slovenia) plus Cyprus and Malta
EU27	From January 2007, the EU25 plus Bulgaria and Romania
EU28	From July 2013, the EU27 plus Croatia
EUR	Euro (currency)
FAO	Food and Agriculture Organization of the United Nations
FTA	Free Trade Agreement
FTAAP	Free Trade Area of the Asia Pacific
GATT	General Agreement on Tariffs and Trade
GDP	Gross domestic product
GMO	Genetically modified organism
GTAP	Global Trade Analysis Project (and Model)
HICs	High-income countries
ICT	Information and communication technology (revolution)
LDCs	Least-developed countries
MFN	Most favoured nation
MMT	Million metric tons
NAFTA	North American Free Trade Agreements
NAMA	Non-agricultural; market access (in DDA negotiations)
NRA	Nominal rate of assistance
NRP	Nominal rate of protection (from import competition)
NTB	Non-tariff barriers to trade
OECD	Organization for Economic Cooperation and Development
OPEC	Organization of the Petroleum Exporting Countries

OTDS	Overall Trade Distorting Support
PSE	Producer support estimate (or earlier, producer subsidy equivalent)
R&D	Research and development
RCEP	Regional Comprehensive Economic Partnership (proposed for Asia)
RRA	Relative rate of assistance (to farmers)
SDT	Special and differential treatment (of developing countries in DDA)
SPS	Sanitary and phytosanitary (trade restrictions)
SSA	Sub-Saharan Africa
SSG	Special Safeguard (for tariffied agricultural products)
SSM	Special Safeguard Mechanism
SSP	Sensitive and Special Products (in the DDA agricultural negotiations)
STE	State trading enterprise
TBT	Technical barriers to trade
TFP	Total factor productivity (growth)
TPP	Trans-Pacific Partnership
TRI	Trade reduction index
TRQ	Tariff rate quota (on agricultural imports)
TTIP	Transatlantic Trade and Investment Partnership
URAA	Uruguay Round Agreement on Agriculture
WRI	Welfare reduction index
WTO	World Trade Organization

EXECUTIVE SUMMARY

This study reviews policy developments in recent years and, in the light of that, explores ways in which further consensus might be reached among WTO members to reduce farm trade distortions – and thereby also progress the multilateral trade reform agenda. Particular attention is given to ways that would boost well-being in developing countries, especially for those food-insecure households still suffering from poverty and hunger.

Why open agricultural trade matters

There is overwhelming conceptual and empirical support for the claim that opening to trade can raise the level and growth of national income. That can in turn provide the wherewithal to reduce poverty, hunger and under-nutrition, and also boost diet diversity, food quality and food safety, and thereby ultimately boost national and global food security, health and well-being. The economic benefits of openness are proportionately greater, the smaller is the national economy. Such gains are even greater if accompanied by a freeing up of domestic product, factor and other input markets.

Policy reforms since the 1980s: much achieved, much still needed

For several decades prior to the 1980s, agricultural protection and subsidies in high-income countries had been depressing international prices of farm products. As well, governments of newly independent developing countries often directly taxed farm exports, as well as harming farmers indirectly with an industrialization strategy that involved restrictions on imports of manufactures and an overvalued currency. Since an important aspect of those price-distorting policies was their anti-trade bias, they reduced the quantity of farm products traded internationally. This meant that food prices were more volatile in international markets than they otherwise would have been.

Since the mid-1980s, many countries have been reforming their agricultural, trade and exchange rate policies. In addition to farm policy reforms in high-income countries, reforms in developing countries since the 1980s have reduced greatly their anti-agricultural distortions. These two parallel sets of reforms are as dramatic as the policy changes in those countries in the preceding three decades.

The Uruguay Round Agreement on Agriculture (URAA) sought to reduce farm export subsidies, increase import market access, and cut domestic producer subsidies. Its implementation during 1995-2004 led to less liberalization of markets

for farm products than had been hoped for, but accessions to WTO (especially of China) and other unilateral trade policy developments meant markets were considerably less distorted by 2004. Since then there has been only limited reform, however, and plenty of diversity remains in the extent of farm protection. Importantly, a strong anti-trade bias persists.

More specifically, the evidence shows that (a) both high-income and developing countries continue to insulate their domestic food markets from the full force of fluctuations in international prices, (b) some large emerging countries have transitioned from an anti- to a pro-agricultural policy regime that could be equally wasteful, and (c) plenty of diversity in price distortions remains across countries, and across commodities within each country. In particular, export-focused farmers in developing countries are still discriminated against by farm policies in two respects: by the anti-trade structure of assistance that remains within their own agricultural sector, and by the assistance still afforded farmers in high-income countries.

Hence there remains considerable scope for continuing the reform process which would further boost farm trade, 'thicken' international food markets, and thus not only raise the average level but also lower the volatility of prices in those markets. It would as well ensure that productive resources within the farm sector of each country – and hence globally – are put to their best use.

Huge scope still for welfare gains from further trade reform

Shortly after the WTO's first round of multilateral trade negotiations was launched in the capital of Qatar (the so-called Doha Development Agenda or DDA) in late 2001, there was a great deal of *ex ante* economic modelling analysis of the prospective effects of a DDA agreement. Indeed the quality of that analysis was far higher and far more comprehensive than prior to any of the GATT's seven negotiation rounds that preceded it, including the Uruguay Round. Given the focus on development, many analyses gave special attention to the likely effects on developing countries in particular. And because distortions were still greatest in agriculture, that sector got more attention than any other. The model results gave insights into possible effects of options under consideration, allowing negotiators and observers an opportunity to evaluate the prospective effects of various packages of reform. They also offered cautions as to what to avoid.

To provide a sense of what was at stake, some modellers first simulated full trade liberalization of all merchandise globally. This of course was not a realistic immediate prospect, but the exercise is useful in providing a benchmark against which to compare various partial reforms. What the study by Anderson and Martin (2006) revealed, for example, was that:

- **The potential gains are huge** from further global trade reform: nearly US$300 billion per year by 2015, plus whatever productivity growth it would generate;

- **Developing countries would gain disproportionately** from full global trade reform: as a share of GDP, their gain would be one-third greater than that for developed countries;
- **Agriculture is where cuts are needed most**, because of the very high rates of assistance in that sector relative to other sectors: food and agricultural policies are responsible for more than three-fifths of the welfare foregone globally – and in developing countries – because of merchandise trade distortions; and
- **Increased market access in agriculture is far more crucial than subsidy cuts**: 93% of the global welfare cost of agricultural policies was due to market access barriers and only 2% to export subsidies and 5% to domestic support measures.

Ways forward within the WTO

The clear consensus of empirical studies is that the agricultural ***market access*** pillar that offers by far the largest scope for benefits for developing countries and the world economy. One proposal is to abandon the complicated formula considered in the DDA and instead focus on a simpler tariff-reduction formula that sets an average reduction level and gives WTO members the flexibility to meet the average reduction.

A simplified set of formulae also might lubricate ***domestic support*** reforms: product-specific caps could help; support for cotton could be limited to a percentage of the value of agricultural production; the Green Box could be maintained but subjected to a comprehensive review by the OECD; and reporting requirements for domestic support could be extended to get more timely and detailed notifications.

For ***safeguards,*** the Special Safeguard could be eliminated, which might encourage food-importing developing countries to put in place more-efficient domestic measures (see below) rather than seek to use trade measures to deal with international price slumps or import surges***.***

Disciplining ***export restrictions*** is now more-obviously needed following the recent price spikes which saw them exacerbate international price volatility and undermine confidence in imports as a trustworthy source of food.

New reasons and opportunities for unilateral action

The core message from this study is that open agricultural markets maximize the role that trade can play to boost developing country welfare and global food security and ensure the world's agricultural resources are used most sustainably. Declining costs of trading internationally reinforce that message, with thanks to the information and communication technology (ICT) revolution. As well, the WTO's Trade Facilitation Agreement, once ratified by members over coming months, will add to that lowering of trade costs. If global warming and extreme weather events

are to become more damaging to food production as climate change proceeds, that provides all the more reason for countries collectively to open up food markets to allow trade to encourage more production and buffer seasonal yield fluctuations. The more countries do that, the less volatile will be international food prices.

By contrast to price-distorting measures, which re-distribute well-being between farmers, food consumers and taxpayers but at the expense of overall national welfare, investments in rural public goods can *raise* national income, boost economic growth and, in some cases, enhance the food security of both farm and nonfarm households in the country. That is certainly true of public agricultural research investments, which slows any decline in food self-sufficiency and may lower domestic consumer prices for some foods and so benefit not only farmers but also net buyers of those foods – unlike food import restrictions, which raise domestic prices and thus benefit net sellers of food *but at the expense of net buyers of food*. More people will be harmed than helped by such a policy measure in countries where the majority of workers are (or will be in a few years) net buyers of food. Improving poor rural infrastructure such as roads would lower both the cost of procuring off-farm inputs and the gap between the farm-gate and market prices of outputs, and thereby raise farm incomes and consumers' economic access to food. And expanding basic rural education and health investments would boost the productivity of future farm workers and the prospects for those wishing to work part- or full-time in non-farm jobs. The ICT revolution is making it far cheaper and easier for governments to provide contingent income supplements to poor and hence most food-insecure households, whether they be urban or rural. Such payments, which were unaffordable in developing countries in the past because of the high cost of administering small handouts, have already begun to lower the political resistance to trade policy reforms.

Chapter 1

INTRODUCTION

Half-way through the Uruguay Round of multilateral trade negotiations (1986-1994), the world's most prominent agricultural trade economist published a revised version of his seminal 1973 study entitled *World Agriculture in Disarray* (Johnson 1991). That book described a world in which the northern hemisphere's high-income countries had been increasingly protecting their farmers for the previous three decades with import restrictions and subsidies, while developing countries assisted industrialists at the expense of their farmers. Global agricultural resources were thus being squandered, with too much farm production and investment in rich countries and too few income-earning opportunities for farmers in developing countries – who constitute two-fifths of the world's workforce and two-thirds of the world's extreme poor (Castañeda et al. 2016) – to expand and possibly export their way out of poverty.

The hope of many was that the Agreement on Agriculture that eventually emerged from those Uruguay Round negotiations, and which came into force with the new World Trade Organization (WTO) on 1 January 1995, would bring agriculture under the trade rules of the General Agreement on Tariffs and Trade (GATT) and reverse that wasteful and globally inequitable situation described by Johnson. The Cairns Group of agricultural-exporting countries,[1] in its first submission to the GATT following the launch of the Uruguay Round, made clear that it expected to "achieve fully liberalised trade in agriculture, to eliminate distortive agricultural policies, and to bind the necessary undertakings under strengthened GATT rules and disciplines" (GATT 1987).

As it turned out, the Uruguay Round Agreement on Agriculture (URAA) fell far short of requiring full trade liberalization and subsidy elimination. However, it did contain new disciplines on domestic support and export subsidies and commitments to replace nontariff barriers with bound tariffs and reduce those tariff bindings over the decade to 2004. This was a significant first step towards fairer

[1] The 14 foundation countries in the Cairns Group are Argentina, Australia, Brazil, Canada, Chile, Columbia, Fiji, Hungary, Indonesia, Malaysia, the Philippines, New Zealand, Thailand, and Uruguay. The group is named after the Australian city where they first met in August 1986 (see http://cairnsgroup.org). Higgott and Cooper (1990) provide an assessment of the group's initial impact.

competition and less distortions to trade in farm products. Importantly, Article 20 of that Agreement also envisaged a continuation of the farm policy reform process.

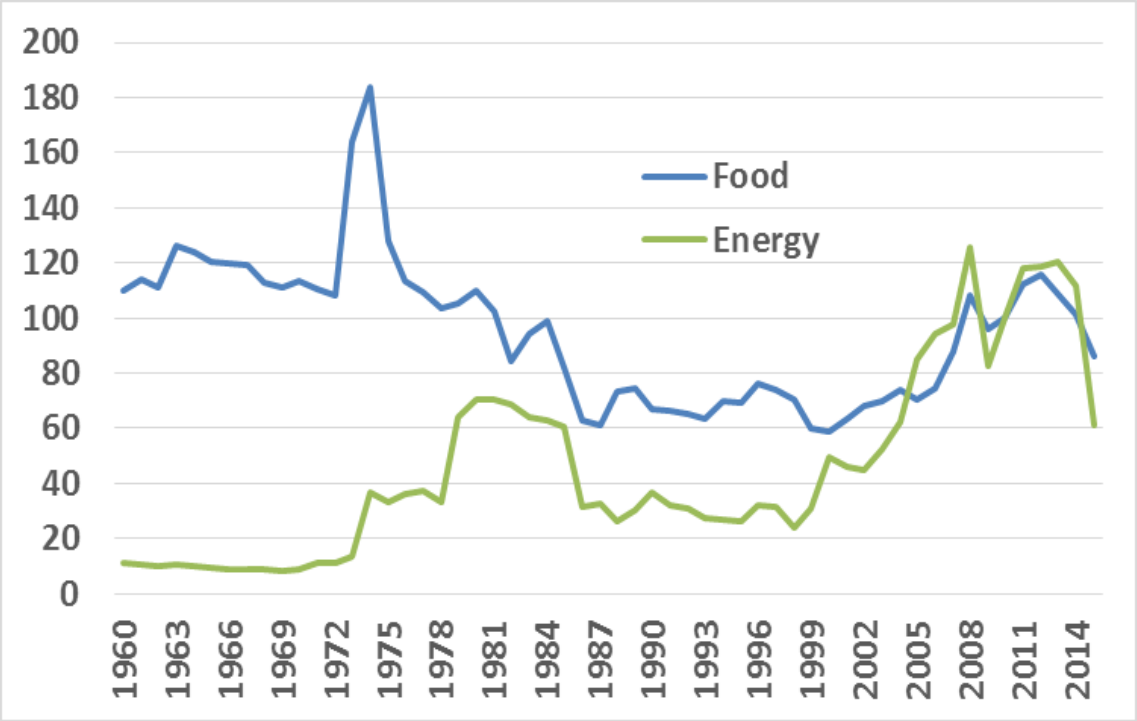
In several ways the global policy situation began improving *during* the Uruguay Round trade negotiations. For example, the European Union started to reform its highly-distortive Common Agricultural Policy, and many developing countries began opening their economies and phasing out their agricultural export taxes. As well, Europe's and Asia's communist countries began transitioning from central planning to market economies. Many transition and developing countries have since applied to join the WTO, raising its membership from 128 to 164, with another 20 Observer countries as of November 2016, most of which are in the midst of negotiating their accession.

The WTO's so-called Doha Development Agenda (DDA) was launched in late 2001. Like the Uruguay Round, the aim from the outset was to reach agreement on a single undertaking, by building on the progress made in the previous round, including on farm trade issues. Agricultural trade matters have remained high on the negotiating agenda, partly because it is well recognized that trade in farm products continues to be far more distorted than trade in other goods, notwithstanding the URAA's implementation. Yet developing country members of WTO are far from unanimous in their concerns: some share the Cairns Group's aim of ridding the world of price- and trade-distorting farm and food policies, while others insist on special treatment for politically sensitive issues. To date that divergence has kept a consensus among WTO members out of reach. Some limited progress was made at the WTO Trade Ministerial Meetings in Bali in late 2013 and in Nairobi in late 2015, but DDA negotiations now seem unlikely to conclude successfully with a comprehensive package. Nonetheless, negotiations are continuing on key farm trade issues highlighted in the DDA.

Soon after the last of the Uruguay Round commitments were implemented, the world's agricultural markets and policies took another turn. In 2008, and again in 2010-12, food (and fuel) prices shot up in international markets (Figure 1.1). Many developing country governments scrambled to insulate their domestic markets from that shock, not least by altering their border restrictions on trade in food staples. Those responses exacerbated the international price spikes and so worsened the situation for other countries. They also underlined the fact that the URAA plus the WTO's related and subsequent agreements were not yet able to prevent the emergence or reinstatement of farm policies capable of undermining global food security.

The purpose of the present study is to review how policies have developed in recent years and, in the light of that, to explore ways in which further consensus might be reached among WTO members so as to progress multilateral or plurilateral farm trade policy reforms on Doha issues, and in ways that would boost welfare in developing countries, especially for those food-insecure households still suffering from poverty, hunger and malnutrition.

Figure 1.1: Real international prices of food and fossil fuel, 1960 to 2015
(2010 = 100, based on real 2005 US dollars)



Source: World Bank (2016).

The study begins in Chapter 2 by explaining why trade openness maximizes national (hence global) food security and economic welfare even in cases where it does not ensure a country will be 100% food self-sufficient. The chapter explains why attempts to reach long-run food self-sufficiency using farm trade barriers are likely to undermine rather than strengthen national food security, nutrition and health. They also reduce long-run prospects for export growth by developing countries' more-competitive farmers. In addition, the chapter shows why national attempts by many countries to insulate their domestic food markets from international price volatility are likely to be unsuccessful *and* to exacerbate those fluctuations in the international marketplace.

Chapter 3 summarizes the state of disarray in world food markets by the mid-1980s and the achievements since then in reducing that disarray, including as a consequence of GATT and WTO agricultural negotiations, and particularly as they affect developing countries. It reviews in particular the impacts of the Uruguay Round Agreement on Agriculture and its implementation, of accessions to WTO (especially of China), and of other trade policy developments up to 2004 when Uruguay Round implementation was completed. It concludes by summarizing the modest contributions by WTO to multilateral policy reforms in the dozen years since 2004.

Chapter 4 assesses the extent of recent (including unilateral) reforms to past distortive policies and the opportunities that remain to boost economic welfare and improve food security and nutrition by further opening markets for farm products. It does so by summarizing the empirical evidence that is revealed by comparing domestic and international prices over time. Wedges between those prices can be due to market access restrictions, to domestic support policies for farmers, to export subsidies (and in some cases export taxes), and to consumer subsidies. Those indicators of price distortions suggest there has been only limited reform over the past dozen years unilaterally and under WTO and preferential trade agreements, compared with the progress made in the previous two decades. Wedges between domestic and international food prices did narrow in food-importing countries when the latter rose between 2005 and 2012, but those changes are reversing as international prices return to trend. Plenty of diversity remains in the extent of farm protection both across countries and across commodities within countries, and a strong anti-trade bias persists.

Chapter 5 summarizes estimates of the likely economic effects of further multilateral reform to policies affecting global agricultural trade. It shows how those effects would be distributed between high-income versus developing countries, and also within the developing country grouping. It includes projections of the effects of both full liberalization (so as to provide a sense of the cost of current programs, or of potential gains against which to compare benefits from partial reforms) and of different degrees of partial reform as proposed under the WTO's Doha Development Agenda (DDA).

Chapter 6 turns to the key ongoing and emerging issues in agricultural trade negotiations. As revealed in Chapter 4, by far the most important farm policies economically continue to be import market access restrictions. Some other issues have to do with export competition, such as export credits, state trading enterprises, and food aid. Export restrictions also are a concern, especially after they were imposed by some countries when international food prices spiked in 2007-08. Domestic support programs are generally less disruptive of global markets than trade measures, but they attract much attention because they are very visible in national budget papers each year. Among them is the program of supports for the cotton industry in the United States, which understandably aggrieves those developing countries specialized in exports of cotton. Also of concern are subsidies for public stockholding of food, as are safeguards. The 'Group of 33' developing countries has been strongly pushing for an agricultural Special Safeguard Mechanism (SSM), but the proposal has been equally strongly opposed by other WTO members who believe it would effectively undermine previous agreements reached on tariff bindings – and would not even achieve its stated aim. The impasse over a SSM was one of the principle causes of the breakdown in the DDA negotiations in July 2008.

In the light of the preceding chapters, the final chapter examines possible ways forward. It reiterates the basic point from Chapter 2 that each country can improve its own food security, nutrition and health by unilaterally replacing market

access restrictions and domestic price subsidies with generic social safety nets for dealing with adverse situations. But it recognizes that it is politically easier for a nation to reform multilaterally rather than unilaterally. Hence a number of proposals are laid out as options that could be pursued even if it proves impossible to resurrect the DDA as a single undertaking. Those options are rapidly becoming more feasible and cheaper to implement thanks to the dramatic spread of the information technology revolution among even the poorest of developing countries.

Chapter 2

WHY OPEN AGRICULTURAL TRADE MATTERS

Since food is the most basic of human needs, it is not surprising that food security is a sensitive policy concern, particularly in countries that are somewhat dependent on food imports and that have experienced interruptions to import supplies. European countries felt that acutely during and following World War II, which led them to develop a Common Agricultural Policy (CAP) soon after the formation of the predecessor to the European Union, the European Economic Community (EEC). A key objective of the CAP was self-sufficiency in basic foods. Likewise, Japan sought imperial rice self-sufficiency in the first half of the 20th century (Anderson and Tyers 1992). After it lost its colonies of Korea and Taiwan in 1945, Japan then sought national self-sufficiency for rice and a range of other farm products. More recently, numerous developing countries have placed long-run food self-sufficiency high on the list of their policy priorities.

The first section of this chapter explains why attempts to reach *long-term* food self-sufficiency using farm trade barriers are more likely to undermine than to boost national food security – and at the same time reduce prospects for export growth by competitive farmers in more-open developing countries.

Trade measures are also brought into play to deal with *short-term* food security concerns, such as at times of international price spikes. By altering food trade restrictions at a country's border, governments hope to insulate their domestic food markets from international price volatility. This chapter's second section explains why such actions by a combination of food exporter and importer countries will offset each other and, at the same time, exacerbate those fluctuations in the international marketplace for other countries.[2]

2.1 Trade policies and long-run food security

Achieving long-term food self-sufficiency is possible for all but the most densely populated countries simply by banning imports of food. That raises domestic food prices, which encourages local farmers to increase their production. The domestic

[2] Further elaboration of these issues can be found in Anderson (2017).

price rise also discourages food consumption, however. That trade policy therefore *undermines* food security, which refers to the condition in which all people, at all times, have physical, social and economic access to sufficient, safe and nutritious food to meet their dietary needs and food preferences for an active and healthy life (FAO 2015).

More than that, import restrictions also limit a nation's export opportunities, and hence lower the gains that come from national production and trade specialization that David Ricardo so eloquently explained two hundred years ago (Ricardo 1817).

Gains from production specialization have been going on since the hunter-and-gatherer era. Think of a tribe in a pre-agrarian country of men and women both young and old. The strongest (mostly adult men) spend their time hunting wild animals and carrying their kill back to camp, while women and the older children gather wild fruits, nuts and roots. All members of the tribe may have the same food preferences, and some of the men may well be able to gather fruit quicker than women and children; but by specializing in tasks in which each group has a comparative (cost) advantage, they collectively bring in a larger aggregate quantity and variety of foods than if each person had to both hunt for and gather their own food.

One can expand on that example to imagine a second nearby tribe with a different demographic makeup and different mix of hunting and gathering opportunities in their territory and with improved hunting or gathering tools. Those different endowments and technologies would provide another source of potential gains from trade, in this case inter-tribal. If one of the tribes discovered the benefits of collecting the best seeds and planting them in tilled soil, their new farming operation would provide further scope for trade gains. And if, by interacting through trade, the other tribe learns how to select seeds and grow crops or pasture, even more opportunities open up for both tribes to gain from production specialization and trade.

The improvement in welfare, food security, nutrition and health via trade is greater the more the hunting, gathering, cropping or livestock management by one or more of the trading partners is subject to seasonal fluctuations – as is most plant and animal growth. The direction of trade in surpluses following the harvest season could well be reversed in the off-season for such foods. This is even truer if one or more regions is subject to natural disasters that occasionally wipe out some food supplies.

Of course if the two tribes decided to go to war with each other, or if the second tribe formed an alliance with a third tribe that required trade between the first two to cease, the benefits of the initial inter-tribal trade would evaporate. But so long as the first tribe had maintained those skills in hunting and gathering or farming, it would be no worse off in the future than before it began its inter-tribal trade – and it still would have had the benefit of greater welfare and food security throughout that period of trade.

Generalizing from these simple examples, it is clear that broadening to regional, national, international and ultimately inter-continental and global trade multiplies the gains from production specialization and market exchange, and reduces the extent of food insecurity, malnutrition and risk of famine. The increased competition that comes from trade opening also has been shown to boost both farm productivity growth (Yu and Nin-Pratt 2011) and overall economic growth (Anderson and Brueckner 2016). Furthermore, it expands the scope for raising diet diversity and food safety and quality, the demands for which tend to rise with per capita income (Clements and Si 2015).

Improving food security requires improving the three interrelated elements of food availability, access and utilization, as well as reducing market instability. How much access households have to available food supplies depends heavily on their income, assets, remittances or other entitlements. How well household heads utilize the foods that are accessible to them depends on their knowledge and willingness to ensure a healthy and nutritious diet for all members of their household. That in turn depends on the level of education in the household, particularly of adult females, which again is closely related to household income and wealth or other entitlements.

Thus food insecurity is a consumption issue that is closely related to household poverty. Any initiative whose net effect is to raise real incomes, especially of the poorest households, may also enhance food security, nutrition and health. Since openness to trade raises national income (and increases food diversity, quality and safety for the reasons mentioned above), it should be considered among the food policy options open to national governments. If all countries were open to international trade and investment, the use of resources devoted to producing, marketing, distributing and retailing the world's food would be optimized, and fluctuations in trade volumes and international food prices would be minimized. Openness thus contributes to all four key components of food security: availability, access, utilization and market stability.

Opening up to trade would be especially beneficial to food security for two categories of countries: those that are restricting food imports and where the majority of the poor and under-nourished are net buyers of food, and those where the majority of the poor and under-nourished are net sellers of food and their governments are restricting food exports. In both cases, reducing those trade restrictions will tend to raise the real income, food security, nutrition and health of those countries' poor households. As for the other two categories of countries (food-importers where the majority of the poor are net sellers of food, and food-exporters where the majority of the poor are net buyers of food), opening such economies of trade would still raise their average national income, and that increases the scope for assisting the poor with more-efficient domestic policy measures. Such measures, discussed more in the final chapter, include increased investments in agricultural R&D and rural infrastructure for the first category and conditional cash e-transfers to the most vulnerable households in the second category.

Trade openness has increased dramatically over the past half-century, but the world is still a long way short of fully open trade, especially in farm and food products (see details below in Chapter 4). As well, in recent years politicians in numerous countries have failed to find strong support for trade-liberalizing initiatives, including – indeed especially – at the multilateral level of the WTO. So before going any further, it is worth reviewing in more detail the potential benefits from trade reform, starting with static economic gains-from-trade arguments and then considering additional dynamic gains.

Static economic gains from own-country trade reform

The standard comparative static analysis of national gains from international trade emphasize the economic benefits from exploiting comparative advantage in situations where a nation's costs of production and/or preferences differ from those in the rest of the world. Distortionary policies such as trade restrictions or subsidies diminish those benefits.

More specifically, an export tax or its equivalent lowers the domestic price below the border price of a tradable product such as grain (as does an import subsidy), whereas an import tax or its equivalent raises its domestic price above the border price (as does an export subsidy). Also, an import tax (or export subsidy) is the equivalent of a consumer tax and a producer subsidy, hence lowering it reduces the extent to which the measure assists producers of that tradable product. Conversely, lowering an export tax (or import subsidy), which is the equivalent of a consumer subsidy and a producer tax, reduces the extent to which the measure harms producers of the good in question.

This is part of the more general theory of the welfare effects of market distortions in a trading economy, as summarized by Bhagwati (1971) and Corden (1997). Those gains from opening an economy are larger, the greater the variance of rates of protection among industries. Likewise, the more productive domestic firms within industries expand by drawing resources from less productive firms that contract or go out of business when the economy is opened. Indeed theory and empirical studies suggest the shifting of resources within an industry may be more welfare-improving than shifts between industries when protection is cut. Furthermore, if trade barriers are managed by inefficient institutions (such as distributors of import or export quota licences), gains from removing such barriers will be larger than removal of standard trade taxes (Khandelwal, Schott and Wei 2013).

The static gains from trade opening tend to be greater as a share of national output the smaller the economy, particularly where economies of scale in production have not been fully exploited and where consumers (including firms importing intermediate inputs) value variety so that intra- as well as inter-industry trade can flourish. Less-than-full exploitation of scale economies is often the result of imperfect competition being allowed to prevail in the domestic marketplace, which

again is more common in smaller and poorer economies where industries have commensurately smaller numbers of firms. The gain comes from firms having to reduce their mark-ups in the face of greater competition. This applies to numerous links of the food value chain, many of which are becoming increasingly concentrated in the hands of a few firms (Reardon and Timmer 2012, Sexton 2013).

Those gains from opening up will be even greater if accompanied by a freeing up of domestic markets and the market for currency exchange. The more stable is domestic macroeconomic policy, the more attractive will an economy be to capital inflows. And the more domestic microeconomic policies are friendly to markets and competition for goods, services and productive factors, the greater the likelihood that adjustments by firms and consumers to trade liberalization will lead to a more-efficient utilization of national resources, lower consumer prices (in most cases) and greater economic welfare (Corden 1997). If domestic policy reforms included improving the government's capacity to redistribute income and wealth more efficiently and in ways that better matched society's wishes, concerns about the distributional consequences of trade liberalization also would be lessened.

Trade in services goes alongside and facilitates most trade in goods. Recent data compiled by the OECD/WTO (2016) reveal that nearly one-third of the gross value of exports of goods is made up of services (banking, insurance, transport, etc.). For processed food that share was 36% in 2009, and for primary agriculture it was 26%. Hence freeing up a country's markets for services can boost national welfare not only directly but also indirectly via lowering the cost of exporting farm products and other goods (Francois and Hoekman 2010).

Dynamic economic gains from own-country trade reform

The standard comparative static arguments can be supplemented with links between trade and economic growth. The mechanisms by which openness contributes to growth are gradually getting to be better understood and appreciated. Channels through which openness to trade can affect an economy's growth rate include the scale of the market when knowledge is embodied in the products traded, the degree of redundant knowledge creation that is avoided through openness, and the effect of knowledge spillovers. The latest surge of globalization has been spurred also by the technology 'lending' that is involved in off-shoring an ever-rising proportion of production processes. As Baldwin (2016) points out, this joining of a supply chain has made industrialization potentially far less complex and far faster – especially for countries with reliable workers, a hospitable business environment and located near large industrial countries such as China. To the extent that boosts manufacturing in some emerging economies, so it generates more export market opportunities for farmers in other developing countries.

Greater openness to international financial markets also boosts growth via the stimulation to investment that more risk-sharing generates. When trade reform includes financial markets, more is gained than just a lower cost of credit. The

resulting financial deepening can stimulate growth too (Townsend and Ueda 2010). A study by Hoxha, Kalemli-Ozcan and Vollrath (2013) examines potential gains from financial integration and finds that a move from autarky to full integration of financial markets globally could boost real consumption by 9% permanently in the median developing country, and up to 14% in the most capital-scarce countries. In a case study of Thailand, Townsend and Ueda (2010) estimate welfare gains from financial liberalization as high as 28%.

Importantly from a policy maker's viewpoint, the available empirical evidence strongly supports the view that open economies grow faster (see the surveys by Winters 2004, Billmeier and Nannicini 2009 and Francois and Martin 2010). Notable early macroeconometric studies of the linkage between trade reform and the rate of economic growth include those by Sachs and Warner (1995) and Frankel and Romer (1999). More-recent studies also provide some indirect supportive econometric evidence. For example, freeing up the importation of intermediate and capital goods promotes investments that increase growth (Wacziarg 2001). Indeed, the higher the ratio of imported to domestically produced capital goods for a developing country, the faster it grows (Lee 1995; Mazumdar 2001). In a more recent study that revisits the Sachs and Warner data and then provides new time-series evidence, Wacziarg and Welch (2008) show that dates of trade liberalization do characterize breaks in investment and GDP growth rates. Specifically, for the 1950-1998 period, countries that have liberalized their trade (defined as those raising their trade-to-GDP ratio by an average of 5 percentage points) have enjoyed on average 1.5 percentage points higher GDP growth compared with their pre-reform rate. A new study by Coelli, Moxnes and Ulltveit-Moe (2016) estimates the effect on innovation of trade policy reform during the 1990s in over 60 countries using international firm-level patent data. It finds that 7% of the increase in knowledge creation during the 1990s can be explained by those policy reforms.

Easterly (2001) reminds us that a robust conclusion that can be drawn from available empirical evidence is that people respond to incentives. Hence getting incentives right in product, input and factor markets is crucial – and removing unwarranted subsidies and trade barriers is an important part of that process. Evidence from 13 case studies reported in Wacziarg and Welch (2008) adds further empirical support to that view, as does the fact that there are no examples of autarkic economies that have enjoyed sustained economic growth, in contrast to the many examples since the 1960s of reformed economies that boomed after opening up.

Specifically, economies that commit to less market intervention tend to attract more investment funds, ceteris paribus, which raise their stocks of capital (through greater aggregate global savings or at the expense of other economies' capital stocks). More-open economies also tend to be more innovative, because of greater trade in intellectual capital, and because greater competition spurs innovation (Aghion and Griffith 2005; Aghion and Howitt 2006), leading to higher rates of capital accumulation and productivity growth (Lumenga-Neso, Olarreaga and Schiff 2005). More-open economies also tend to be less vulnerable to foreign shocks such as

sudden stops in capital inflows, currency crashes and severe recessions (Frankel and Cavallo 2008).

In short, international trade and investment liberalization can lead not just to a larger capital stock and a one-off increase in productivity but also to higher rates of capital accumulation and productivity growth in the reforming economy because of the way reform energizes entrepreneurs. For growth to be maximized and sustained, though, there is widespread agreement that governments also need to (a) have in place effective institutions to efficiently allocate and protect property rights, (b) allow domestic factor and product markets to function freely, and (c) maintain macroeconomic and political stability (Rodrik 2007; Wacziarg and Welch 2008; Baldwin 2004; Chang, Kaltani and Loayza 2005).

Does trade reform alleviate poverty?

