

Please cite this paper as:

Brooks, J. and A. Matthews (2015-02-23), "Trade Dimensions of Food Security", *OECD Food, Agriculture and Fisheries Papers*, No. 77, OECD Publishing, Paris.
<http://dx.doi.org/10.1787/5js65xn790nv-en>



OECD Food, Agriculture and Fisheries
Papers No. 77

Trade Dimensions of Food Security

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OECD FOOD, AGRICULTURE AND FISHERIES PAPERS

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Abstract

TRADE DIMENSIONS OF FOOD SECURITY

by

Jonathan Brooks (OECD, France) and Alan Matthews (Trinity College, Dublin)

This report examines the different channels through which trade openness (and reforms to achieve it) can affect a country's food security. The overall conclusion is that trade openness has a positive net impact on food security, although specific constituencies, including some poor households, could see their immediate food security threatened by the withdrawal of trade protection. The challenge for policymakers is to design flanking policies which enable countries to reap aggregate gains yet mitigate specific losses. Those policies include social protection and the provision of risk management tools, allied with investments in productivity so that average incomes rise to the extent that any adverse shock to incomes is unlikely to jeopardise food security. Developing countries are increasingly able to deploy such targeted instruments. Lessons are also being learned with respect to the political economy of trade reform, such that changes can be introduced in a way that minimises adjustment stresses and helps build the consensus needed to lock in the benefits of trade policy reform.

Keywords: Trade, agriculture, food security, liberalisation

JEL classification: F10, F13, F14, Q17, Q18

Acknowledgements

The authors are grateful to Megan Davidova and Hilary Kinka, who provided research assistance; to Florence Bossard, who provided statistical support; and to Anita Lari, Christine Cameron and Michèle Patterson, for help with formatting and preparation. The report benefited from comments by Member country delegations, and from feedback on an earlier draft received at the ICTSD Bali Trade and Development Symposium, in December 2013. This report was declassified by Working Party for Agricultural Policies and Markets in November 2014.

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Executive Summary

The standard FAO definition of food security implies that people can only be considered as food secure when sufficient food is *available*, they have *access* to it and it is well *utilised*. (i.e. their absorption translates into improved nutritional outcomes). A fourth requirement is *stability* across those three dimensions over time, which means the ability to manage risks effectively.¹ Most people in developed countries can be considered as food secure, in the sense that these conditions are generally met, although the economic crisis since 2008 has seen a growth in the number of people seeking food assistance, while there are concerns about poor nutrition, as well as fears that shocks such as trade embargoes could threaten the food security of even wealthier citizens. This study focuses on the links between trade and food security in developing countries where hunger and undernourishment are more acute policy concerns.

On, balance, trade openness improves each dimension of food security. Trade in food and agricultural products increases the availability of food by enabling products to flow from surplus to deficit areas. Beyond the balancing role of trade, open markets improve access by raising the incomes of exporters (via higher prices than would be received in the absence of trade) and importers (through lower prices than would otherwise be paid). More broadly, the location of production in areas where resources are used relatively efficiently contributes to higher per capita incomes and faster economic growth. Open trade can also improve utilisation and nutrition by increasing the diversity of national diets. Finally, open markets generally improve the stability of availability of access, for the simple reason that the risks associated with own food production exceed those of pooled production on international markets.

Yet across each dimension there is a mixture of positive and negative effects resulting from trade openness, and the latter need to be managed. In terms of availability there are concerns about import dependence for countries without a comparative advantage in food production, and the possibility of food supplies being interrupted. With regard to access, there are concerns about the impact of greater openness on the incomes of those who were formerly protected. Rising incomes may increase the utilisation of food, but also contribute to a “nutrition transition”, under which not all effects are positive. And while open markets reduce the risks associated with poor domestic harvests, they make international instability a more relevant issue. The balance of such trade-offs, and options for managing them, is assessed in this paper.

OECD analysis suggests that the negative side-effects of greater openness should be managed as far as possible by non-trade policies that do not forfeit the aggregate gains. Such policies include micro and macro level responses.

At the micro level, flanking policies can help mitigate the burden of reform on those who formerly benefited from protection. This group could potentially include the food insecure, although the main beneficiaries of price protection tend not to be smaller food-insecure farm households but rather more commercial farms with significant food surpluses to sell. The challenge is to either raise productivity and thereby redress a lack of competitiveness, or create new opportunities in other sectors. Social safety

1. According to the FAO definition, agreed at the 1996 World Food Summit, food security exists when all people, at all times, have physical, social and end economic access to sufficient, safe and nutritious food to meet their dietary needs and food preferences for a healthy and active life.

nets can help producers who are otherwise unable to respond effectively to new market opportunities, while risk management tools can be used to help improve producers' resilience to risks emanating from both domestic and international sources. In terms of nutrition, public information and education are the first step towards addressing these issues, while further measures to influence food choices can also be considered.

At the macro level, there have been a few countries for which the financing burden has increased in recent years, mostly Small Island Developing States, but for most countries, the cost of food imports relative to total imports and the cost relative to foreign exchange earnings have been declining over a period of decades, and recent spikes in food prices have been small relative to this overall trend. Countries can insure themselves against surges in their food import bills by hedging on international markets, while the international community has several financing mechanisms that are potentially available in the event of rare but severe shocks. Countries can also diversify the commodity composition of both exports and imports, as well as the number of trading partners.²

Many developing countries have been reluctant to follow the recommendation that they use non-trade instruments to address any negative side-effects of trade reform, including on food security, often on the grounds that they do not have the capacity to implement them while the necessary capacity would take too long to develop. Instead, they have chosen to apply price policies and associated border measures. In this, they have been encouraged by the continued reluctance of many developed countries to forego trade and domestic support measures.

Efforts to affect incomes via price levels and accompanying border measures tend to be ineffective at helping the poor and food insecure. In the case where prices are supported at higher than market levels, the benefits to producers leak away to owners of factor inputs while the linking of support to production inherently tends to favour larger farmers. Moreover, in low-income countries, there are poor people who buy food and poor people who sell food, so changing prices to help one constituency by definition harms the other. Beyond immediate incomes, price support may be used to offset market failures, which in the case of developing countries may result in low level poverty traps. But fundamentally price support tackles the symptoms rather than the causes of those market failures.

There are more plausible arguments for seeking to influence the stability of prices when market-based risk management tools are weakly developed and social protection (including safety nets) is not widely available. From a political standpoint, price policy responses with associated changes in border measures are also a quick and visible way of responding to shocks such as the 2007-08 food price spike. These policies are not the most effective that are potentially available, even in low-income countries, and may even be counter-productive. Moreover, they are not a cooperative international solution: efforts to stabilise domestic prices export instability onto world markets, while export bans have resulted in some countries experiencing difficulties in sourcing imports.

There is nevertheless an ongoing debate about the relative effectiveness of trade policies as a "second best" solution pending the development of superior tools. Yet non-trade options are increasingly available to developing countries, even though the evidence shows that large numbers were not in a position to apply them when food prices spiked in 2007-08. Countries would benefit from taking the necessary steps to move towards instrument choices that are likely to be more effective in the long term. In order to do that, (i) supporting institutions need to be developed; (ii) the pacing and sequencing of reforms, and parallel development of non-trade policies, need to be managed; and (iii) the political economy forces that lead policymakers to favour short-term trade measures need to be contained.

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2. In terms of the risk of trade interruptions, the implications of reducing that risk through protectionist policies, possibly in pursuit of self-sufficiency targets, need to be weighed relative to the long term costs of such a strategy and its impacts on other sources of risk, notably those stemming from domestic markets. These issues are taken up in the OECD project exploring policy responses to risks of transitory food insecurity (OECD, 2014).

The principal recommendation of this study is that the deployment of non-trade policies should be scaled up to enable the poor to cope with any negative side-effects of trade openness, in particular market instability stemming from both domestic and international sources. Trade openness, when accompanied with parallel policy instruments, enhances the scope for developing countries to improve their food security. This paper has highlighted two specific areas where flanking policies could be helpful. One is in mitigating the impacts of periodic extreme international price movements (either upwards or downwards) by ensuring that adequate safeguards are available to manage these risks, yet in a way that does not translate into systemic distortions in the long run. Having such parallel policies in place could help build support for deeper liberalisation. The other is in managing occasional exposure to unsustainably high food bills. This may require the development of some form of insurance, with the support of international financial assistance. More generally, an approach which focuses on coping with the consequences of mostly rare, specific problems is likely to be more helpful to developing countries than resorting to systematic use of trade-distorting policies.

1. Introduction

Open markets have a pivotal role to play in raising production and incomes, enabling production to be located in areas where resources are used most efficiently and facilitating the flow of products from surplus to deficit areas. Open trade also raises overall incomes through the benefits to exporters (in the form of higher prices than would be received in the absence of trade) and importers (through lower prices than would otherwise be paid), while contributing to faster economic growth and rising per capita incomes. These are the main channels through which trade promises to improve food security.

But trade reforms, whether by a country itself or by its trading partners, change the terms of trade, creating a mixture of winners and losers. They also foster structural change that should ultimately benefit all, but not without pressure on the incomes and livelihoods of those who formerly benefited from protection and are forced to adjust.

The basic question for policymakers is how they can enable trade to make its vital contribution to food security and economic wellbeing, yet mitigate negative impacts such that nobody's food security is compromised. Conventional welfare analysis would suggest that policymakers should use targeted non-trade policies to offset negative impacts, on the grounds that they do not forfeit the efficiency gains from trade reform and can be targeted to specific beneficiaries. However, there are concerns that some countries, in particular poorer countries, may not have the institutional or fiscal capacity to make use of these instruments, and that some recourse to the levers of trade policy might be necessary.

In examining the links between trade and food security, a useful starting point is the FAO's definition of food security, agreed at the 1996 World Food Summit, which suggests that food security exists when 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. This definition implies that people will only be food secure when sufficient food is **available**, they have **access** to it, and it is well **utilised**. A fourth requirement is the **stability** of those three dimensions over time, which means the ability to manage risks effectively.

Trade can lead to a net improvement along each dimension of food security. Yet there are possible downsides that have made policymakers in some countries reluctant to open food and agricultural markets. Thus while greater openness increases food availability by enabling food to flow from surplus to deficit regions, that same benefit prompts concerns about the dangers of trade being cut off. Similarly, while more open trade should raise aggregate incomes and the overall conditions of food access, that will not be the case, at least immediately, for those who formerly benefited from protection. And while greater trade can improve the diversity of diets and with it the utilisation of food, the effect of greater openness on incomes leads to changes in diets that are not all positive. Finally, while openness to world markets reduces the risks associated with poor domestic harvests, it makes international instability a more relevant issue. The balance of such trade-offs, and the options for managing them, are assessed in this paper.

A particular aim of the analysis is to examine developing countries' options for dealing with negative impacts. Those options include alternative non-trade policies, such as social protection and help with risk management, but arguably the need to defer trade reforms or retain the option to deploy trade policy instruments under specific circumstances.