A careful survey by Ravallion (2006) of empirical evidence suggests aggregate economic growth differences have been largely responsible for the differences across developing countries in poverty alleviation. Initiatives that boost economic growth are therefore likely to be helpful in the fight against poverty, and trade liberalization is such an initiative. But cuts to trade barriers also alter relative product prices domestically and in international markets, which in turn affect factor prices. Hence the net effect on poverty depends also on the way those price changes affect poor households' expenditure and their earnings net of remittances and taxes. If the consumer and producer price changes (whether due to own-country reforms and/or those of other countries) are pro-poor, then they will tend to reinforce any positive growth effects of trade reform on the poor.

How poor households within developing countries are affected by trade reforms depends on each country's circumstances (Winters 2002, Winters and Martuscelli 2014). We know from myriad empirical studies that reforms of agricultural policies of developed countries could provide a major source of developing country gains from trade liberalization, and lowering barriers to textiles and clothing trade also is important. Both would boost the demand for unskilled labor and for farm products produced in poor countries. Four-fifths of the world's extreme poor (earning less than US$1.90 a day in 2011 PPP) live in rural areas and two-thirds work in agriculture (Castañeda et al. 2016; OECD 2003, p. 3). Since many poor rural households are net sellers of farm labor and/or food, one would expect such reforms to reduce the number in extreme poverty. A set of analyses reported in Anderson, Cockburn and Martin (2010, 2011), in which global and national economywide model results are carefully combined with household income and expenditure survey data for nearly a dozen developing countries, tests this hypothesis. It finds strong support for it in most of the country case studies considered. If full global trade reform were to be undertaken, that study concludes that it would reduce the number of people in extreme poverty by at least 26 million (Anderson, Cockburn and Martin 2011, Table 4). Bear in mind, too, that those

estimates are from comparative static models, and so are very much lower-bound estimates because they do not include the poverty-reducing dynamic effects on economic growth of such reforms (World Bank and WTO 2015).

Would openness improve nutrition and health?

Openness to trade and investment also allows diets to become more diversified, and therefore potentially more nutritious, healthier and safer. Insofar as investment openness speeds the development of supermarkets, that certainly increases the range and safety of food products available for those who find it more convenient to shop there, even if it reduces the number of small shops available in nearby neighbourhoods (Reardon, Henson and Gulati 2010).[3]

The WTO's Sanitary and Phytosanitary Agreement encourages countries to adopt international food standards so as not to unduly limit trade, but allows countries to adopt stricter standards so long as they are credibly justified and apply equally to both domestic and imported products (Josling, Orden and Roberts 2010). One of those standard-setting bodies is the Codex Alimentarius Commission. It is being encouraged to broaden its focus beyond toxic substances so as to also deal with the nutritional content of foods. But there is nothing in WTO agreements preventing nations from adopting, for example, a traffic light set of labelling regulations to indicate to consumers the extent of fats, salt and sugar in a product (James et al. 2010).

The extent to which diet diversity is increasing can be seen by comparing indexes of diversity of national food production versus national food availability. Remans et al. (2014) provide estimates of two diversity indexes: the Shannon entropy diversity index, which reflects how many different types of food items there are in the country, and a modified functional attribute diversity index, which reflects the diversity in the nutrients provided by the different food items. According to those estimates averaged during 2000-09, both indicators are greater (= more diversity) in availability than in production, especially in terms of nutrients (Table 2.1). This is

[3] Some observers worry about the advertising strength of multinational processing or retail companies selling low-priced processed foods, some of which may be considered less nutritious than the more-expensive traditional foods they replace (e.g., Hawkes, Grace and Thow 2015). In such circumstances, there are more-efficient policy responses than preventing such trade or foreign direct investment (which, by limiting competition, may simply lead to higher-cost domestic firms providing a smaller range of similar but more-expensive foods). A more-appropriate response is to ensure there is adequate nutritional information available (e.g., on product labels); and education campaigns could guide consumers to healthy food choices, regardless of whether the firms processing or retailing the available foods are local- or foreign-owned. Taxing the use of ingredients considered unhealthy (sugar, salt, oils, … ?) is another approach some countries have begun adopting (Alston, Macewan and Okrent 2016), although care is needed to ensure this does not lead to their substitution by untaxed alternative ingredients that are similarly unhealthy.

Table 2.1: Coefficient of variation of global production and consumption of key food products, 1970 to 2010

	Production		Consumption	
	1970-94	**1995-2010**	**1970-94**	**1995-2010**
Soybean	11.0	8.8	9.0	7.2
Maize	8.1	6.0	5.3	4.5
Wheat	5.7	4.4	4.4	2.0
Rice	4.4	3.2	4.1	2.2
Sugar	4.7	5.1	4.3	3.1
Milk	7.9	5.0	7.4	5.8
Beef	3.7	2.2	3.6	2.4

Source: Liapis (2012).

expected to continue with economic growth and urbanization,[4] and will have more potential to do so the more open is each economy to international trade and investment.

The first two of the United Nations' 17 Sustainable Development Goals are to eliminate poverty and hunger by 2030, and the third one is to ensure health and well-being for all at every stage of life. Yet on current trends, undernourishment in developing countries will only halve from its current 13% by 2030, as will the prevalence of stunting among children under five (currently 28%), according to FAO (2016a). To accelerate those developments, opening up to food trade is one of the most feasible initiatives that national governments could take.

Would more trade reform expand the number of food-exporting countries?

Global merchandise trade grew faster in the second half of the 20th century than in any other half-century in history: between 1950 and 2000 world exports of all goods grew at 5.3% per year, compared with the previous record rate of 3.5% in 1850-1913 (Federico 2005). However, agricultural trade grew less rapidly than trade in other goods from 1950, and slower than agricultural trade in the first wave of globalization: 3.2% in 1950-2000 and 3.4% in 1850-1913. As a result, agriculture's proportion of global goods trade fell from 0.5 in 1913 and 1937 to 0.4 in 1951, 0.24 in 1961, 0.12 in 1981 and 0.07 in 2001 and 2011, before rising temporarily to 0.09 in 2012-14 (Federico 2005, p. 29; WTO 2015).

The slower growth of farm trade is partly due to the fall in agriculture's share of global GDP (it is now only 3%, down from more than 50% not much earlier than 1900), partly to the growth in agricultural protectionism, and partly to the recent

[4] In 1950, just 30% of the world's population lived in urban areas. By 2015 that share had reached 50%, and by 2050 it is projected to reach two-thirds, with even the poorest region (Sub-Saharan Africa) having the majority of its population in urban areas, according to the United Nations (Bloom 2016).

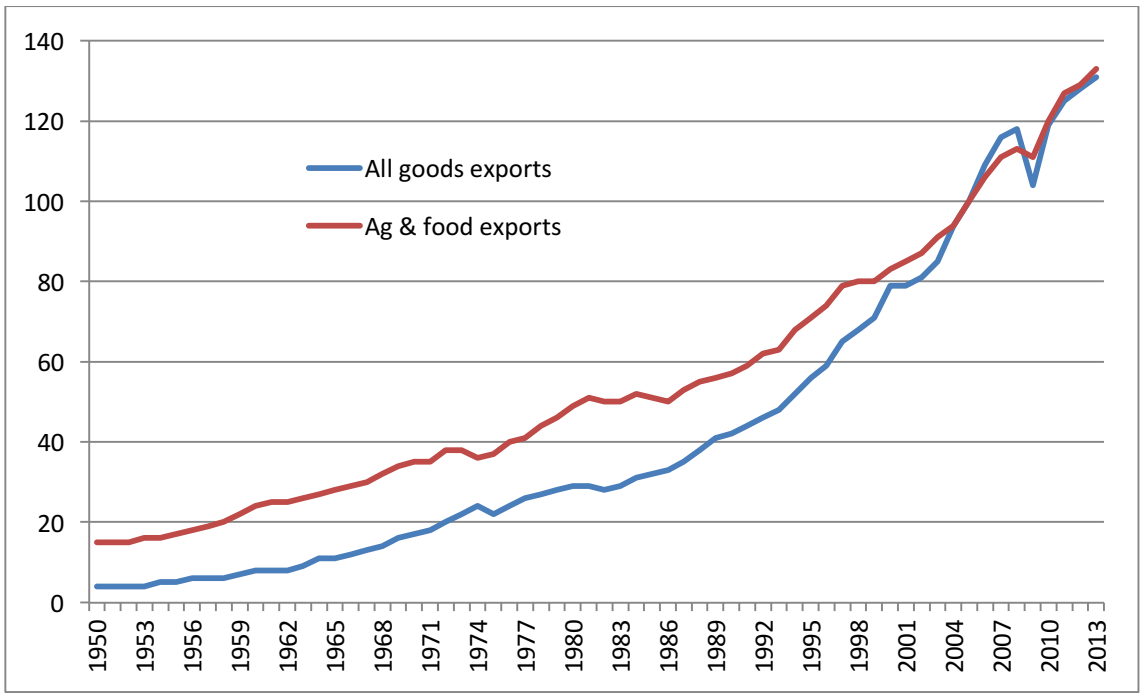
fragmentation of industrial production into ever-more processes and the associated rapid expansion in the number of links in their global value chains (Baldwin and Robert-Nicoud 2014; Baldwin 2016). The latter shows up in the global shares of sectoral exports to sectoral GDP, which rose during 1995-2010 from 66 to 105% for manufacturing while hardly changing (a rise from 53 to 58%) for agriculture. Those trends are reflected in the slower growth of global exports of farm versus all goods (Figure 2.1), and notwithstanding the rise since 1950 in the share of global farm production that is exported (Figure 2.2).

One consequence of relatively little food production being traded internationally is that just a few countries dominate each product's international trade. Table 2.2 shows the data for eight major traded foods in 2013. The top four countries account for 90% of both soybean and oil palm exports, and the top six account for 80% of both rice and sugar, for 77% of maize, and for around 70% of wheat, beef and milk. How the concentration of countries exporting or importing key food products is changing over time is shown in Table 2.3: the number of countries exporting them has doubled since the 1970s, while the number importing them has risen by only one-third. Another indicator is the Herfindahl Concentration Index, which indicates more concentration the closer it is to one. Figure 2.3 suggests that concentration of global production in the exporting countries has fallen for all of those key products virtually every decade since the 1970s, and is high only for maize and soybean. Were there to be less of an anti-trade bias in policies affecting farmer incentives in all countries, it is likely that an even larger number of countries would emerge as significant exporters of major food products. That would reduce the concern in some potentially food-importing countries that they would feel too vulnerable to supply disruption if they were to allow themselves to become more import-dependent.

The variability of global production of key food items is greater than the variability of consumption, indicating the important role that changes in stocks can play in stabilizing global food availability. The variability of both has been less in the 1995-2010 period than during 1970-95 (Table 2.4). On the supply side, that could be associated with changes in technologies and input use that reduce yield variability, or with changes in the location of production, but it is contrary to what one might have expected as climates change and with the perceived associated increase in extreme weather events. On the demand side, it could be a result of financial deepening, which provides more options for households to borrow in times of greater need and repay the loans when higher incomes allow. At the individual country level, the breaking of the link between production and consumption because of consumption smoothing through time can be the result of greater openness to trade in food, and even in capital (Islamaj and Kose 2016). The extent to which farm products are traded still varies widely across commodities though (Figure 2.4).

Figure 2.1: Volume of global agricultural and total merchandise exports, 1950 to 2013

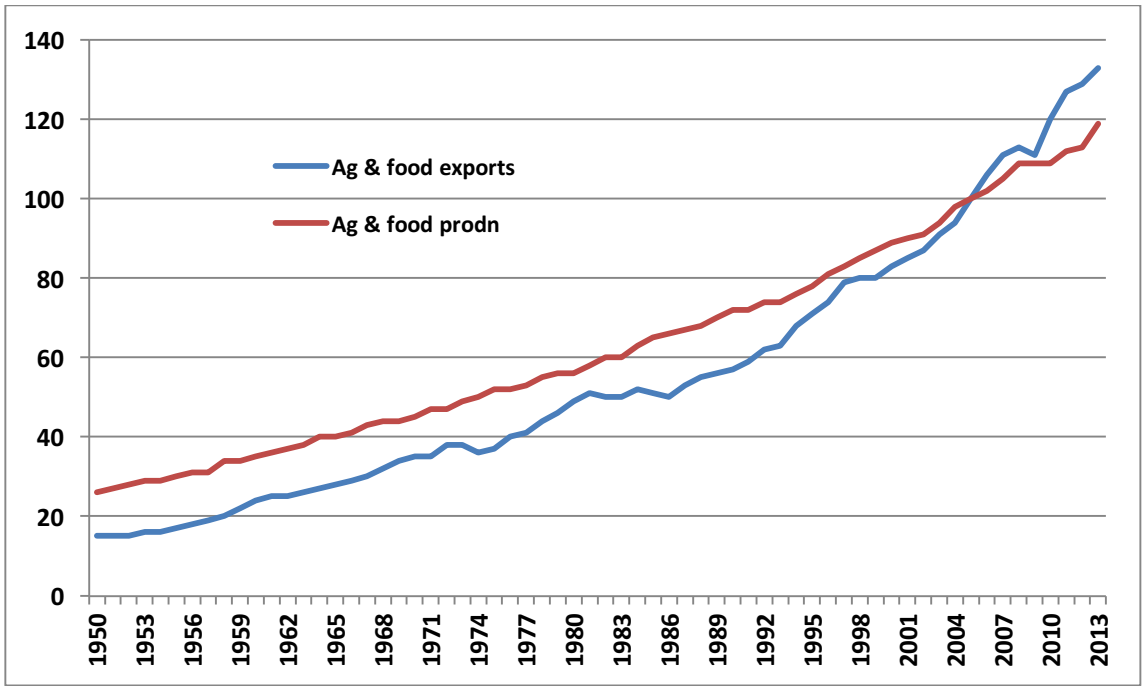
(index of value at constant prices, 2005 = 100)



Source: WTO (2015).

Figure 2.2: Volume of global agricultural production and exports, 1950 to 2013

(index of value at constant prices, 2005 = 100)



Source: WTO (2015).

Table 2.2: Top six exporting countries for eight key traded farm products, 2013
(% by value of global exports of each product)

Wheat		**Rice**		**Maize**		**Sugar, raw**	
USA	21	India	34	USA	20	Brazil	54
Canada	13	Thailand	18	Brazil	18	Thailand	9
France	12	USA	9	Argentina	17	Australia	7
Australia	12	Pakistan	9	Ukraine	11	Guatemala	6
Russia	7	Viet Nam	7	France	7	Mexico	3
Germany	5	Italy	3	India	4	Cuba	3
TOP SIX	71	TOP SIX	80	TOP SIX	77	TOP SIX	80

Soybean+oil		**Oil palm**		**Beef, boneless**		**Milk, powder**	
Brazil	36	Indonesia	47	Brazil	18	New Zealand	45
USA	33	Malaysia	36	Australia	18	Argentina	7
Argentina	12	Netherlands	5	USA	15	Netherlands	7
Paraguay	4	PNG	1	Netherlands	7	Australia	4
Canada	3	Thailand	1	Ireland	6	France	3
Netherlands	2	Germany	1	NewZealand	5	UAE	3
TOP SIX	90	TOP SIX	92	TOP SIX	68	TOP SIX	69

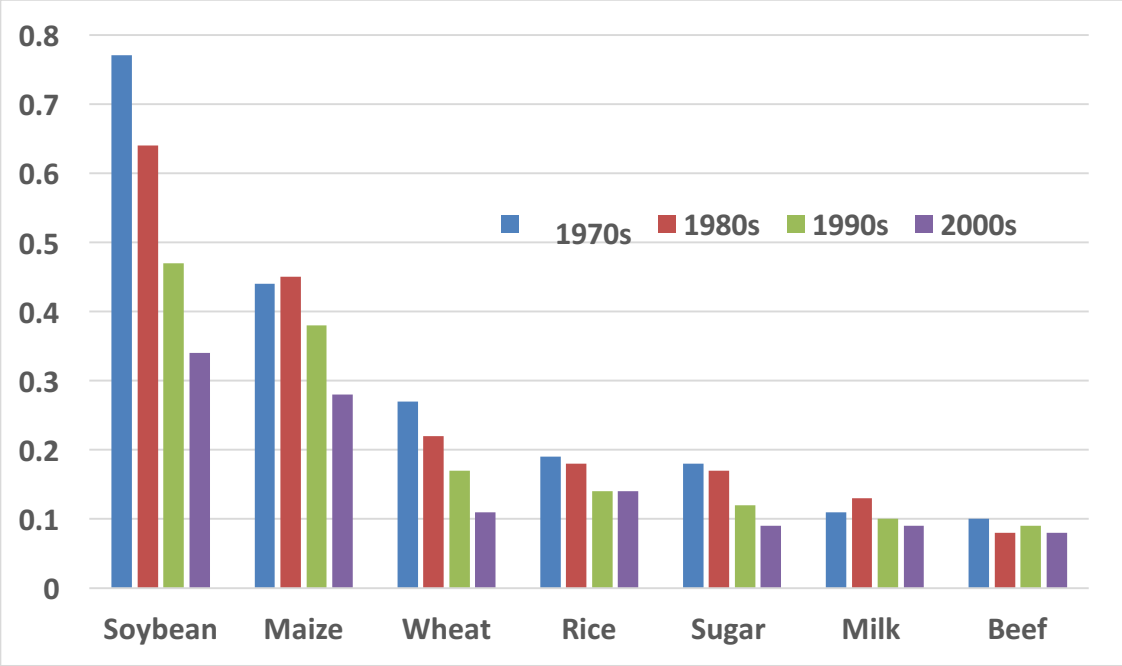
Source: FAO (2016b), accessed 5 April.

Table 2.3: Indexes of diversity of national food production and availability, by developing country region, 2000-09

	Shannon entropy diversity index		**Modified functional attribute diversity index**	
	Production	**Availability**	**Production**	**Availability**
South Asia	0.71	0.85	0.13	0.71
East Asia	0.76	0.88	0.12	0.71
Sub-Saharan Africa	0.80	0.83	0.05	0.71
Middle East+N. Africa	0.92	0.86	0.08	0.82
Europe+Central Asia	0.82	0.88	0.08	0.80
Latin America	0.78	0.92	0.08	0.80

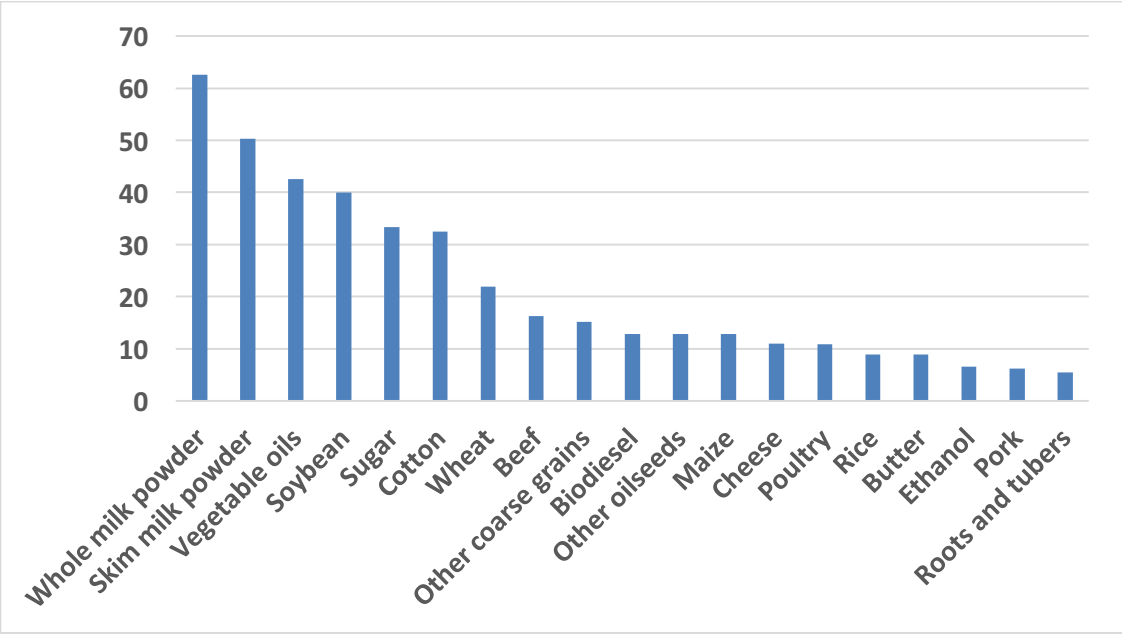
Source: Remans et al. (2014).

Figure 2.3: Hirfendahl index of concentration of production of key food products among the countries exporting them, 1970 to 2009



Source: Liapis (2012).

Figure 2.4: Share of volume of global production of farm products traded internationally, 2013-15 (%)



Source: OECD/FAO (2016).

Table 2.4: Number of exporting and importing countries for key food products, 1970 to 2009

	1970s		1980s		1990s		2000s	
	Exporters	**Importers**	**Exporters**	**Importers**	**Exporters**	**Importers**	**Exporters**	**Importers**
Wheat	36	136	40	146	61	162	91	177
Maize	58	142	55	149	80	169	102	196
Rice	63	175	61	175	90	202	114	219
Sugar	60	165	56	174	81	207	111	222
Beef	62	159	64	175	82	202	109	216
Milk	48	184	49	186	81	206	116	219
Soybean	30	71	38	91	63	118	87	161

Source: Liapis (2012).

2.2 Trade policies and short-run food security

The pattern of government distortions to agricultural incentives, detailed in Chapter 4 below, reveals that there has been under-production of farm products in developing countries for many decades. Also, the anti-trade bias of those policies reduced international trade in farm products below what would have been the case under global free trade. That means international markets for these weather-dependent products are 'thinner' and thus more volatile. The consequent price volatility has been exacerbated by the tendency for both rich and poor countries to alter their border measures from year to year in an attempt to stabilize prices and quantities in domestic food markets. Using a stochastic model of world food markets, Tyers and Anderson (1992, Table 6.14) found that instability of international food prices in the 1980s was three times greater than it would have been under free trade in those products.

The tendency for fluctuations around trend levels of international food prices to be transmitted less than fully to national markets means the percentage by which the domestic price exceeds the border price also fluctuates from year to year around its long-run trend, and in the opposite direction to the international price.

This propensity of national governments to insulate domestic markets has not diminished in either developing or high-income countries as part of the trade-related policy reforms that began in the mid-1980s. Indeed, it has been exacerbated by the spread of policies involving biofuel subsidies and mandates that have linked the prices of food to the even-more-volatile energy raw material prices (de Gorter, Drabik and Just 2015).

To estimate the proportion of any international price fluctuation that is transmitted to domestic markets within twelve months, Anderson and Nelgen (2012) estimate short-run transmission elasticities for each of nine key traded food products for all countries for the period 1985 to 2010. Those elasticity estimates range from 0.73 for soybean down to just 0.43 for sugar. The unweighted average across those nine products is 0.56, suggesting that, within one year, barely one-half the movement in international prices of those key primary food products is transmitted to domestic markets.

It has long been recognized that when some governments alter the restrictiveness of their food trade measures to insulate their domestic markets somewhat from international price fluctuations (including through using specific rather than *ad valorem* tariffs), the price volatility faced by other countries is amplified. That reaction therefore prompts more countries to follow suit. The irony is, however, that when both food-exporting and food-importing countries so respond, each country group undermines the other's attempts to stabilize its domestic markets. That is to say, what seems like a solution to each importing (or exporting) country's concern *if it were acting alone* turns out to be less effective, the more exporting (or importing) countries – presumably for the same loss-aversion political economy reasons – respond in a similar way.

To see this more clearly, Martin and Anderson (2012) consider the situation in which a severe weather shock at a time of low global stocks causes the international food price to suddenly rise. If national governments wish to avert short-term losses for domestic food consumers, and they do so by temporarily altering their food trade restrictions (e.g., by raising export taxes or lowering import tariffs), then only a fraction of that price rise is transmitted to their domestic market. That response raises the consumer subsidy equivalent/lowers the consumer tax equivalent of any such trade measure, and does the opposite to the distortion to producer incentives. However, if such domestic market insulation is practiced by similar proportions of the world's food-exporting and -importing countries, it turns out to be ineffective in keeping domestic price volatility below what it would be in the international marketplace if no governments so responded. It is like everyone in a crowded stadium standing up to see better: if people are of equal height, no-one is better off.

Martin and Anderson (2012) also point out that, with the help of some simplifying assumptions, it is possible to get at least a back-of-the-envelope (BOTE) estimate of the percentage contribution of government trade policy reactions to an international price spike such as in 2006-08. Updated estimates for the key grains are 40% for rice, 19% for wheat, and 10% for maize (Anderson and Nelgen 2012). It is possible to apportion those policy contributions between country groups. Anderson and Nelgen (2012) estimate that developing countries were responsible for the majority of the policy contribution to all three grains' international price spikes during 2006-08, whereas in 1972-74 the opposite was the case except for rice. As for exporters versus importers, it appears exporters' policies had the majority of the influence, other than for wheat in the 1970s, but importers made a very sizeable contribution as well.

It is also possible, in the light of these estimates, to get a sense of how effective were changes in trade restrictions in limiting the rise in domestic prices. The numbers for 2006-08 suggest that, on average for all countries in the sample, domestic prices rose slightly more than the adjusted international price change for wheat, and only slightly less for maize and just one-sixth less for rice. The conclusion drawn from these results is that the combined responses by governments of all countries have been sufficiently offsetting as to do very little to insulate domestic markets from the previous decade's international food price spike.

A new study, by Jensen and Anderson (2017), has sought to fine-tune these BOTE estimates by using the same estimates of price distortions but inserting them in a global economy-wide model (GTAP – see Hertel 1997). The GTAP model is able to take account of the interactions between markets for farm products which are closely related in production and/or consumption, and is able to estimate the impacts of those insulating policies on grain prices and on the grain trade and economic welfare of the world's various countries.

In terms of the aggregate contribution of altered domestic price distortions to the grain price rises internationally, the estimates from the earlier BOTE analysis are

remarkably close to those from the GTAP model, although least so for wheat. Those GTAP results suggest that for rice, the main contributors via lowered import restrictions are Indonesia and the Philippines, and the main contributors via higher export barriers are (in order) India, Pakistan, Thailand and China. In the case of wheat, Japan and India contributed most on the import side while the main contributors on the export side are Argentina, Pakistan and China. China, Argentina, Central Asia and India are the dominant contributors as exporters to the rise in the international price of coarse grains, while Western Europe is the main contributor among the importers.

The international price impacts of exporting countries' actions dominate those of grain-importing countries in all three cases, but the extent of that domination is greatest for rice. On average in the GTAP results, domestic prices rose nearly one-quarter less than the adjusted international price change for rice, but only slightly less for wheat and coarse grains. The extent of insulation was greater in developing countries, which is not inconsistent with the finding that their policymakers contributed more to the price spike than governments of high-income countries.

These results suggest that the combined responses by governments of both groups of countries (food exporters and food importers) were sufficiently offsetting as to do very little to insulate domestic markets from the 2006-08 international food price spike.

Moreover, a related study shows that those policy responses did not even reduce global poverty when account is taken of the combined effect of all countries' actions in exacerbating the international price spikes (Anderson, Ivanic and Martin 2014). On the contrary, that study estimates that those combined policy actions contributed an extra 82 million people to the world's poverty pool (Table 2.5).

Table 2.5: Poverty effects of countries insulating themselves from the 2006-2008 spike in international food prices

	Estimated change in millions of poor people …	
	… *ignoring* international price effects	**… *including* international price effects**
Indonesia	1.6	0.1
China	-5.7	3.6
India	-59.0	4.4
Pakistan	-9.9	-5.9
Nigeria	-4.4	-1.2
Other Sub-Saharan Africa	-0.9	0.7
Rest of world	-4.3	5.6
World	**-81.6**	**7.5**

Source: Anderson, Ivanic and Martin (2014).

2.3 Implications of rising food demand: projections to 2030

With the recent slowdown in Western economies and the relatively rapid economic growth in emerging economies, the global industrial centre of gravity has been shifting away from the north Atlantic and raising the importance of natural resource-poor Asian economies in world output and trade, especially of manufactures. The industrialization of Asia in turn has been increasing the region's demand for food, feed, fibres and other primary products, and thus prices and quantities of exports from natural resource-rich economies.

This development is a continuation of a process begun in Japan in the 1950s and followed by Korea and Taiwan from the late 1960s and subsequently by some Southeast Asian countries. Most recently it has involved far more populous China and India.

The early Northeast Asian group represents just 3% of the world's population, hence its rapid industrial growth was accommodated by the rest of the world without much difficulty, including in food and other primary product markets. This was possible because real prices in international markets for farm products followed a steep downward trend throughout the 20th century.[5] Agricultural prices spiked upwards in 1973-74, in part because the Soviet Union chose unexpectedly to enter the international grain market after a crop shortfall; but they and the oil price fell in the mid-1980s and stayed flat for another two decades (Figure 1.1).

Such price spikes in competitive markets for farm products rarely last long because they stimulate a positive production response on the supply side of the market and also substitution toward cheaper alternatives on the demand side. Soon after the recent turn of the century, however, the real prices of primary products began rising unexpectedly, with food and energy prices moving in parallel (Figure 1.1). Some fingers were pointed toward China and India, which together account for more than two-fifths of humanity. Their rapid and persistent economic growth has great significance for primary product markets and for such things as food and energy security and greenhouse gas emissions nationally, regionally and globally. Market and government responses to these concerns will have non-trivial effects in both the emerging economies and their trading partners, including for food.

To investigate the possible magnitudes of effects, Anderson and Strutt (2014a, 2016) have used the GTAP economy-wide model to project the world economy to 2030. Their baseline projection reflects relatively conservative growth assumptions, including for China and India, and assumes trade-related policies of

[5] That was also the case for many minerals and metals (Pfaffenzeller, Newbolt and Rayner 2007). As well, the price trend for fossil fuels had been flat for many decades through to the early 1970s. However, when the Organization of the Petroleum Exporting Countries (OPEC) cartelized by agreeing in 1973 on restrictive production quotas, the US dollar price of oil in international markets quadrupled; and it doubled again in 1979-80 following the Islamic Revolution in Iran.

each country do not change. The rates of total factor productivity (TFP) growth in each sector is assumed to be similar to the recent past and so is somewhat higher in most primary sectors, and somewhat lower in services, than in manufacturing. For agriculture it is higher for North America than for Europe on the assumption that Europe continues to reject applications to allow genetically modified crop production.

Differences across regions in rates of growth of factor endowments and factor productivity, and the fact that sectors differ in their relative factor intensities and their share of GDP, ensure that the structures of production, consumption and trade across sectors within countries, and also between countries, is going to be very different in 2030 than in the model's base period which is 2007. Real food prices in international markets in 2030 are projected to be only slightly higher than in 2007 though, and hence well below the historically high levels of 2008-12 and consistent with the latest agricultural model projections by OECD/FAO (2016).

In particular, developing economies (especially the faster-growing ones of Asia) will account for considerably larger shares of the projected global economy by 2030. Their aggregate share of world GDP (measured in 2007 US$, not PPP dollars in which developing country shares are much larger) is projected to rise from 27% in 2007 to 40% in 2030 in the baseline scenario. Most of that rise is in Asia, but the shares of Latin America and Sub-Saharan Africa excluding South Africa (hereafter LA and SSA) also rise non-trivially. Europe's share, meanwhile, is projected to fall from 36 to 29%, and NAFTA's from 30 to 26%. Economically active population shares change less, so their incomes per capita converge considerably. For example, the average incomes in LA and SSA are projected to rise relative to the global average between 2007 and 2030 by one-sixth and one-third, respectively.

When global value added is broken down by sector, the changes are more striking. China by 2030 is projected to return to its supremacy as the world's top producing country not only of primary products but also of manufactures. The global manufacturing share remains close to 4% for LA and rises to just under 1% for SSA, while the global share of overall GDP rises by more than one percentage point each for LA and SSA. This reflects the projected rise in importance of (especially non-agricultural) primary production in LA and SSA. As a result, LA and SSA exports of non-farm primary products increase their combined share of global exports from 18 to 29%, while their combined farm product share of world trade rises from 15 to 18%. Meanwhile, the Asia region doubles its share of world agricultural and food imports, while increasing its share of other primary imports by more than a third by 2030.

As for the sectoral shares of national trade, the projected consequences for LA differ considerably from those for SSA. SSA is a net importer of farm products, and that dependence increases slightly over the projection period as low African incomes and thus food consumption levels rise, whereas LA is a large net exporter of agricultural goods whose share of total LA exports rises slightly between 2007 and 2030. As for other primary goods, they account for two-thirds

Table 2.6: Projected shares of agricultural imports under different tariffs for China and India, 2030 (%)

	China					***India***				
	Share of agric. imports, 2030 baseline	Share of ag. imports, 2030 with selected food import bans	2030 tariff rates	2030 tariff rates, with selected import bans	*China's out-of-quota bound tariffs at WTO*	Share of agric. imports, 2030 baseline	Share of ag. imports, 2030 with selected food import bans	2030 tariff rates	2030 tariff rates, with selected import bans	*India's out-of-quota bound tariffs at WTO*
***Rice**[a]	1	0	2	196	*65*	0	0	43	256	80
Wheat[a]	0	0	2	115	*65*	7	0	100	326	80
Coarse grains	0	1	2	2	*65*	0	0	24	25	60-80
Fruit & veg	8	16	7	8	*11*	23	26	35	35	25-50
Oilseeds	11	15	2	2	*3*	1	1	41	41	75
Vegetable oils	18	30	2	2	*3*	28	30	82	81	75
Sugar	1	2	0	0	*50*	1	1	96	96	*na*
Cotton	3	4	4	4	*40*	7	8	10	10	*na*
Other crops	1	2	8	8	*na*	17	21	48	48	*na*
Beef & sheepmeat[a]	1	0	11	255	*12*	0	0	17	136	*na*
Other meats[a]	26	0	8	164	*12*	3	0	17	156	*na*
Dairy products[a]	4	0	8	159	*11*	1	0	31	153	60
Other+processedfood	25	30				13	13			
TOTAL	100	100				100	100			
Prop'n of total	*13*	*10*				*9*	*8*			

[a] Indicates sectors subject to the self-sufficiency policy.

Source: Derived from GTAP Model results reported in Anderson and Strutt (2016).

of SSA's 2007 exports and that becomes only slightly larger by 2030, while in LA their share is projected to rise from one-fifth in 2007 one-third by 2030. Thus LA's very strong comparative advantage in farming is projected to be maintained and its moderately strong comparative advantage in mining to increase, and for SSA the changes in comparative advantage are more modest because its exports are already highly specialized in non-food primary products.

The sectoral structure of imports is projected to change relatively little for LA and SSA but very considerably for China and South Asia under the assumption that trade policies do not change over the projection period. In particular, the share of farm products in imports doubles for South Asia and trebles for China, and the shares of other primary products in imports also rise, nearly doubling in China by 2030. Whether in fact China and India allow such an increase in food import dependence is a moot point, to be taken up below. As a result, the shares of farm exports going to Asian developing countries are projected to increase by more than one and a half times for LA and by two and a half times for SSA, almost all at the expense of exports to high-income countries rather than to other developing countries. The changes in importance of developing Asia for non-farm primary products from SSA and LA are not quite as dramatic as for farm products, but by 2030 it will be the destination for more than one-third of LA's and two-fifths of SSA's exports of those products, having been around one-quarter in 2007. Clearly this represents a huge change in the direction of primary product trade in just one generation for both LA and SSA – provided Asian governments don't raise barriers to those imports.

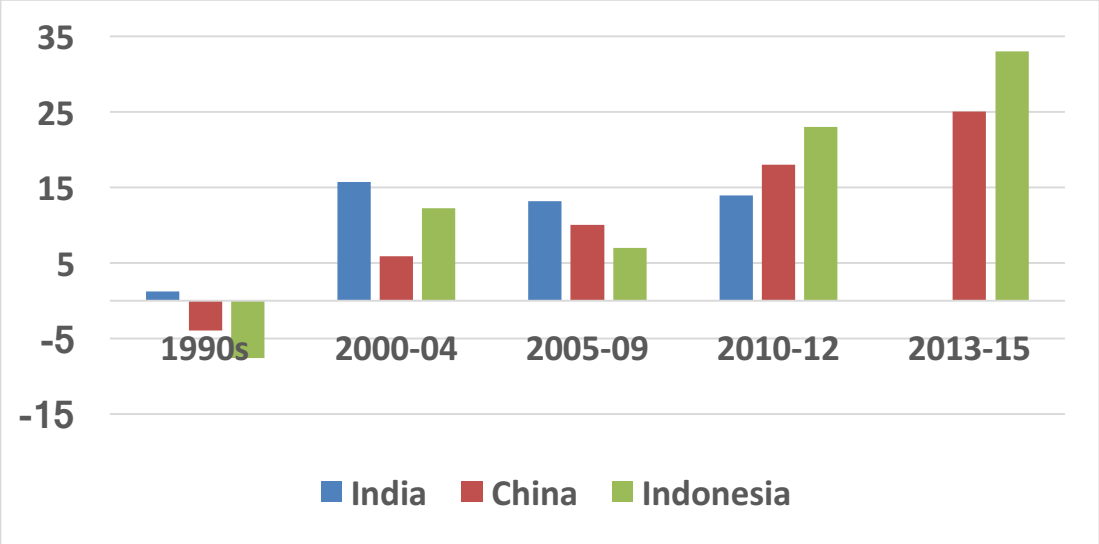
What if China and India ban imports of key foods?

If the projected decline in self-sufficiency in farm products by 2030 for China and South Asia in the baseline scenario were of concern to those countries, it may trigger a trade policy response. That is, it may lead China and India to follow the earlier-industrializing Northeast Asian countries in imposing import restrictions on key food grains and, in the interest of boosting farm incomes to reduce the yawning urban-rural income gap, imposing import restrictions on meat and milk products (but not on coarse grains and oilseed products required for animal feedstuffs). Indeed there are signs already of such a rise in agricultural supports for farmers in these two countries (Figure 2.5).

According to the GTAP model, if such a trade policy response by China and India were in the form of tariff equivalents severe enough to eliminate imports of those selected products in 2030, that would raise substantially the share of imports of agricultural products that are not protected (Table 2.6). As resources moved toward rice, wheat and livestock production, self-sufficiency would fall further for crops that provide inputs into livestock feedstuffs, and also for other crops.

The tariff equivalents of such import restrictions in that simulation range from 115% for wheat to 255% for red meats for China and between 136% and 326%

Figure 2.5: Agricultural nominal rates of assistance[a] in China, India and Indonesia, 1990 to 2015 (%)



[a] The Nominal Rate of Assistance is the percentage by which gross returns to farmers have been raised by national farm policies (predominantly import restrictions and, in India's case, farm input subsidies). The final blue column for India is just for 2010.

Source: Compiled from estimates in Anderson and Nelgen (2013) and OECD (2016).

for those products in India. These are well above bound out-of-quota tariffs in numerous cases (compare the last two columns for China and for India in Table 2.6) and so would be inconsistent with WTO commitments under international law.

Moreover, such a policy response would impose a burden on Chinese and Indian households that are net buyers of those grain, meat and milk products, because domestic consumer prices for those products would increase along with the producer price hikes. This may substantially undermine national food security and nutrition in China and India by reducing households' economic access to food. It would also reduce agricultural exports from Latin American and other food-surplus developing countries.

What if all developing countries become more protective of their farmers?

How different might farm policies be in 2030 if there were no further multilateral or major preferential trade agreements? Anderson et al. (2016) address this question by making projections of agricultural price distortions to 2030, based on knowledge of current WTO-bound tariffs and political economy theory. The latter suggests a simple set of econometric equations to help explain policy choices for the most

important agricultural products. Once estimated by Anderson et al. (2016), they use those equations in conjunction with the GTAP model to project future agricultural distortions for any country in the absense of further trade reform.[6] Their estimates reveal that for developing countries as a whole, the average nominal rate of agricultural protection (NRA) would rise from 9% to 16% by 2030, with the biggest tariff increases being in East Asia and Latin America and, by product, for grains, beef, oilseeds and sugar.

If such protection growth were to occur instead of policies remaining unchanged through to 2030, the welfare cost to developing countries would be $13 billion higher per year by 2030. To put it another way, if the alternative to not agreeing multilaterally to lower agricultural protection rates is not to do nothing but rather to raise protection rates unilaterally as incomes grow and comparative disadvantage in farming continues, then the benefit foregone from that failure to agree is even larger than traditionally estimated.

This thought experiment also is a reminder of the value of legally binding tariffs in the WTO – something that was not done for farm products under the GATT prior to the conclusion of the Uruguay Round Agreement on Agriculture. Had Japan and Korea been required to bind their agricultural tariffs at the rates in place when they signed onto the GATT in 1955 and 1967, respectively, estimates of the economic benefits of their membership of that club would have been much lower had it been assumed their farm tariffs would remain unchanged over the following quarter-century rather than rise – as indeed they did, and spectacularly so (Figure 2.6).

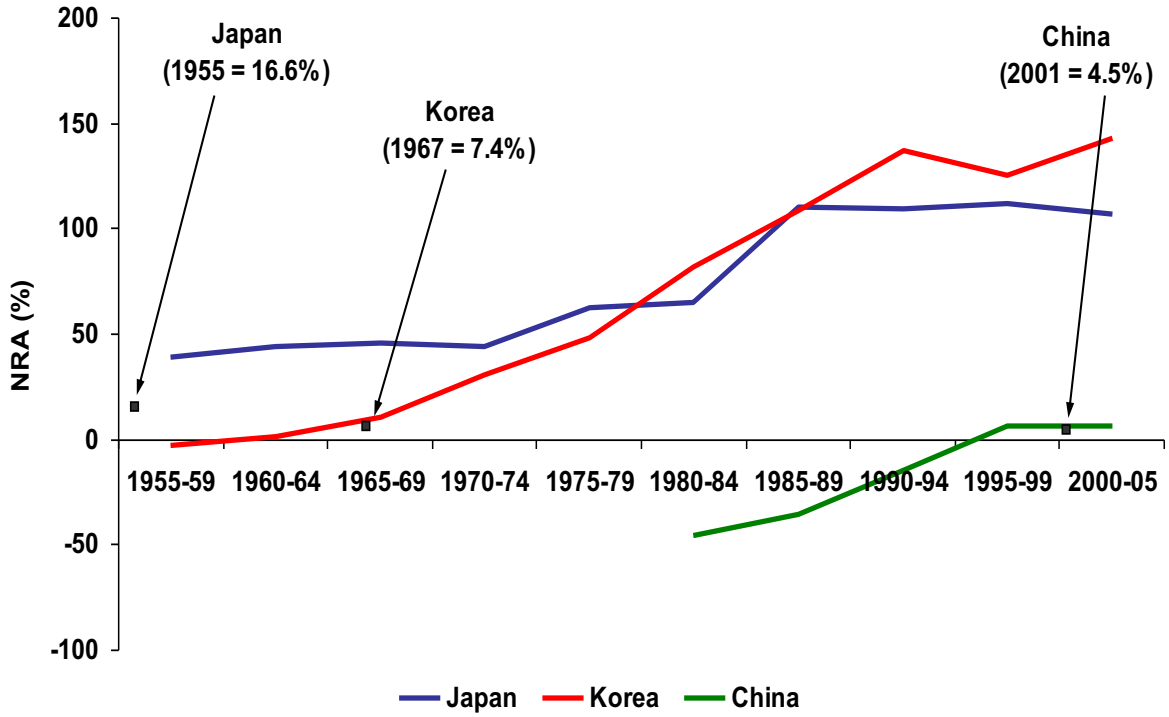
At the time of China's accession to WTO in December 2001, its NRA was less than 5% (see Figure 11.4), or 7% for just import-competing agriculture according to Anderson and Valenzuela (2008). Its average bound import tariff commitment was about twice that (16% in 2005), but what matters most is out-of-quota bindings on the items whose imports are restricted by tariff rate quotas. The latter tariff bindings as of 2005 for China were 65% for grains, 50% for sugar and 40% for cotton (WTO, ITC and UNCTAD 2007, p. 60). Hence China, too, has scope to raise its agricultural protection substantially.

2.4 Implications of climate change for food supplies and trade policy

The above projections of the world economy have a 'business as usual' baseline that has not incorporated allowance for climate change. This is understandable because the confidence bands around what those impacts might be are still very wide, and more so the further out in time one seeks to project (Tol 2014). What is clear, however, is that climate change is altering agricultural production not only in the

[6] Bouët and Laborde (2010) also seek to assess the implications for the world economy of protection growth that might result from failure of the WTO's Doha round. However, their assumed alternative protection rates are more ad hoc than in this section.

Figure 2.6: Nominal rate of agricultural assistance (NRA) in Japan, Korea and China and date of accession to GATT or WTO, 1955 to 2005 (%)



Source: Anderson (2009, Figure 1.14).

long term but also year to year. In terms of the latter, many areas of the world are experiencing increased volatility of weather patterns and more intense or more frequent extreme weather events that can ruin a year's production in minutes. Few models explicitly incorporate this uncertainty, and thus most underestimate worst-case scenarios (Burke et al. 2015). Openness to international (as well as intra-national) trade can be hugely important in mitigating the short-term effects of extreme weather that would otherwise drastically undermine food security (Burgess and Donaldson 2010). Hence this aspect of climate change underscores the importance of food trade openness.

As for the long-term effects of climate change, there are already signs that the optimal locations for producing the world's various foods are altering (Donaldson, Costinot and Smith 2016). One response to date is rural workers migrating to urban areas of their country or to foreign countries, but this has proven less possible, for financial liquidity reasons, for poorer households and countries (Cattaneo and Peri 2015). Another response is breeding crop varieties for different climates. Agricultural research has been spectacularly successful in expanding the climate range for growing wheat (Olmstead and Rhode 2007, 2011).[7] However, R&D takes

[7] The case of maize is a little different: the varieties developed in the United States at least are more sensitive to drought than earlier varieties (Lobell et al. 2014).

decades. Faster options such as opening up more to trade in food therefore also need to be considered as possible long-run policy responses to climate change.

Numerous global economic modelling studies have been undertaken to assess the role trade can play in the wake of long-run climate change. Their results vary greatly depending on the modellers' assumptions (von Lampe 2014, Elbehri 2015, Ch. 10, Baldos and Hertel 2015),[8] but they all confirm the very positive role of trade openness. Just four sets of results are mentioned here to illustrate the types of conclusions being drawn.

First, Hertel, Burke and Lobell (2010) find that the adverse poverty effects of climate change are most severe among non-farm households in Africa and South Asia, but that farm households are likely to become less poor in regions such as Latin America. This difference results from lower yields outweighing any price rises for farm incomes in Africa and South Asia and the opposite for farmers in food-exporting countries of South America.

Second, while the average level of international food prices is expected to rise as a result of climate change, the extent is widely contested (Weibe et al. 2015). For example, quite large rises are predicted by IFPRI's modelling of agricultural markets (Nelson et al. 2010), whereas others using global economywide models, such as Roson and van der Mensbrugghe (2012), are able to allow for intersectoral adjustment and tend to get smaller price rise projections. The range of projections is from zero to above 20% for some crops by 2050. The aggregate real price rise by 2030 may be well under 5% though.

Third, when economywide models are used, they can also incorporate effects of climate changes on other sectors (e.g., tourism in low-lying islands) and on factor productivity (e.g., the debilitating effect of higher temperatures and humidity on labour productivity in the tropics). Such spillover effects to the agricultural sector may be more important for some farmers or consumers than the direct effects of climate change on crop yields (Valenzuela and Anderson 2011).

And fourth, Baldos and Hertel (2014) show that standard drivers of food market developments focused on in the previous section, such as growth in populations, incomes and farm productivity, are likely to have a much bigger impact on long-run trends in prices and food security than are changes in climate.

In addition to climate change itself impacting food markets, so too are policy responses to climate change. One response in the US and EU has been to introduce biofuel subsidies and renewable fuel mandates. Another is to impose taxes on greenhouse gas emissions, which may eventually apply to and harm agricultural more than manufacturing and services production.[9] On the other hand, payments for CO_2 absorption may expand the demand for farm workers and farm land.

[8] To aid model transparency and convergence for this and general foresight work, the Agricultural Model Inter-comparison and Improvement Project (AgMIP) has been established. See www.agmip.org.

[9] If methane emissions were taxed, production of ruminant animals (especially beef and dairy cattle) would be the most adversely affected farm activities. See, e.g., Geber et al. (2013), Golub et

Clearly, the net effect of all of these types of developments on the future of any one farm product market remains highly uncertain, as do the net effects on poverty, food security, nutrition and health in each nation. One thing *is* certain though: food trade openness will become even more important in a world undergoing climate change, because it will ease the pain for those adversely affected, and it will allow expansion for those farmers lucky enough to benefit more from food price changes than they lose from reductions in crop and pasture yields per hectare.

al. (2013) and Springmann et al. (2016). On the other hand, the more carbon emissions are taxed and markets for carbon credits evolve, some farmers will find it profitable to grow trees or alter their crop mix and agricultural practices so as to sequester more carbon in the soil and in perennial vegetation and thus sell carbon credits to polluting industries (Toensmeier 2016).

Chapter 3

REFORM ACHIEVEMENTS SO FAR, AND GATT/WTO CONTRIBUTIONS

Notwithstanding the virtues of trade openness summarized in the previous chapter, throughout history most countries have intervened at their border with measures that distort the country's trade and drive a wedge between domestic and international market prices. An exceptional period was the mid-nineteenth century, which saw repeal of Britain's Corn Laws and the 1860 trade agreement between Britain and France. Those milestone events triggered a gradual opening up of world trade, and contributed to rapid growth in advanced economies. That first globalization wave was brought to an abrupt halt by the First World War and then the protectionism of the 1930s. When followed by the Second World War, leaders of key trading economies felt driven to establish a set of rules to govern international trade. The resulting General Agreement on Tariffs and Trade (GATT) came into force in 1948.

The GATT also provided for Contracting Parties to conduct multilateral rounds of negotiations to gradually lower simultaneously their barriers to trade. Those rounds resulted in major reductions between the late 1940s and early 1980s in manufacturing protectionism in developed countries. However, they were unable to stop – let alone reverse –growth in agricultural protectionism in those countries over that period. Those policies inevitably depressed international prices of farm products, and ultimately led to surpluses in Western Europe. When export subsidies were provided to help dispose of them, an export subsidy war erupted across the north Atlantic. That drove international prices of farm products to a record low in the mid-1980s, just as the next (seventh) GATT Round of negotiations were to be launched in Uruguay. It also triggered the formation of the so-called Cairns Group of agricultural-exporting countries, whose sole aim was to keep agriculture on the top of the Uruguay Round's agenda. As a result, an agreement on agriculture was among those that came into force along with the World Trade Organization (WTO) on 1 January 1995. Those commitments were implemented over the following decade.

This chapter summarizes the extent of the increase in disarray in world agricultural markets up to the mid-1980s before assessing the economic welfare and other effects of trade reforms between then and 2004. It also compares them with the potential effects of removing the distortions remaining at the end of that period.

The chapter's final section reviews the comparatively modest trade agreements over the subsequent dozen years.

3.1 The disarray by the mid-1980s

Apart from the mid-nineteenth century repeal of Britain's Corn Laws, the history of industrial and post-industrial development has been overlaid with a history of agricultural protection growth. Poor agrarian economies tend to tax agriculture relative to other tradables sectors, but as nations industrialize their policy regimes tend to gradually change from negatively to positively assisting farmers relative to other producers (and conversely from subsidizing to taxing food consumers). The period from the 1950s to the 1980s saw substantial growth in agricultural protectionism in the advanced industrial economies and its spread to newly industrializing economies, tendencies that accelerated and came to a head in the mid-1980s.

Given this history, the attempt in the Uruguay Round to reduce farm price supports was seen as both exciting and daunting: exciting, because a successful liberalization would reduce the huge and growing waste of resources that would be associated with the continuation of past trends in farm policies; and daunting, because the history of those policy trends across many countries and over a long period suggests major counter-acting of domestic political forces would be needed for a multilateral agreement to be reached.

Why has the growth of farm protectionism historically been so difficult for societies to avoid? It seems almost incredible that the Uruguay Round could have been held up for years by a farm trade dispute affecting products that account for less than one-tenth of world trade and less than one-twentieth of GDP and employment in the main countries seeking exceptional treatment for agriculture. It seems all the more incredible given that the economies hurt most by these policies are those of the protecting countries themselves. Those protectionist policies are wasteful in terms of raising consumer prices for food; requiring ever-larger treasury outlays to farmers; redistributing welfare with increasing inefficiency (not only because it costs consumers and taxpayers much more than one dollar for every dollar received by farmers, but also because the largest producers receive the lion's share of the benefits); making non-agricultural producers less competitive in so far as farm programs retain resources in agriculture; and damaging the natural environment, not least because these price-support policies typically encourage excessive use of farm chemicals (Tyers and Anderson 1992).

To understand why agreement on farm trade reform had been so difficult to achieve in the Uruguay Round, it needs to be understood that this involved not just a dispute between the United States and France, as some media commentators implied. Those countries just happened to be the most vocal representatives of two groups of countries. On the one hand, there are the traditionally lightly protected,

food-exporting contracting parties to the GATT, involving not only the members of the Cairns Group but also numerous other developing countries. And on the other hand, there are other highly protected industrial countries, namely the Norway, Switzerland, Japan and Korea, as well as the European Union.

Nor is it only recently that farm policy has become a contentious issue in trade negotiations. Indeed it is *because* those policies are so contentious (a) that the first four rounds of GATT-based multilateral trade negotiations virtually ignored them and the next three eventually had to drop them, and (b) that many regional and other preferential trade agreements exclude farm products. We should therefore not be surprised that the inclusion of farm policies in the Uruguay Round caused problems. Their inclusion was considered necessary, however, because they had become extremely distortionary by the 1980s, both absolutely and relative to non-farm trade policies, and because there was every indication that agricultural protection growth would continue to spread, cancer-like, unless explicitly checked.

While much of the government intervention in agricultural trade over the centuries has been aimed at stabilizing domestic food prices and supplies, there has been a general tendency for such policy interventions to gradually change in the course of a country's development from effectively taxing agriculture relative to other tradable sectors to effectively subsidizing farmers. From the late 1100s to the 1660s, prior to the first industrial revolution, Britain used export taxes and licences to prevent domestic food prices from rising excessively. During 1660-90 a series of Acts gradually raised food import duties (making imports prohibitive under most circumstances) and reduced the export restrictions on grain, provisions that were made even more protective by Britain's Corn Law of 1815. The famous repeal of the Corn Laws in the mid-1840s heralded a period of relatively unrestricted food trade for Britain, but agricultural protection gradually returned in Europe during the last decades of that century, spiked in the early 1930s, and increased again after the 1940s. Meanwhile, tariffs on West European imports of manufactures have been progressively reduced since the GATT came into force in the late 1940s -- adding to the encouragement of agriculture relative to manufacturing production.

Japan provides an even more striking example of the tendency to increasingly assist agriculture relative to other industries. Its industrialization began later, after the opening up of the economy following the Meiji Restoration in 1868. By early in the 20th century Japan had switched from being a small net exporter of food to becoming increasingly dependent on rice imports. This was followed by calls from farmers and their supporters for rice import controls. Their calls were matched by equally vigorous calls from manufacturing and commercial groups for unrestricted food trade, since the price of rice at that time was a major determinant of real wages in the nonfarm sector. The heated debates were not unlike those that led to the repeal of the Corn Laws in Britain six decades earlier. In Japan, however, the forces of protection triumphed, and a tariff was imposed on rice imports from 1904. That tariff then gradually rose over time, providing a nominal rate of protection for rice of more than 30% during World War I.

Even when there were food riots because of shortages and high rice prices just after that war, the Japanese government's response was not to reduce protection but instead to extend it to its colonies and to shift from a national to an imperial rice self-sufficiency policy. That involved accelerated investments in agricultural development in the colonies of Korea and Taiwan behind an ever-higher external tariff wall that by the latter 1930s had driven imperial rice prices to more than 60% above those in international markets.

After post-war reconstruction Japan continued to raise its agricultural protection, just as had been happening in Western Europe, but to even higher levels: from an average nominal rate for grains and meats of around 50% in the late 1950s to around 100% by the early 1970s and to more than 200% by the late 1980s.

An import-substituting industrialization strategy was adopted in the 1950s in liberated South Korea and Taiwan, which harmed agriculture there; but that was replaced in the early 1960s with a more-neutral trade policy that resulted in very rapid export-oriented industrialization in those densely populated economies. That development strategy imposed competitive pressure on the farm sector which, just as in Japan in earlier decades, prompted farmers to lobby (successfully, as it happened) for ever-higher levels of protection from import protection in those newly industrialized economies as well (Anderson, Hayami and Others 1986, Ch. 2).

From the latter 1970s Europe's Common Agricultural Policy also provided of export subsidies to dispose of its induced surpluses. That stimulated the United States to defend its export markets by subsidizing US farm exports as well -- a move that contributed to international food prices falling by 1986-87 to their lowest level in real terms. The export subsidies under the US Export Enhancement Program were very costly to the US, added only very modestly in proportional terms to the budgetary cost of Europe's Common Agricultural Policy, and imposed large costs on other actual or would-be agricultural-exporting countries.

As a consequence of these policy developments, the deadweight welfare losses in those protecting countries from distorting their food markets more than doubled over the 1980s, while the benefits to their farmers as a group increased by about 50%. According to one set of estimates from a multi-commodity model of world food markets, the annual benefits of these policies to farmers of Western Europe, the United States and Japan rose from $94 to $141 billion over the 1980s (in 1985 US dollars), while the cost to consumers in those countries rose from $120 to $216 billion. That study estimated the direct global loss of economic welfare because of industrial country food policies trebled in the 1980s, rising from $16 billion to $50 billion (Tyers and Anderson 1992, Tables 6.5, 6.6). And that does not include the costs of lobbying for and administering the policies, nor the collection and by-product distortion costs of raising the government revenue needed to finance the subsidies, let alone the indirect cost these policies imposed in terms of holding up the Uruguay Round's conclusion.

3.2 Evaluating the Uruguay Round Agreement on Agriculture

In the light of the long history of agricultural protection growth in industrial countries, even achieving a standstill in agricultural protection growth via the Uruguay Round would have to be described as progress. It would be an advance over what otherwise might have been the case, in part because it would reduce the risk of newly industrializing countries following the more advanced ones down the agricultural protection growth path. But in fact more (although only a little more) than a standstill on farm policy was agreed to in the Uruguay Round. The Uruguay Round Agreement on Agriculture (URAA) has three main components: reductions in farm export subsidies, increases in import market access, and cuts in domestic producer subsidies. The implementation period for developed countries was six years, and for developing countries it was ten years, and the extent of reform required of developing countries was less.

The fact that farm export subsidies were still to be tolerated continued to distinguish agricultural from industrial goods in the GATT, a distinction that stems from the 1950s when the United States insisted on a waiver for agriculture of the prohibition of export subsidies. Moreover, even by the turn of the century farm export subsidies needed to be only about one fifth lower than they were in the late 1980s to comply with the URAA. True, the budgetary expenditure on export subsidies was to be lowered by 36% from the base period (24% for developing countries), but for some commodities it was only the agreed cut in the *volume* of subsidized exports (21% for industrial countries, 14% for developing countries) that bit. This is because nominal international food prices were considerably higher in the implementation period than in the more-depressed 1986-90 base period, in which case less export subsidy payments were required to maintain a particular domestic price.

A second distinguishing feature of the URAA is that it required nontariff import barriers to be converted to tariffs.[10] Those tariffs were then to be reduced and bound. However, the extent of tariff reduction by the end of the century was even more modest than for export subsidies: the *unweighted* average tariff cut must be 36% (24% for developing countries), but it could be less than one sixth as a *weighted* average, since each tariff item need be reduced by only 15% of the claimed 1986-88 tariff equivalents (10% for developing countries). Tangermann (1994) gives the example of a country with four items subject to tariffs, three sensitive ones with 100% duty rates and one with a 4% duty. Reducing the three high rates to 85% (a 15% cut) and eliminating the 4% rate (a 100% cut) would give an unweighted average cut of 36.25%. This would meet the requirement for an unweighted average cut of

[10] Important exceptions are Japan and Korea. They managed to avoid tariffying their rice policies (Hayami and Godo 1996, Yap 1996).

36% and minimum cuts per item of 15%, but it would allow high protection on sensitive products to remain and it may increase the dispersion of rates.[11]

Moreover, the claimed tariff equivalents for the base period 1986-88, and hence the initial tariff bindings, are in many cases far higher than the actual tariff equivalents of the time. The European Union, for example, set them on average at about 60% above the actual tariff equivalents of the CAP in recent years, while the United States set theirs about 45% above recent rates. This 'dirty' tariffication has two consequences. One is that actual tariffs may provide no less protection by 2000 than did the non-tariff import barriers of the early 1990s. Indeed in the case of the EU the final bindings for the year 2000 were almost two-thirds above the actual tariff equivalent for 1989-93, and for the United States they were more than three-quarters above (final column of Table 1). The other consequence of binding tariffs at such a high level is that it allows countries to set the actual tariff below that but to vary it so as to stabilize the domestic market in much the same way as the EU has done in the past with its system of variable import levies and export subsidies. This means there has been much less than the hoped-for reduction in fluctuations in international food markets that tariffication was expected to deliver.

Dirty tariffication is not confined to industrial countries. On the contrary, developing countries are even more involved in the practice. This is possible because they were allowed to convert unbound tariffs into 'ceiling bindings' unrelated to previous actual rates of protection. Many developing countries chose to bind their tariffs on agricultural imports at more than 50% and some as high as 150% -- far above the tariff equivalents of restrictions actually in place in the 1980s/early 1990s.

It is true that some countries have agreed also to provide a minimum market access opportunity, such that the share of imports in domestic consumption for products subject to import restrictions rises to 5% by the year 2000 under a tariff quota (8% in the case of rice in Japan in lieu of tariffication; less in the case of developing countries). But that access is subject to special safeguard provisions, so it only offered potential rather than actual access (another form of contingent protection). As well, there is scope to minimize the impact on those imports on the domestic market: Yap (1996) gives the example of Japan, whose required rice imports could be of low feed quality and/or could be re-exported as food aid. Furthermore, market access rules formally introduced scope for discriminating in the allocation between countries of these tariff quotas. And perhaps even more importantly, the administration of such quotas tends to legitimize a role for state trading agencies such as Indonesia's BULOG. When such agencies have selling rights on the domestic market in addition to a monopoly on imports and exports of farm products, they can choose to charge 'mark-ups' and thereby distort domestic prices easily and relatively covertly.

[11] An increase in the dispersion of rates within the sector could itself be welfare-reducing even if the mean rate was unchanged. This is more likely the more resources (including agricultural land) can be switched from what become less-protected to more-protected sub-sectors (Lloyd 1974).

There are thus elements of quantitative management of both export and import trade in farm products now under the WTO, including scope for discriminatory limitations on trade volumes, rather than just limitations on price distortions. This feature of the agricultural agreement is unfortunate, for it reduces the degree of flexibility of economies to adjust to changing market circumstances, and while it may reduce uncertainty for some traders (those lucky enough to be granted import quotas, for example), it does so at the expense of greater uncertainty for all other traders.

The third main component of the URAA is that the aggregate level of domestic support for farmers was required to be reduced to four-fifths of its 1986-88 level by 2000 (and to 87% by 2004 for developing countries). That too required only modest reform in most industrial countries because much of the decline in that measure of support had already occurred. In the EU and US, for example, their bound tariff levels in 2000 were about two-thirds above the actual tariff equivalents during 1989-93 on average. Moreover, there are many forms of support that need not be included in the calculation of the aggregate measure of support (AMS), the most important being direct payments under production-limiting programs of the sort adopted by the US and EU. That meant the use of such "Green Box" instruments (including environmental provisions) could spread to other developed countries and commodities as farm income support via trade measures becomes less of an option. For budgetary reasons developing countries use domestic farm support measures much less than developed countries and so this possibility is likely to be less attractive to them. However, under the Special and Differential Treatment clauses of the URAA, they have some additional exempt policy measures, should they wish to provide more domestic support for their farmers in the future. These include investment subsidies and broadly based farm input subsidies.

The Uruguay Round included also a separate Agreement on the Application of Sanitary and Phytosanitary Measures. Its purpose is to ensure that any claims that import restrictions are necessary for human, animal, or plant health or safety be more scientifically based and more transparent in the future than has been the case in the past. This may help to reduce the abuse of SPS measures, although there is still sufficient vagueness in the wording to ensure that the protectionist use of these measures will not be removed entirely.

In short, implementing the agricultural reforms agreed to in the Round involved only very modest liberalization in industrial countries and even less in developing countries, with plenty of room for disputes over compliance during the implementation period. Agriculture's relative decline and loss of farm jobs in heavily-protected industrial countries may have accelerated as a result of implementing the URAA, but only slightly. But at least it brought agriculture into the mainstream of the WTO (which allowed the Uruguay Round to be concluded), and it promised to reopen agricultural negotiations and continue the process of farm reform into the new millennium. Moreover, the important need to tariffy nontariff import barriers and to quantify the Aggregate Measure of Support in the interests of transparency,

and to include domestic producer subsidies in the reform package, has been acknowledged and explicitly incorporated in the URAA. The new rules and obligations eventually will constrain further farm protection growth in both industrial and developing countries (if not immediately), thereby promising greater certainty and stability to international food markets this century and so encouraging developing countries with a natural comparative advantage in farm products to exploit the new market opportunities, not least through seeking reductions in their own country's direct and indirect policy discrimination against agriculture.

Moreover, there has been considerable reduction in the degree of tariff escalation affecting markets for tropical export products. In the cases of rubber, jute, oilseeds, spices, tobacco and wood, for example, tariffs on the primary and semi-processed products traditionally have been lower than on the final manufactured products but the latter have been reduced much more than the former thanks to the Uruguay Round (ESCAP 1995, pp. 128-30).

3.3 Impact of Uruguay Round agreements on developing countries

The Uruguay Round was not only about agriculture. Manufacturing tariffs (already quite low) were reduced further; 'voluntary' export restraints were phased out; the Multifibre Arrangement was abolished and protection to textiles and clothing lowered; a (small) beginning was made to liberalize trade in services; there is now greater discipline on abuse of intellectual property rights; tighter rules have been introduced on technical barriers to trade, rules of origin, pre-shipment inspection, trade-related investment measures, import licensing, safeguards, subsidies, and countervailing measures; a plurilateral agreement on government procurement was signed; and much-improved dispute settlement procedures were put in place in the new WTO.

All of these changes have enhanced global economic welfare (Anderson 2016). Whether and to what extent a particular country shared in that welfare gain depends largely on how much (a) its trading partners lowered barriers to its exports, (b) its competitors lowered their trade barriers, and especially (c) how much the country concerned lowered its own trade barriers. Since the Uruguay Round involved so much more than just agriculture, and since this freeing up of global trade and the associated boost to economic growth has altered countries' comparative advantages, it is only possible to think about the impact of the Round on a country from a global, economy-wide perspective. In particular, did the Uruguay Round, which was fully implemented by 2004, improve the country's terms of trade and, if not, were its own policy reform commitments sufficient to ensure its citizens were nonetheless better off from the Round's implementation? And how did it affect the country's agricultural sector and food security?

3.4 Effects of the Uruguay Round and other trade policy reforms by 2004

Of course the Uruguay Round was not the only reason for trade policy changes over the two decades to 2004. Two other notable events were the accession of China and Taiwan to the WTO by early 2002, and the enlargement of the European Union from 15 to 25 members. What were the net economic effects of trade policy changes around the world over those two decades? And how do the effects on farm incomes and economic welfare in developing countries compare with the effects of those price distortions still in place as of 2004? Valenzuela, van der Mensbrugghe and Anderson (2009) use a global economy-wide model (the World Bank's Linkage model – see van der Mensbrugghe 2005) to provide a combined retrospective and prospective analysis that seeks to assess how far the world has come, and how far it still had to go following the implementation of the Uruguay Round, in removing the disarray in world agriculture. That study quantifies the impacts both of past reforms and remaining policies by comparing the effects of price-distorting policies in the period 1980-84 with those of 2004.