The structure of the paper is as follows. Section 2 examines the links between trade and food availability, while Section 3 considers the links between trade and food access. The two issues are closely linked, because while food may simply be unavailable, a lack of availability is more commonly resolved through higher prices – making the issue one of access for those who cannot afford food. Section 4 examines the combined risks to availability and access induced by more (or less) trade openness. Section 5 summarises some of the ways in which trade affects nutrition and hence food utilisation. In the light of this analysis, Section 6 draws insights from case study work to suggest ways in which trade reforms can be managed in a manner that supports food security at the national, regional and global level. Section 7 concludes with implications for the multilateral reform process.

2. Trade and food availability

Trade plays a vital role in balancing the deficits of net food importers with the surpluses of net food exporters. In the absence of trade, food prices would be *higher* in countries that are net food importers in order to bring national supply and demand into equilibrium, potentially worsening the food security status of consumers in those countries. In the absence of trade, food prices would be *lower* in net exporting countries because of the inability to export surplus production.

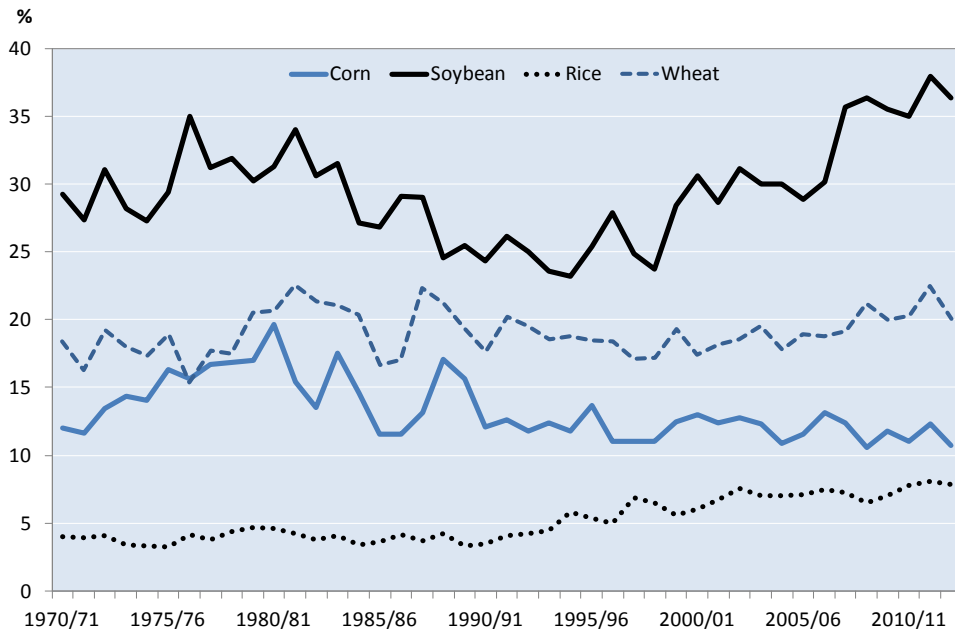
For most countries, domestic production is the main source for domestic consumption and trade plays a relatively minor role. Globally, the share of trade relative to production varies across commodities, with about 20% of wheat production traded globally, compared with more than 35% of soybeans but less than 10% of rice (Figure 1). Liapis (2012) finds that, for most commodities, the export share of production has not changed dramatically over recent decades. Rice, sugar, whole milk powder and soybean oil have experienced rising export shares, shares for maize and butter have declined, and there is no discernible trend in the shares for wheat, soybeans and beef.

Historically there was a tendency for developing countries to be net agricultural exporters and for developed countries to be net agricultural importers. But since about 1980, both groups of countries have been in an approximate balance, although developing countries' share of the value world trade has risen to around 40% of the world total (Figure 2).

The aggregate trends in Figure 2 do not tell the full story of structural changes in world agricultural trade. First, the developing country agricultural trade balance is heavily influenced by the export performance of Brazil, augmented in recent years by significant net exports from India and Indonesia, and by the rising net import position of China (Figure 3). The right-hand panel of Figure 3 shows that a deterioration in the agricultural trade balance occurred for all three important developing country groups - least developed countries [LDCs], low-income food deficit countries [LIFDCs] and net food-importing developing countries [NFIDCs].³

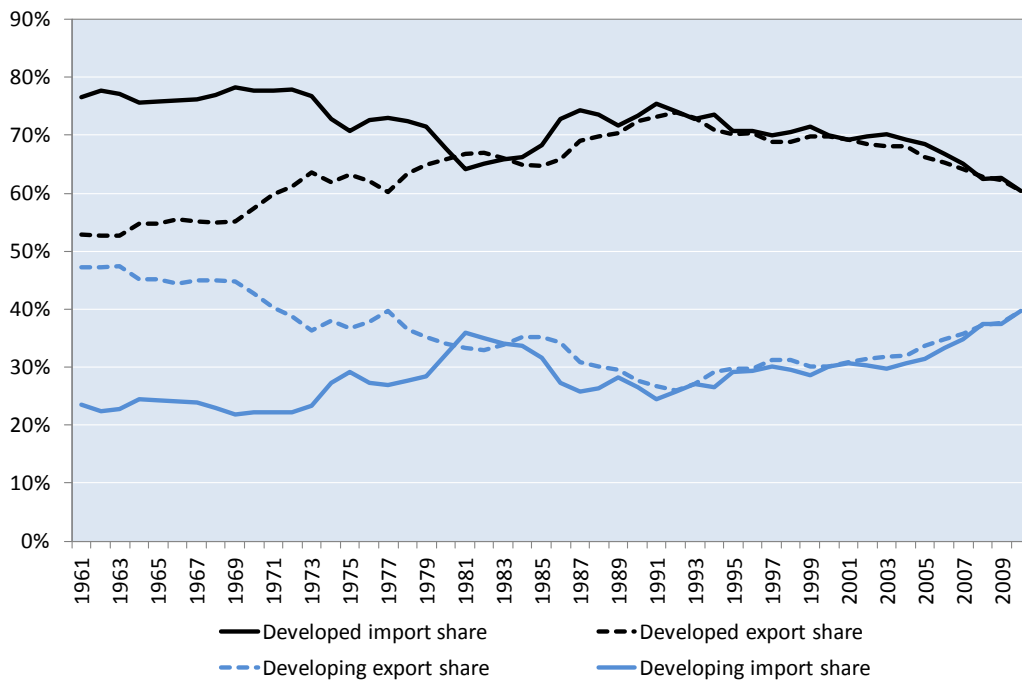
3. LDCs are defined by the United Nations, LIFDCs are defined by FAO and NFIDCs are defined in the WTO Agreement on Agriculture.

Figure 1. Proportion of global grain production traded globally



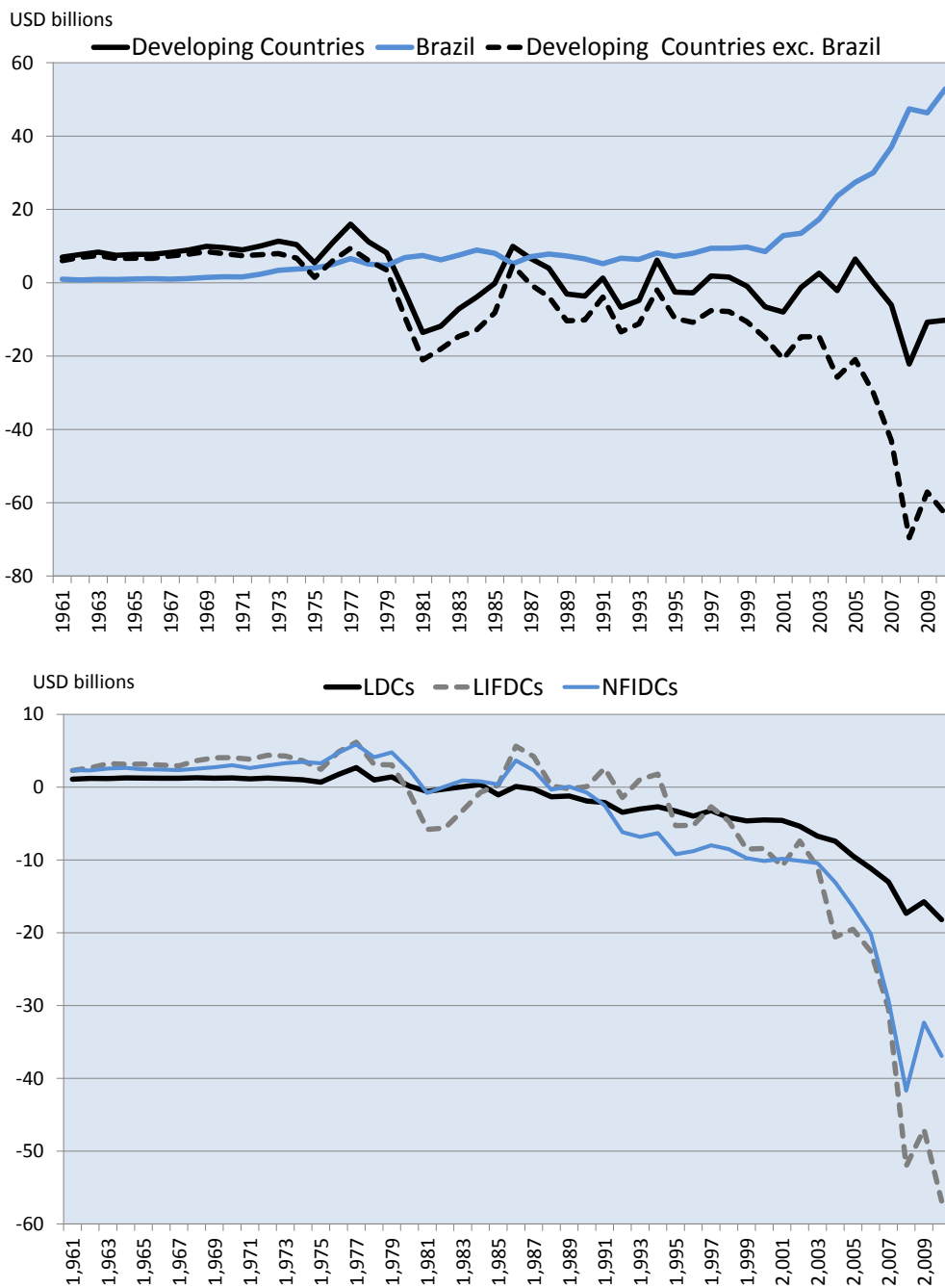
Source: USDA data.

Figure 2. Developed and developing country shares of the value of world agricultural trade



Source: Matthews (2012) based on FAOSTAT. Developing countries include transition economies.

Figure 3. Net agricultural trade of selected developing country groups, 1961-2010



Note: Developing countries include transition economies. LDCs (Least Developed Countries), LIFDCs (Low-Income Food-Deficit Countries), NFIDCs (Net Food-Importing Developing Countries).

Source: Matthews (2012) based on FAOSTAT.