Several key findings from that economy-wide modeling study, summarized in Table 3.1, are worth emphasizing. First, the policy reforms from the early 1980s to the mid-2000s is estimated to have improved global economic welfare by $233 billion per year, and removing the distortions remaining as of 2004 would add another $168 billion per year (both in 2004 US dollars). This suggests that in a global welfare sense the world moved three-fifths of the way towards global free trade in goods over that quarter century.

Table 3.1: Effects on developing countries (DCs) and the world of reforming global goods markets between 1980-84 and 2004, and of removing remaining price and trade distortions as of 2004 (2004 US billion dollars and %)

	Reform from 1980-84 to 2004	**Move to free trade as of 2004**
Global economic welfare, US$b (%)	$233b (0.8%)	$168b(0.6%)
DCs' economic welfare, US$b (%)	$73b (1.0%)	$65b (0.9%)
DCs' share of global agric output	58%→ 62%	62%→ 65%
DCs' share of global agric exports	43%→ 55%	55%→ 64%
% rise in DCs' agric (nonag) GDP	4.9% (0.4%)	5.6% (1.9%)
% rise in international agric. prices	13%	<1%

Source: Valenzuela, van der Mensbrugghe and Anderson (2009).

Second, developing countries benefited proportionately more than high-income economies (1.0% compared with 0.7% of national income) from those past policy reforms, and would gain nearly twice as much as high-income countries by completing that reform process (an average increase of 0.9% compared with 0.5% for high-income countries). Of those prospective welfare gains from global liberalization, 60% would come from agriculture and food policy reform. This is a striking result given that the shares of agriculture and food in global GDP and global merchandise trade are only 3 and 6%, respectively. The contribution of farm and food policy reform to the prospective welfare gain for just developing countries is even greater, at 83%.

Third, the developing countries' share of the world's primary agricultural exports rose from 43 to 55%, and its farm output share from 58 to 62%, because of those reforms to 2004, with rises in nearly all agricultural industries except rice and sugar. Removing remaining goods market distortions would boost developing countries' export and output shares to 64 and 65%, respectively.

Fourth, for developing countries as a group, net farm income (value added in or GDP from agriculture) is estimated to be 4.9% higher than it would have been without the reforms of the past quarter century, which is more than ten times the proportional gain for non-agriculture. If policies remaining in 2004 had been removed, net farm incomes in developing countries would have risen a further 5.6%, compared with just 1.9% for non-agricultural value added. As well, returns to unskilled workers in developing countries – the majority of whom work on farms – would rise more than returns to other productive factors from that liberalization.

3.5 WTO contributions to multilateral policy reforms since 2004

Despite the considerable potential for global welfare gains from another round of multilateral trade negotiations, the WTO's Doha Round has struggled to gain traction over the past dozen years – and not least because of difficulties in reaching consensus on agricultural issues. An agreement on trade facilitation was reached in the WTO ministerial meeting in Bali in late 2013, which will help mostly developing countries. Then in December 2015, at the WTO Tenth Ministerial Conference in Nairobi, a package of Decisions was agreed, a number of which are relevant to agriculture. The most important is a commitment to abolish farm export subsidies (with the exception of scheduled export subsidies for processed dairy products and pork, which have been given until 2020 to be phased out). Developing countries have until the end of 2018 to phase out their export subsidies, apart from marketing and transport subsidies which can continue until the end of 2023. Least developed countries (LDCs) and net-food-importing developing countries have until 2030 to meet their commitments.

The Nairobi Decisions also contain disciplines to prevent the use of other export policies as subsidies. These include limitations on financing support for agricultural exporters, such as export credits, export credit guarantees or insurance programmes; rules for agricultural-exporting state-owned enterprises; and disciplines to ensure that international food aid does not adversely impact domestic markets.

Public stockholding for food security purposes and cotton were mentioned again. The stockholding Decision reaffirms the commitment of WTO members to negotiate and make all concerted efforts to agree and adopt a "permanent solution" to this issue. The cotton Decision calls on developed countries – and developing countries that declare themselves able to do so – to grant listed "cotton-related" exports from LDCs duty-free and quota-free access from 1 January 2016 to the extent provided for in their respective preferential trade agreements in favour of LDCs. As well, cotton export subsidies are required to end immediately for developed countries and by 1 January 2017 by developing countries.

Developing countries again sought to have recourse to a Special Safeguard Mechanism (SSM) based on import quantity and price triggers. All that was agreed though was that those negotiations will continue to be pursued in the WTO Committee on Agriculture. This issue is taken up in Chapter 6, along with other ongoing and unresolved issues. But before addressing those issues, the next chapter examines remaining barriers to agricultural trade, and Chapter 5 then looks at the effects of proposals put on the table during the WTO's Doha Round.

Chapter 4

REMAINING BARRIERS TO FARM TRADE

As already noted, agricultural protection and subsidies in high-income (and a few upper middle-income) countries have been depressing international prices of farm products for many decades, thereby lowering the earnings of farmers and associated agribusinesses in developing countries (Johnson 1991). Those policies almost certainly added to global inequality and poverty, since two-thirds of the world's extremely poor people are farmers and four-fifths live in rural areas in developing countries (Castañeda et al. 2016). As well as this external adverse influence on incomes of farmers in developing countries, their own governments taxed them following independence until at least the 1980s. This involved both directly taxing farm exports, and in some cases (in-kind) production, as well as harming farmers indirectly with an import-substituting industrialization strategy that involved restrictions on imports of manufactures and an overvalued currency.

An important aspect of those price-distorting policies was their anti-trade bias: they reduced the quantity of farm products traded internationally. Such 'thinning' of the international market meant that its prices have been more volatile than they otherwise would have been, and that has induced national governments to insulate somewhat their domestic food markets from international price volatility – so adding further to those fluctuations in international prices.

While many developing country governments have reformed their agricultural, trade and exchange rate policies, thereby reducing their anti-agricultural bias, and some high-income countries have reduced their farm price supports too, both groups of countries continue to have an anti-trade bias in their policies and to insulate their domestic food markets from international price fluctuations. As well, in the most advanced developing economies, the gradual removal of their previous discrimination against the agricultural sector is being followed by rising levels of support for their farmers, which will further depress the economic conditions facing farmers in poorer countries.

This chapter begins by outlining ways of measuring the price-distorting impacts of policies (which have improved considerably over the past half-century), before summarizing empirical evidence of domestic price distortions since the mid-1950s. When placed in historical perspective, the reforms since the mid-1980s are as dramatic as the policy changes in the preceding three decades. Therefore, in tracing the impacts of those farm and food policy developments since the 1950s, we

subdivide the period into the years to the mid-1980s, which were characterized by policies that were strongly anti-trade, and the subsequent decades which saw the gradual undoing of those policies. Despite those policy reforms, the evidence shows that countries continue to insulate their food markets from international price fluctuations, and to assist more their import-competing farmers. As well, plenty of diversity in distortions remains across countries, and across commodities within each country. Hence a continuation of the reform process would still expand farm trade, 'thicken' international food markets, and raise the mean and lower the volatility of prices in those markets.

4.1 Indicators of national distortions to prices

The most common indicators of government interventions in agricultural markets of high-income countries and a few large middle-income countries are the producer and consumer support estimates (PSEs and CSEs) and related measures that have been computed annually by the OECD (2016). Those estimates only begin in 1986 though, and they refer only to the farm sector with no comparable numbers for non-farm sectors.

For present purposes it is helpful to go back further in time, to include also the world's developing countries since they account for half of global agricultural production, and to compare the price-distorting effects of government policies on farm products with those affecting the tradable products of other sectors of the economy. A World Bank study, summarized in Anderson (2009) and updated by Anderson and Nelgen (2013), sought to do that for 82 countries that together account for more than 90% of the world's population and global trade, employment, GDP and poverty.

For that World Bank study, the Nominal Rate of Assistance (NRA) for each farm product in any country has been defined as the percentage by which government policies have directly raised gross returns to farmers above what they would be without the government's intervention (or lowered them, if NRA<0 – see Anderson et al. 2008).[12] That measure has been used to estimate a weighted average NRA for all covered products (accounting for more than two-thirds of the gross value of national farm production in each of the 82 studied countries). The NRA is expressed as a percentage of the value of production at undistorted prices – unlike the OECD's PSE and CSE, which are expressed as a percentage of the distorted price and so cannot exceed 100%.

[12] The NRA takes account of not only trade taxes-cum-subsidies but also non-tariff measures (NTMs) that alter prices. Of course some of those NTMs, including domestic regulations and standards, may be introduced to overcome externalities and thus may raise rather than lower national welfare (Beghin, Maertens and Swinnen 2015; Swinnen, Vandeplas and Vandemoortele 2016). In such cases the NRA is an imperfect indicator of distortions, but these cases are expected to have only a very minor influence on the main empirical trends reported below.

To that NRA for covered products is added a 'guesstimate' of the NRA for non-covered products and an estimate of the NRA from non-product-specific forms of assistance or taxation in each country.[13] Each farm industry is classified either as import-competing, or a producer of exportables, or as producing a nontradable (with its status sometimes changing over the years). That classification makes it possible to generate for each year the weighted average NRAs for import-competing and exportable farm products, thereby providing an indication of the extent of anti-trade bias.

Also computed for the World Bank project is a production-weighted average NRA for nonagricultural tradables, for comparison with that for agricultural tradables via the calculation of a percentage Relative Rate of Assistance (RRA), defined as RRA = $100*[(100+NRAag^t)/(100+NRAnonag^t)-1]$ where $NRAag^t$ and $NRAnonag^t$ are the percentage NRAs for the tradables parts of the agricultural (including non-covered) and non-agricultural sectors, respectively.[14] Since the NRA cannot be less than -100% if producers are to earn anything, neither can the RRA (since the weighted average $NRAnonag^t$ is non-negative in all 82 country case studies). And if both of those sectors are equally assisted, the RRA is zero. This measure is useful in that if it is below (above) zero, it provides an internationally comparable indication of the extent to which a country's sectoral policy regime has an anti- (pro-)agricultural bias (Anderson et al. 2008).

The extent to which consumers are taxed or subsidized also has been examined by that World Bank project. To do so, a Consumer Tax Equivalent (CTE) is calculated by comparing the price that consumers pay for their food and the international price of each food product at the border. Differences between the NRA and the CTE arise from distortions in the domestic economy that are caused by transfer policies and taxes/subsidies that cause the prices paid by consumers (adjusted to the farm gate level) to differ from those received by producers. In the absence of any other information, the CTE for each tradable farm product is assumed to be the same as the NRA from border distortions.

In calculating the NRAs and CTEs for each sector of the economy, the methodology outlined in Anderson et al. (2008) also includes the implicit trade tax distortions generated by dual or multiple exchange rates, drawing on the methodology of Dervis, de Melo and Robinson (1981).

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[13] Since the 1980s, governments of some high-income countries have provided so-called 'decoupled' assistance to farmers too (Orden, Paarlberg and Roe 1999, Gardner 2002, Swinnen 2008, Josling and Tangermann 2015). However, because that support in principle does not distort resource allocation, its NRA has been computed separately and is not included in the World Bank study for direct comparison with the NRAs for other sectors or for developing countries.

[14] Farmers are affected not just by prices of their own products but also by the incentives non-agricultural producers face. That is, it is *relative* prices and hence *relative* rates of government assistance that affect producer incentives. Eighty years ago Lerner (1936) provided his Symmetry Theorem that proved that in a two-sector economy, an import tax has the same effect as an export tax. This carries over to a model that also includes a third sector producing only nontradables (Vousden 1990).

The cost of government policy distortions to incentives, in terms of resource misallocation, tends to be greater the greater the variation of NRAs across industries within the sector (Lloyd 1974). A simple indicator of dispersion is the standard deviation of the covered industries' NRAs. However, it is helpful to have a single indicator of the impact of the sector's price-distorting policies on overall welfare or trade at any time, and to trace its path over time and make cross-country comparisons. To that end, the family of indexes first developed by Anderson and Neary (1994, 2005) under the catch-all name of trade restrictiveness indexes has been drawn on to generate indicators of distortions imposed by each country's agricultural policies on its economic welfare, and also on its agricultural trade. Lloyd, Croser and Anderson (2010) define and estimate a Welfare Reduction Index (WRI) and a Trade Reduction Index (TRI) for the same 82 countries. Both the WRI and TRI take into account that, for some covered products, the producer distortions (NRA) differ from the distortions faced by consumers (CTE). As their names suggest, these two new indexes respectively capture in a single indicator the direct welfare- or trade-reducing effects of distortions to consumer and producer prices of covered farm products from all agricultural and food price and trade policy measures in place.

Specifically, the TRI (or WRI) is that ad valorem trade tax rate which, if applied uniformly to all farm commodities in a country that year, would generate the same reduction in trade (or economic welfare) as the actual cross-commodity structure of agricultural NRAs and CTEs for that country, other things equal.

The WRI measure indicates the partial equilibrium welfare cost of agricultural price-distorting policies better than the NRA because it recognizes that the welfare cost of a government-imposed price distortion is related to the square of the price wedge. It thus captures the disproportionately higher welfare costs of peak levels of assistance or taxation, and is larger than the mean NRA or CTE. Furthermore, the WRI is positive regardless of whether the government's agricultural policy is favouring or hurting farmers, since both types of distortion reduce national economic welfare.

4.2 Empirical estimates of policies' distortions to prices: NRAs

To gauge how farmer incentives in high-income and developing countries have evolved since the 1950s, we draw on the time series evidence from the above-cited World Bank study compiled by Anderson and Valenzuela (2008), summarized in Anderson (2009), and updated to 2011 by Anderson and Nelgen (2013). Of the 82 countries in that study, more than half are developing countries. It turns out that the NRA and CTE in that database are very highly correlated for most products in all countries, reflecting the dominance of border trade measures among the policies adopted. For that reason, and to conserve space, only producer price distortions are reported in this section.

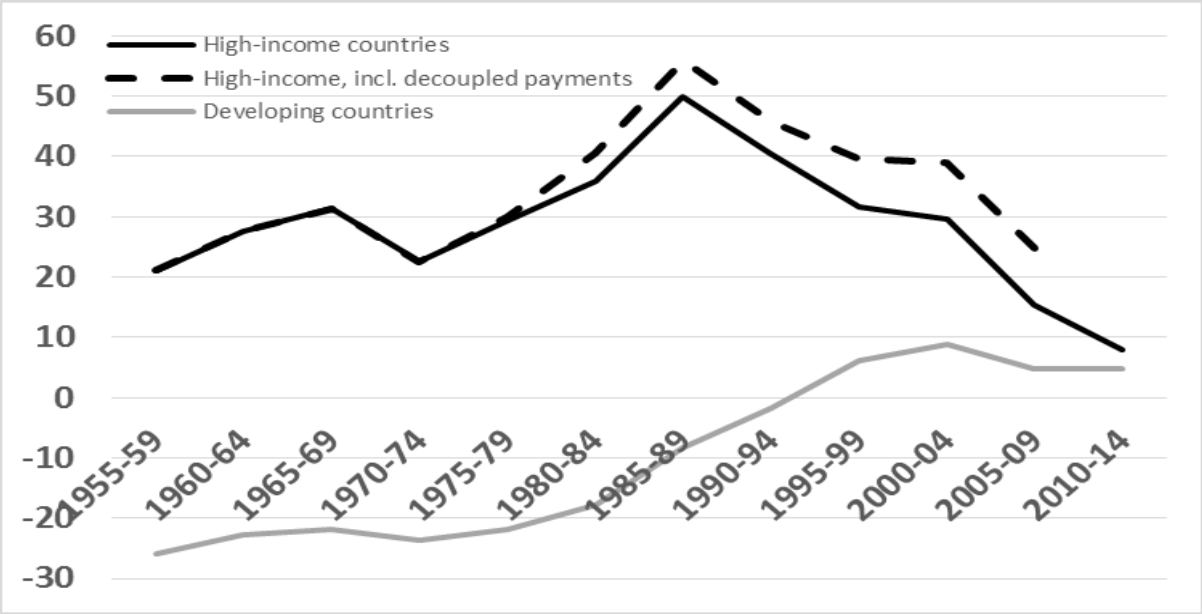
For developing countries, the main comprehensive set of pertinent estimates over time was, until recently, for the period just prior to when reforms became widespread. They were generated as part of a major study of 18 developing countries from the 1960s to the mid-1980s by Krueger, Schiff, and Valdés (1988, 1991). That study by the World Bank shows that the depression of incentives facing farmers has been due only partly to various forms of agricultural price and trade policies, including subsidies to food imports. Much more important in many cases were those developing countries' non-agricultural policies that hurt their farmers *indirectly*. The two key ones were manufacturing protectionism (which attracts resources from agriculture to the industrial sector) and overvalued exchange rates (which attract resources to sectors producing nontradables, such as services).

The more-recent World Bank database, as updated by Anderson and Nelgen (2013), covers 45 developing countries but also 13 European transition economies as well as 24 high-income countries. The results from that study (which are compared with the earlier Krueger/Schiff/Valdés ones in Anderson 2010) reveal that there have been substantial reductions in distortions to agricultural incentives in developing countries over the past three decades. They also reveal, however, that progress has not been uniform across countries and regions, and that the reform process is far from complete. More specifically, many countries still have a wide dispersion in NRAs for different farm industries, and in particular have a strong anti-trade bias in the structure of assistance within their agricultural sector.

The global summary of those new results is provided in the following series of Figures. Figure 4.1 reveals that the nominal rate of assistance (NRA) to farmers in high-income countries rose steadily over the post-World War II period through to the end of the 1980s, apart from a dip when international food prices spiked around 1973-74. After peaking at more than 50% in the mid-1980s, when real international food prices were at a near-record low, the average agricultural NRA for high-income countries has fallen very substantially.[15] This is so even when the new farm programs that are somewhat 'decoupled' from directly influencing production decisions are included. For developing countries, too, the average NRA for agriculture has been moving towards zero, but from a level of around –25% between the mid-1950s and early 1980s. Indeed it 'overshot' in the 1990s by becoming positive, and is now close to the average NRA for high-income countries.

[15] This is true even for the high-income countries of the Middle East that were not included in the World Bank study. For example, in 2015 Saudi Arabia abandoned its 3-decade program of huge support for wheat production, and announced a 3-year phase-out of support for green fodder production (both of which have been completely irrigated). The main reason for the policy change was a strong concern over the depletion of the country's scarce water reserves. The Saudi government is instead encouraging agricultural companies to invest in foreign countries that have a comparative advantage in producing those two crops plus rice, maize, barley and soybean, and re-exporting them back to Saudi Arabia (USDA 2016).

Figure 4.1: NRAs to agriculture in high-income and developing countries,[a] 1955 to 2014 (%)



[a] Five-year weighted averages, with decoupled payments included in the dashed line. The non-EU transitional economies of Central and Eastern Europe and Central Asia (ECA) are included in the high-income country group.

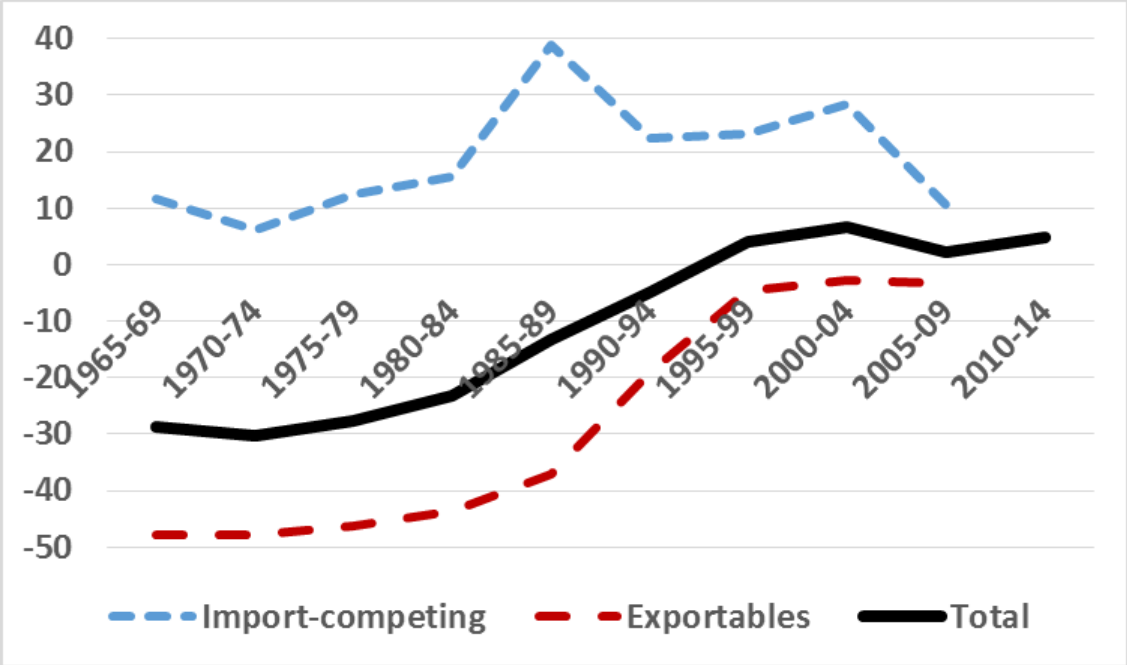
Source: Anderson (2009), updated from estimates in Anderson and Nelgen (2013) and, for 2010-14, www.ag-incentives.org.

The developing country average NRA conceals the fact that the exporting and import-competing subsectors of agriculture have very different NRAs. While the average NRA for farm product exporters in developing countries has been negative throughout (coming back from –50% in the 1960s and 1970s to almost zero in 2000-10), the NRA for import-competing farmers in developing countries has fluctuated around a trend rate that has risen from 10 and 30% – and it even reached 40% in the years of low international prices in the mid-1980s (Figure 4.2). This suggests that export-focused farmers in developing countries are still discriminated against by farm policies in two respects: by the anti-trade structure of assistance within their own agricultural sectors, and by the protection still afforded farmers in high-income countries.[16] That anti-trade bias also reflects the more-general fact that NRAs are not uniform across commodities, which in turn indicates that resources within the farm sector of each country are not being put to their best use – a point picked up in the next chapter.

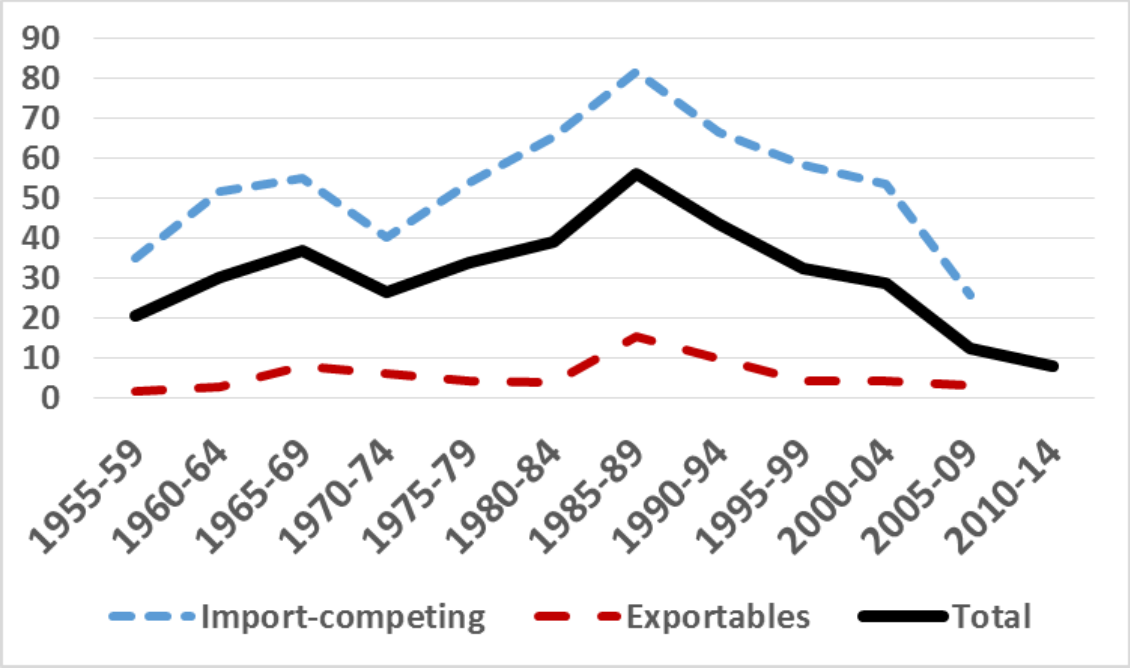
[16] Farmers in some war-torn states continue to be discriminated against by those in charge, as for example in the territories occupied by ISIS in recent years (Jaafer and Woertz 2016).

Figure 4.2: NRAs to exportable, import-competing, and all agricultural products in developing and high-income countries, 1955 to 2014 (%)

(a) Developing countries



(b) High-income countries plus Europe's transition economies



Source: Anderson (2009, Ch. 1), updated using Anderson and Nelgen (2013) and, for 2010-14, www.ag-incentives.org.

4.3 Empirical estimates of policies' distortions to prices: RRAs

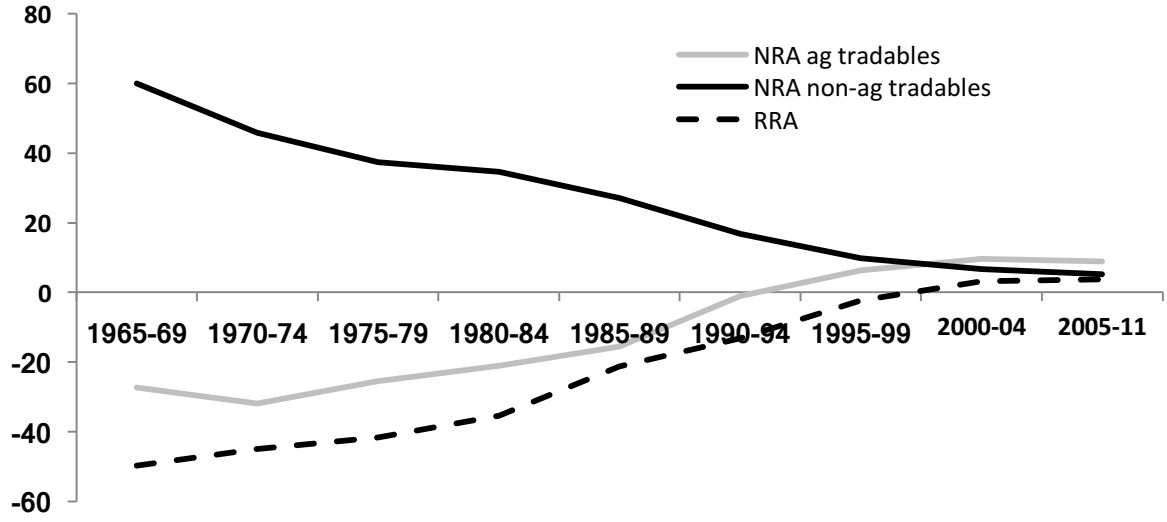
The improvement in farmers' incentives in developing countries is understated by the above NRA estimates, because those countries also have reduced their assistance to producers of non-agricultural tradable goods, most notably manufactures. The decline in the weighted average NRA for manufacturers, depicted in Figure 4.3, was greater than the increase in the average NRA for tradable agricultural sectors for the period to the mid-1980s, and both caused the estimated RRA to rise somewhat. For the period since the mid-1980s, changes in both sectors' NRAs have contributed almost equally to the further improvement in farmer incentives. The RRA for developing countries as a group went from minus 46% in the second half of the 1970s to just above zero in the first decade of the present century. This increase (from a coefficient of 0.54 to 1.01) is equivalent to an almost doubling in the relative price of farm products, which is a huge change in the fortunes of developing country farmers in just one generation.

China was among the key countries contributing to this major change and, in its case, reducing the overvaluation of its official exchange rate was an important part of its reform.[17] China's RRA rose from -61% in 1981-84 to -31% in 1990-94, 1% in 2000-04, and 17% in 2010-14. India's RRA similarly rose, albeit somewhat slower than China's, from -41% in the 1970s to -12% in the 1990s and 12% in 2000-10. These are two of the most important developing economies to have policy regimes that have transitioned from taxing to subsidizing farmers relative to producers of other tradable products – but they are certainly not the only ones. Korea and Taiwan preceded them by a quarter-century, and seven other developing countries monitored by the OECD also have reached the status of having an NRA at least half the current average for the OECD as a whole (Figure 4.4). Moreover, evidence from a soon-to-be-released new global database that extends the series depicted here reveals that the NRA for all developing countries as a group had, by 2014, slightly exceeded that for all high-income countries (Laborde 2016).

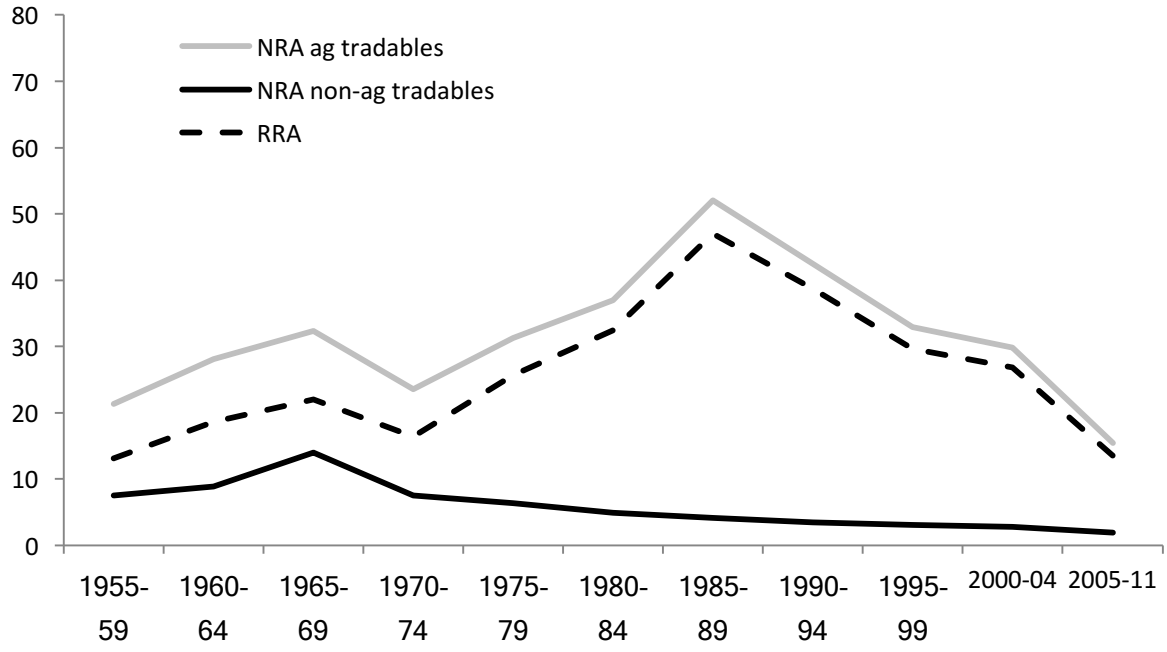
[17] In China, the distortion in the domestic market for foreign currencies was gradually reduced in an indirect way, by allowing exporters to sell an increasing share of their foreign currency earnings on a higher-priced secondary market that (unlike in many other countries with an overvalued currency) was legal. This lowered the trade tax equivalent of that distortion over time, and hence its impact on the NRA for farm and non-farm sectors, depending on the extent to which they were net-exporting or net-importing sectors. That currency market distortion made China's RRA estimates about one-fifth larger than they would have been in the mid-1980s, but that difference gradually fell to zero by the mid-1990s (Huang et al. 2009, Table 3.5).

Figure 4.3: Developing and high-income countries' NRAs to agricultural and non-agricultural tradable sectors, and RRAs,[a] 1955 to 2011 (%)

(a) Developing countries



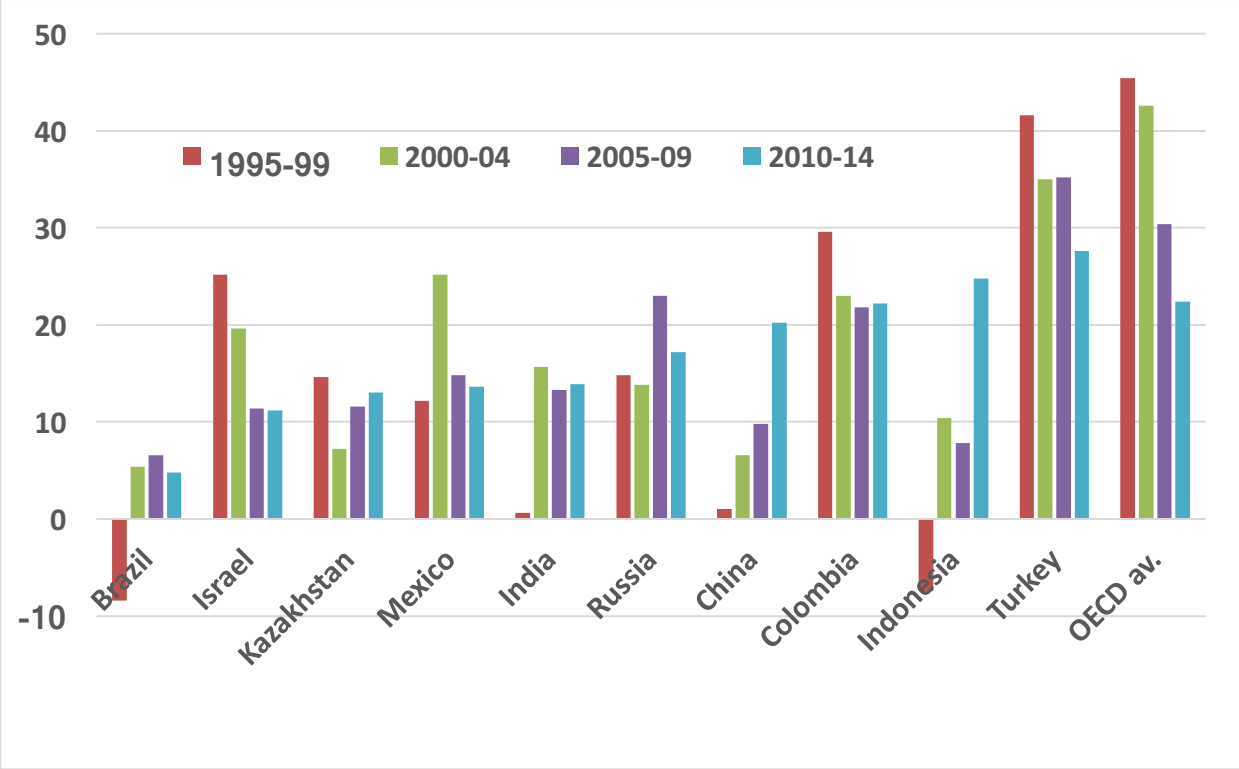
(b) High-income countries



[a] Five-year averages. Calculations use farm production-weighted averages across countries. RRA is defined as $100*[(100+NRAag^t)/(100+NRAnonag^t)-1]$, where $NRAag^t$ and $NRAnonag^t$, respectively, are the NRAs for the tradable segments of the agricultural and non-agricultural sectors.

Source: Anderson (2009, Ch. 1), updated from estimates in Anderson and Nelgen (2013).

Figure 4.4: Nominal rates of assistance to agriculture in key emerging countries and the OECD, 1995 to 2014[a] (%)



[a] The Indian estimates are from Anderson and Nelgen (2013) and its final period refers to just 2010. The final bars refer to the average NRA for all member countries of the OECD.

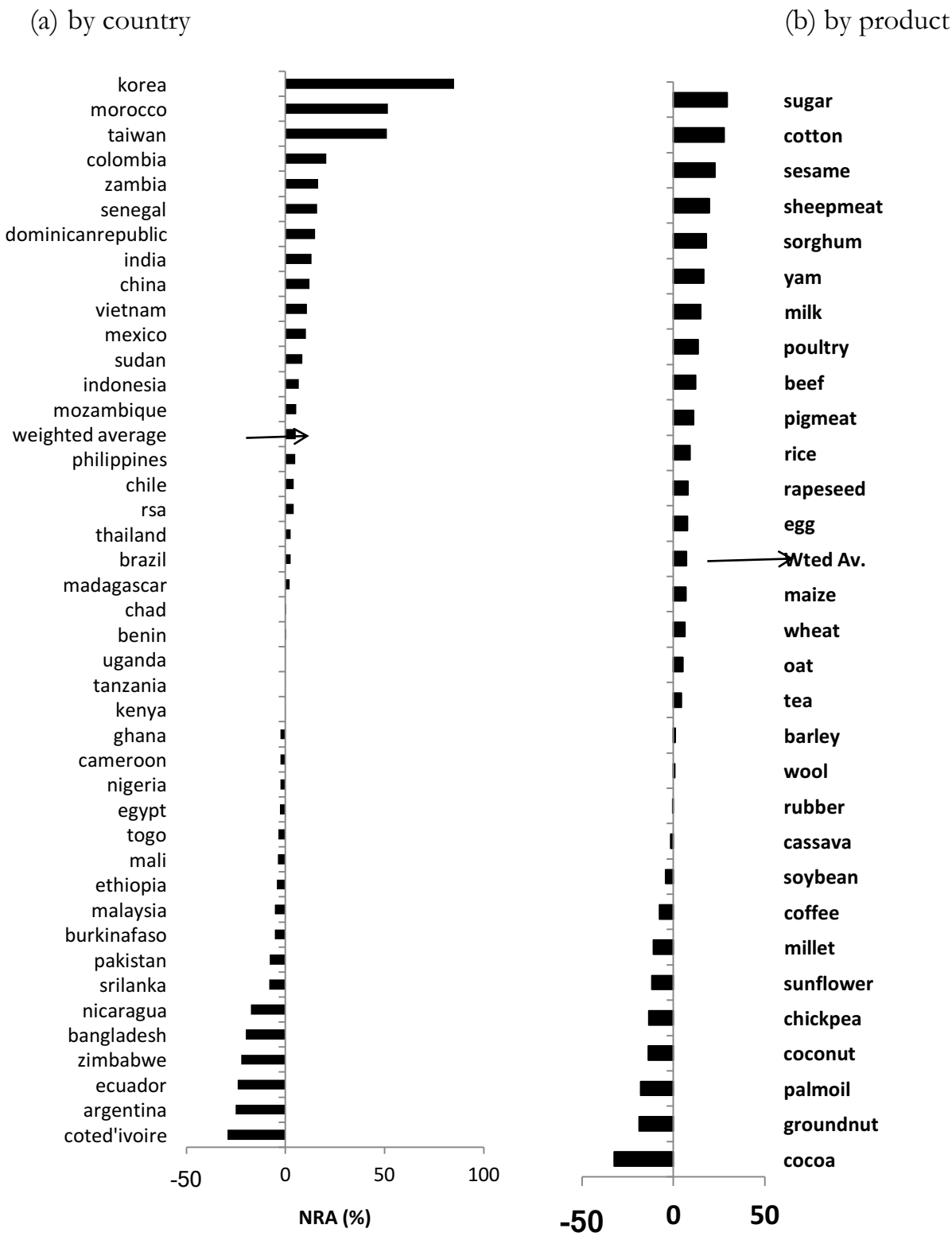
Source: OECD (2016).

4.4 Empirical estimates of policies' distortions to prices: TRIs and WRIs

The NRA averages hide the fact that there is still a wide range of NRAs across both countries and commodities (Figure 4.5).[18] Because the cost of government policy distortions in terms of resource misallocation within a country tend to be greater the

[18] The farm products least protected from import competition tend to be those that are inputs into other (often highly protected) industries such as meat and dairy production. That openness, together with rapidly growing demands for livestock products and edible oils as incomes grow in developing countries, and rapidly growing supplies in a few key countries of (a) maize and soybean thanks to new transgenic varieties being adopted and (b) oil palm as a result of forest clearing in Southeast Asia, means that international trade in those products has expanded dramatically. Byerlee, Falcon and Naylor (2016) describe it a as revolution akin to the green revolution that began in Asia in the 1960s. Over the period from 1995 (just prior to the adoption of GM crops) to 2013, the US$ values of global exports of vegetable oils (including meal) increased 6.2-fold, while that for cereals, meats, and dairy products each increased slightly less than total agricultural trade (3.2-fold). Exports of vegetable oils and meals amounted to $123 billion in 2013, compared with just under $20 billion in 1995, according to FAO (2016b).

Figure 4.5: NRAs across developing countries and across products globally, 2005-10(%)



Source: Derived from estimates in Anderson and Nelgen (2013).

greater the dispersion of commodity NRAs, it is informative to also report estimates of the trade- and welfare-reduction indexes (TRI and WRI). The WRI recognizes that the welfare cost of a government-imposed price distortion is related to the square of the price wedge; and both indexes are appropriately positive regardless of whether the government's policy is favouring or hurting producers in a particular sector.

The cross-commodity variability of NRAs around the overall national sectoral average each year was no less in the most-recent decade than it was in the three previous decades for both the developed and the developing country groups, suggesting that the reduction in the mean NRA has not been accompanied by a fall in the NRA variance across commodities within the sector. This is why the WRI in Figure 4.6 is still well above zero.

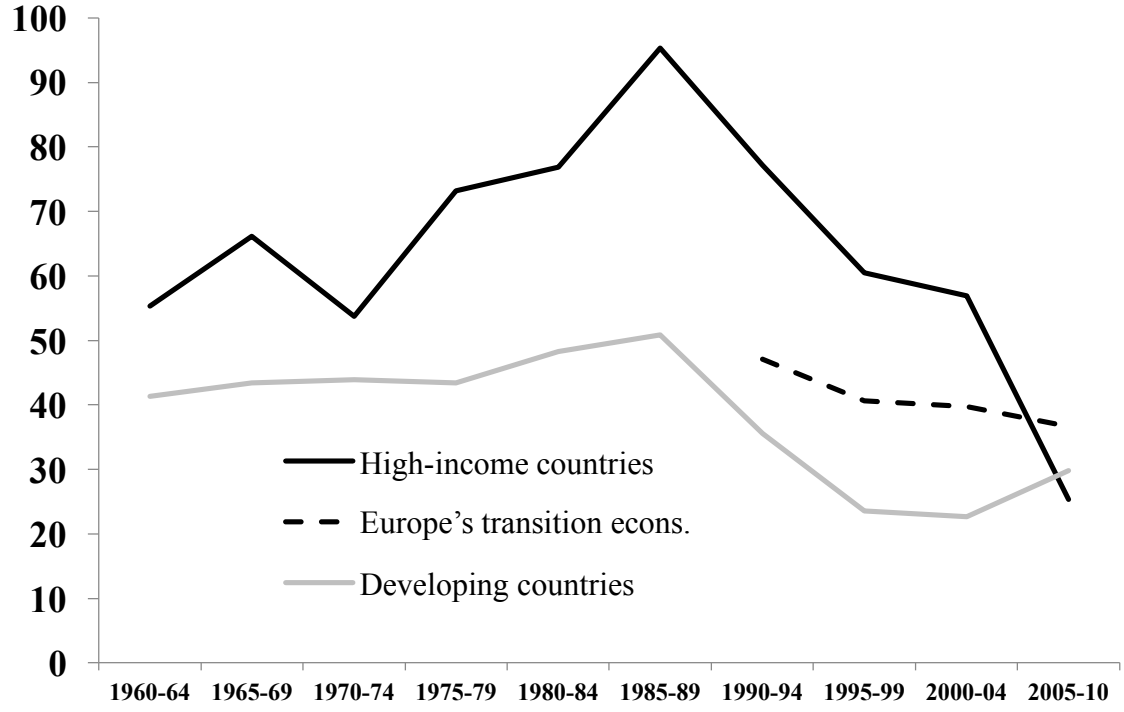
A crucial component of the NRAs' (and CTEs') commodity product dispersion is that the agricultural policy regime across countries still tends to have an anti-trade bias. This bias has declined over time for the developing country group, mainly because of declines in agricultural export taxation and in spite of growth in their agricultural import protection. For the high-income group, the anti-agricultural trade bias has also declined over time, despite a rise and then decline in agricultural export subsidies that offset slightly a similar trajectory in import protection. Hence the inverted U-shaped trends in the TRI for both country groups reported in Figure 4.6.

These two indicators suggest that the adverse trade and welfare effects of agricultural policies of the mid-1980s have lessened since then, notwithstanding the large range of NRAs that Figure 4.5 reveals still remain across countries and commodities. But there have also been declines in manufacturing protectionism over the past few decades, as revealed in Figure 4.3.

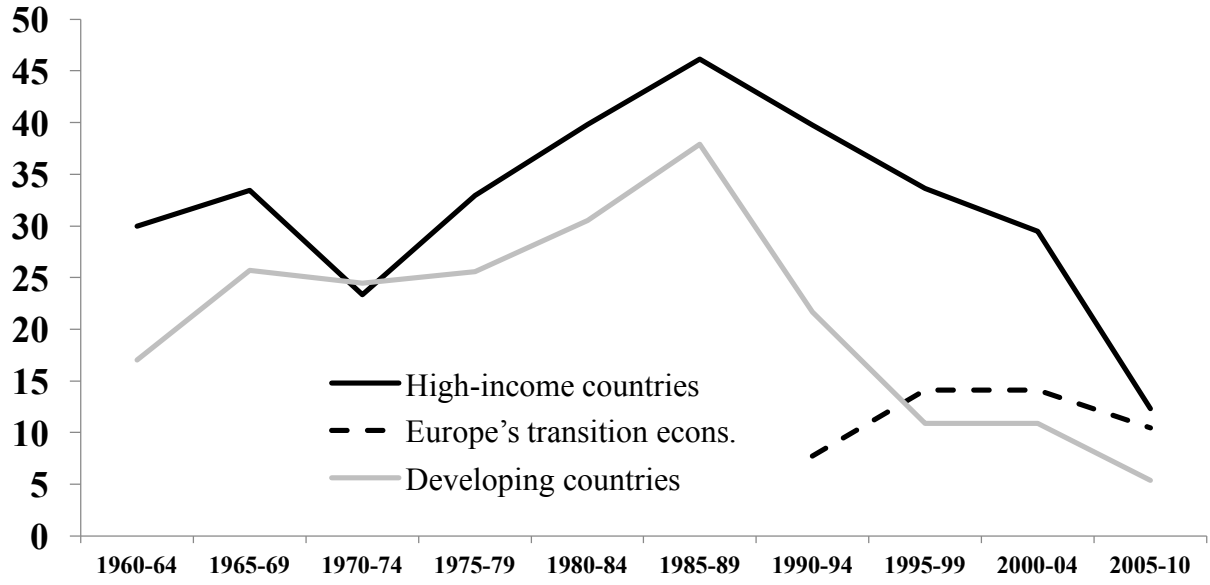
The WRI is also helpful in checking on the changing relative importance of various policy instruments. Among the trade-distorting policy instruments, Figure 4.7 reveals how much export taxes have been phased out by developing countries while assistance to import-competing agricultural sub-sectors of developing countries has grown, according to the WRI estimates. Among the high-income countries, the growth of decoupled, more-direct income-support measures in Western Europe means that region now has a far different pattern of assistance than that in Northeast Asia where border-measure supports continue to dominate (Figure 4.8). That conclusion is also drawn from the OECD's PSE estimates, which contrast the relatively high proportion of support that is not directly market-distorting for US and Western European farmers versus the dominance of such measures in the so-called BRICS emerging economies (Figure 4.9).

Figure 4.6: WRIs and TRIs among high-income, transition, and developing countries for tradable farm products, 1960 to 2010 (%)

(a) Welfare-reduction index

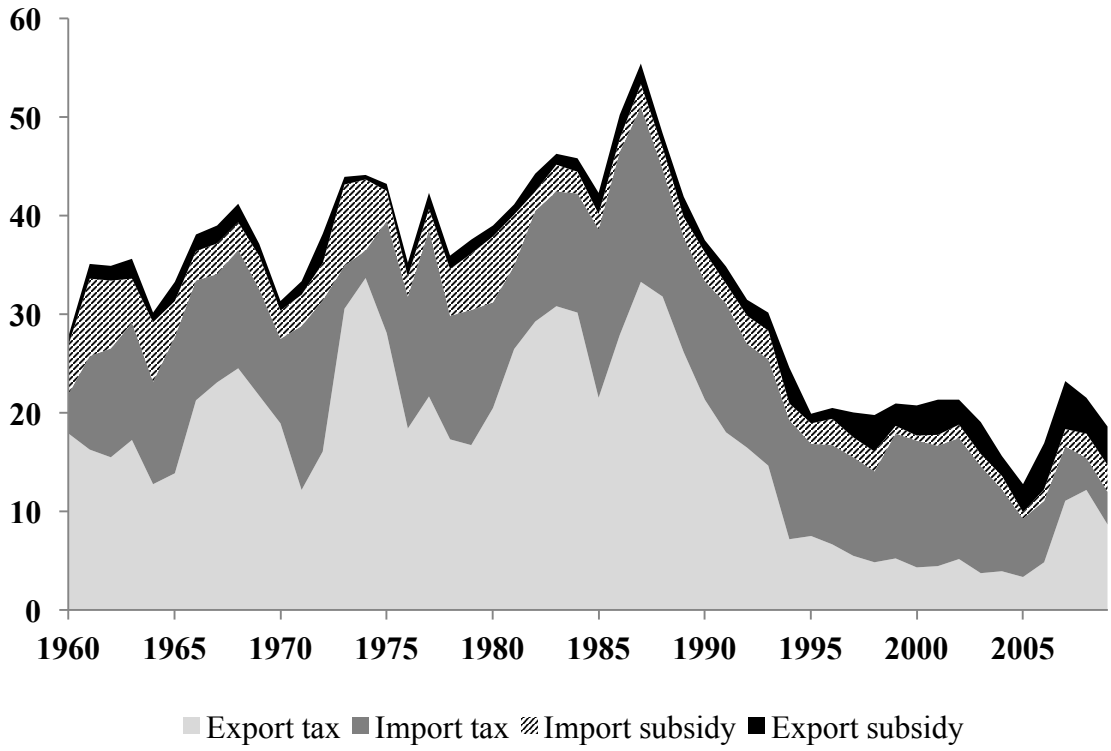


(b) Trade-reduction index



Source: Lloyd, Croser, and Anderson (2010), updated from Anderson and Nelgen (2013).

Figure 4.7: Contributions of various instruments to the border component of the welfare reduction index (WRI) for developing countries, 1960 to 2009 (%)



Source: Derived from estimates reported in Croser and Anderson (2011), updated using Anderson and Nelgen (2013).

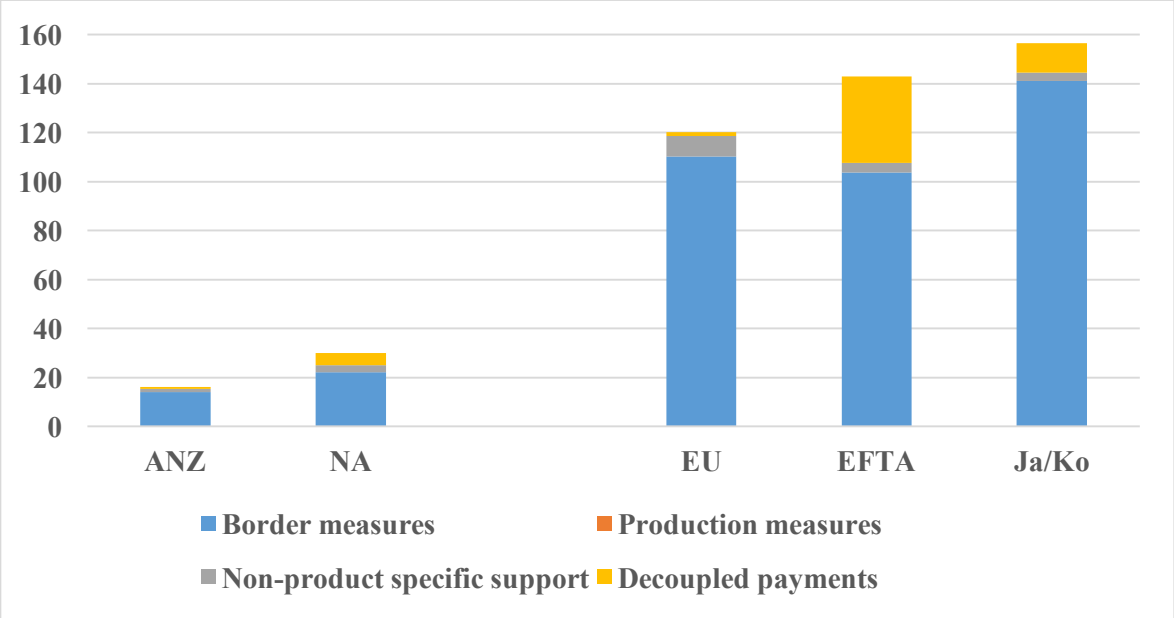
4.5 Conclusion

The TRI and WRI estimates are useful as supplements to the NRA and RRA, and together they help explain why the global economy-wide modelling reported in the previous chapter suggested the world moved more than halfway towards free trade in the two decades to 2004 but still had substantial scope to add more to global welfare via further trade policy reform. The above estimates suggest developing countries have not taken as much advantage of those opportunities as high-income countries during the past dozen years. Plenty of diversity in price distortions remains across countries, and across commodities within each country.

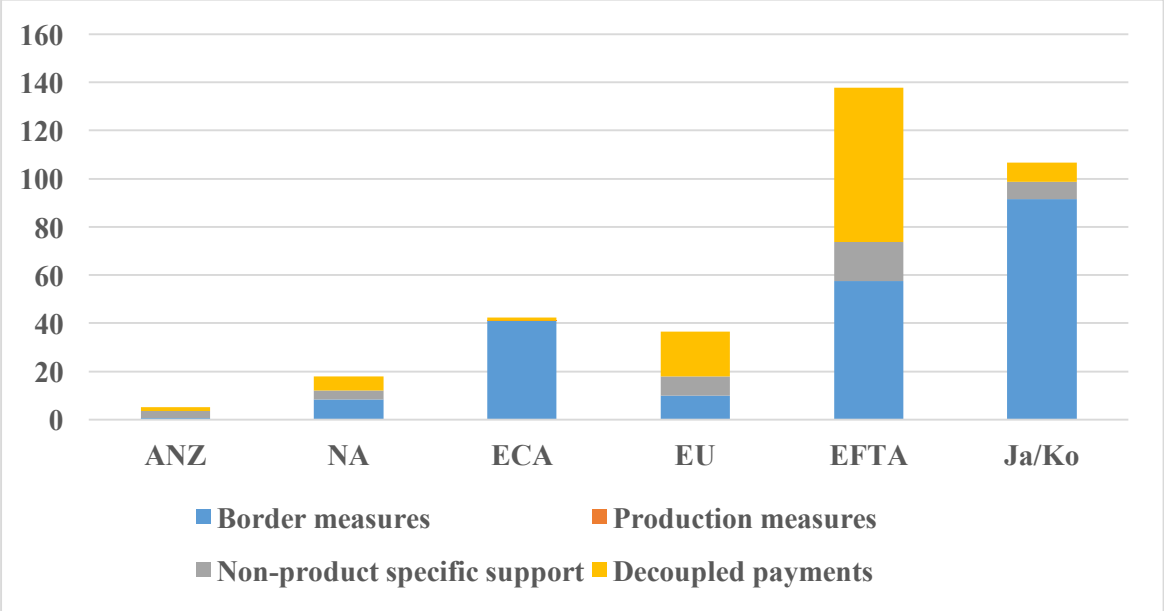
In particular, export-focused farmers in poorer developing countries are still discriminated against by farm policies in two respects: by the anti-trade structure of assistance that remains within their own agricultural sector, and by the assistance still afforded farmers in high-income and advanced developing countries. A continuation of the reform process would boost farm trade, 'thicken' international food markets, and thus not only raise the average level but also lower the volatility of prices in

Figure 4.8: Contributions of various policy instruments to the producer component of the WRI, selected high-income and transition countries, 1980–84 and 2005–10 (%)

(a) 1980–84

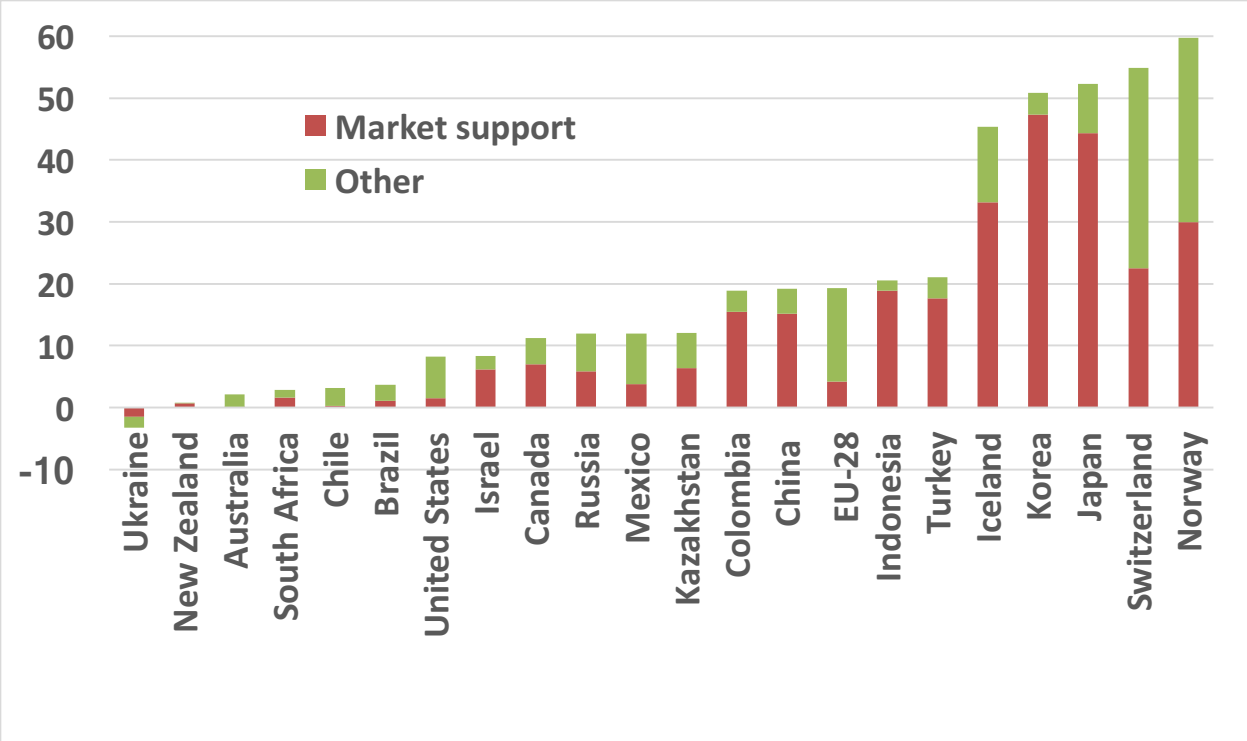


(b) 2005–10



Source: Croser and Anderson (2011), updated using Anderson and Nelgen (2013).

Figure 4.9: Contributions of market-distorting and other policy instruments to the producer support estimate (PSE), high-income and emerging countries, 2012–14 (%)



Source: OECD (2016).

those markets. It would also ensure that productive resources within the farm sector of each country and globally would be put to their best use. However, for that process to help export-focused farmers in poorer developing countries, import restrictions need to be reduced not only in high-income countries but also in developing countries themselves. This is because an increasing share of developing country exports go to other developing countries: in 2005 that share was 46% but by 2015 it was 58%, even though the share of developing countries as a group in global merchandise exports was just 45% in both years (UNCTAD 2016).

With this in mind, the next chapter examines what has been proposed under the WTO's Doha round of multilateral trade negotiations, and their likely effects on developing countries.

Chapter 5

TRADE AND WELFARE EFFECTS OF FURTHER PARTIAL REFORMS UNDER WTO

With the decade-long implementation of the Uruguay Round agreements to be completed at the end of 2004, including the historic URAA, and the WTO's membership expanded to cover all but a small fraction of world trade, it was expected that a new round of multilateral trade negotiations would be launched as early as the WTO's 1999 Trade Ministerial Meeting in Seattle. However, that meeting had to be abandoned because of anti-globalization protesters. It was only after the terrorist attacks of 11 September 2001 on the United States that the membership of the WTO convened in the capital of Qatar to launch a new comprehensive round, the so-called Doha Development Agenda.

In the first few years of the DDA there was a great deal of *ex ante* analysis of the prospective effects of a DDA agreement. The quality of that analysis was far higher and far more comprehensive than prior to any of the GATT's seven negotiation rounds that preceded it, including the Uruguay Round. Given the focus on development, many analyses gave special attention to the likely effects on developing countries in particular. And because market distortions were still greatest in agriculture, that sector got more attention than any other.

It now seems unlikely that all the policy reform proposals tabled in the first few years of the DDA will ever become part of a single-undertaking agreement at the WTO. Nonetheless, analyses of them are worth examining because they give insights into what might have been, and why the package was insufficiently appealing to enough of the key members of the WTO. They also offer cautions as to what to avoid in future. So after providing some background, this chapter summarizes the main questions that were addressed in the economic analyses that focused on the agricultural parts of the DDA, and explains what was learnt from a sample of those analyses.

5.1 Background to the DDA

Agriculture has a habit of causing contention in international trade negotiations. It caused long delays to the Uruguay Round in the late 1980s and 1990s, and again it proved to be the major stumbling block in the DDA.

The political sensitivity of this declining sector means there are always self-interested groups suggesting it be side-lined in trade negotiations – as indeed it has been in numerous sub-global preferential trading agreements, and in the GATT prior to the Uruguay Round.[19] Today the groups with that inclination include not just farmers in the highly protecting countries and net-food-importing developing countries. Also included are food exporters receiving preferential access to those markets, including holders of tariff rate quotas, and members of regional trading agreements, not to mention parties to non-reciprocal preference agreements which include all least-developed countries.

However, because agricultural earnings are so important to a large number of developing countries, the highly protective farm policies of a few wealthy countries have been targeted by them in the DDA negotiations. Better access to rich countries' markets for their farm produce is a high priority for them.[20]

Some developing countries have been granted greater access to developed-country markets for a selection of products under various preferential agreements. Examples are the EU's provisions for former colonies in the Africa, Caribbean and Pacific (ACP) program and for Least Developed Countries under the Everything-But-Arms (EBA) agreement. Likewise, the United States has its Africa Growth and Opportunity Act (AGOA) and Caribbean Basin Initiative (CBI). These schemes reduce demands from preference-receiving countries for developed-country farm policy reform, but they exacerbate the concerns of other countries excluded from such programs and thereby made worse off through declining terms of trade. Moreover, their trade-diverting effects may even be worsening rather than improving aggregate global welfare – and even developing country welfare.

In addition, many in developing countries feel they did not get a good deal out of the Uruguay Round. From a merchantilist viewpoint, the evidence seems to support that claim: Finger and Winters (2002) report that the average depth of tariff cut by developing countries was substantially greater than that agreed to by high-income countries. As well, developing countries had to take on costly commitments such as those embodied in the SPS and TRIPS agreements (Finger and Schuler 2001). They therefore have been determined in the Doha round that they get significantly more market access commitments from developed countries before they contemplate opening their own markets further.

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[19] The rules of the GATT are intended, in principle, to cover trade in all goods. However, in practice, trade in agricultural products was largely excluded from their remit as a consequence of a number of exceptions. Details are to be found in Josling, Tangermann and Warley (1996) and in Anderson and Josling (2005).

[20] Around half of the economically active population in developing countries is engaged in agriculture, which is several times larger than the sector's measured GDP share. While some of that difference in shares is due to under-reporting of subsistence consumption and of the extent of part-time off-farm work by farm families, it nonetheless implies that these people on average are considerably less productive and hence poorer than those employed in non-agricultural activities.

Table 5.1: Average applied import tariffs, by sector and region, 2001
(%, *ad valorem* equivalent)

Importing region: ***Exporting region:***	**HICs**[b]	**DCs**[a]	**WORLD**
Agriculture and food			
High-income countries[b]	18	18	17.8
Developing countries[a]	14	18	15.6
All countries	16	18	16.7
Textiles and apparel			
High-income countries[b]	8	15	12.0
Developing countries[a]	7	20	9.3
All countries	8	17	10.2
Other manufactures			
High-income countries[b]	2	9	4.1
Developing countries[a]	1	7	2.5
All countries	1	8	3.5
All merchandise			
High-income countries[b]	3	10	5.4
Developing countries[a]	3	10	4.9
All countries	3	10	5.2

[a] These import-weighted averages incorporate tariff preferences provided to developing countries, unlike earlier versions of the GTAP database. They assume the EU is a single customs territory.
[b] High-income countries include the newly industrialized East Asian territories of Hong Kong, Korea, Singapore and Taiwan as well as Europe's transition economies that joined the EU in April 2004.

Source: Anderson and Martin (2006, Table 1.1).

Greater market access for developing countries' exporters, and especially for poor producers in those countries, is to be found in agriculture (and to a lesser extent in textiles and clothing). This can be seen from a glance at Table 5.1. It shows that, at the time of the launch of the DDA in 2001, developing country exporters faced an average tariff (even after taking account of preferences) of 16% for agriculture and food, and 9% for textiles and clothing, compared with just 2.5% for other manufactures. The average tariff on agricultural goods is high not just in high-income countries but also in developing countries, suggesting even more reason why attention focused on that sector in the DDA.

Table 5.2: Agricultural weighted average import tariffs, by region, 2001
(%, *ad valorem* equivalent, weights based on imports)

	Bound tariff	MFN applied tariff	Actual applied tariff[a]
Developed countries	27	22	14
Developing countries	48	27	21
of which: LDCs	*78*	*14*	*13*
WORLD	37	24	17

[a] Includes preferences and in-quota TRQ rates where relevant, as well as the ad valorem equivalent of specific tariffs. Developed countries include Europe's transition economies that joined the EU in April 2004. The 'developing countries' definition used here is that adopted by the WTO and so includes East Asia's four newly industrialized tiger economies, which is why the 21% shown in column 3 is above the 18% and 14% shown in the first column of Table 5.1.

Source: Jean, Laborde and Martin (2006, Table 4.2).

The Uruguay Round Agreement on Agriculture (URAA) converted all agricultural protection to tariffs and limited future increases in them through tariff bindings, but the process of converting non-tariff barriers into tariffs (inelegantly termed "tariffication") provided numerous opportunities for backsliding that greatly reduced the effectiveness of the agreed disciplines (Hathaway and Ingco 1996). In developing countries, the option for "ceiling bindings" allowed countries to set their bindings at high levels, frequently unrelated to the previously prevailing levels of protection. Hence agricultural import tariffs were still very high in both rich and poor countries when the DDA was launched, with bound rates half as high again as MFN applied rates (Table 5.2).

As well, agricultural producers in some countries were being supported by export subsidies (still tolerated within the WTO only for agriculture) and by domestic support measures. Together with tariffs and other barriers to agricultural imports, these measures supported farm incomes and encouraged agricultural output to varying extents. The market price support component also typically raised domestic consumer prices of farm products. For OECD member countries as a group, the producer support estimate (PSE) was almost the same in 2001-03 as in 1986-88, at about $240 billion per year. However, there was a significant increase in the proportion of that support coming from programs that are somewhat "decoupled" from current output, such as payments based on area cropped, number of livestock, or some historical reference period.