This trend is also apparent if we consider changes in the net food trade status of individual countries. Developing countries are predominantly and increasingly net importers of food and agricultural products (Table 1).⁴

Table 1. Net food exporters and net food importers

	1980-85		2005-10	
	Food exporters	Food importers	Food exporters	Food importers
Industrialised countries	16	18	12	22
Developing high income countries	2	13	0	15
Upper middle income countries	28	20	14	34
Lower middle income countries	23	26	15	34
Low income countries	12	25	3	34
Other	2	1	2	1
Total	83	103	46	140

Source: Matthews (2013) from FAOSTAT. Definition of food excludes fish.

However, Valdés and Foster (2012) note that data on aggregate net food and agricultural trade can be misleading, and propose a distinction between non-food agricultural and food products. Their categorisation defines food in terms of food staples and excludes all processed food, so is a narrower definition of food than that applied in Table 1. The data suggest that while net importers of food staples dominate, this is not a rising phenomenon. Rather the change in trade status for agriculture and food as a whole comes more from the tendency of developing countries to become net importers of non-food agricultural products, as the contribution of cash crop exports declines (Table 2).⁵

Table 2. Net trade status in agricultural and food products

	1995-99	2000-04	2005-09
Agricultural exporter and food exporter	23	22	22
Agricultural exporter and food importer	36	30	22
Agricultural importer and food exporter	3	2	4
Agricultural importer and food importer	74	82	90
Total	136	136	138*

*Serbia and Montenegro are in the 2005-09 figures

Source: Valdés and Foster (2012).

4. Food refers to the total amount of a commodity available as human food during the reference period. Data include the commodity in question, as well as any commodity derived therefrom as a result of further processing. Food from maize, for example, comprises the amount of maize, maize meal and any other products derived therefrom available for human consumption. Food from milk relates to the amounts of milk as such, as well as the fresh milk equivalent of dairy products.
5. In determining net trade positions in all food and agricultural goods, Valdés and Foster use the entire list of FAO, but for the purpose of assessing the net trade position in *food* they consider the commodities most important for basic diets: cereals, meat, dairy and eggs, vegetable oils, and sugar. Their definition of food differs from that of FAO, which includes a large range of raw and processed items, from almonds to chocolate to yoghurt.

A country's net trade status may derive from its comparative advantage, but it may also be an outcome of distortionary policies. Countries that protect their agricultural sectors will produce more and consume less than would be the case if resources were allocated in line with their comparative advantage, implying fewer imports and possibly exportable surpluses. This has tended to be the case in the majority of OECD countries, although the degree of protection and other forms of trade-distorting support has declined significantly over the past 25 years (OECD, 2012a). Conversely, countries that tax their agricultural sectors will import more than would be the case with free trade. This has historically been the case in developing countries, at least for exportable products, although the propensity to tax agriculture diminishes, and even reverses, as countries develop (Anderson et al., 2008).

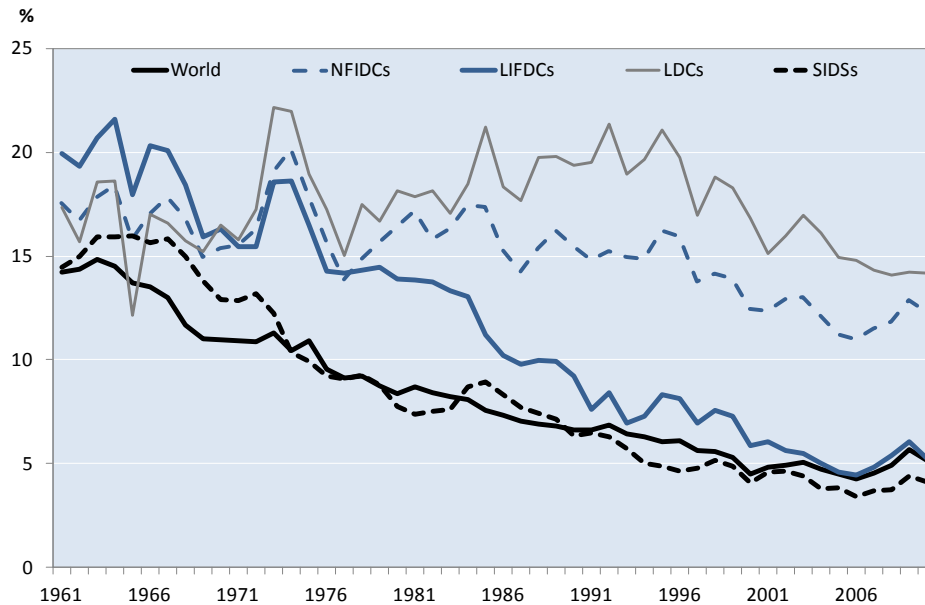
In terms of national food availability, rising net imports of food and agricultural products may reflect the reallocation of resources in line with a country's comparative advantage. But they also raise two concerns. One is that countries may not be able to afford the associated food import bills, a fear that has heightened during the recent period of high food prices. Another is that rising imports might not be an outcome of an efficient allocation of resources, but instead could be associated with a collapse in domestic production, whether as a result of exposure to foreign competition or wider development failures.

Two indicators shed light on the ability of developing countries to finance food imports. The first is the share of food import expenditure in total merchandise imports, with a high or rising share suggesting possible difficulties in acquiring the desired level of imports. A second is the coverage ratio, defined as the share of food import expenditure in a country's foreign exchange earnings. While import expenditures can be financed by aid inflows and by borrowing, in the longer run a country should find it easier to rely on food imports if it can finance these imports from its own foreign earnings.

Figure 4 shows food import shares expressed relative to total merchandise imports over the period 1961-2010 for a number of developing country groups. For the world as a whole, the importance of food imports in merchandise imports is falling, from around 15% in 1961 to around 5% today. The shares for Low Income Food Deficit Countries (LIFDCs) and for Small Island Developing States (SIDSs) follow broadly the same trends. Trends for NFIDCs and Least Developed Countries (LDCs) are flatter, mainly because shares remained stable between 1961 and the mid-1980s and only began to decline at that point. The experience of the different groupings during the 2008-10 food price spike has been mixed. Shares remained roughly stable for LDCs but increased slightly for the other three groupings. This evidence suggests that, for food-importing developing countries in general, meeting the cost of food import bills has become less onerous over time. For NFIDCs, the maximum share experienced by any country was less than 30%.

Figure 5 shows trends in the coverage ratio for particular developing country groupings. This chart shows a less reassuring picture for the shorter period 1995-2011. A sharp downward trend in the coverage ratio is evident only for LDCs but with some reversal in recent years. In the case of SIDSs and LIFDCs, the fall in the coverage ratio was gentler in the earlier years and again there was a deterioration in the coverage ratio during the recent food price spike, particularly for the SIDSs. Nonetheless, for developing countries in aggregate, there is no support in these figures for the view that food import bills are becoming unsustainable. Aggregate figures may, of course, conceal difficulties experienced by particular countries. For several countries, mostly SIDs, the ratio of food imports to merchandise exports was over 100% in 2008-10 (Matthews, 2013).

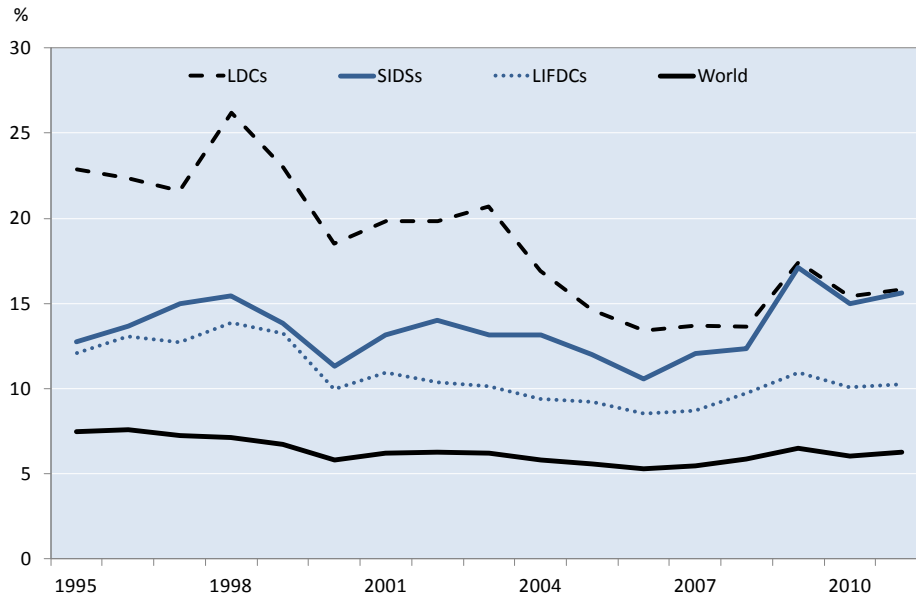
Figure 4. Food imports as share of total merchandise imports, 1961-2010



Note: NFIDCs (Net Food-Importing Developing Countries), LIFDCs (Low-Income Food-Deficit Countries), LDCs (Least Developed Countries), SIDCs (Small Island Developing States).

Source: FAOSTAT.

Figure 5. Ratio of food import expenditure to total export earnings from goods and services



Note: LDCs (Least Developed Countries), SIDCs (Small Island Developing States), LIFDCs (Low-Income Food-Deficit Countries).

Source: UNCTADSTAT.

A deeper structural concern is that the shift from being a net food exporter to a net food importer may reflect a basic failure in economic development, rather than a reallocation of scarce resources in line with a country's comparative advantage. On balance across countries, however, there is no evidence

of a shift in net trade status being associated with worse food security outcomes as measured by the prevalence of under-nutrition) over the period 1995-97 to 2008-2010 (Matthews, 2013). Four categories are identified, from great improvement to stable or no improvement, with roughly equal numbers in each group (Table 3). Of the 119 countries for which data are available, 11 out of 15 which remained net exporters had at best little improvement in food security; compared with 14 out of 34 among countries which shifted from being exporters to importers; and 34 out of 60 among countries that were importers in both periods. Approximately one-third of countries which switched from being exporters to importers showed a great improvement in food security outcomes – compared with less than 10% of countries which remained net exporters. Forty per cent of countries that changed from net food exporter to net food importer are Small Island Developing States, accounting for half the countries in that category. For these countries, growing food staples may simply represent a less efficient use of domestic resources.

Table 3. Changes in net food trade status and progress on food security

	Stable or not improved	Little improvement	Moderate improvement	Great improvement	Total
Exporter in both periods	9	2	2	2	15
Change from exporter to importer	6	8	9	11	34
Change from importer to exporter	1	2	4	3	10
Importer in both periods	18	16	13	13	60
Total	34	28	28	29	119

Source: Matthews (2013).

Globally, it is likely that trade will become more important in terms of ensuring food security. Net food importing countries have, in general, more rapidly growing populations and more rapidly growing food demand per capita than net exporters. Net food importers also have, on average, poorer resource endowments in terms of land and water availability, with yield performances that will potentially be more adversely affected by climate change. On the other hand, greater investments in increasing agricultural productivity could significantly affect production and productivity growth. For example, yield gaps are high in many net food importing countries in Africa, and closing these yield gaps would narrow the difference between consumption and production.