Nonetheless, the achievements of the URAA provided some scope for optimism about what might be achieved via the WTO as part of the DDA and beyond. The Doha round has the advantage over the Uruguay Round of beginning from the framework of rules and disciplines agreed in that previous Round. In particular, it has the three clearly identified "pillars" of market access, export subsidies, and domestic support on which to focus. A framework for the current negotiations, reached in July 2004 (WTO 2004), provided a strong basis for undertaking *ex ante* analysis of various options potentially available to WTO members during the Doha negotiations.

This section provides a summary mostly of one study (Anderson and Martin 2006), but that study built on numerous analyses of the DDA and agricultural trade, including five books that appeared in 2004.[21] What distinguishes the Anderson and Martin (2006) collection of studies from those 2004 studies and other books with similar titles is that (a) its *ex ante* analysis focuses on the core aspects of the July 2004 Framework Agreement from the viewpoint of agriculture and developing countries, taking account also of what might happen to non-agricultural market access and the other negotiating areas, (b) it does so in an integrated way by using the Global Trade Analysis Project (GTAP) Version 6 database (amended to account for key protection changes to early 2005)[22] and the World Bank's global, economy-wide Linkage model described above in Chapter 4 and details of which are documented in van der Mensbrugghe (2005),[23] and (c) it involved an intense program of integrated research

[21] One edited by Aksoy and Beghin (2004) provides details of trends in global agricultural markets and policies, especially as they affect nine commodities of interest to developing countries. Another, edited by Ingco and Winters (2004), includes a wide range of analyses based on papers revised following a conference held just prior to the aborted WTO Trade Ministerial meeting in Seattle in 1999. The third, edited by Ingco and Nash (2004), provides a follow-up to the broad global perspective of the Ingco and Winters volume: it explores a wide range of key issues and options in agricultural trade reform from a developing country perspective. The fourth, edited by Anania, Bohman, Carter and McCalla (2004), is a comprehensive tenth-anniversary retrospective on the URAA as well as a look ahead following also numerous unilateral trade and subsidy reforms in developed, transition and developing economies. And the fifth focuses on implications for Latin America (Jank 2004).

[22] The Version 6 GTAP database is a major improvement over the previous version for several reasons. One is that it includes global trade and protection data as of 2001 (previously 1997), the year the DDA was launched. Another is that protection data are available, for the first time, on bound as well as applied tariffs, non-reciprocal as well as reciprocal tariff preferences, the *ad valorem* equivalents of specific tariffs (which are plentiful in the agricultural tariff schedules of many high-income, high-protection countries), and the effects of agricultural tariff rate quotas. In addition, key trade policy changes to the start of 2005 have been added, namely, the commitments associated with accession to WTO by such economies as China and Taiwan, the implementation of the last of the Uruguay Round commitments (most notably the abolition of quotas on trade in textiles and clothing at the end of 2004), and the eastward enlargement of the European Union from 15 to 25 members in April 2004.

[23] This analysis is vastly more sophisticated than the *ex ante* analyses undertaken for the Uruguay Round. At that time there were very few economy-wide global models, so primary reliance was on partial equilibrium models of world food markets (see, e.g., World Bank 1986, Goldin and

by a complementary set of well-informed economic researchers from four continents.

5.2 What questions have been in focus?

Among the core questions addressed in the multi-authored study reported in Anderson and Martin (2006) are the following:

- How much are each of the three "pillars" of agricultural distortions (market access, export subsidies and domestic support) contributing to the welfare losses from price-distorting policies as of 2005, compared with non-agricultural trade barriers?
- How might the demands for Special and Differential Treatment for developing and least-developed countries be met without compromising the potential welfare gains from trade expansion for those economies?
- What are the consequences, in terms of opening up to imports, of alternative formulas for cutting bound agricultural tariffs?
- In the case of products whose imports are subject to tariff rate quotas, what are the trade-offs between reducing in-quota or out-of-quota tariffs versus expanding the size of those quotas or the in-quota tariffs?
- To what extent would the erosion of tariff preferences, that necessarily accompanies MFN trade liberalization by developed countries, reduce the developing countries' interest in agricultural and other trade reform?
- What should be done about agricultural export subsidies, including those implicit in export credits, food aid, and arrangements for state trading enterprises?
- Based on recent policy changes in key countries, how might domestic farm support measures be better disciplined in the WTO?
- What are the consequences of reducing the domestic support commitments made in the Uruguay Round, in terms of cuts to the actual domestic support levels currently provided to farmers?
- In particular, how might reductions in cotton subsidies help developing country farmers in West Africa and elsewhere?
- What difference does it make to expand market access for non-agricultural products at the same time as for farm goods under a Doha agreement?

Knudsen 1990, Tyers and Anderson 1992); estimates of protection rates were somewhat cruder and less complete; and analysts grossly overestimated the gains because they did not anticipate that tariffication would be so "dirty" in the sense of creating large wedges between bound and MFN applied tariff rates, nor did they have reliable estimates of the tariff preferences enjoyed by developing countries or the ad valorem equivalent of specific tariffs. Some of these limitations also applied to *ex post* analyses of the Uruguay Round (see, e.g., Martin and Winters 1996).

- Which developing countries would have to reduce their farm output and employment as a result of such a Doha agreement?
- Taking a broad brush, and in the light of past experience and our understanding of the political economy of agricultural policies in rich and poor countries, how might reform of those policies best be progressed during the DDA negotiations?
- What would be the overall market and welfare consequences, for various countries and regions as well as globally, of the alternative Doha reform commitments considered in addressing each of the above questions?

5.3 Reform scenarios modelled

So as to focus in this chapter on the agricultural component of the DDA proposals in particular, scenarios are considered that make simplifying assumptions about non-agricultural components of the negotiations, namely no reform in services, and no new trade facilitation measures. Also, agricultural export subsidies are assumed to be eliminated (as indeed was agreed in the WTO Trade Ministerial meeting in December 2015), and domestic support for agriculture is cut in just four economies: by an average of 28% for the U.S., 18% for Norway, 16% for the EU and 10% for Australia.

More difficult to determine were the likely nature and extent of reductions in market access barriers, so a number of scenarios are considered initially for agricultural and food products in isolation of non-agricultural tariff cuts, before incorporating (as in Scenarios 5 and 6 below) some non-agricultural market access. A total of six simulations are designed to evaluate the consequences of different approaches to liberalization, and particularly different degrees of tops-down progressivity in the tariff cuts, and different degrees of Special and Differential Treatment. Throughout this study, the WTO usage of the term 'developing countries' applies when allocating Special and Differential Treatment (SDT), which means Hong Kong, Korea, Singapore and Taiwan are all able to enjoy SDT despite their high-income status.

The experiments begin for *Scenario 1* with a progressive or tiered reduction formula with marginal agricultural tariff rate reductions of 45%, 70% and 75% within each of the three bands defined by the Harbinson (WTO 2003) inflection points of tariff rates of 15% and 90% for developed countries (that is, for low agricultural tariffs the marginal rate of reduction is 45%, for medium-level tariffs it is 70%, and for the highest tariffs it is 75%), and for developing countries the reductions are 35%, 40%, 50% and 60% within each of their four bands (and least-developed-countries are not required to undertake any reduction commitments). These cuts are greater than those proposed in the Harbinson draft (WTO 2003) because its cuts were too light to have much impact (providing only two-thirds of the global welfare gain of Scenario 1, and leading to zero gain in Scenario 2).

Scenario 2 considers the impact of a proportional cut formula that brings about the same reduction in average agricultural tariffs in developed countries as a group (44%), and developing countries as a group (21%), as Scenario 1's tiered formulas.

Scenario 3 has the same proportional cut formula as Scenario 2 but adds 2% Sensitive Products[24] in developed countries and 4% Sensitive and Special Product (SSP) in developing countries, thereby reducing the average cut to 16% for developed countries and 9% for developing countries.

Scenario 4 considers the effects of adding to Scenario 3 a tariff cap of 200% such that any product with a bound tariff in excess of that limit will be subjected to a reduction down to that cap rate, which leads to average cuts in food and agricultural tariffs of 18% for both developed and developing countries.

Scenario 5 adds to Scenario 1 the cuts in non-agricultural tariff bindings of 50% in developed countries, 33% in developing countries, and zero in LDCs.

Finally, *Scenario 6* makes developing (including least-developed) countries full participants in the round, undertaking the same reductions in bound (but not necessarily applied) tariffs as the developed countries in Scenario 5.

5.4 The DDA proposals: model results

It is not possible in this chapter to provide details of analysts' answers to all of the questions posed in Section 5.2, but in this section a paragraph summarizes each of the main findings and provides a guide to the pertinent literature. The modeling results are based on the LINKAGE Model of the global economy (van der Mensbrugghe 2005) and Version 6.05 of the GTAP database which is calibrated to 2001, but the model is projected to 2015 which is when implementation would have been completed had the DDA negotiations been concluded at the biennial Trade Ministerial Meeting in Hong Kong in late 2005. Details of the modeling features and scenarios are in Anderson, Martin and van der Mensbrugghe (2006a,b). The first few lessons below come from a scenario involving full trade liberalization and farm subsidy removal, while the rest come from a series of partial liberalizations which are listed for convenience in Table 5.3.

What's at stake: inferences from simulating full global trade liberalization?

The potential gains from further global trade reform are huge. Global gains from trade reform post-2004 are estimated to be large even if dynamic gains and gains from economies of scale and increased competition are ignored. Freeing all merchandise trade and agricultural subsidies is estimated to boost global welfare by nearly $300 billion per

[24] As described in Jean, Laborde and Martin (2006, 2011), "Sensitive Products" are chosen for each country by taking into account the importance of the product, the height of its existing tariff, and the gap between its bound and applied tariffs in that country.

Table 5.3: Six Doha partial liberalization scenarios

Scenarios:	**Description**
Pre-simulation	2001 protection measures are amended by allowing EU15 eastward enlargement to make 25 members, implementation of WTO accession commitments by China and Taiwan, and implementation of Uruguay Round commitments including abolition of quotas on textiles and clothing by end-2004, followed by normal global growth projection for ten more years to 2015 (baseline simulation)
Scenarios 1-6	All assume agricultural domestic support cuts in developed country markets and the abolition of agricultural export subsidies, plus:
Scenario 1	Harmonizing formula for agricultural market access with lesser cuts for Developing Countries and none for Least Developed Countries
Scenario 2	Proportional cut in agricultural tariffs of Developed Countries (with lesser cuts for Developing Countries and none for Least Developed Countries) to get the same cut in the average tariff as in Scenario 1
Scenario 3	Proportional cut as in Scenario 4 + Sensitive Products (2% for Developed Countries and 4% for Developing Countries)
Scenario 4	Scenario 2 + reductions in high tariffs down to a 200% tariff cap
Scenario 5	Scenario 1 plus 50% proportional cut in all tariffs on non-agricultural products for Developed, 33% for Developing, zero for Least Developed Countries
Scenario 6	Developed countries' Harmonizing formula cuts for agriculture, plus Developed Countries' 50% proportional cut in all non-agricultural tariffs, are also each applied in Developing and Least Developed Countries

Source: Anderson, Martin and van der Mensbrugghe (2006a, Table 12.8).

year by 2015, plus whatever productivity effects that reform would generate.[25]

Developing countries could gain disproportionately from further global trade reform. The developing countries (as defined by the WTO) would enjoy 30% of the global gain from complete liberalization of all merchandise trade, well above their share of global GDP. Their welfare would increase by 0.8%, compared with an increase of just 0.6% for developed countries (Anderson, Martin and van der Mensbrugghe (2006b, 2006d). The developing countries' higher share is partly because they have

[25] There was already strong evidence by 2005 supporting the view that trade reform in general was also good for economic growth and, partly because of that, for poverty alleviation (Winters 2004, Dollar and Kraay 2004, Winters, McCulloch and McKay 2004).

relatively high tariffs themselves (so they would reap substantial efficiency gains from reforming their own protection), and partly because their exports are more concentrated in farm and textile products whose tariffs in developed country markets are exceptionally high (see Table 5.1) – notwithstanding non-reciprocal tariff preferences for many developing countries, which contribute to losses associated with terms of trade deterioration for some of them.

Benefits could be as much from South-South as from South-North trade reform. Trade reform by developing countries is just as important economically to those countries as is reform by developed countries, including from agricultural liberalization (Table 5.4b). Hence choosing to delay their own reforms or reforming less than developed countries, and thereby holding back South-South trade growth (detailed in Anderson, Martin and van der Mensbrugghe 2006e), could reduce substantially the potential gains to developing countries.

Agriculture is where cuts are needed most. To realize that potential gain from opening up goods markets, it is in agriculture that by far the greatest cuts in bound tariffs and subsidies are required. This is because of the very high rates of assistance in that sector relative to other sectors. Food and agricultural policies are responsible for more than three-fifths of the global gain foregone because of merchandise trade distortions (column 1 of Table 5.4(a)) – despite the fact that agriculture and food account for less than 10% of world trade and less than 4% of global GDP. Agricultural reform is at least as important to the welfare of developing countries as it is for welfare in the rest of the world: the gains to developing countries from global agricultural liberalization represent almost two-thirds of their total potential gains, which compares with just one-quarter from textiles and clothing and one-ninth from other merchandise liberalization (Table 5.4b).

Subsidy disciplines are important, but increased market access in agriculture is crucial. Extremely high applied tariffs on agricultural relative to non-farm products are the major reason for food and agricultural policies contributing 63% of the welfare cost of current merchandise trade distortions. Subsidies to farm production and exports are only minor additional contributors: 3 and 1 percentage points respectively, compared with 59 points due to agricultural tariffs.[26] This is even truer for developing countries than for developed ones (compare columns 1 and 2 of Table 5.5). A more-detailed empirical analysis by Anderson, Martin and Valenzuela (2006) includes estimates of implicit forms of farm export subsidization such as via food aid, export credits or state trading enterprises, but even they conclude that 93% of the global welfare cost of agricultural policies was due to market access barriers and

[26] This result is very similar to that reported from a partial equilibrium study by Hoekman, Ng and Olarreaga (2004). In terms of their impact on the value of global agricultural trade, domestic support measures are responsible for 17% of its reduction; and in terms of their impact on net farm income in developing countries, domestic support measures are responsible for 38% of its reduction (Anderson, Martin and Valenzuela 2006).

Table 5.4: Projected effects on economic welfare of full trade liberalization from different groups of countries and products (%)

(a) Distribution of effects on* global *welfare

From full lib'n of:	**Agriculture and food**	**Textiles and clothing**	**Other manuf.**	**ALL GOODS**
Percentage due to:				
HIC[a] policies	46	6	3	55
DC policies	17	8	20	45
ALL POLICIES	**63**	**14**	**23**	**100**

(b) Distribution of effects on* developing countries' *welfare

From full lib'n of:	**Agriculture and food**	**Textiles and clothing**	**Other manuf.**	**ALL GOODS**
Percentage due to:				
HIC[a] policies	30	17	3	50
DC policies	33	10	7	50
ALL POLICIES	**63**	**27**	**10**	**100**

[a] The HIC (high-income country) group includes the transition economies of Eastern Europe and the former Soviet Union. The DC group includes all developing countries.

Source: Anderson, Martin and van der Mensbrugghe (2006a, Table 12.6).

Table 5.5: Distribution of global welfare impacts of fully removing 2001 agricultural tariffs and subsidies (%)

Agricultural liberalization component:	Beneficiary region: HICs[a]	DCs	World
Import market access	66	27	93
Export subsidies	5	-3	2
Domestic support	4	1	5
All measures	***75***	***25***	***100***

[a] High-income countries include the newly industrialized East Asian customs territories of Hong Kong, Korea, Singapore and Taiwan as well as Europe's transition economies that joined the EU in April 2004.

Source: Summarized from Hertel and Keeney (2006, Table 2.7), as explained in Anderson, Martin and Valenzuela (2006).

only 2% to export subsidies and 5% to domestic support measures.[27] That study also estimated that market access restrictions are responsible for 89% of the policy-induced reduction in global farm trade, and for the majority of the policies' boost to net farm incomes in high-income countries and to the loss in net incomes of developing country farmers. Disciplining domestic subsidies and phasing out export subsidies remained very important agenda items though (Hart and Beghin 2006), not least to bring agriculture into line with non-farm trade in terms of not using export subsidies and to reduce the risk of re-instrumentation of assistance from import tariffs to domestic subsidies.

In developing countries the poor would gain disproportionately from multilateral trade reform. Full global merchandise trade liberalization would raise real factor returns for the poorest households most. This is implied in results showing that, for developing countries, the biggest factor price rise is for farm land, followed by unskilled labour. Since farmers and other low-skilled workers constitute the vast majority of the poor in developing countries, such reform would be highly likely to reduce both inequity and poverty.

[27] Laborde (2014) provided an update of that estimate based on 2007 distortions data, and found market access was still responsible for 89% of the global welfare loss from farm trade distortions.

Effects of partial reform as proposed in the DDA

Large cuts in domestic support commitments are needed to erase binding overhang. In turning to what has been proposed under a Doha partial reform package, the devil as always is in the details. For example, commitments on domestic support for farmers were so much higher than actual support levels at the time that the 20% cut in the total bound Aggregate Measure of Support (AMS) promised in the July Framework Agreement as an early instalment would require no actual support reductions for any WTO member. Indeed a cut as huge as 75% for those with most domestic support is needed to get some action, and even then it would only require cuts in 2001 levels of domestic support for four WTO actors: the US (by 28%), the EU (by 18%), Norway (by 16%) and Australia by 10% – and the EU and Australia had already introduced reforms of that order between 2001 and 2005, so they would have needed to do no further cutting under even that formula.

Large cuts in bound rates are needed also to erase binding overhang in agricultural tariffs. Table 5.2 shows there has been substantial binding overhang in agricultural tariffs: the average bound rate in developed countries was almost twice as high as the average applied rate in 2001, and in developing countries the ratio was even greater. Thus large reductions in bound rates are needed before it is possible to bring about *any* improvements in market access. To bring the global average actual agricultural tariff down by one-third, bound rates would have to be reduced for developed countries by at least 45%, and up to 75% for the highest tariffs, under a tiered formula.

A complex tiered formula may be little better than a proportional tariff cut. It turns out that, because of the large binding overhang, a tiered formula for cutting agricultural tariffs would generate not much more global welfare – and no more welfare for developing countries as a group – than a proportional cut of the same average size (columns 1 and 2 of Tables 5.6, 5.7 and 5.8). This suggests there may be little value in arguing over the finer details of a complex tiered formula just for the sake of reducing tariff escalation. Instead, a simple tariff cap of, say, 100% or even 200% could achieve essentially the same outcome (Jean, Laborde and Martin 2006, 2011).

Even large cuts in bound tariffs do little if "Sensitive Products" are allowed, except if a cap applies. If members succumb to the political temptation to put limits on tariff cuts for the most sensitive farm products, much of the prospective gain from Doha could evaporate. Even if only 2% of HS6 agricultural tariff lines in developed countries are classified as sensitive (and 4% in developing countries, to incorporate also their "Special Products" request), and are thereby subject to just a 15% tariff cut (as a substitute for the tariff rate quota (TRQ) expansion mentioned in the Framework Agreement), the welfare gains from global agricultural reform would shrink by three-quarters. However, if at the same time any product with a bound tariff in excess of 200% had to reduce it to that cap rate, the welfare gain would shrink by 'only' one-third (columns 3 and 4 of Tables 5.6, 5.7 and 5.8).

Table 5.6: Projected welfare effects of possible Doha reform scenarios
(% difference from baseline, and Equivalent Variation in income in 2001 US$ billion)

	Agricultural subsidy cuts[a] plus:					
	Tiered agricultural tariff cuts[b]	Propn'l agricultural tariff cuts[b]	Scenario 2 plus 2% SSP	Scenario 3 plus 200% cap	Scenario 1 plus 50% NAMA cut for HICs[c]	Scenario 1 plus 50% NAMA cut for HICs+DCs[d]
	Sim 1	**Sim 2**	**Sim 3**	**Sim 4**	**Sim 5**	**Sim 6**
High-income[e]	0.20	0.18	0.05	0.13	0.25	0.30
Middle-income	0.10	0.10	0.00	0.01	0.15	0.21
of which: China	***-0.02***	***-0.01***	***-0.05***	***-0.04***	***0.07***	***0.06***
Low-income	0.05	0.04	0.01	0.00	0.18	0.30
WORLD	**0.18**	**0.16**	**0.04**	**0.10**	**0.23**	**0.28**
(and in $billion)	*74.5*	*66.3*	*17.9*	*44.3*	*96.1*	*119.3*

[a] Elimination of agricultural export subsidies and cuts in actual domestic support as of 2001 of 28% in the US, 18% in the EU, and 16% in Norway.

[b] In Scenarios 1 and 2 the applied global average tariff on agricultural products is cut by roughly one-third, with larger cuts in developed countries, smaller in developing countries, and zero in least developed countries. In Scenario 1 there are three tiers for developed countries and four for developing countries, following Harbinson (WTO 2003) but 10 percentage points higher.

[c] Non-agricultural market access (NAMA) is expanded by a 50% tariff cut for developed countries, 33% for developing countries, and zero in least developed countries.

[d] Developing and least developed countries cut all agricultural and non-agricultural tariffs as much as developed countries.

[e] High-income countries (HICs) include the newly industrialized East Asian customs territories of Hong Kong, Korea, Singapore and Taiwan as well as Europe's transition economies that joined the EU in April 2004.

Source: Anderson, Martin and van der Mensbrugghe (2006a, Table 12.14).

TRQ expansion could provide additional market access. Only a small number of farm products are subject to tariff rate quotas, but they protect over half of all developed countries' production and 44% of their agricultural imports (de Gorter and Kliauga 2006). Bringing down the (out-of-quota) MFN bound tariffs on those products could be supplemented by lowering their in-quota tariffs or expanding the size of the quotas. While this may increase the aggregate rent attached to those quotas and hence resistance to eventually removing them, the extent of binding overhang is such that quota expansion may be the only way to get increased market access for TRQ products in the Doha round – especially if they are among the ones designated as 'sensitive' and hence subject to lesser cuts in their bound tariffs.

High binding overhang means most developing countries would have to make few cuts. Given the high binding overhang of developing countries, even with their high applied tariffs – and even if tiered formulae are used to cut highest bindings most – relatively few of them would have to cut their actual tariffs and subsidies at all (Jean, Laborde and Martin 2006). That is even truer if "Special Products" are subjected to smaller cuts and developing countries exercise their right – as laid out in the July Framework Agreement – to undertake lesser cuts (zero in the case of LDCs) than developed countries.

Politically this makes it easier for developing and least developed countries to offer big cuts on bound rates – but it also means the benefits to them are smaller than if they had a smaller binding overhang.

Cotton subsidy cuts would help cotton-exporting developing countries. The removal of cotton subsidies (which have raised producer prices by well over 50% in the US and EU – see Sumner 2006) would raise the export price of cotton (although not equally across all exporters because of product differentiation). If those subsidies were removed as part of freeing all merchandise trade, that price rise is estimated to be 8% for Brazil but less for Sub-Saharan Africa on average. However, cotton exports from Sub-Saharan Africa would be a huge 75% larger, and the share of all developing countries in global exports would be 85% instead of 56% in 2015, vindicating those countries' efforts to ensure cotton subsidies receive specific attention in on-going negotiations.[28]

Expanding non-agricultural market access would add substantially to the gains from agricultural reform. Adding a 50% cut to non-agricultural tariffs by developed countries (and 33% by developing countries and zero by LDCs) to the tiered formula cut to agricultural tariffs would double the gain from Doha for developing countries (compare Scenarios 1 and 5 in Tables 5.6, 5.7 and 5.8). That would bring the global gain to $96 billion from Doha merchandise liberalization, which is a sizable one-third of the potential welfare gain from full liberalization of $287 billion. Adding services reform would of course boost that welfare gain even more.

[28] See also the analysis of cotton policies by Anderson and Valenzuela (2007).

Table 5.7: Projected dollar change in real income in alternative Doha scenarios (change in real income in 2015 in 2001 $billion compared to baseline scenario)

	Sim 1	Sim 2	Sim 3	Sim 4	Sim 5	Sim 6
Australia+ NZ	2.0	2.2	1.2	1.2	2.4	2.8
EU 25 + EFTA	29.5	28.2	10.7	10.9	31.4	35.7
United States	3.0	3.4	2.5	2.1	4.9	6.6
Canada	1.4	1.2	0.4	0.4	0.9	1.0
Japan	18.9	15.1	1.4	12.9	23.7	25.4
Korea + Taiwan	10.9	7.3	1.7	15.9	15.0	22.6
Hong Kong+Sing.	-0.1	-0.1	-0.2	-0.2	1.5	2.2
Argentina	1.3	1.4	1.1	1.0	1.3	1.6
Bangladesh	0.0	0.0	0.0	0.0	-0.1	-0.1
Brazil	3.3	3.2	1.1	1.1	3.6	3.9
China	-0.5	-0.4	-1.4	-1.1	1.7	1.6
India	0.2	0.1	0.2	0.2	2.2	3.5
Indonesia	0.1	0.2	0.2	0.0	1.0	1.2
Thailand	0.9	1.0	0.8	0.8	2.0	2.7
Vietnam	-0.1	-0.1	-0.1	-0.1	-0.5	-0.6
Russia	-0.3	-0.1	-0.7	-0.7	0.8	1.5
Mexico	-0.2	-0.2	-0.3	-0.3	-0.9	-0.2
South Africa	0.1	0.1	0.2	0.3	0.4	0.7
Turkey	0.6	0.5	0.1	0.0	0.7	1.4
HICs	**65.6**	**57.2**	**17.8**	**43.2**	**79.9**	**96.4**
DCs	**9.0**	**9.1**	**0.1**	**1.1**	**16.1**	**22.9**
Middle-income	8.0	8.3	0.0	1.0	12.5	17.1
Low-income	1.0	0.8	0.2	0.0	3.6	5.9
East Asia	0.5	0.9	-0.4	0.6	4.5	5.5
South Asia	0.4	0.3	0.3	0.4	2.5	4.2
EEurope+CAsia	0.1	0.2	-0.9	-0.9	0.8	2.1
ME+NthAfrica	-0.8	-0.9	-1.2	-1.2	-0.6	0.1
SSaharanAfrica	0.3	0.3	-0.2	-0.1	0.4	1.2
Latin America	8.1	8.0	2.5	2.1	7.9	9.2
WORLD	**74.5**	**66.3**	**17.9**	**44.3**	**96.1**	**119.3**

Source: Anderson, Martin and van der Mensbrugghe (2006a, Table 12.14).

Table 5.8: Projected change in real income in alternative Doha scenarios (change in real income in 2015 in % compared to baseline scenario)

	Sim 1	Sim2	Sim 3	Sim 4	Sim 5	Sim 6
Australia+ NZ	0.35	0.38	0.22	0.20	0.42	0.48
EU 25 + EFTA	0.29	0.28	0.11	0.11	0.31	0.36
United States	0.02	0.02	0.02	0.01	0.03	0.05
Canada	0.15	0.13	0.05	0.05	0.10	0.11
Japan	0.38	0.30	0.03	0.26	0.48	0.51
Korea + Taiwan	0.86	0.58	0.14	1.26	1.19	1.79
Hong Kong+Sing.	-0.02	-0.02	-0.04	-0.04	0.35	0.52
Argentina	0.32	0.34	0.27	0.26	0.34	0.39
Bangladesh	-0.06	-0.06	-0.03	-0.04	-0.10	-0.09
Brazil	0.50	0.49	0.17	0.17	0.55	0.59
China	-0.02	-0.01	-0.05	-0.04	0.07	0.06
India	0.02	0.02	0.03	0.02	0.25	0.40
Indonesia	0.05	0.08	0.09	0.01	0.37	0.44
Thailand	0.43	0.49	0.38	0.38	0.99	1.33
Vietnam	-0.20	-0.22	-0.11	-0.16	-0.83	-0.97
Russia	-0.06	-0.03	-0.15	-0.15	0.16	0.31
Mexico	-0.02	-0.02	-0.04	-0.04	-0.11	-0.02
South Africa	0.06	0.09	0.11	0.17	0.25	0.49
Turkey	0.25	0.22	0.02	0.02	0.26	0.55
HICs	**0.20**	**0.18**	**0.05**	**0.13**	**0.25**	**0.30**
DCs	**0.09**	**0.09**	**0.00**	**0.01**	**0.16**	**0.22**
Middle-income	0.10	0.10	0.00	0.01	0.15	0.21
Low-income	0.05	0.04	0.01	0.00	0.18	0.30
East Asia	0.01	0.03	-0.01	0.02	0.13	0.16
South Asia	0.03	0.02	0.03	0.03	0.21	0.36
EEurope+CAsia	0.01	0.02	-0.09	-0.09	0.08	0.21
ME+NthAfrica	-0.07	-0.07	-0.10	-0.10	-0.05	0.01
SSaharanAfrica	0.06	0.06	-0.04	-0.02	0.10	0.27
Latin America	0.29	0.29	0.09	0.08	0.29	0.33
WORLD	**0.18**	**0.16**	**0.04**	**0.10**	**0.23**	**0.28**

Source: Anderson, Martin and van der Mensbrugghe (2006a, Table 12.14).

Adding non-agricultural tariff reform to agricultural reform helps to balance the exchange of "concessions". The agricultural reforms would boost the annual value of world trade in 2015 by less than one-quarter of what would happen if non-agricultural tariffs were also reduced. The latter's inclusion also would help balance the exchange of "concessions" in terms of increases in bilateral trade values: in that case developing countries' exports to high-income countries would then rise by $62 billion, which is close to the $55 billion increase in high-income countries' exports to developing countries. With only agricultural reform, the latter's bilateral trade growth would be little more than half the former's (Table 5.9).

Table 5.9: Projected effects on bilateral merchandise trade flows of adding non-agricultural tariff cuts to agricultural reform under Doha
(2001 $billion increase over the baseline in 2015)

	Propn'l agric reform only[a]		Agric + non-ag reform[b]	
Exports to:	**High-income[c] countries**	**Developing countries**	**High-income[c] countries**	**Developing countries**
Exports from :				
HICs[c]	20	11	80	55
DCs	18	5	62	16
WORLD	**38**	**16**	**142**	**71**

[a] Scenario 2 in Table 5.3.
[b] Scenario 5 in Table 5.3.
[c] High-income countries include the newly industrialized East Asian customs territories of Hong Kong, Korea, Singapore and Taiwan as well as Europe's transition economies that joined the EU in April 2004.

Source: Source: Anderson, Martin and van der Mensbrugghe (2006a, Table 12.16).

Most developing countries gain, and the rest could if they reform more. Even though much of the developing country gains from that comprehensive Doha scenario go to numerous large developing countries, notably Brazil, Argentina and Other Latin America plus India, Thailand and South Africa. The rest of Sub-Saharan Africa gains too. This is particularly so when developing countries participate as full partners in the negotiations. An important part of this result comes from the increases in market access – on a non-discriminatory basis – by other developing countries.

Preference erosion may be less of an issue than commonly assumed. Some least developed countries in Sub-Saharan Africa and elsewhere appear to be slight losers in our Doha simulations when developed countries cut their tariffs and those LDCs choose not to reform at all themselves. These simulations overstate the benefits of tariff preferences for LDCs, however, since they ignore the trade-dampening effect of complex rules of origin and the grabbing of much of the rents by developed-country importers. Even if they would lose after correcting for those realities, it remains true that preference-receiving countries could always be compensated for preference erosion via increased aid at relatively very small cost to current preference providers – and in the process other developing countries currently hurt by LDC preferences

Table 5.10: Projected effects of a comprehensive Doha reform on agricultural output and employment growth growth, by region
(annual average growth rate, 2005 to 2015, %)

	Output		Employment	
	Baseline	**Sim 5**	**Baseline**	**Sim 5**
Australia+New Zealand	3.5	4.3	0.4	1.0
Canada	3.5	4.0	0.2	0.6
United States	2.2	1.9	-0.8	-1.4
EU 25 + EFTA	1.0	-0.3	-1.8	-2.8
Japan	0.5	-1.4	-2.7	-4.1
Korea and Taiwan	2.2	1.5	-1.3	-2.1
Argentina	2.9	3.5	0.9	1.5
Bangladesh	4.2	4.2	1.1	1.2
Brazil	3.3	4.4	1.1	2.2
China	4.3	4.3	0.8	0.8
India	4.3	4.4	1.0	1.0
Indonesia	3.0	3.0	-0.7	-0.6
Thailand	-0.1	0.4	-4.6	-4.3
Vietnam	5.8	5.9	3.9	4.0
Russia	1.5	1.4	-2.3	-2.4
Mexico	3.9	4.0	2.0	2.3
South Africa	2.5	2.6	0.0	0.1
Turkey	3.0	3.0	-0.5	-0.5

Source: Anderson, Martin and van der Mensbrugghe (2006a, Table 12.17).

would enjoy greater access to the markets of reforming developed countries (Bouët, Fontagné and Jean 2006; Hoekman, Martin and Braga 2009).

Farm output and employment would grow in developing countries under Doha. Despite a few low-income countries losing slightly under our Doha scenarios when they choose to reform little themselves, in all the developing countries and regions shown the levels of output and employment on farms expand. It is only in the most protected developed countries of Western Europe, Northeast Asia and the US that these levels would fall – and even there it is only by small amounts, contrary to the predictions of scaremongers who claim agriculture would be decimated in reforming countries (Table 5.10). Even if there was a move to completely free merchandise trade, the developed countries' share of the world's primary agricultural GDP by 2015 was projected to be only slightly lower at 25% instead of 30% (but their share

Table 5.11: Projected impact of Doha reform scenarios on average international product prices (% relative to baseline)

	Sim 1	Sim 2	Sim 3	Sim 4	Sim 5
Rice	0.9	1.4	1.3	1.7	1.1
Wheat	1.8	1.6	1.6	1.8	1.7
Other grains	3.7	3.5	3.5	3.7	3.5
Oilseeds	4.5	3.9	3.9	4.5	4.4
Sugar	2.8	2.4	2.4	2.9	2.7
Cotton	6.0	5.8	5.8	5.9	5.8
Fruit and vegetables	1.2	0.9	0.8	1.3	1.0
Other crops	0.9	0.5	0.5	1.2	0.8
Vegetable oils and fats	0.7	0.6	0.6	1.0	0.8
Livestock	0.8	0.7	0.7	0.9	0.6
Processed meats	3.5	3.3	3.3	3.5	3.4
Dairy products	11.8	11.8	11.8	11.7	11.8
Other food, bev. & tobacco	0.3	0.5	0.5	0.4	0.1
All agriculture and food	**1.8**	**1.8**	**1.8**	**1.9**	**1.7**
All primary agriculture	2.0	1.7	1.7	2.1	1.9
All processed agriculture	1.7	1.8	1.8	1.8	1.6
Textile and wearing apparel	0.2	0.2	0.2	0.2	-0.1

Source: Anderson, Martin and van der Mensbrugghe (2006b, Table 5).

of global agricultural exports would be diminished considerably more: from 53% to 38%).

International prices for staple foods rise very little. Opening up global markets as proposed raises the prices of foods in international markets, but only slightly: it is the cotton price that rises most, followed by animal products consumed by the relatively affluent, followed by livestock feedstuffs (Table 5.11). The expanded demand in the international market for staples such as wheat and rice is met by a sufficient supply response as to keep those rises to below 2%. In domestic markets that would be less
protected after such a DDA agreement, food prices would fall, thereby lowering the cost of living for consumers in those countries.

Poverty could be reduced under Doha. Under the full merchandise trade liberalization scenario, extreme poverty in developing countries (those earning no more than $1/day) is projected to drop by 32 million in 2015 relative to the baseline level of 622 million, a reduction of 5%. The majority of the poor by 2015 are

projected to be in Sub-Saharan Africa, and there the reduction would be 6%. [29] Under our Doha scenarios, the projected poverty impacts are far more modest. The number of poor living on less than $1/day would fall by 2.5 million in the case of the core Doha Scenario 5 (of which 0.5 million are in SSA) and by 6.3 million in the case of Doha Scenario 6 (of which 2.2 million are in SSA). This corresponds to the relatively modest ambitions of the merchandise trade reforms as captured in these Doha scenarios. If only agriculture was reformed (Doha Scenario 1) there would be much less poverty alleviation globally and none at all in SSA (Anderson, Martin and van der Mensbrugghe 2006c). This shows the importance for poverty of including manufactured products in the Doha negotiations.

Developing countries could trade off Special and Differential Treatment for more market access. If developing countries were to tone down their call for Special and Differential Treatment (see Josling 2006), in terms of wanting smaller cuts and longer phase-in periods, reciprocity means they could expect bigger tariff and subsidy cuts from developed countries. Similarly, if they were to forego their call for lesser cuts for "Special Products", they could demand that developed countries forego their call for some "Sensitive Products" to be subject to smaller tariff cuts. A comparison of Scenarios 5 and 6 in Tables 5.6, 5.7 and 5.8 shows that the economic payoffs for low-income countries even if high-income countries do not reciprocate with larger offers is considerable. Moreover, embracing those options to reform more in the context of the Doha round would have made it harder for high-income countries to resist the call to respond with larger reforms themselves.

More-recent economic modelling reinforces the above findings. With the stalling of the DDA since 2008, there have been few new studies of its prospective effects. An important exception is a pair of papers by Laborde, Martin and van der Mensbrugghe (2011, 2012) that not only analyze what was still on the Doha negotiation table but also incorporate new and better ways of including estimates of the price distortions caused by trade and farm subsidy policies. They too use the World Bank's LINKAGE model (but version 7.1, see van der Mensbrugghe 2011), and they also provide estimates of gains from partial global liberalization of all merchandise trade and subsidies. Laborde, Martin and van der Mensbrugghe (2011) estimate that if the

[29] The approach here has been to take the change in the average per capita consumption of the poor, apply an estimated income-to-poverty elasticity, and assess the impacts on the poverty headcount index. We have done this by calculating the change in the real wage of unskilled workers, deflating it by a food/clothing consumer price index which is more relevant for the poor than the total price index. That real wage grows, over all developing countries, by 3.6%, or more than four times greater than the overall average income increase. We are assuming that the change in unskilled wages is fully passed through to households. Also, while the model closure has the loss in tariff revenues replaced by a change in direct household taxation, the poverty calculation assumes – realistically for many developing countries -- that these tax increases only affect skilled workers and high-income households. While these simple calculations are not a substitute for more-detailed individual country case study analysis using detailed household surveys as in, for example, Hertel and Winters (2006), they are able to give a broad region-wide indication of the poverty impact.

basic formula approach to reducing trade barriers and subsidies, as proposed, were to be adopted by all WTO member countries, then global GDP would be 0.36% higher.

5.5 What has been learnt from analyses of DDA proposals?

Among the numerous implications that can be drawn from the above findings, the following are worth highlighting.

Prospective gains are large enough to deserve the attention of politicians. Even if there were no reforms forthcoming in services and if the counterfactual would be the status quo rather than protectionist backsliding, the proposed DDA partial liberalizations would be non-trivial, especially for developing countries. Multilateral cuts in MFN bindings are helpful also because (a) they can lock in previous unilateral trade liberalizations that otherwise would remain unbound and hence be vulnerable to backsliding, (b) they make it illegal to sharply increase protection when international food prices slump (Francois and Martin 2004), and (c) they can be used as an opportunity to multilateralize previously agreed preferential trade agreements and thereby reduce the risk of trade diversion from those bilateral or regional arrangements.

Since developed countries would gain most, and have the most capacity and influence, they need to show leadership at the WTO. The large developed countries cannot generate a successful agreement on their own, but nor can the Doha round succeed without a major push by those key traders. Their capacity to assist poorer economies could hardly manifest itself more clearly than in encouraging global economic integration via trade reform, and in particular in opening developed country markets to the items of greatest importance to poorer countries, namely farm (and textile) products. The more that is done by developed countries, the more developing countries will be encouraged to reciprocate by opening their own markets more – accelerating South-South trade in addition to South-North trade.

Outlawing agricultural export subsidies was the obvious first step. That has been needed for decades (Hoekman and Messerlin 2006), to bring agriculture into line with the basic GATT rule against such measures, and in the process to help limit the extent to which governments encourage agricultural production by other means (since such a ban raises the cost of surplus disposal). China has already committed not to use them, and other developing countries too can find more-efficient ways of stabilizing their domestic food markets than by dumping surpluses abroad. Somewhat unexpectedly, it was agreed at the biennial Trade Ministerial Meeting in Nairobi in December 2015 to phase out farm export subsidies.

Agricultural tariff and domestic support bindings must be cut hugely to remove binding overhang and provide some genuine market opening. Getting rid of the binding overhang that resulted from the Uruguay Round, particularly with 'dirty tariffication', remains a priority. The highest-subsidizing countries, namely the EU, US and Norway, need

to reduce their domestic support not just for the sake of their own economies but also to encourage developing countries to reciprocate by opening their markets as a quid pro quo. But more than that is needed if market access is to expand. If a choice had to be made, reducing MFN bound tariffs in general would be preferable to raising tariff rate quotas, because the latter help only those lucky enough to obtain quotas and crowd out non-quota holders. (Being against the non-discrimination spirit of the GATT, they deserve the same fate as textile quotas, which were abolished at the end of 2004.) Exempting even just a few Sensitive and Special Products is undesirable as it would reduce hugely the gains from reform and would tend to divert resources into, instead of away from, enterprises in which countries have their least comparative advantage. If it turns out to be politically impossible not to designate some Sensitive and Special Products, it would be crucial to impose a cap such that any product with a bound tariff in excess of, say, 100% had to reduce it to that cap rate.

Expanding non-agricultural market access at the same time as reforming agriculture is essential for a balanced exchange of concessions. With other merchandise included, the trade expansion would be four times greater for both rich and poor countries – and poverty in low-income countries would be reduced considerably more.

South-South "concessions" also are needed, especially for developing countries, which means reconsidering the opportunity for developing countries to liberalize less. Since developing countries are trading so much more with each other now, they are the major beneficiaries of reforms within their own regions. Upper middle-income countries might consider giving least developed countries duty-free access to their markets (mirroring the initiatives of developed countries), but better than such discriminatory action would be MFN tariff reductions by them. Even LDCs should consider reducing their tariff binding overhang at least, since doing that in the context of Doha gives them more scope to demand "concessions" (or compensation for preference erosion or other contributors to terms of trade deterioration) from richer countries – and yet would not require them to cut their own *applied* tariffs very much.

5.6 Is WTO passé?

It has become fashionable in some circles to suggest that the swathe of preferential trade agreements that have been signed recently or are under serious negotiation mean that there is no need to return to the WTO's multilateral trade negotiating table. Such a view is unfortunate, for at least two reasons.[30] First, the TTP among Pacific Rim countries including the US, and the TTIP negotiations between the US and EU, may both be abandoned when the new US President takes office in January

[30] For more reasons, see Bagwell, Bown and Staiger (2016).

2017, given the candidates' pronouncements during 2016 election campaigning. That would also apply to a prospective APEC-wide free trade agreement.

Second, that adverse view of WTO's future reflects an incomplete understanding of what the WTO still has to offer the world. The WTO has four areas of competence in addition to providing a forum to negotiate reductions in policy-induced distortions to the free international flow of goods and services (including when non-members seek to accede to WTO). Those four other roles are to:

- establish and revise from time to time the core rules and disciplines on international trade that have served the world well since first introduced in 1948;
- provide a forum for settling trade-related disputes between members via a well-proven consultation, Panel and Appellate process;
- monitor, record notifications and disseminate information on trade and trade-related policies of members; and
- coordinate with other international organizations on trade-related issues.

A comprehensive theoretical analysis by Bagwell, Bown and Staiger (2016) makes clear that the rules-based, non-discriminatory multilateral trading system still has far more to offer the world economy than a series of preferential trading agreements of the sort that have been signed in the past decade or so. This is supported by a recent survey of the empirical evidence on the contribution to global economic welfare of the GATT and WTO (Anderson 2016). And with newly-compiled evidence, Bown (2016a) argues that the scope for even just negotiating tariff reductions to boost South-South trade in goods – not to mention also services – is still very large among WTO members. True, additional regional preferential trade agreements also could provide opportunities for trade growth. However, even the mega-agreements being negotiated at present, most notably the TTP and TTIP, offer developing countries at best only a small fraction of the welfare benefits that the proposals made under the DDA could offer (Bureau, Guimbard and Jean 2016).[31]

Recall too that multilateral cuts in MFN bindings are helpful also because they can lock in previous unilateral trade liberalizations that otherwise would remain

[31] On the various motives for the rapid spread of FTAs and what it means for the WTO, see Bagwell and Staiger (2016), Bown (2016b), Grossman (2016) and Limão (2016). A regional agreement potentially of more importance to Australian trade is the Regional Comprehensive Economic Partnership (RCEP) between the ten ASEAN members and the six countries with which ASEAN has existing FTAs: Australia, China, India, New Zealand, Japan and South Korea. The 16 member states of the RCEP agreed to finalize negotiations on the agreement before the end of 2016, but that deadline may slip. It would be the world's largest FTA, covering a population of 3.5 billion, or more than half the world total, and two-fifths of world trade. Because it includes China, RCEP would involve three-fifths of Australia's trade, compared with TTP which covers just one-third of Australia's trade. And for developing countries, RCEP offers far more promise than TTP.

unbound and hence be vulnerable to backsliding. Also, they make it illegal to sharply increase protection when international food prices slump, and they can be used as an opportunity to multilateralize previously agreed preferential trade agreements and thereby reduce the risk of trade diversion from those bilateral or regional arrangements. Clearly the WTO is very far from passé – but it will take strong political leadership to get WTO members to return to the negotiating table each with a willingness to compromise enough to reach meaningful multilateral agreements.

Chapter 6

ONGOING AND EMERGING ISSUES IN AGRICULTURAL TRADE NEGOTIATIONS

Given the scope that still remains for economic welfare gains to developing countries from further agricultural and trade policy reforms, as laid out in the previous chapter, what can be done by WTO members? One of the key impediments to members reaching agreement on the DDA package in August 2008 was widespread scepticism about what the DDA would deliver in terms of improved market access. Yet detailed analyses have suggested that even with the proposed flexibilities with respect to sensitive and special products, the gains from the framework agreement of 2008 would have been substantial, and developing countries would have gained disproportionately. Those gains have been estimated to depend heavily on the extent of further trade reforms by developing countries themselves, however, especially as South-South trade continues to grow in importance.

The inability to bring the DDA to a successful conclusion has led numerous WTO members to focus in negotiating bilateral, regional and plurilateral trade agreements.[32] Some already have reached agreement and begun to be implemented, while some very large ones are still being negotiated. The latter plurilateral ones include the Trade in Services Agreement (TISA) and the Environmental Goods Agreement (EGA) along with a planned initiative on fisheries subsidies, and regional ones include the Trans-Pacific Partnership (TPP) among 12 Pacific rim countries, the Transatlantic Trade and Investment Partnership (TTIP) between the US and EU, and the Regional Comprehensive Economic Partnership (RCEP) among Asian economies plus Australia and New Zealand. Since both TPP and TTIP involve the US, both may be abandoned when the new US President takes office in January 2017, given the candidates' pronouncements during the 2016 election campaign. The TPP also faces headwinds in getting through Japan's Diet because of farm trade liberalization sensitivities, as does the TTIP in EU member countries.

Preferential trade agreements may have been easier to conclude than the DDA in recent years because they involve a much smaller number of countries than the full 164 in the WTO. However, they have tended so far to do little to liberalize

[32] On the pros and cons of these alternatives to multilateral, single-undertaking negotiations, see Gallagher and Stoler (2010), Hoekman and Messerlin (2015), Bown (2016b) and Limão (2016).

agricultural markets or cut farm subsidies, and even their non-agricultural trade reforms have had only a modest impact in terms of welfare gains to signatories – and in most cases they harm some outsiders. A new comprehensive study by Bureau, Guimbard and Jean (2016) finds that all the preferential agreements completed between 2001, when the DDA was launched, to 2013 contributed only a 0.3% cut in applied import tariff duties on all goods worldwide. That compares with that study's estimate of an average cut of 1.0% due to WTO commitments and an additional 1.3% cut due to unilateral decisions over that 2001-13 period.

The purpose of this chapter is to review the ongoing and emerging issues in agricultural trade negotiations that are making it difficult to bring the DDA to a successful conclusion with a comprehensive agreement.[33] The key unresolved issues in the agricultural part of the DDA negotiations relate to export competition, market access, domestic support, cotton, safeguards, public stockholding, and export restrictions.

Despite gains made in the WTO Trade Ministerial meeting in Nairobi in December 2015, particularly in agreeing to phase out agricultural export subsidies, little progress was made towards meeting broader goals of disciplining domestic support and increasing market access for farm products; and even with respect to export competition, the Nairobi reforms were limited in the areas of export credits, agricultural-exporting state trade enterprises (STEs), and food aid. In this chapter we examine those ongoing unresolved issues in the context of the DDA's draft negotiating text of 6 December 2008 (the so-called Rev 4 text).[34] The "new" trade issues that have emerged over the past decade, largely as a result of the food price spikes from 2007, include food security concerns relating to public stockholding and export restrictions and bans.

6.1 Export competition

Arguably the most significant outcome from the Nairobi Ministerial is the agreement on export competition (Ortiz, Bellman and Hepburn 2016). It involved four elements: export subsidies, export credits, state trading enterprises, and food aid.

[33] This chapter draws heavily on Glauber (2016b).

[34] On 6 December 2008, New Zealand's Ambassador to WTO, Crawford Falconer, as chairperson of the agricultural negotiations, circulated a draft "modalities" text that reflected the "July 2008 package" talks when ministers came to Geneva, 21–30 July to try to agree on "modalities" in agricultural and non-agricultural market access. The so-called Rev 4 text (the text was the fourth revision to a draft modalities text circulated 1 August 2008) is a lengthy document that reflected hundreds of hours of negotiations on proposed disciplines on domestic support, market access and export competition.

Export subsidies

WTO members agreed on an immediate standstill and phase-out of agricultural export subsidies. Developed countries agreed to remove their existing export subsidy entitlements immediately.[35] Developing countries have until 2018 to remove their export subsidies, and up to 2022 for products or groups of products for which a Member has notified export subsidies in one of its three latest export subsidy notifications. Developing countries are also committed to eliminate export subsidies permissible under Article 9.4 of the Agreement on Agriculture by the end of 2023, or the end of 2030 in the case of Net Food Importing Developing Countries.

Export subsidies have long been viewed as particularly trade-distorting because of their targeted use for specific commodities in specific markets (Gardner 1996; Diaz-Bonilla and Hepburn 2016). The use of export subsidies has declined significantly since implementation of the Uruguay Round Agreement on Agriculture in 1995 though, particularly with higher international food prices in recent years. As well, domestic reforms in the US and EU have reduced their need for export subsidies to dispose of production surpluses. That *de facto* reduction in subsidies may lead some to discount the importance of an agreement to eliminate agricultural export subsidies. However, analysis by Diaz-Bonilla and Laborde (2015) suggests that full use of export subsidies could displace almost US$12 billion worth of production in developing countries and further drive down international food prices. Indeed, as the use of dairy export subsidies by the US and EU in 2008 and 2009 demonstrates, political pressures to use such instruments to respond to domestic concerns remain strong in the absence of such disciplines.

Export credits

On export credits, the Nairobi outcome establishes a maximum repayment period at 18 months except for LDCs, NFIDCs, and a few additional developing countries for whom the maximum repayment rate will be between 36 and 54 months (or an unlimited period in the case of Cuba). All credit insurance and guarantee programs are to be self-financing. The key difference between the Nairobi agreement and Annex J of the Rev 4 text is that the repayment period under the latter would have been capped at 6 months.

Over 80% of agricultural exports that received export financing in 2015 were supported by some sort of risk cover, with most of this provided by Canada (31%) and the United States (28%). The value of US exports supported by risk cover was US$2.5 billion in 2015 while that of Canada was $3 billion. The 18-month repayment period is consistent with recent changes in the US export credit program as part of its settlement of its dispute with Brazil over cotton subsidies.

[35] Canada, the EU, Norway and Switzerland can extend export subsidies for processed products, dairy and swine meat up to 2020, provided that they eliminate them for LDCs in 2016 as well as meet other conditions relating to the volume and value of those subsidies.

Agricultural-exporting State Trading Enterprises (STEs)

Based on the most recent WTO notifications, 17 members notified or reported to WTO some 60 agricultural-exporting STEs covering a variety of commodities (WTO 2016). STEs by country and product group are summarized in Table 6.1. Fruit, vegetables and tobacco account for 57% of the products dealt with by reported STEs. China (25) and India (14) reported the most agricultural-exporting STEs, accounting for almost two-thirds of all reported STEs.

Since 2001, a number of prominent STEs have been dissolved or privatized. They include the Australian and Canadian wheat boards and the New Zealand STE for dairy products. Currently STE export volumes and values appear small relative to global trade volumes, although there are some significant exceptions. For example, the New Zealand STE accounted for more than one-third of global trade in kiwifruit during the period reported.

Table 6.1: Reported agricultural-exporting State Trading Enterprises (STEs)

WTO member	No. of agric-exporting STEs	Commodities covered
Australia	1	Rice
Canada	1	Wheat, barley, canola
China	25	Rice, maize, cotton, tobacco, tea, soybean[a]
Columbia	4	Rum and other cane-based alcohols
Costa Rica	1	Cane sugar
Dominica	1	Bananas
Ecuador	1	Maize, rice and cereals[b]
Fiji	1	Raw sugar, molasses
Grenada	1	Cocoa beans
India	14	Onions, gum karaya, sugar
Indonesia	1	Rice
Israel	3	Groundnuts, eggs, fruits and vegetables
Moldova	1	Wine
New Zealand	1	Kiwifruit
Trinidad&Tob.	1	Cocoa, coffee
Tunisia	2	Snuff, leaf tobacco, cigarettes, olive oil
Ukraine	1	Ethyl alcohol
All reported	**60**	

[a] No activity for soybean since China's accession to the WTO in late 2001.
[b] Ecuador reports no export activities through its STE.

Source: WTO Secretariat.

Under the December 2015 Nairobi outcome, WTO members are to ensure that agricultural-exporting STEs operate in a manner that does not undermine the new export subsidy disciplines. This Nairobi outcome is limited to best efforts, which is thus somewhat weaker than the disciplines listed under Annex K of Rev 4 which would eliminate the use of export monopoly powers for STEs (such as single desk sellers). Nor does the Nairobi outcome require that governments refrain from providing exporting STEs with financing or capital at below market rates, or underwriting their losses, both of which would have been disciplined under Rev 4 (Diaz-Bonilla and Hepburn 2016).

Food aid

The Nairobi outcome also includes new disciplines on food aid. The new disciplines attempt to balance concerns that food aid is available in times of humanitarian crises with concerns that food aid does not provide a means by which to circumvent disciplines on export subsidies (Clay 2014). Under the Nairobi outcome, food aid must be needs-driven, provided in fully grant form, and not tied directly or indirectly to commercial agricultural exports or other goods and services. In addition, agricultural food aid is not to be re-exported in any form, and its provision must take into account of local market conditions of like products.

Members are encouraged to procure international food aid from local or regional sources to the extent possible. Members are also encouraged to restrict monetization (selling in-kind food aid to raise cash) only to situations where there is a demonstrable need for monetization for the purpose of transport and delivery of the food assistance, or to re-address chronic food deficit requirements – and only after local or regional market analyses show it would not disrupt local or regional commercial markets.

In 2001, food aid totalled about 10 MMT, about half of which, according to the World Food Programme (WFP), was provided in the form of non-emergency food aid. By 2012, food aid totalled 4.7 MMT, about 30% of which was non-emergency food aid. Recent notifications to the WTO reveal that 12 of the 13 food aid donors' programmes are consistent with the Nairobi food aid disciplines (WTO 2016). Nonetheless, concerns over the use of food aid as a surplus disposal tool remain, as evident in the uproar over the recently announced US donation of peanuts to Haiti (Bovard 2016).

6.2 Market access

As discussed above in Chapter 3, under the Uruguay Round Agreement on Agriculture members agreed to convert non-tariff barriers to tariff equivalents and, where necessary, guarantee minimum access to domestic markets through the creation of tariff rate quotas. Participants agreed that developed countries would

cut the tariffs (the higher out-of-quota rates in the case of tariff-quotas) by an average of 36%, in equal steps over six years. Developing countries would make 24% cuts over 10 years. Several developing countries also used the option of offering ceiling tariff rates in cases where duties were not "bound" (that is, committed under GATT or WTO regulations) before the Uruguay Round.[36]

This was a significant first step in liberalizing the global agricultural sector, yet the tariffication process resulted in many countries having very large bound agricultural tariffs, many over 100%, particularly in dairy products, meat, poultry and sugar (Gibson et al. 2001).

Fortunately, not all countries apply tariffs at their bound rate. Tariff "overhang" – the difference between bound and applied rates – can be quite large, particularly in developing countries where tariffs are often the primary means by which the country protects its producers. Such overhangs leave the country with the ability to raise tariffs quickly should it wish to insulate its domestic market from fluctuations in world prices. However, as pointed out in Chapter 2, when countries exercise that ability, they reduce the benefit that stable, bound tariffs have over nontariff barriers, and they contribute toward greater instability in international prices.

Lowering tariffs benefit the world economy by providing consumers with lower-cost goods and by encouraging productive resources to move to activities in which each country has its strongest comparative advantages. Empirical studies have shown that the vast majority of benefits from freeing agricultural markets are still to be obtained in the market access pillar (Anderson, Martin and Valenzuela 2006; Hertel and Keeney 2006; Hoekman, Ng and Olarreaga 2007b; Laborde and Martin 2012). Yet agreement to lower import restrictions has been difficult to achieve. The Rev 4 text on market access represents a compromise between those members who sought aggressive tariff cuts and those who sought to protect the most politically sensitive commodities.

A central feature of the Rev 4 text was a tiered formula for cutting bound agricultural tariffs which provides for large proportional cuts on higher tariff rates. The level of ambition in the tiered cut formula was high, with a minimum average cut of 54% for developed countries and maximum average cut of 36% for developing countries. However, to address sensitivity concerns of members, the text also introduced a wide range of exceptions and flexibilities in the form of Sensitive Products and Special Products that weakened the disciplines. Moreover, the discretionary aspect of the flexibilities created uncertainties about members' market access gains.[37]

[36] Least-developed countries did not have to cut their tariffs.

[37] In a recent paper Laborde and Martin (2015) argue that negotiators in the DDA chose formulas that, while ideal from an economic efficiency viewpoint in that they most sharply reduce the highest – and most economically – costly tariffs, came at a high cost for politically sensitive commodities. The political costs associated with the formulas appear to have led to strong pressure

Recent analyses by Laborde (2014) and Laborde and Martin (2015) provide estimates of the impact of the market access provisions of Rev 4 on average bound and applied tariff levels. Based on the formula reductions proposed in Rev 4, average bound tariff levels are estimated to decline by almost 49%. Tariffs for high-income countries are estimated to decline by 61% while developing countries (excluding LDCs) would see tariffs fall by 38%. Even after flexibilities, the average tariff level for high-income countries was 40% lower while that for developing countries was 14% lower.

Table 6.2 shows that the result is far more muted when applied rates are considered. Most of the gains are in high-income countries where applied rates are closer to bound rates and where flexibilities (such as sensitive product designation) would still require tariff cuts even if at a reduced rate. Potential access gains are considerably less in developing countries due to the larger gap between bound and applied rates and the flexibility afforded to special products (which require no tariff cuts).

The relatively small gain in market access was one of the reasons why the negotiations broke down in 2008 (Blustein 2009). Nonetheless, reducing tariff binding overhang is of value because it reduces the ability of countries to raise applied tariffs to bindings in the future (Francois and Martin 2004).

Table 6.2: Average applied agricultural tariffs before and after tariff cuts under two Rev 4 scenarios

Country groups:	**Baseline**	**Formula cuts (%) with no flexibilities**	**Formula cuts (%) with flexibilities**
All countries	14.6	9.0	11.9
HICs	15.5	7.5	11.1
DCs (excl. LDCs)	13.3	11.3	13.2
Selected countries:			
Brazil	7.4	7.3	7.4
China	7.0	5.7	6.7
EU 28	13.9	4.9	6.9
India	49.9	47.3	49.9
Japan	23.2	12.7	17.6
US	3.3	1.9	2.6

Source: Laborde (2014).

for many complex exceptions, which both lowered members' market access gains and increased uncertainty about them.

6.3 Domestic support

A landmark achievement of the Uruguay Round, and specifically of the URAA, was the full inclusion of agriculture in the global system of multilateral rules and disciplines, including those governing agricultural support.[38] Domestic support levels were bound and subject to reduction commitments (20% reduction over 6 years for developed countries, 13% cuts over 10 years for developing countries). Significantly, countries were encouraged to adopt support policies that had minimal production- and trade-distorting effects and which were exempt from reduction commitments (the so-called green box).

Trade-distorting support as measured by the total aggregate measurement of support (AMS) has declined substantially for the major subsidizing countries over the last 20 years (Brink 2014a, 2017). Major domestic policy reforms in Japan, the EU and US have resulted in support levels for those countries significantly below bound levels. All are well below 50%, although there is some variation particularly for countries whose support levels are tied to market prices (such as the US and Canada).

Despite those reductions in AMS levels, concerns about domestic support levels remain. First, the URAA also contain provisions which exempt large levels of support from reduction commitments. Those exemptions include certain direct payments to farmers where the farmers are required to limit production (sometimes called "blue box" measures covered under Article 6.5 of the URAA), certain government assistance programmes to encourage agricultural and rural development in developing countries (covered under Article 6.2 of the URAA), and other support on a small scale ("de minimis") when compared with the total value of the product or products supported (5% or less in the case of developed countries and 10% or less for developing countries). Blue box support accounts for about 26% of non-green box support over the period for the EU, and 14% for Japan. De minimis support accounts for almost 50% of US non-green support, about two-thirds of support for Canada and Brazil, and 100% of China's support.[39] Support under Article 6.2 accounts for 28% of Brazil non-green box support, 97% of India's support and 100% of Indonesia's support.

Second, the current caps on domestic support apply only to the aggregate level of support across all commodities. The URAA provides no disciplines on spending on individual commodities for members with AMS bindings.[40] Thus

[38] For a detailed history of the negotiations, see Josling, Tangermann and Warley (1996). At the outset of the Uruguay Round it was suggested that domestic supports would be less economically costly than trade measures because they would tend to be scrutinized in annual reviews of government budgets (Snape 1987)

[39] China, India and Indonesia do not have bound AMS levels. China is ineligible for Article 6.2 support.

[40] For countries without AMS bindings, the *de minimis* level provides an effective cap on individual commodity support.

countries could theoretically concentrate support to one commodity and remain compliant with URAA disciplines.[41]

Third, concerns have been expressed about the growth in green box spending, particularly in the areas of decoupled income support (paragraph 6 of Annex 2) and agricultural insurance programs (paragraphs 7 and 8). Both the EU and US have notified large amounts of decoupled support under paragraph 6. In 2012/13, the EU notified its Single Payment Scheme and other decoupled programs totalling more than €33 billion under paragraph 6 of Annex 2. In 2013, the US notified direct payments totalling US$5 billion under paragraph 6 (the direct payment program was eliminated in the 2014 farm bill). Recent empirical research has questioned whether decoupled support is truly decoupled (Goodwin and Mishra 2006; Gardner, Hardie and Parks 2010; Hendricks and Sumner 2014).

Agricultural insurance programs have grown from $2 billion in premiums in 1986 to over $30 billion in 2014 (Glauber 2015). Programs in the US and China account for about half of this total. The evidence on the effects on agricultural insurance on production is mixed (Goodwin and Smith 2012; Lau, Schropp and Sumner 2015). While some countries report their insurance programs as amber box programs, Glauber (2015) points out that a number of programs are reported as green box despite providing no evidence to show that they are compliant with Annex 2 criteria.

While non-green box support levels in high-income countries have largely declined from 1995, support in advanced developing countries such as China, India and Indonesia has increased, although from very low levels (Brink 2014a,b, 2017; Anderson and Strutt 2014; OECD 2016). Support has largely been in the form of input subsidies in India (and investment subsidies in Brazil). China's price support programs have grown considerably in recent years, particularly since the fall in global prices since 2013 – prompting the United States on 20 September 2016 to initiate WTO dispute proceedings regarding China's domestic support for such crops as wheat, rice and corn. With build-ups in government-held grain stocks in emerging markets such as China, questions have arisen as to the sustainability of such policies. To that end, China has recently announced reforms in domestic support policies for maize (Shuping and Stanway 2016).

The Rev 4 text tried to address many of these concerns by capping and reducing blue box support, reducing amber box support, and reducing de minimis levels. Product-specific caps were introduced on amber and blue box support, and a new measure of support was bound and reduced: Overall Trade Distorting Support (OTDS), defined as the sum of amber, de minimis and blue box supports. Similar to the approach to market access, tiered cuts for AMS and OTDS were proposed, with support in the highest tier having the steepest percentage cuts.

Because many of its support programs are tied to market prices, the US is

[41] However, such support could be vulnerable to challenge under the Agreement on Subsidies and Countervailing Measures.

particularly vulnerable to the proposed caps under Rev 4. In a recent analysis, Glauber and Westhoff (2016) found the likelihood of US support levels exceeding proposed support caps under Rev 4 at least once over the next 10 years is quite high, reflecting lower projected international food prices and new domestic support policies under the 2014 farm bill.

If the WTO rules on domestic support are to be effective, compliance must be monitored and enforced. Article 18 of the URAA requires domestic support measures to be notified to the WTO Committee on Agriculture. The Committee on Agriculture identified a need for annual reporting of applied support and prompt notification of new or modified measures (Brink 2011). Notification requirements, however, are not binding, and there have been significant delays in reporting, including for major subsidizing members.[42] Questions have arisen as well as to whether domestic support has been notified appropriately in accordance with Article 6 and Annex 2. Crop insurance subsidies have been reported by members as product-specific amber box, non-product-specific amber, green box and as Article 6.2 support, often with little documentation on how the specific measure operates (Brink 2017). For example, China has failed to report subsidies for its agricultural insurance programs, which totalled almost US$3 billion in 2012 alone (Glauber 2015). Concerns have also been raised about the reporting of price support programs under public stockholding programs (discussed below).

6.4 Cotton

In the area of cotton, some progress was made in the December 2015 meeting in Nairobi towards eliminating cotton export subsidies and providing duty free/quota free access for LDCs (Townsend 2016). However, there was no progress on its domestic support. At the Hong Kong Ministerial in 1995, it was agreed that cuts on cotton domestic support would be deeper and would occur sooner than formula cuts for other commodities, but little further progress was made, except that, as part of the settlement with Brazil in the *US-Upland Cotton* case, the US agreed to modify its support programs in the 2014 farm bill.

Townsend (2016) notes that US cotton area sown and US cotton subsidies have both fallen dramatically since the late 1990s and early 2000s when Brazil brought the case before the WTO. Lau et al. (2015) point out the potential

[42]For example, the US failed to report support under its 2002 farm bill until October 2007, and the EU failed to report support under its 2003 CAP reforms until 2009. As of July 2016, the latest year of support notified by India or China was 2010 (WTO 2016). Brink (2017) notes that as of November 2015, the latest notifications for the world's ten largest agricultural producers related to 2013 (Brazil, Russian Federation), 2012 (European Union, Japan, United States), 2011 (Indonesia, Nigeria), 2010 (China, India), and 2001 (Turkey).

distortions of the new Stacked Income Protection Plan (STAX), although participation in STAX has been low in its first two years of operation.