Model simulations which capture the combined impact of long-term supply and demand drivers (for a review of different approaches, see Von Lampe et al. 2014) produce a wide range of estimates of the likely net trade positions of countries in 2050. On balance, they suggest that trade is likely to become increasingly important as a supplement to domestic production in ensuring adequate food availability (and as a source of export earnings and income as will be seen in the following section). For example, the latest FAO projections to 2050 envisage the net cereals imports of developing countries increasing from 116 million tonnes in 2005-07 to 168 million tonnes in 2030 and 196 million tonnes in 2050 (Alexandratos and Bruinsma, 2012). While these projected outcomes can be influenced by policy interventions, they suggest that the balancing role of trade in contributing to food availability in developing countries will become more, rather than less, important over time (OECD, 2013).

Given the importance to most countries of trade in ensuring food availability, there are understandable concerns about trade being interrupted. This can arise as a result of war and conflict, embargos (e.g. the US grain embargo of the Soviet Union in 1980) and boycotts (e.g. of South Africa exports in the 1980s). Such scenarios may constitute “extreme events”, with a low probability but severe consequences if the event happens. A more likely scenario is that a particular trading partner may block or impede trade temporarily, with implications for the prices that an importing country is obliged to pay. For example, India cut off rice exports to Bangladesh in 2007 in order to lower prices on its domestic market (Dorosh and Rashid, 2012). These issues and possible responses are addressed in the section covering risks to availability and access.

Box 1. The importance of regional trade in food and agriculture products

Regional trade has the potential to improve food security, especially in countries where deeper integration with world food markets remains difficult. Well-functioning regional markets can reduce the cost of food, its volatility and the uncertainty of supply. The major benefit of intra-regional trade is to link food surplus areas with food deficit areas, particularly for food staples. Increased regional trade can boost agricultural growth in surplus zones while mitigating shortages in deficit ones. Studies in Sub-Saharan Africa, for example, show that prices for maize and cassava fall significantly when there are open borders (Dorosh et al. 2009).

In many regions, rural food surplus production zones supply major deficit urban consumption centres as their natural markets, but the presence of borders often adds significant costs to moving food within these natural ‘food sheds’ (World Bank, 2012b). For example, staple foods trade regularly across national borders in Eastern and Southern Africa. Principal maize surplus areas lie in South Africa, Northern Mozambique, Southern Tanzania and Eastern Uganda and to a lesser extent in Northern Zambia and Northern Tanzania. Sourcing supplies from these surplus areas, local traders supply deficit markets in Southern Mozambique, Malawi and Kenya (Dorosh et al., 2009). Nonetheless, cross-border trade in food staples in Africa remains limited for reasons discussed below, and prices for staples, especially in land-locked countries, can vary substantially between years of domestic good harvest and those of poor harvest (World Bank, 2012a).

Cross-border trade flows can also potentially help to reduce price volatility in staple food markets where countries in a region are affected differently by exogenous shocks such as weather. Different seasons and rainfall patterns and variability in production, which will increase as climate change continues, imply variable market conditions across countries. Where production variability is not highly correlated among most countries in the region, integration through regional trade offers the prospect of cancelling the effects of small country size on production volatility (Koester 1986). Studies have calculated the amount of stocks needed for each country within a defined region so as to stabilise cereal consumption in times of fluctuations in cereal production and import prices (Dorosh et al., 2009; Koester, 1986). These studies have compared those stock levels to the levels required by the same countries when co-operating regionally. Their results show regional stocks to be more efficient than the sum of national stocks without co-operation.

There are significant differences in the importance of intra-regional agricultural trade in different regions, even taking account of differences in region size, country size and the overall value of trade. Among developing country regions, more than half of Asia’s agricultural exports go to other Asian countries, but the intra-regional shares drop to 17% in South and Central America and 20% in Africa (WTO, International Trade Statistics for 2011). However, food trade is largely informal in a number of regions, which means that the importance of regional trade may be significantly underestimated. A recent study by the OECD’s Sahel and West Africa Club suggests that regional staple trade in West Africa could be two to three times bigger than official estimates (SWAC, 2012).

The constraints to increasing intra-regional trade are sometimes the lack of physical infrastructure, such as roads, but more often a consequence of government interventions. A recent study of agricultural supply chains in Central America shows that between 29% and 48% of the import prices of grains comes from logistics costs (World Bank, 2012b). In Africa, poor infrastructure was seen as the main impediment to intra-African trade, with transport costs accounting for 50–60% of total marketing costs (GTZ, 2010). However, the road infrastructure along the major international trade corridors has improved, and the high costs are often due to difficulties with ‘soft’ infrastructure, such as roadblocks and licensing arrangements which limit competition among transport operators. Export bans, unnecessary permits and licenses, costly document requirements, and conflicting standards raise transaction costs, add to uncertainty and often lead to the exit of private sector traders from participation in regional trade.

Regional trade agreements (RTAs) can help to facilitate intra-regional trade if they address these barriers and help to create a more predictable trade environment. The share of duty free tariff lines in South-South agreements is expected to increase from 28% to approximately 92% when fully implemented, while North-South agreements increase their share of duty free lines from over 68% to only 87% (Fulponi et al., 2011).

Nonetheless, these agreements have often failed to live up to their potential in practice, with governments often ignoring their obligations and resorting to unilateral measures when convenient. For example, cereal markets across South Asia (especially Bangladesh-India rice and Pakistan-Afghanistan wheat) are increasingly connected. As a

result, cereal price policies have major spill-over effects across borders. The 2007-08 experience with the surge in international market cereal prices illustrated the unreliability of some of these trading relationships, as export restrictions by India and Pakistan contributed to higher prices for consumers in Bangladesh and Afghanistan (Dorosh, 2008). Liberalising agricultural trade within a regional agreement needs strong political will and countries have to be prepared to give up some autonomy in designing and implementing their domestic food policies. With governments committed to pursue interventionist policies to stabilise prices, regional trade flows are often sacrificed when they appear to stand in the way of national food security – despite the longer-term costs.

Increasing regional trade flows requires enabling public sector actions across a number of fronts: investment in physical infrastructure where needed; regulatory reform; improvement of customs administration; harmonisation of standards; and greater transparency regarding trade policy. In many countries, the absence of a stable and predictable policy environment at the national and regional level has created mistrust between government and the private sector (World Bank, 2012b). Effective communication and interaction at the national level between national ministries, the business sector and civil society is required to build understanding and support for the role of intra-regional trade.

Source: OECD (2013).

3. Trade and food access

The foremost cause of food insecurity is a lack of access, which stems primarily from poverty and deficient incomes. It is instructive to recall that while food prices are a significant determinant of the affordability of food, and hence peoples' access to it, there were as many hungry people in the world as there are today in the early 2000s, when international food prices were at all-time lows. Moreover, even under the most favourable scenarios, it is unlikely that international cereal prices will fall in the medium term to the levels of ten years ago (OECD and FAO, 2013). Fundamentally, there is much more scope for improving food security by raising incomes than there is by lowering prices.

There is growing evidence that trade openness contributes to higher incomes and faster economic growth. For example, a 2008 World Bank study finds that over the 1950–98 period, countries that liberalised their trade regimes experienced average annual growth rates that were about 1.5 percentage points higher than before (Wacziarg and Welch, 2008). There is also evidence that agricultural liberalisation makes a significant contribution to aggregate gains (Anderson et al., 2006; OECD, 2006). Yes whilst most policymakers accept that there are benefits from trade openness in principle, they point out that reforms create winners and losers via terms of trade effects, and are concerned that the losers could include the poor and food insecure. Gauging who will win and who will lose, and over what timeframe, is a complex task. At the micro level, the incidence of own-country and other countries' reforms will depend on:

- The extent to which other countries' reforms raise or lower international prices.
- The extent to which own-country reforms raise or lower border prices (and their subsequent effects on the world market).
- The transmission of border price changes onto domestic markets.
- The net trade status, and potential net trade status, of poor and potentially food insecure households.
- Household and market responses to the new set of domestic prices.

No one model can capture all of these impacts satisfactorily. Global models capture the key international interactions, but seldom the household level consequences within countries⁶; while national models using household level data miss out on the global picture. Hence, it is necessary to

6. Micro-simulations within general equilibrium models are increasingly fashionable, although these typically make rudimentary assumptions about households' interactions with domestic product and factor markets (Brooks and Dewbre, 2006).

piece together the evidence from a patchwork of global models, estimates of cross-border and domestic price transmission, and national models incorporating disaggregated (household) impacts.

Global impacts

The countries responsible for the bulk of world agricultural production and trade have an overall tendency to provide support and protection to their agricultural sectors. This increases export supply (or reduces import demand) and suppresses international prices for most commodities. Most studies have suggested that multilateral trade reforms would raise international prices for most commodities modestly, i.e. by less than 10% (OECD, 2006; Anderson et al., 2006). Recent analysis suggests even smaller impacts, of the order of just 1%, partly because of reforms in developed OECD countries, partly because international food prices are now higher, and partly because of the imposition of export taxes by developing countries, which have the reverse tendency of raising international prices (Anderson, 2010). A major historical concern has been with the effects of OECD countries' agricultural policies on the economic welfare of developing countries. The findings of OECD analysis of this particular issue, and on the wider implications of reforms for developing countries, are discussed in Box 2.

Box 2. The evolving effects of OECD country agricultural policies on developing countries

For decades, the agricultural policies of OECD countries have been considered to thwart the development prospects of poorer countries. This is because of the high degree of support provided to farmers, and the potentially damaging spill-overs of that support onto developing countries. In recent years, there have been important changes in the level and composition of support, and in the types of policy spill-over effects that are of greatest concern.

In the early years of the Uruguay Round of trade negotiations, OECD countries provided a high degree of support to their farmers, with government transfers accounting for 37% of gross farm receipts (the %PSE) across the OECD area in 1986-88. Moreover, a large share of that support (over 80%) was linked to output, mostly in the form of higher prices than those prevailing on world markets. This in turn required the use of trade policy instruments, which were seen to have a range of negative impacts on developing countries:

- High tariffs on agricultural products, typically several times above those levied on industrial goods, restricted market access for developing country farmers with export potential.
- Elevated domestic prices led to the accumulation of surpluses, which were subsequently offloaded on developing country markets with the use of export subsidies (sometimes badged as food aid). This undermined local markets for developing country farmers competing with imports.
- Price supports and subsidies, by stimulating production, suppressed prices on world markets, again lowering returns to developing country farmers.

These impacts implied weaker terms of trade for developing countries that were specialised in agriculture.

While the nature of the effects of many OECD agricultural policies has not changed, the magnitude has. At the same time, other policies, such as support to biofuels, have tended to work in the opposite direction. Agricultural price supports and other distorting policies such as output and input subsidies still lead to restrictions in market access, and depress world prices relative to what they would otherwise be. However, the spill-over impacts have become less important because of declines in the rate of support, and changes in the extent to which that support is provided through trade-distorting instruments. Export subsidies have been used only lightly in recent years. By 1999-2001 the share of transfers in gross farm receipts (%PSE) had declined to 32%, with more than two-thirds of that support linked to output. In the past ten years, those changes have accelerated, such that over the period 2009-11, the %PSE averaged 20%, with 45% of transfers linked to output. Recent improvements have been facilitated by stronger world prices, which enable a given domestic price to be maintained with lower support.