China has been the biggest subsidizer of cotton since 2009-10 (Imboden 2014), and its policies have driven world cotton stocks to nearly double the average levels—and 45% above the previous record—for the years since 1950 (MacDonald, Gale and Hansen 2015). Recent market-oriented reforms in China are expected to align its production decisions more in line with market prices, but the large overhang of its burdensome stocks is expected to continue to weigh on imports and on cotton prices in international markets for some time.

6.5 Safeguards

Under the URAA, members were entitled to use of the Special Safeguard (SSG) for agricultural products that had been tariffied. While SSG usage has declined, it is still used by some countries for sensitive products such as dairy, rice, and processed grain products.

Since developing countries that did not tariff have been unable to access the SSG (Dhar 2016), they argued, and won concessions in the WTO's 2005 Hong Kong Ministerial, for a price- and volume-based SSM to protect sensitive products, in the context of a single DDA undertaking.

Disagreement over details of the proposed Special Safeguard Mechanism (SSM) was one of the principal causes of the breakdown in DDA negotiations in July 2008. Proponents argued that a mechanism was needed to insulate producers from price fluctuations and import surges, given that most developing countries were not eligible to utilize the SSG. Critics have argued that such an SSM could restrict normal growth in trade and be used improperly as trade protection, thus potentially destabilizing global markets and harming domestic consumers (Hertel, Martin and Leister 2010; Martin and Anderson 2012). Moreover, Thennakoon and Anderson (2015) point out that the domestic producer benefits may be illusory, in so far as not just food-importing countries but also food-exporting countries actively raise their protection in response to a slump in international prices.

6.6 Public stockholding

The increases in commodity prices and price volatility since 2007 have led countries to implement numerous policies ostensibly aimed at food security. Following the price spikes of 2007/08, 2010/11 and 2012/13, a number of countries expressed renewed interest in the role of public stockholding programs to address food needs in such times of shortages, while others implemented export bans or export restrictions.

Public stockholding programs may serve to buffet the effects of drought and other food shortages, but concerns have been raised when they also provide market support to farmers. Those concerns include the possibility that products, ostensibly purchased for domestic public stockholding purposes, are ultimately released on to global markets, distorting international prices and undermining global food security. The issue of public stockholding was raised in both the Bali and Nairobi trade ministerial meetings, and it continues to be a contentious issue at the WTO (Diaz-Bonilla 2014; Matthews 2014, Glauber 2016a).

The Nairobi Ministerial saw WTO members reaffirm their commitments to engage constructively to negotiate a 'permanent solution' on public stockholding for food security purposes, as well as previous decisions which commit members to refrain from bringing trade disputes under WTO rules on farm subsidies until a lasting agreement on this issue can be found. Yet positions have not changed much between WTO Members since an interim compromise was agreed to at the Bali Ministerial in 2013. Developing countries, led by the G-33 coalition, argue the way in which farm subsidies are currently calculated at the WTO fails to take into account the impact of price inflation that has occurred since reference prices were established in the URAA over two decades ago. High-income countries and many developing country exporters are concerned that such programs may distort production and trade, and hence are reluctant to exclude food purchases from domestic support calculations.

A number of recent analyses have explored how the URAA could be modified to accommodate public stockholding programmes within Annex 2 without undermining domestic support obligations (Bellman et al. 2013; Montemajor 2014; Matthews 2014; Diaz-Bonilla 2014; Brink 2014a; Glauber 2016a). Any such modifications have yet to be agreed on, however.

6.7 Export restrictions

The international food price spikes of 2007/08, 2010/11 and 2012/13 led many countries to respond by banning exports or imposing high taxes on them. As Martin and Anderson (2012) point out, such export restrictions exacerbate world price volatility by shorting world supplies. That encourages other countries to follow suit by banning exports in their country or by panic buying in importing countries. Anderson and Nelgen (2012) estimate that changes in restrictions on global grain trade during 2006-08 were responsible for increasing rice prices by 40%, maize prices by 20% and wheat prices by 10%.[43]

In the DDA negotiations leading up to December 2008, no consensus was reached on disciplining export restrictions. Rev 4 proposed that members introduce

[43] The size of these estimates change little when a more-comprehensive modelling exercise is undertaken, as in Jensen and Anderson (2017).

new export restrictions to notify them within 90 days of implementation, and provide additional information on their operation. The text also provides for consultation with affected parties.

Leaders of the G-20 group of major economies agreed in 2011 not to impose export restrictions on humanitarian food aid being procured by the WFP. However, subsequent efforts to adopt this agreement by the entire WTO membership were unsuccessful, in part due to the opposition by large developing countries within the G-20 who did not want to expand the agreement to the WTO (Diaz-Bonilla and Hepburn 2016; Anania 2014). This is unfortunate because, as the analysis in Section 2.2 of Chapter 2 shows, such temporary export restrictions exacerbate price spikes, and yet when food-importing countries respond by temporarily lowering their import barriers they raise international prices further which offsets the domestic price-insulating effect of the exporters' action. In short, when a similar proportion of the world's food-exporting and food-importing countries so act at the same time, it is as futile as everyone in a stadium standing up to see better.

Chapter 7

WAYS FORWARD

Progress in WTO negotiations to liberalize markets multilaterally beyond URAA commitments has been limited because key parties have not been sufficiently willing to compromise – particularly on agricultural issues – during the DDA talks. That has caused many to shift their focus to preferential trade agreements. Such sub-global agreements are poor substitutes for a multilateral agreement though, for at least three reasons: they can provide only a (usually tiny) fraction of the global gains that a multilateral agreement could deliver; they typically deliver very little market opening for farm products; and their discriminatory nature ensure they hurt at least a sub-set of countries not included in the agreement.

In the first section of this chapter, some ideas are presented within the context of the DDA aimed at bringing negotiators back to Geneva to finish the agricultural policy reform process. But they are not silver bullets, nor are they necessarily free of controversy. In each case a proposal is offered for consideration, with the extent of cuts subject to negotiation and so placed in square brackets.[44]

The second section of the chapter returns to a theme in Chapter 2, namely to focus on the gains that can come from unilateral action, but in a way that draws on new opportunities for developing countries. Those new opportunities arise from recent technological revolutions that have been major contributors to the current globalization wave – but have yet to be fully taken on board in many of the world's poorer economies. If the more-advanced members of the WTO were to assist others to harness these opportunities, including through aid-for-trade initiatives, the DDA's agricultural stumbling blocks may well be lessened even if it is not possible for that WTO round to be concluded as a comprehensive single undertaking.

7.1 Some proposals for dealing with agricultural DDA issues

With the agreements made in new export competition disciplines in the Nairobi package of December 2015, many might argue that the low-hanging fruit of agricultural negotiations has already been harvested. Yet much remains to be done to free up the world's agricultural markets. Paragraph 31 of the Nairobi Ministerial

[44] These proposals draw heavily on Glauber (2016b).

Declaration reaffirms the strong commitment to advance negotiations on the remaining issues including market access and domestic support as well as export competition. Falconer (2016) has recently spoken of the importance of confidence-building measures in reducing some of the 'water' (or 'binding overhang') in tariffs and domestic support. The proposals put forward here are modest in that regard but are aimed at achieving a more comprehensive package across all three pillars of the WTO's agricultural trade negotiations.

What farm trade reforms would do the greatest good? The clear consensus of empirical studies is that the ***market access*** pillar offers by far the largest share of benefits for developing countries and the world economy. In an analysis of the proposed Rev 4 text, Laborde (2014) concludes that 89% of the global gains would come from a reduction in tariffs. That is not much lower than the 93% calculated by Anderson, Martin and Valenzuela (2006) a decade ago when farm policies were more import protectionist.

The proposed formula for reducing bound tariffs under Rev 4 looks aggressive, but its effects on applied tariffs are muted by tariff binding 'overhang', and by complex flexibilities that reduce ambition and introduce large uncertainties as to how flexibilities would be implemented. We therefore offer an alternative proposal:

> ***Proposal 1:*** In lieu of complicated formula, consider a simpler tariff reduction formula that sets an average reduction level and gives WTO members the flexibility to meet the average reduction. Unlike the URAA formula which was based on an average tariff cut, developed country members could be required to cut their average bound tariff by [36]%, and developing country members by [24]%. A more ambitious approach could include minimum cuts for all tariff lines, and tariff caps to bring down the most extreme tariff bindings.

How can recent ***domestic support*** reforms be built upon? Applied domestic support levels for the major developed country subsidizers are currently below URAA bindings, and some key developing countries have brought in domestic support reforms as well. However, without structured disciplines, those reform efforts are at risk of being reversed, especially when international market prices fall or domestic policies change. There have already been some increases in supports over the past decade in some rapidly emerging economies.

The Rev 4 formula provides for substantial cuts in this policy space but through a complex set of sub-disciplines relating to amber box, blue box, *de minimis*, product-specific support, and overall trade-distorting support. It also provides for specific carve outs and exceptions, leading to uncertainty regarding the overall potential impact. We therefore offer the following proposal:

Proposal 2: Commensurate with the approach taken for market access, reduce and harmonize domestic support levels using a simplified set of formulae. Eliminate exemptions under Articles 6.2 (development subsidies), 6.3 (*de minimis*) and 6.5 (blue box), and cap total amber support at [5]% of the total value of agricultural production for developed countries, [8.5]% for China, and [10]% for other developing countries. The value of production could be determined each year, much akin to a PSE-type concept, or it could be based on a recent base period [e.g., 2013-15]. To avoid concentration of support in a handful of commodities, product-specific caps could be put forward, perhaps based on higher percentages [7.5%/15%]. If there are to be additional flexibilities, allow for a more gradual phase-in of cuts for developing countries. Support for cotton could be limited to [5%] of the value of agricultural production. Basing support caps on the value of production would have the additional advantage of harmonizing support levels across commodities. The Green box could be maintained but subjected to a comprehensive review by the OECD. And reporting requirements for domestic support could be tightened to get more timely, detailed, accurate and complete notifications (e.g., as laid out in Annex M of Rev 4). Ideally that would involve mandated annual notifications to the Agriculture Committee of all forms of applied support in each category, and prompt reporting of all new or modified measures.

How could reforms in ***export competition*** best contribute? Significant progress was made in Nairobi in December 2015 by agreeing to phase out export subsidies, but there remain some areas where further progress could be made. For example:

Proposal 3: On export credits, deeper cuts on repayment terms could be phased down to [12] months. On STEs, export subsidy monopolies could be eliminated, at least for those commodities where member exports exceed [5%] of global exports of that commodity.[45]

What to do about ***safeguards***? Following Nairobi, discussions on safeguards and public stockholding are scheduled to continue to take place in the Committee on Agriculture. Little consensus has emerged to date. The Special Safeguard (SSG) for agricultural products that have been tariffied is rarely used, yet it provides an excuse for developing countries that have not yet tariffied their farm products to demand a Special Safeguard Mechanism (SSM). An SSM would open up the possibility of tariff bindings being flaunted, which is why agricultural-exporting members oppose it so strongly. What does not seem to be appreciated is that if used

[45] Footnote 2 in Annex K sets a *de minimis* value of 0.25% of the total value of all agricultural trade during 2003-05. As pointed out by Diaz-Bonilla and Hepburn (2016), that value is over US$1.5 billion.

when international prices slump, it will depress those prices further which will (a) encourage other importers to raise their tariffs *and* (b) trigger some exporting country governments into supporting their exporters – the effect of which would be to offset the domestic effect of the actions of those invoking SSM, via further depressing the international price. Just as with recent responses to upward price spikes, such actions by each national government to price slumps can be made ineffective when a similar proportion of exporting countries act to offset the importers' actions. Instead we offer the following proposal (to be elaborated on in Section 7.2 below):

> ***Proposal 4:*** The SSG could be eliminated immediately, and food-importing developing countries could be encouraged to put in place more-efficient domestic measures rather than seek to use trade measures via an SSM to deal with international price slumps or import surges**.**

What should be done about subsidized ***public stockholding***? It is commonly assumed in developing countries that public stockholding of basic foods is essential to ensure national food security, rather than relying on international markets to boost domestic availability in future periods of domestic shortfall. Large countries especially worry about food import dependence, fearing they may not be able to afford to pay what it would take if their shortfall coincided with shortfalls elsewhere. India, for example, is proud of its record at stabilizing domestic prices of its staple foods, which has been possible partly by holding large stocks of wheat and rice (Saini and Gulati 2016; Gouel, Gautam and Martin 2016). But public stockholding can be extremely expensive, and almost inevitably it leads to corruption and physical spoilage. As well, decisions as to when to alter the level of stocks can be manipulated by the government to suit its political purposes. That tends to crowd out private stockholding both domestically and abroad, because private agents cannot then predict when the government will build up or run down those public stocks. Even so, we propose:

> ***Proposal 5:*** Make the Bali compromise permanent and extend it to developing countries. Exempt LDCs from reporting public stockholding programs as part of their AMS. Public stockholding programs would remain vulnerable to challenge under the Agreement on Subsidies and Countervailing Measures.

How best to address ***export restrictions***? When altered in times of price spikes they exacerbate international price volatility and undermine confidence in the international market as a trustworthy source of food. Little consensus has been reached in this area, except to avoid using them to inhibit humanitarian aid. Now that Argentina has abandoned its taxes on farm exports, perhaps the time is ripe to re-visit this issue with the following proposal:

Proposal 6: As a first step, require consultation and monitoring as proposed in Rev 4, and adopt G-20 language prohibiting export restrictions on humanitarian food aid being procured by the World Food Program. Ultimately, members could go further and adopt disciplines on export measures that parallel those on import measures (including bindings and phased reductions).

7.2 New reasons and opportunities for re-instrumenting support

The core message from this study is that open agricultural markets maximize the role that trade can play to boost developing country welfare and global food security and ensure the world's agricultural resources are used most sustainably.

Declining costs of trading internationally reinforce that message, with thanks in particular to the information and communication technology (ICT) revolution and to evolutionary innovations in transport, handling, and supermarket retailing. As well, the WTO's Trade Facilitation Agreement, once ratified by members over coming months, will add to that lowering of trade costs (Zaki 2014), complementing the dramatic recent developments in regional and global value chains (Baldwin 2016).

If global warming and extreme weather events are to become more damaging to food production as climate change proceeds, then that provides all the more reason for countries collectively to open up food markets so as to lower the variance of international food prices and allow trade to buffer seasonal fluctuations in domestic production.

Yet the projected decline in food self-sufficiency in many emerging economies may concern some groups in those countries enough for them to push for increased barriers to their nation's food imports. This section therefore begins by rehearsing why import protection is unlikely to boost most households' economic access to food, and hence is likely to undermine rather than enhance national food security and nutrition. Indeed any policy that distorts markets tends to reduce national income and hence the aggregate capacity to afford food.

By contrast, expanding public investments in areas where the marginal social rate of return is above the opportunity cost of funds not only raises the level of national income in the short-run by enhancing the nation's aggregate stock of capital but also raises the long-run rate of economic growth. If those public investments include agricultural R&D, rural infrastructure, and rural education and health, that incidentally would boost farm productivity growth and thus food self-sufficiency. In doing so, however, it would also boost national and global food security, nutrition and health. According to a just-released modelling study, with trade liberalization included those initiatives could end global hunger by 2030 at a very modest cost (Laborde et al. 2016; see also Kharas et al. 2016, Ch. 4).

After contrasting these two alternative initiatives that both lead to less dependence on imported food, this section examines the increasing efficacy of generic social protection measures as another way to assist poor rural households that avoids using trade-restrictive measures.

Food market-distorting measures

Numerous market price-distorting measures are used by governments in their attempts to ensure social stability through improving national food security and reducing farm-nonfarm income inequality and poverty. The most common are trade measures such as an import tariff, which is the equivalent of a production subsidy plus a consumption tax at the same rate as the tariff (as is also an export subsidy).

In theory, a measure that distorts just the production or consumption side of the domestic market at the same rate as a trade measure would reduce national income less than that trade measure. That is not always true in practice though. A case in point is the rice policy of Thailand's government that was first introduced in October 2011. There the government would buy rice from farmers at above the market price and store it for exporting later, pending a rise in the export price. However, because the international price did not rise, much of that stored rice was spoiled and the government had to dispose of some of the rest at a loss (Permani and Vanzetti 2016). Such production subsidies, when combined with inefficiently (and often corruptly) managed public storage activities, therefore may involve an even greater national loss than a trade measure. Moreover, that government expenditure could have been directed instead toward investments in high-payoff rural public goods (see below).

India's government also buys grain from farmers at above-market prices when the latter fall below a threshold level, and has similar wastage problems to Thailand. India subsidizes also the farmers' purchase of key inputs such as fertilizer, electricity, fuel, credit and seeds. During the past decade these input subsidies have amounted to around 10% of the value of farm production (Hoda and Gulati 2013, p. 1, Brink 2014b). They are more wasteful than an equivalent transfer to farmers via an output subsidy, because in addition to over-encouraging output they also distort the mix of inputs used in production. Moreover, when many of those subsidized inputs are provided by inefficient government agencies, as is the case in India (Hoda and Gulati 2013, p. 2; Jha et al. 2013), this adds further to their wastefulness.

How would farmers in a developing country such as India cope if their government opened up and allowed international price volatility to be fully transmitted to the domestic market? Even if that were to be done unilaterally ahead of other WTO member countries (in which case international prices would not yet have had the stabilizing influence that multilateral reform would bring through 'thickening' agricultural markets), Allen and Atkin (2016) provide evidence that such reforming countries would be better off. Using forty years of agricultural micro-data from India, they show (using evidence from altered relative farm-gate prices due to

the lowering of trade costs following road construction) that farmers simply shift production toward less risky crops. Even though the volatility of farmers' real incomes would have increased had their crop choice remained constant, by changing what they produced farmers were able to avoid this increased volatility and benefit from the opening up of trade.

Similarly, food consumer subsidies can be much more wasteful in practice than in theory. India is again a case in point, as it broadens its rice and wheat consumer subsidy scheme so as to extend discounts to two-thirds of India's households (involving a potential annual payment of more than US$20 billion, see Kishore, Joshi and Hoddinott 2014). Apart from the wasteful corruption and losses by the public procurement and distribution system associated with such schemes,[46] recent studies in both India and China demonstrate that such consumer subsidies do almost nothing to boost nutrition, as consumers tend to eat the same amount of nutrients but do so by switching, for example, from less-preferred coarse grains to subsidized rice and wheat (Jensen and Miller 2011; Kaushal and Muchomba 2015).

To avoid the budgetary outlays that producer or consumer subsidies involve, some other food-importing countries have imposed import restrictions on at least their key food grains (e.g., Japan, Korea and Indonesia for rice). In the interest of boosting farm incomes to reduce the urban-rural income gap, Japan and Korea have imposed import restrictions also on meat and milk products – but not on coarse grains and oilseed products required for animal feedstuffs, which means that sub-sector would still not be self-reliant insofar as it continues to depend on imported ingredients for feed.

This option was examined for China and India in Chapter 2. That modelling suggests that if those countries banned imports of grains, domestic resources would move toward rice, wheat and livestock production but self-sufficiency would fall for crops that provide inputs into animal feedstuffs, and also for other crops (Table 2.6). In the case of China the tariff equivalents of such import restrictions by 2030 would range from 115% for wheat to 160% for non-ruminant meats and milk products to 255% for red meats. These are well above China's WTO-bound tariffs and so would be inconsistent with China's WTO commitments under international law. Moreover, such a policy response would impose a burden on households that are net buyers of those grain, meat and milk products, because domestic consumer prices for those products would increase along with the producer price rise. In short, such a policy response to declining food self-sufficiency undermines national food security and nutrition by reducing economic access to food for the vast majority of households.

Growth-enhancing investment measures

Price-distorting measures re-distribute well-being between farmers, food consumers and taxpayers but at the expense of overall national welfare. By contrast, investments

[46] Hoda and Gulati (2013, p. 3) suggest that two-fifths of those foodgrain stocks leak away.

in rural public goods can *raise* national income, boost economic growth and, in some cases, enhance the food security of both farm and nonfarm households in the country (Fan and Hazell 2001). Three types of rural investments are considered here by way of examples: agricultural research and development (R&D), infrastructure, and human capital (basic education and health).

Public agricultural R&D investments in developing countries have risen considerably in recent times. As a result, the developing countries' share of global public agricultural R&D has risen by half over the past three decades, from an average of 31% in 1980-2000 to 45% by 2011 (Pardey et al. 2016a,b). Yet the marginal returns from boosting such levels of public investment in most developing countries are still extremely high (Hurley, Rao and Pardey 2012; FAO 2012), suggesting scope for high returns from more such expenditure.

The Green Revolution contributed hugely to food supplies and economic growth over many countries and several decades (Gollin, Hansen and Wingender 2016). The more-recent evidence from Brazil also is compelling: during the 1980s and 1990s, Brazil invested far more in public agricultural R&D as a percentage of national agricultural GDP than most other countries. Not surprisingly, Brazil's outputs of both crop and livestock products have more than doubled since the early 1990s, and its food self-sufficiency has been boosted commensurately. By biasing that research toward labour-saving technologies, that investment also helped farmers adjust to rising rural wages – something that becomes more pressing as economic growth proceeds, including in China where the supply of under-employed labour in rural areas has shrunk.

Raising agricultural R&D spending is clearly an option for countries to choose if they wish to slow their decline in food self-sufficiency. In addition to also boosting national income growth, such investments would lower domestic consumer prices for (at least nontradable) foods and so would benefit not only farmers but also net buyers of those foods, thereby contributing to both the availability and access dimensions of food security. This contrasts with food import restrictions, which reduce the range of foods available and raise domestic prices which benefit net sellers of food *but at the expense of net buyers of food*. More people will be harmed than helped by such a policy measure in countries where the majority of workers are (or will be in a few years) employed in non-farm jobs. And in most developing countries the poor (i.e., households below the international extreme poverty line) are net buyers of food on average (Anderson, Ivanic and Martin 2014, Table 1).

To illustrate this point, Anderson and Strutt (2014) model increases in total factor productivity that would be required in Chinese agriculture for the country (a) to achieve the same overall food self-sufficiency rate in 2030 as would result from a ban on grain and livestock product imports (94%) and, even more ambitiously, (b) to return to the same overall agricultural self-sufficiency as in 2007, namely 97%. In case (a), a cumulative 33% improvement in agricultural TFP for China over the period to 2030 roughly achieved that target. In case (b), it takes a 59% cumulative improvement in agricultural TFP over the period to 2030. This TFP increase

generates higher incomes and so leads to higher volumes of various foods consumed, thus boosting national food security – in contrast to its deterioration in the import protection scenario. While the tightening of food import restrictions are estimated to reduce China's real GDP by 0.9%, an increase in agricultural TFP of 33% (or 59%) raises estimated real GDP by 4.5% (or 7%).[47]

Turning to another investment area, poor infrastructure such as rural roads add to the cost of procuring off-farm inputs, and also to the gap between the farm-gate and market prices of outputs. It thereby depresses farmer incentives and reduces consumers' economic access to food. So too do poor-quality telecommunications in rural areas, through raising the costs of such things as price information in distant markets and e-banking and farm credit.[48] Likewise trade facilitation investments at a country's border: they can reduce poverty by both raising the price received by exporters and lowering the price paid for imported goods.[49] Better rural infrastructure also improves the opportunities for farm household members to earn part-time incomes off the farm, insofar as it lowers commuting costs (Fan and Zhang 2004). Experiences in many developing countries show that part-time off-farm earning opportunities for farm household members can reduce rural poverty and the farm-nonfarm income gap – and without reducing farm production greatly, thanks to the capacity to move to internationally available labour-saving techniques as rural wages rise (Otsuka, Estudillo and Sawada 2009).

China is one country that has been investing vast sums in infrastructure in recent decades, but whether there have been sufficient investments flowing into rural areas to ensure the marginal rate of return is driven down to that from further urban infrastructure investment is a moot point. Fan and Chan-Kang (2008), for example, examine returns from investments in local as compared with national roads in China. Their study suggests the benefit-cost ratio for local roads is four times greater than for highways. That does not mean rural people would not benefit from major highway networks though: Roberts et al. (2012) estimate that such investments could boost Chinese real incomes by 6% in the short run without increasing rural-urban income inequality. Even so, highway networks between pairs of major cities are found to benefit the larger city more (Faber 2012). The allocation of infrastructure investment funds even among rural areas may be less than optimal. Fan and Zhang (2004) found that the lower productivity in China's western regions could be

[47] These cumulative increases in agricultural TFP of 33% or 59% may seem high, but recall that they are spread over a 23-year projection period. They are also consistent with the estimates by Gollin, Hansen and Wingender **(**2016) of the contribution of the Green Revolution to economic growth. The annual rates required would be only 1 or 2% more than historically, which is not excessive – see, for example, Alston, Babcock and Pardey (2010) and Fuglie, Wang and Ball (2012).

[48] Hoddinott, Rosegrant and Torero (2013) show that expenditures that improve access to market information through SMS messaging and interventions has a benefit/cost ratio between four and eight. This intervention is relatively cheap to provide, costing around $4 per capita in 2013 – and scale economies are driving that cost down rapidly.

[49] World Bank and WTO (2015). The WTO's Trade Facilitation Agreement, if ratified by two-thirds of the members in coming months, is projected to boost the world economy substantially. As with the DDA, that agreement will benefit disproportionately developing \countries (WTO 2015).

explained by the lower levels there of rural infrastructure, education, and science and technology. They concluded that improving both the level and efficiency of public capital in the west would be key to narrowing the productivity difference between it and other regions of China, thereby reducing the country's income and wealth inequality.

As for basic education and health investments, they tend to be lower in quality as well as quantity in rural versus urban areas in many developing countries (World Bank 2007). This means the productivity of future farm workers and managers will be lower than is socially optimal, and farm production will be less. But it also means those wishing to work part- or full-time in nonfarm jobs will be less successful in finding and thriving in such positions and thus in repatriating earnings back to their relatives still working the farm. Both outcomes lower national economic growth and contribute to the farm-nonfarm household income gap (Rozelle et al. 2005).

Freeing up factor markets

Markets for labour, land, water and financial capital are still far from free of restrictions in lots of developing countries, which means productive factors are used inefficiently. Making it easier for rural workers to access urban jobs would go a long way to reducing the rural-urban income gap. In the case of China, that would mean relaxing the *Hukou* household registration system. A recent study of Russia, for the period 1995-2010, found that when barriers that hindered internal labour migration in the 1990s were eliminated, the economies of the poorer Russian regions grew out of their poverty trap and their income levels converged toward those in more-affluent Russian regions in the first decade of this century (Guriev and Vakulenko 2015). Reducing such barriers to worker movements would increase the payoff from boosting the above-mentioned under-investments in rural education, health and infrastructure too.

Regulations that restrict or prohibit the sale of farm land also are a constraint in numerous developing countries. As wages rise there is plenty of scope for mechanization to improve labour productivity, but far more so where economies of farm land size can be exploited. That is, farm land consolidation is required to allow more efficient use of farm machinery. In China land rental markets have developed to alter the operational size of some farms, but least so in areas where tenure security is weakest.

Markets in developing countries for water use in farming are even less developed than markets for land use. Whenever farmers are paying less than the true cost of irrigation water, they will be over-using it and thereby making less available for urban households and industries. Once water markets are developed with well-defined access, they provide greater certainty and hence more asset security for farmers (and other users).

The absence of tight land and water tenure rights makes it more difficult for farmers to access credit on reasonable terms requiring collateral. This adds to the

cost of food production. Again farmers have found innovative ways around their credit constraints, such as renting rather than buying farm machinery (Christiaensen 2013), but freeing up capital markets so that more rural micro-credit institutions could develop would reduce this constraint on growth outside urban areas.

Improving the efficiency of markets for all key factors of agricultural production – and for intermediate inputs such as fertilizer and seeds – are important ways to improve not only current farm incomes but also the pathways for farm households to accumulate wealth. Without that security, farmers will be less inclined to support the government's other economic reform efforts (Morrow and Carter 2013).

Expanding the role for generic social protection instruments

Fortunately for many developing countries there are politically feasible alternative policy instruments to market-distorting measures that are more efficient and effective in improving national food security and nutrition, lowering the gap between farm and nonfarm household incomes, and reducing extreme poverty. The information and communication technology (ICT) revolution recently has made it far cheaper and easier than in the past to target income supplements, as and when needed, to the poorest and hence most food-insecure households, whether they be urban or rural. Such payments were unaffordable in developing countries in the past because of the fiscal outlay involved and the high cost of raising taxes and administering small handouts. However, the ICT revolution has not only lowered the cost of knowledge in remote areas (World Bank 2011) but also made it possible for conditional cash transfers to be provided electronically as direct assistance to even remote households who have access to electronic banking. The extent to which households in developing countries have a bank account or its equivalent is now very high (World Bank 2015). As well, debit cards can be used to retrieve cash from collection centres (as in Pakistan, see Cheema et al. 2016)

Evidence of the practical workability of such conditional social safety net programs in developing countries is growing rapidly. Hoddinott and Wiesman (2010) explore such programs in Mexico, Honduras and Nicaragua, and conclude that exposure to these programs raised both the quantity of calories consumed and the quality of the recipients' diets – and the benefits were most pronounced among the poorest households. Adado and Bassett (2012) assess programs in six southern African countries, and they too find substantial improvements in the quantity and quality of food consumed by recipients in poor households there. They also note that the benefits could be even greater with complementary activities such as nutrition counselling and micro-nutrient supplements. Following a survey of results on consumption from a wide range of Latin American countries, Fiszbein and Schady (2009, Ch. 4) conclude that conditional cash transfers have had substantial positive impacts on consumption and on poverty alleviation.

Even unconditional cash transfers have generated significant impacts. For example in Pakistan, the Benazir Income Support Program, which has reached more than five million people since it was introduced in 2008, has enabled recipient households to increase their ownership of livestock and consumption of high-quality protein, lower the proportion of girls who are malnourished, and empower the females who are the recipients of the debit card into which funds are deposited every three months (Cheema et al. 2016).

Prospective offsetting effects that were a source of concern when such programs were created do not appear to have been sufficiently large as to offset the benefits of the transfer. For example, the schemes do not seem to reduce the labour supply of adults or to crowd out private transfers; and some programs increase productive investment, which boosts and sustains the impact on poverty. The latter is further supported by evidence from Mexico reported in Gertler, Martinez and Rubio-Codina (2012), who find that one-quarter of cash transfers were invested in productive activities, thereby ensuring sustained higher living standards even after such programs end. While the political challenge of switching from market-distorting trade measures to domestic policy instruments for addressing non-trade domestic concerns is evidently non-trivial, this emergence in a wide range of developing countries of new, lower-cost social protection mechanisms involving conditional cash e-transfers is encouraging.

China is more capable than most developing countries in being able to effectively deliver social protection payments electronically to its rural households. Huang, Wang and Rozelle (2013) point out that the government has set up a special account for each household in a local bank, and an annual allocation is made just prior to the planting season to each account from the Agricultural Financial Subsidy Fund. This provides China a way to avoid going any further down the agricultural protection growth path and thereby repeating the economically costly mistakes of higher-income countries, or going as far down the producer and consumer subsidy pathway that India has taken – and then having to reverse either of those processes, the political cost of which would be larger the longer such programs are in place. Moreover, such cash transfers would have an even more favourable national food security impact if combined with an increase in agricultural R&D investment.

The ICT revolution is making it more and more feasible for governments to provide social protection to any losers from any policy reforms who might otherwise fall into poverty (Klapper and Singer 2014; World Bank 2015). More than that, such social protection can even contribute to economic growth, thereby potentially also pulling more people out of poverty (Alderman and Yemtsov 2014). To the extent that the more-widespread scope for providing social protection lowers the political resistance to trade policy reforms, there may be room for more optimism in the future than there has been in the past about prospects for trade liberalization.

Even with new trade agreements, there will continue to be millions of poor and hungry people needing assistance to rise or remain above extreme poverty, especially when consumer food prices spike up or farmer's product prices slump.

The key point to conclude on is that policies to avert disastrous losses for such groups need not be as dependent on trade measures in the future as they have been in the past. Trade-distorting policy measures are very blunt instruments for dealing with either short-run price volatility or long-run concerns such as raising government revenue or reducing rural-urban income inequality and poverty. Myriad financial instruments are rapidly becoming available even in low-income countries for both farmers and food consumers to manage price risk (World Bank 2014). As well, instruments such as a value-added tax are becoming lower-cost ways to raise government revenue than trade taxes even in low-income countries. The more such complementary domestic measures are set at their optimal level from society's viewpoint, the easier it will be for a country to choose to liberalize agricultural (and indeed all) trade, the more efficient and sustainable will be the future use of the nation's resources, the faster the economy will grow, and the more equitable will be the outcome in that any potential losers could be compensated by the winners so that everyone's welfare improves.

7.3 Conclusion

As ample as those above new opportunities are for facilitating unilateral trade liberalization, it remains true that even more can be achieved for each national economy when countries do so collectively. The more of the world's markets that are liberalized, the 'thicker' international markets become and hence the less volatile they will be. That benefit – an international public good – would be even greater if WTO member countries were to agree collectively to desist from temporarily altering their food trade restrictions when prices spike up or down. That would require binding not only import tariffs but also export taxes on farm products and agreeing to phase them down over time. It would also require developing countries to abandon their demand for an agricultural Special Safeguard Mechanism, the impact of which would be to *raise* international food price volatility.

Is there a way to bring negotiators back to Geneva to finish the agricultural policy reform process? It would be easy to be pessimistic, especially given the anti-globalization mood of many polities at present, including in the United States and European Union. Much of that mood is driven by migration issues, and by concerns that open trade is 'unfair' in its outcomes. Hence the importance of alleviating those concerns by enhancing social safety nets – which, as discussed above, can now be provided at much lower cost than in the past. Even if the currently negotiated mega-regional free-trade negotiations involving the United States (TTP and TTIP) are unable to be ratified, other opportunities are in play. The Asian mega-regional (RCEP) has perhaps the best prospects for succeeding, because its participating countries have so much to gain from the emergence of regional and global value chains. Once that is in place, and once the current anti-globalization mood on both

sides of the north Atlantic eases, an RCEP agreement may well provide a foundation to build upon at the WTO for reducing trade-distorting measures globally.

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