The welfare impacts of OECD country agricultural policies on developing countries come via efficiency losses and terms of trade effects (which create both winners and losers). The last major OECD effort to calculate these impacts globally was in 2006 when prices were relatively low. In general, the price depressing effects of OECD country policies – calculated when support was considerably higher than it is now – were found to be relatively small for most products, with a 50% cut in all forms of support causing cereal and meat prices to be 2-3% higher than they would otherwise be, and prices for oilseeds and oilseed meal to decline slightly. Dairy products were a notable exception, with 50% cuts causing prices to increase by 13%. These findings were broadly in line with those of other studies conducted around that time (OECD, 2006).

In terms of the overall welfare impacts (calculated using a version of the GTAP model), the main conclusion was that OECD countries should reform primarily because it was in their own interests to do so – in fact they would reap 90% of the benefits from global agricultural reforms. The OECD study noted that the welfare effects of reform on developing countries were complex and would vary by country. Specifically, competitive suppliers would gain from more open markets and from commodity price increases, while net importers of agricultural commodities would lose in the absence of corresponding increases in the prices of goods they export. Some countries also stood to lose from the erosion of benefits of preferential trading arrangements with OECD countries. On balance, OECD analysis concluded that most developing countries would gain from OECD country liberalisation, although the gains were small relative to the benefits of reforming their own policies. Moreover, a large share of the gains were concentrated among a few emerging economy exporters, in particular Brazil (OECD, 2006).

In 2007-08, world food markets were exposed to a severe shock, with world prices for major food staples showing their biggest increase in real terms since the 1970s. Those price changes exceeded by an order of magnitude the price changes that models such as Aglink suggested would flow from OECD country reforms. There was swift recognition that while strong prices offer long term benefits for farmers, the short to medium term impacts on poor consumers are predominantly negative. The current emphasis on the harm that high prices inflict on developing country consumers, as opposed to the harm that low prices inflict on farmers with net sales, has led to charges of inconsistency being levelled at international organisations in general (e.g. Swinnen, 2010), although OECD was always careful to note that price changes in either direction create winners and losers.

The observation that OECD policies to support domestic prices suppress international prices, does not imply that output-linked policies are now to be recommended because they contain upward pressure on world prices. Distortionary policies are inefficient as well as being inequitable in terms of their domestic effects (OECD, 2001; OECD, 2003), and globally they prevent resources from being allocated in an efficient way – even if concerns about the pattern of winners and losers have shifted compared to the period when prices were low.

Higher prices have, however, provided a new context. The price depressing effects of OECD countries' policies are no longer the immediate concern and the use of export subsidies has almost disappeared. The agricultural policies of most immediate concern are those that contribute to higher and more volatile world prices, namely export restrictions by exporters, temporary tariff reductions by importers, and government support for diverting crops to biofuel production. The use of these instruments is not confined to OECD countries. Export restrictions – which are only weakly constrained by WTO rules – were used mostly by emerging economies in 2007 and 2008 (Jones and Kwiecinski, 2010). Biofuel policies in the United States and the European Union affect mostly the grains and oilseeds sector, but Brazil's hugely important ethanol sector uses mainly sugar cane and could in principle thrive without support policies. Government support policies for biofuels make world market prices of these products (and their substitutes) substantially higher than they would be, while for biofuel mandates add to price volatility by creating demand that is less responsive to prices.

More generally, developing countries, in particular the BRICS, are becoming increasingly important to world agricultural trade. Whereas trade between OECD countries accounted for 58% of world agricultural trade in 1999, by 2009 that share had fallen to less than half. Brazil is now the third largest agricultural exporter in the world, after the EU and the US, with more than USD 50 billion of agricultural exports per year. China is simultaneously the fourth largest exporter and the fourth largest importer (with a net deficit), exporting labour intensive products and importing land intensive products in line with its comparative advantage.

As developing countries become richer, and more important to international trade, it is essential to look at a wider web of interactions and policy effects. In particular, the developed (OECD) versus developing country distinction is becoming a less and less relevant lens through which to view the links between agricultural policies and spill-over impacts onto developing countries.

Source: OECD (2012a).

Price transmission

The pass-through of international price changes onto domestic markets depends on the extent to which international price changes translate into changes in border prices and then the degree to which border price changes are transmitted onto domestic markets. In principle, the removal of trade protection should bring international prices and prices at the border into parity, once an adjustment is made for the cost of transportation. The subsequent pass-through to domestic prices depends on other policies as well as on domestic transport and transaction costs, which induce a gap between export and import parity prices and provide an element of “natural” protection or dis-protection. A lack of market transparency can also mean that buyers and sellers incur search costs, with equivalent effects.

Data on explicit trade policy measures, such as tariffs and export subsidies, reveal the policy-induced gap between international and border prices. However, the full extent of protection or dis-protection is revealed better by indicators which compare the ratio of internal domestic prices to international prices, while adjusting for the costs of getting the domestic and foreign product to a common “point of competition”. One such indicator is the OECD’s Nominal Protection Coefficient (NPC), which is available for OECD countries and several emerging economies.⁷ Among the twelve developing, emerging and transition economies for which NPCs have been computed, the protection afforded to producers in 2010-12 was mostly positive (implying $NPC > 1$). In the three Latin American economies, it was very low, with an NPC of 1.02 in Brazil, 1.00 (i.e. zero protection) in Chile and 1.04 in Mexico. Protection in the Asian economies was substantially higher, with NPCs of 1.13 in China, 1.26 in Indonesia and 1.87 in Korea. Among transition economies, the pattern varied, with positive protection in Kazakhstan and Russia (NPCs of 1.08 and 1.11 respectively) but dis-protection in Ukraine (with an NPC of 0.96) reflecting the country’s use of export taxes. South Africa provided minimal protection (an NPC of 1.01), while the rates were higher in Israel and Turkey (1.11 and 1.19 respectively). In Indonesia, Kazakhstan, Russia and Ukraine the overall average masks a tendency to provide positive protection to import-competing sectors, but dis-protection for exportables.

An analogous indicator, a Nominal Rate of Assistance (NRA), has been computed for a large number of developing countries as part of a World Bank project (Anderson, 2008).⁸ However, most calculations extend only to 2004, with provisional updates for more recent years. These NRA data reveal some broad patterns, such as a tendency of low income and lower middle income countries to tax their export sectors (i.e. NRA for exportables < 0), but the picture is complex, with countries at the same level of income and with the same net trade status exhibiting different patterns in terms of protection (Table 4). For example, if we take lower middle income countries that are importers of food and agricultural products, we see that Egypt, Nigeria and Pakistan lower prices for importable agricultural products (NRA for importables < 0), whereas Philippines, Senegal and Sudan provide import protection (NRA for importables > 0).

The numbers show how priorities among countries vary, with some countries providing protection to exporting producers by maintaining prices above world market levels and others suppressing prices in order to reduce costs for consumers, for example via export taxes. On the import side, some countries protect import-competing farmers but others import at world market prices and further subsidise prices to consumers. So the implications of moving to neutral policies (free trade) will vary within and between food exporters and food importers.

The simplest way of capturing the domestic impact of an international price change is to compare domestic and international price changes. This approach subsumes the combined effects of policies and transaction costs in impeding price transmission. Data from the FAO Global Information and Early Warning System show that recent food price increases have had heterogeneous impacts (Sharma, 2012). Looking at 155 series of domestic cereal prices (maize, rice and wheat) from 52 countries in 2007-08, Sharma finds that domestic prices rose by more than the change in the world markets (over 100% transmission rate) in 48 of the 155 series, with transmission of between 50% and 100% in 50 cases, and transmission of less than 50% in 57 cases. The transmission rates were significantly lower during the second spike (2010-11). One might expect the least developed countries to be less integrated with world markets, suggesting lower rates of price transmission. But this could result in very high rates of observed transmission if a shortfall in the domestic harvest coincides with a spike in world prices, underlining the point that correlation does not equate to causality.

7. See OECD (2013b).

8. There are some differences in the ways in which the OECD’s NPC and the World Bank’s NRA are computed, but in the majority of cases there is a formal correspondence, with $NRA = NPC - 1$. For a discussion, see Brooks (2013).

Table 4. Protection and dis-protection of agriculture across countries, 2004

	Exportables and importables subsidised	Exportables taxed, importables subsidised	Exportables and importables taxed	Only imports protected
	$NR_{Ax} > 0; NR_{Am} > 0$	$NR_{Ax} < 0; NR_{Am} > 0$	$NR_{Ax} < 0; NR_{Am} < 0$	$NR_{Ax} \approx 0; NR_{Am} > 0$
	Brazil	Kazakhstan		Chile
Upper Middle Income	Colombia	Malaysia		China
	Thailand	Mexico		
	Turkey	South Africa		
	Sri Lanka	Ghana	Egypt	Philippines
	Viet Nam	India	Nigeria	
Lower Middle Income		Indonesia	Zambia	
		Senegal		
		Nicaragua		
		Sudan		
		Kenya	Zimbabwe	Burkina Faso
Low income		Madagascar		Uganda
		Mozambique		
		Bangladesh		

Source: Adapted from Anderson (2008).

Causality can be investigated econometrically, via time series techniques that test for market integration and for (Granger) causality from international to domestic prices. But even these approaches cannot separate out the policy and non-policy determinants of imperfect price transmission. Time series estimates from the World Bank and IMF suggest a wide variation in the degree to which prices are transmitted from international to domestic markets. Among developing countries, the largest pass-through is observed in the countries of Latin America, which are largely open to international trade. In Sub-Saharan Africa the pass-through of rice and wheat prices to countries importing these cereals has been relatively fast, but the transmission of international maize prices has been much weaker. In Asia the transmission of changes of international rice prices to local prices differed significantly by country during the 2007-08 food price spike. In Bangladesh and Cambodia, two countries relatively open to trade, the pass-through was fast and relatively large, both immediately after the rise in the international price and three months afterwards. The pass-through in China and India, the countries with high import protection, was small. Overall, countries with high net food imports are more exposed to volatile world food prices. Countries more open to trade, and with a larger share of cereals imports in total domestic consumption, experience faster and larger transmission of international prices onto local prices (World Bank and International Monetary Fund, 2012).

Case study evidence corroborates time series results, suggesting that in the poorest low income countries domestic agricultural markets are often not integrated with international markets, whereas in middle income countries – where a majority of the world’s food insecure lives – potential exposure to price shocks is greater (Balzer, 2013). However, the combined effects of border policies and other impediments to internal price transmission, which include transaction costs that can be reduced with suitable policies and investments, will vary from one country to the next.

Aside from policies and explicit transaction costs, imperfect market information can impede price transmission. In the absence of market transparency, buyers and sellers incur search costs which can drive a wedge between domestic and international prices, as well as among spatially segregated domestic markets. In general it is possible to obtain data on quoted international prices, but there may be opaqueness in terms of the prices that are agreed privately between buyers and sellers, and in terms of other determinants of domestic prices, such the levels of private and public stocks. Following the 2007-08 price spike, an Agricultural Market Information Service (AMIS) was created by the G20 in order to improve market transparency, by providing a common pool of information on prices, production, trade, utilisation and stocks for major crops (wheat, maize, rice, soybeans) as well as on the policies that affect prices. This system is progressively improving information on the markets for key food staples and the policies that govern those markets.

Domestic household level impacts

The impacts of domestic food price changes on peoples' welfare will depend in the first instance on whether they buy or sell food and the importance of food to their expenditures and revenues (incidence), then on how they respond to new prices and how markets adjust (impact). There will be implications for food security when the impacts on real incomes are sufficiently large to jeopardise access to food.

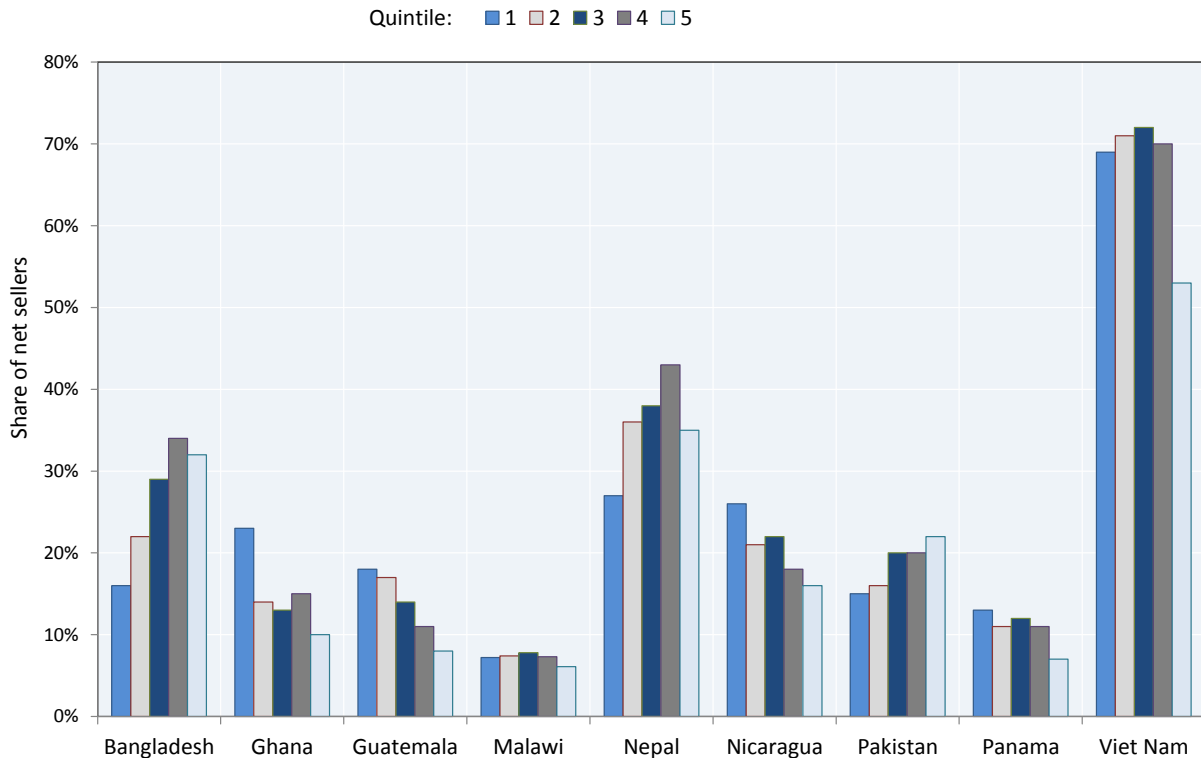
The consequences of food price changes for urban consumers are clear. But in rural areas, there will be a mixture of buyers and sellers of food, so the implications of changing prices are less clear. Work undertaken by Filipinski and Covarrubias (2012) for OECD using the FAO's RIGA database shows the shares of net sellers of food staples among rural households in nine developing countries (Figure 6). Net buyers dominate in all cases except Viet Nam. Three countries are agricultural exporters and food importers (Ghana, Guatemala and Malawi); two (Nicaragua and Viet Nam) are both food and agricultural exporters, even though less than a quarter of the poorest households in Nicaragua are net sellers of food.

As a consequence, most households stand to gain from reforms that lower prices in the short run and *vice versa*. However, simulations of the 2007/08 food price crisis also suggest that the magnitude and timing of the welfare shocks depended heavily on the type of crops produced and consumed by each rural household (Filipinski and Covarrubias, 2012).

While data on a household's net exchange status can indicate the likely incidence of higher or lower prices, such data do not tell us who would ultimately be net buyers or sellers in an open trading environment. For example, global reforms that raise domestic prices could enable some net buyers to be transformed into net sellers if, for example, credit constraints were alleviated. Similarly, consumers could benefit from higher commodity prices if the increase in the derived demand for labour raises wages sufficiently, an effect posited by general equilibrium models for Brazil (Azzoni et al., 2007) and rural India (Jacoby, 2013).

OECD has used partial equilibrium models that link product and factor markets in order to examine the impacts of price support policies and accompanying border measures in developed and developing countries. In developed countries, analysis using the Policy Evaluation Model (PEM) finds that price support policies perform poorly in terms of raising the incomes of farm households, with a significant share of the transfer leaking to input suppliers or leading to deadweight efficiency losses (OECD, 2001). Thus, a dollar of market price support raises the incomes of farmers by less than half a dollar, while input subsidies increase farm households' incomes by just one third of a dollar. A further finding of OECD work is that market interventions also often have perverse distributional effects, paying more to larger and richer farmers than to smaller and poorer ones, and taking money away from consumers and taxpayers to boost the incomes of households whose incomes are already above average (OECD, 2003).

Figure 6. Net trade status of rural households, by income quintile



Source: Filipski and Covarrubias (2012).

However, these results are based on the assumption that farmers operate as commercial businesses in smoothly functioning markets. In order to examine whether they carry over to developing countries, OECD has developed a compatible model that takes into account several specificities of developing countries that are likely to affect the welfare impacts of agricultural policy interventions. One is the joint role of the farm household as a producer and consumer of food crops. This means that the effects of policies such as farm price support depend on what happens on both the supply side and the demand side. A second factor is that many farm households confront high transaction costs when selling output or purchasing inputs. In the extreme, these transaction costs may be so high that the farmer remains cut-off from the market altogether, producing only for home consumption (that is, subsistence). Under these circumstances a subsistence farm household may not benefit from higher farm prices, and could in fact lose via induced increases in land rental rates or in the prices paid for locally available inputs. A third aspect is that rural households are heterogeneous in terms of their income sources, expenditure patterns and ownership of factors (particularly land), and will therefore be affected diversely by the direct and indirect impacts of policies.

The OECD's Development Policy Evaluation Model (DEVPEM) accommodates the above factors and identifies disaggregated impacts for structurally distinct agents, including commercial farms, semi-subsistence and subsistence farms, and landless rural households. The aim of the model is to provide illustrative results that show how structural diversity among developing countries, and systemic differences between developed and developing countries, can affect the welfare and distributional outcomes of alternative agricultural policy interventions. Models are constructed for six countries for which the RIGA data referred to above are available; two in Africa (Ghana and Malawi), two in Asia (Bangladesh and Viet Nam) and two in Latin America (Guatemala and Nicaragua).

Simulation estimates show that the effects of price support policies are often even worse than in developed countries (OECD, 2012). This is because market price support for food crops harms net buyers of food, often the poorest farm and non-farm (landless) households, although the proportion of net buyers varies significantly across countries. Support for cash crops does not have this drawback; however, cash crops are often (but not always) grown by farmers with relatively high incomes, so support seldom reaches the incomes of the poorest. On the other hand, leakages away from the farm level are typically lower, because farmers are less likely to rent land than in OECD countries and they tend to purchase fewer inputs. In general, the results show that non trade-distorting direct payments are the most efficient way of boosting incomes in the short-term, while public investments, which should also have broader long-term pay-offs, have short to medium term impacts that are pro-poor (Jonasson et al., 2014).

Effects on smallholders

There are specific concerns about the effects of trade openness on poor smallholder farmers. On one side, there are fears that only larger commercial farmers may be in a position to benefit from improved export opportunities. On the other, there are fears that smallholders may not be in a position to compete with lower priced food available on international markets.

Some of the constraints work both ways: if smallholders are constrained from competing in major domestic markets by high transport, marketing and distribution costs, then that should also limit their exposure on local markets to import competition. Reducing these costs would enhance their ability to compete in export markets but amplify price pressure from imports. It may also create specific opportunities for smallholders to benefit from access to global markets, in particular for higher value crops. More generally, opening up to trade and facilitating trade by reducing the costs of getting goods to markets can be seen as reforms that cause resources to shift into activities in which they can be more productively engaged.

The question of whether smallholders can benefit from trade openness is discussed in Box 3.

Box 3. Can smallholders benefit from trade openness?

From the perspective of individual producers and smallholders in particular, the creation of markets where none previously existed has the potential to bring gains in output and income which are a multiple of the traditional allocative efficiency gains from participation in trade. A key constraint for smallholder agriculture in developing countries is that farmers practice either subsistence farming or operate largely in local markets due to lack of connectivity to more rewarding markets at provincial, national or global levels. As a result, incentives remain weak, investments remain low, and so does the level of technology adoption and productivity, resulting in a low level equilibrium poverty trap (Torero, 2011). Smallholder access to export markets can help to enhance and diversify the livelihoods of lower-income farm households and reduce rural poverty more generally (World Bank, 2007).

Various studies have shown that access to developed country markets can provide higher revenues for smallholder farmers. In Guatemala, the export of horticultural production generated gross margins per hectare 15 times as large as for maize production, with gross margins per labour day that were twice as large (von Braun and Imminck 1994). In Kenya, McCulloch and Ota (2002) found that farm households involved in export horticulture had higher incomes after controlling for farm size, education, irrigation, and other factors compared to farm households that were not involved. However, there is no inevitability that smallholders can take advantage of these opportunities in the absence of public investments to underpin market transactions. In Nepal, despite the clear revenue advantages of cash cropping, farmers have been reluctant to commit to producing for the market given the rudimentary infrastructure and the high variability of prices. As a result, the costs and benefits of developing markets have been unevenly distributed, with smallholders unable to capitalise on market opportunities and wealthier farmers engaging in input intensive cash cropping (Brown and Kennedy, 2005).

These constraints of weak market linkages and high market frictions have been amplified by a new set of challenges associated with compliance with product and process standards (Lee et al., 2012). Sometimes these standards are set and enforced by governments, but increasingly compliance is required even to gain access to private sector supply chains. There is concern that the productivity or production cost advantages that small-scale farmers might have are increasingly outweighed by the escalating transaction costs associated with facilitating, monitoring, and certifying their compliance with standards. There is a risk of a growing polarisation between agribusiness and smallholder farming systems, reducing the poverty alleviating effects of trade if smallholders are excluded or pushed out of high-value production chains as a result (Vorley and Fox, 2004).

More generally, growing corporate concentration in trading, processing, manufacturing and retailing, raises concerns about potential market distortions arising from the absence of competitive markets. Stronger actors in the global supply chain may be able to use their market power to extract more favourable terms from suppliers, leading to the risk that the share of the value created in the food chain accruing to smallholders and processing firms in developing countries declines over time. This can compromise agriculture's potential to act as an effective route for small producers to exit poverty and improve their food security (Vorley and Fox, 2004). These concerns are not unique to international trade. Supermarkets are increasingly important buyers in some developing countries, particularly for the high-value products meeting specific consumer demands related to production process and quality. In Latin America, supermarkets buy 2.5 times more produce from local farmers than the region exports to the rest of the world (Reardon and Berdegué, 2002) and are increasingly important players in Asia and Africa, where smallholder agriculture is concentrated.

There are different answers in the literature as to whether these developments in global food supply chains create a serious barrier to using agricultural exports to alleviate rural poverty and improve food security. Some analyses conclude that modern supply chains lead to the exclusion of small farmers who cannot comply with high food standards (Swinnen, 2007; Reardon et al., 2009). Others highlight the benefits of the new supply chains in providing information on new products, extending input, credit and advice, as well as making marketing services available. These can ease the resource constraints as well as reduce the production and marketing risks that smallholders otherwise face. Demonstrating compliance to high food standards can facilitate access to markets which might otherwise remain closed. Smallholders and rural households can benefit from high-value export production either directly (such as participating through contract farming) or indirectly through the employment created on large scale estate production or agro-industrial processing (Minten et al., 2009; Maertens et al., 2009).

Much of the debate on smallholders and standards has focused on the experience of horticulture with the GLOBLG.A.P approach (Jaffe et al., 2011). Their study takes an agnostic view, arguing that emerging standards are infrequently the primary factor in smallholder market 'exclusion' but also not commonly a primary vehicle for poverty reduction and sustainable smallholder competitiveness. Based on a large survey of African fruit and vegetable exporters, they found evidence for both the optimists and pessimists regarding the prospects for continued smallholder participation in Africa's fresh produce export trade. On the one hand, major buyers often operated indirect procurement chains involving smallholders alongside direct farm-integrated supplies and the majority reported that they planned to maintain or even increase their purchases from smallholders in the future. On the other hand, the survey found evidence that overall numbers of smallholders supplying the main product to the respondent firms had fallen over time, although often the reason for this fall had nothing to do with standards. Jaffe et al. estimate the total number of African smallholders outside South Africa involved in horticulture exports at around 55 000, and suggest that the focus on smallholders and horticulture has been misplaced. They claim that the largest welfare benefits from export-oriented horticulture relate to employment rather than to direct smallholder produce supply. They further conclude that the largest opportunities for future welfare gains from smallholder engagement in markets relate to the development of domestic and regional value chains involving much larger numbers of producers, with consequent benefits also accruing to domestic consumers.

These complexities make clear that there is no inevitability that agricultural exports will necessarily reduce rural poverty and improve food security. Public policy interventions have an important role to help make export markets work for the poor. Public investments in rural transportation and market infrastructure as well as the provision of support services are essential for small farmers to effectively participate in markets and to minimise risk. Helping small farmers to organise through farm associations and co-operatives can assist smallholders overcome diseconomies of scale and bargain more effectively.

Source: OECD (2013).

Dynamics

The pro-poor benefits of agricultural growth in developing countries are now well established (Christiaensen et al., 2011; de Janvry and Sadoulet, 2010). This fact is often used to justify raising food prices through import protection in order to provide incentives for domestic production of staple foods. Paradoxically, however, the main beneficiaries of price support are not smaller food-insecure farm households but rather the more commercial farms with significant food surpluses to sell. More importantly, import protection policies distract attention from the more effective measures governments can take that would enhance competitiveness of the agricultural sector.

In the longer-term, the adjustments that households make to terms of trade shocks are dominated by the impacts on agricultural growth and productivity. Hassine et al. (2010) find strong support for the positive effect of trade openness on agricultural productivity growth through the transfer of technology from more advanced countries based on empirical evidence for 14 Mediterranean countries. Using their empirically-estimated relationship, they conclude that agricultural trade liberalisation in Tunisia would

reduce poverty in that country. On the other hand, Yu and Nin-Pratt (2011) in examining the factors behind accelerating total factor productivity in Sub-Saharan Africa in recent years conclude that high dependence on agricultural imports is associated with agricultural productivity slow-downs – this may be because, as noted earlier, import dependence reflects weak agricultural development rather than resources shifting successfully into more profitable non-agricultural activities.

More generally, agri-food markets are changing rapidly in many countries with a reduced role for the state, changes in consumer preferences and purchasing power, and the modernisation of food processing and retailing. Enhancing the food security of poor households in this rapidly-changing environment requires a broader focus than just on trade alone and must be seen in the wider context of structural adjustment between the farm and nonfarm economies. For many developing countries, the positive food security impacts of trade on non-agricultural incomes, especially jobs and wages, will be the most important contribution of trade.

4. Trade and risks to food availability and access

Trade plays an important role in stabilising markets, reducing the risks that food will not be available on domestic markets and that peoples' access will be constrained by severe price movements. All countries need access to the world market, for at least some of their food and possibly as an outlet for surplus production. Autarky, or the pursuit of pure self-sufficiency via prohibitive levels of trade protection, exposes a country to the risks associated with its own food production, risks which are likely to be higher than pooled risks on international markets. The key manifestation of risks to availability and access is price volatility, which is likely to be higher on isolated domestic markets than on domestic markets which are integrated with international markets.

Nevertheless, spikes in global food prices over the 2007–12 period have shaken confidence in the stability and reliability of world food markets. In many countries, they led to increased trade policy interventions (Jones and Kwiecinski, 2010; Demeke et al., 2009). In some cases they have re-awakened interest in food self-sufficiency and in public stockholding as a corollary of domestic price policies. Indeed, the issue of public stockholding was a major issue at the WTO negotiations in Bali in 2013, with only a decision on interim arrangements possible, pending agreement by members on a “permanent solution”.

On balance, trade plays a stabilising role owing to the weak correlation of commodity output shocks across countries. Similar to portfolio diversification, a move from autarky towards free trade can reduce total price risk through diversification, as long as the shocks in individual markets are not perfectly correlated. China and India cover so many production environments that each can, to some extent, smooth out internal regional supply and demand variations via internal trade. Yet even these countries can benefit from this stabilising role of international trade. Wright (2012) shows that pooling the entire world's output variation in rice production and sharing it proportionately across countries would reduce the variation of China's and India's shares by about 40% and 60%, respectively. For many smaller countries the effects would be far greater. International pooling of production risks could similarly smooth national supplies of wheat and maize. He notes that, currently, global cereal trade achieves only a fraction of these potential pooling benefits.

With climate change, domestic production shocks are expected to become more important particularly for those countries likely to experience the greatest increases in temperature. For these countries, both the balancing and the stabilising role of trade will become increasingly important over time. Trade flows can partially offset local climate change productivity effects, allowing regions of the world with positive (or less negative) effects to supply those with more negative effects. This stabilising role is illustrated by a simulation of an extended drought in South Asia, which begins in 2030 with a return to normal precipitation in 2040 (Nelson et al., 2009). The analysis shows how substantial increases in trade flows could soften the blow to Indian consumers. Large increases in imports (or reductions in net exports) of rice, wheat, and maize result in higher world market prices, implying that

other countries' producers and consumers help to reduce, though certainly not eliminate, the suffering that a South Asian drought would cause.

A direct comparison of production variability at global and national levels assumes that all global production is potentially available to meet a national shortfall. In practice, the share of global production of the major staples entering international trade is rather low. Agricultural commodity markets are described as thin markets, meaning that relatively small shares of production are traded internationally (Liapis, 2012). When an unusual event takes place, such as the US drought in the summer of 2012, the sharp reduction in production is translated into an even sharper fall in exports or increase in imports, putting immense pressure on markets where only a fraction of production is traded internationally. This can lead to sharp volatility in the prices of agricultural commodities, as witnessed in 2007/8 and 2010/11, particularly if global stocks are low. For example, a 2% decline in milled rice production (9.2 million tonnes in 2010) equates to 28% of world trade in rice in 2010. The impact of market thinness on volatility may be magnified if, in addition, there is a high concentration of export suppliers. Rice, for example, is not only a thinly traded product with less than 7% of global production entering the world market, but trade is also highly concentrated with only six countries accounting for 90% of global rice exports.

A major reason why some agricultural markets are thin is because the full transmission of world to domestic prices and vice versa is impeded by national boundaries. If there were perfect and instantaneous price transmission, then the world market would encompass global production and consumption and not just that element which is traded between countries. In practice, domestic agricultural markets are far from fully integrated into world markets. There are many reasons for this lack of integration. They include fluctuating exchange rates, high transport and transactions costs leading to significant differences between export and import parity prices, market distortions and price controls set by governments, the persistence of trade barriers, and market imperfections. Of special interest are those barriers to market integration resulting from government policy. These can include high transport costs (often arising from inadequate competition in road transport markets) as well as border interventions deliberately designed to prevent the transmission of world market price instability into domestic markets, such as quotas, variable import levies, export restrictions and similar measures. Limited price transmission exacerbates global price fluctuations, but at the same time may serve to protect domestic agents from the full severity of international price volatility (Keats et al., 2010).

There is thus an ambiguity about the stabilising role of trade. While the portfolio diversification effect contributes to price stabilisation, countries engaging in trade also run the risk of importing price instability. This risk is amplified when markets are thin. However, increasing staple food self-sufficiency to reduce dependence on the world market would not necessarily eliminate food price volatility. While it would decrease volatility due to international markets it would increase volatility due to domestic supply shocks. Thus, in assessing the stabilising role of trade, the appropriate comparison is between the variability of domestic prices due to domestic shocks to supply and demand and the variability due to global prices.

Abbott (2012) concludes that on balance, domestic shocks are more frequent and more severe than international shocks, yet that large international price spikes recur periodically. Other evidence suggests that, even allowing for the current imperfect nature of world markets, the stabilising role of trade is the dominant influence. Ivanic et al. (2011) compare the levels of domestic price volatility for four major crops (maize, rice, soybeans and wheat) under two scenarios: one assuming the current level of trade and protection and one in which international trade in these commodities is abolished.⁹ Their results show that international trade – with very few exceptions – lowers domestic price volatility, in many cases very significantly; for example, the standard deviation of rice and soybean prices in East Asia

9. The authors use the standard GTAP model with its stochastic extension to calculate the covariance of global and domestic prices as a result of the exogenous covariance matrix of regional yields for maize, rice, soybeans and wheat.

drops from nearly 30 percentage points to less than five percentage points. The introduction of trade with no policy interventions helps greatly lower domestic price volatility by allowing those regions with better harvests to supply output to those regions with worse harvests. This stabilising capacity of international trade is possible because crop yields are only very weakly correlated across regions, which means that simultaneous global crop failure is extremely unlikely.

Minot (2011) quotes several pieces of evidence to suggest that, in the case of Sub-Saharan Africa, price volatility due to domestic supply shocks is as large as or larger than volatility due to international markets. For example, the price of maize in South Africa (which is a source of imported maize for its neighbours) is more stable than the price of maize in most other Sub-Saharan African countries, and the estimated import parity price of US maize in Sub-Saharan Africa is more stable than the domestic price of maize in most of these countries. More generally, the price volatility of internationally tradable products is lower in Sub-Saharan Africa than that of non-tradable commodities and commodities that are tradable only on regional markets (World Bank and International Monetary Fund, 2012). For example, wheat, rice, and cooking oil – products that are imported on the African continent – exhibit lower price volatility than the prices of domestically produced staples. Efforts to increase the tradability of these less traded commodities even regionally would help to lower their high domestic price volatility.

Simply comparing domestic with international price volatility does not reveal the extent to which domestic price volatility is mitigated or elevated by policies. Specific data on policy changes may be the most informative. In a study of 14 developing countries, Balzer (2013) notes that in 2007-08 export restrictions were applied to food staples by eight (China, Egypt, Ethiopia, India, Kenya, Malawi, Viet Nam and Zambia); import tariffs on one or more staples were waived by five (Bangladesh, Egypt, Kenya, Nigeria and Senegal). Some countries released public stocks, while others stockpiled grain. In a separate study, Demeke et al. (2011) note that export restrictions were also applied by Argentina, Cambodia, Kazakhstan, Pakistan, Russia and Ukraine, while for ten emerging economies (Argentina, Brazil, Chile, China, India, Indonesia, Russia, South Africa, Ukraine and Viet Nam) Jones and Kwiecinski (2010) found that eight of the ten took some measure to directly affect the price or increase the supply of agricultural commodities to limit the rise in food prices. Only Chile and South Africa did not. In some cases, policy responses may have been an *ad hoc* response to higher prices, but in others they reflect longstanding efforts to counter price domestic instability.

In addition to concerns about price volatility, some countries worry that sudden sharp increases in import volumes can disrupt their domestic markets. There has been extensive investigation of the importance of such import surges in recent years (Sharma, 2005). While definitions of what constitutes an import surge differ, it is clear that, as a statistical phenomenon, import surges are very frequent. However, while the incidence of surges may have risen, and surges appear to be a fairly common phenomenon in developing countries, these figures tell us nothing about the impact of the surges. There is nothing either inherently ‘good’ or ‘bad’ about an import surge. Rising imports are not necessarily a negative thing for developing countries, as they add to food availability and to the reduction of hunger. It is often presumed that an import surge of a particular commodity disrupts local markets and pushes down prices, negatively affecting the livelihoods of people relying on the production of that commodity. De Nigris (2005) examined correlations between import surges (measured in per caput terms) and production per caput. He found many examples of negative correlations, indicating an inverse relationship between imports and domestic production and suggesting that imports were needed to compensate for domestic shortfalls. He also found positive correlations for other products where imports increased at the same time as domestic production and which probably reflected increasing demand for these products generated by economic growth. Sharma (2005) also found many cases where an import surge occurred even while domestic prices continued to rise, leading him to conclude that imports have been ‘pulled in’ through prior shortfalls in domestic production rather than higher imports causing domestic production to fall. Thus, the consequences of increased imports for food security need to be carefully evaluated before deciding on the appropriate response.

Since the price spikes in the 2007-12 period, more attention has been paid to the consequences of world price instability for food security in developing countries than to the consequences of import surges. During this period, many countries pursued trade and domestic policy responses intended to stabilise domestic markets and protect urban consumers (Abbott, 2009; Jones and Kwiecinski, 2010). A number of key grain exporting countries, primarily developing economies, adopted export bans or at least partial export restrictions in an attempt to provide enough domestic production for local consumption. At the same time, some major grain importing nations reacted by tendering larger-than-anticipated import bids, reducing pre-existing import restrictions such as tariffs and relaxing tariff rate quotas.

The use of trade measures to insulate economies from shocks to world prices can, at best, transfer the risks associated with commodity production and trade. If many countries seek to transfer price risk to others, the outcome is likely to be ineffective (Martin and Anderson, 2012). In the case of a large exporter, or if a number of exporting countries that are collectively large in the market impose export restrictions, the effect is to increase the world price of the staple food. This increase offsets some of the reduction in the domestic price that results from an export restriction. If, in addition, importing countries reduce tariffs on food imports in an attempt to avoid adverse impacts on consumers, the increases in world prices resulting from the initial price shock and the restrictions imposed by exporters will be further compounded. Thus, the attempts by exporters and importers to offset the impacts of a price increase on themselves may be self-defeating. If all countries follow this type of policy, the stabilising impact on domestic prices is, on average, eliminated, although countries that insulate more than others may experience reductions in price volatility, while those which insulate less may experience increases in price volatility.

Despite declared intentions, government interventions are not always successful in stabilising domestic market prices. Anderson and Nelgen (2012) compare the variability of domestic prices relative to border prices for various developing country regions and for high-income countries for the periods 1955-84 and 1985-2004 (that is, before and following the major economic policy reforms that began for many countries in the mid-1980s). Among developing country regions, the ratios of variability are between two-thirds and four-fifths for Asia, quite close to one for Latin America, and close to or slightly above one for Africa. Interventions in developing Asia are thus shown to be somewhat effective in providing insulation against world market volatility. Asian rice producing and consuming countries have a long history of using border measures to successfully stabilise domestic prices (Timmer, 2010). In contrast, interventions in Africa were such as to possibly even destabilise domestic markets (Jayne and Tschirley, 2009). Taken together, the indicators for the world as a whole suggest that market interventions by governments appear to have had very little impact in preventing domestic market prices from gyrating less than prices in international markets (Anderson and Nelgen, 2012).

IFPRI research has shown that these trade restrictions can explain as much as 30% of the increase in prices in the first six months of 2008 (von Grebmer et al., 2011). Yu et al. (2011) find that the trade policy responses in various countries had differential impacts on the prices of agricultural commodities. Their simulation results show that the overall world price impact of trade policy distortions is most significant for rice, at 24%, followed by wheat (14%) and barley (9%). Poorer food-deficit countries and regions, with limited power to manipulate their trade policies, experienced higher price increases than those major trading countries which adopted policy interventions. The authors show that developing countries which are net importers but did not implement trade policy interventions experienced significant welfare losses resulting from interventions implemented by other major trading countries.

In addition, by lowering domestic prices, export restrictions reduce the incentives to increase production and for those who can – in particular the relatively well-off members of the community – to reduce their consumption. The lower prices penalise farmers, reducing the incentives for investments that can increase long-term supply. While an export restriction (but not an export ban) can improve an exporting country's terms of trade and thus possibly its overall economic welfare, in general there are almost always more efficient instruments than trade measures to assist those who lose (Anderson and Nelgen, 2012). Small and vulnerable developing countries may not be able to avail of insurance against

price volatility or make use of direct measures to target poor households (in periods of high prices) or affected producers (in periods of low prices). In these circumstances, trade measures can be shown to be second-best complements to storage policies (Gouel and Jean, 2012). However, such trade interventions are not a co-operative way to address price volatility and can actually exacerbate it. If trade measures are unavoidable, the challenge is to design agreed rules which can limit the negative spillover effects on other countries.

Public stockholding

Public stockholding can be undertaken as part of a risk management strategy, although there are often wider objectives and a variety of implementation mechanisms. Some governments maintain strategic reserves of public stocks that can be released in times of emergencies and/or used to provide a food safety net for poor households. Deeper interventions include the use of stocks to mediate *levels* of prices received by producers and/or paid by consumers, and also to manage the stability of prices. Those different functions may of course be combined in various ways, and in practice may become blurred. Cash payments may be the most efficient way of guaranteeing citizens' food security under circumstances where markets and institutions are still functioning properly. But if they are not, then the physical distribution of food may be necessary, and the suggestion that developing countries – particularly low income countries and fragile states – should maintain a level of strategic reserves (either nationally or regionally) is relatively uncontroversial (Hallam, 2014). The use of public stocks as a mechanism for providing either systemically higher than market prices to producers or below market prices to consumers opens a wider range of issues, in terms of both the effectiveness of price policies in addressing domestic objectives and their external implications for domestic markets. OECD analysis has suggested that policies that manipulate price *levels* are likely to be ineffective at raising incomes in developing countries, partly because of efficiency losses, partly because they do not target the poorest, and partly because they can impose a budgetary burden that crowds out other essential expenditures (OECD, 2012b). Policies that stabilise prices around market levels need not have such effects, but there remain questions about the domestic effectiveness of public stockholding as a component of even “price neutral” buffer stock schemes, as well as the implications of such schemes for international markets. A recent World Bank review of national and regional experiences concluded that while public stocks could contribute to addressing short-term emergency needs they have not been an effective instrument to stabilise prices (World Bank, 2012c). Similarly, the international organisations' 2011 report to the G20 rejected the use of buffer stocks to stabilise prices as costly and ineffective, although it did see a role for small-scale food security emergency reserves to assist the most vulnerable (FAO, OECD et al. 2011). Current OECD work is seeking to shed light on which stocks policies may enable countries to address their food security needs yet without having an adverse effect on food security in other countries.

In assessing the need or otherwise for market stabilisation, it is important to identify the origin of risk (international or domestic), the degree of exposure, and the nature of the consequences. The role for national policies will depend partly on the extent to which price volatility is contained at the international level. World price changes may be transmitted onto domestic markets more fully in some countries than others, and more in some years than in others. Domestic shocks, stemming chiefly from production shortfalls, are typically more frequent than international shocks, so market openness may help reduce the frequency of shocks. But such a policy may not be sufficient to contain rare but severe international shocks. The worst case scenario is one where domestic and international shocks reinforce each other, for example when the domestic harvest fails and the government needs to purchase large amounts of imports, and there is a price spike on the world market. The priority under these circumstances is to ensure that poor countries are provided with the instruments to address this rare but potentially disastrous scenario.

Vulnerability to international shocks

From the standpoint of food security, two indicators can provide a useful gauge of vulnerability to risks on international markets. One is the concentration of consumers' food purchases, another is the concentration of food import suppliers.

Countries in which consumption is centred around one or two food staples will be more vulnerable to price volatility than countries where dietary patterns are more diversified. Table 5 shows concentration ratios, which show the cumulative shares of the most important (C1), two most important (C2) and three most important (C3) food staples in total calorie consumption. In general, higher income countries have more diversified consumption patterns and so are less vulnerable to increases in the price of one specific staple. But income is not the only factor. In a number of Asian countries, calorie consumption is heavily centred on rice (with C1 greater than 50%), whereas in African countries a wider range of traded and non-traded food staples is often consumed. But there are wide variations. For example, Ethiopia and Malawi are both very poor, but the latter is more vulnerable to an increase in the price of its main staple (in this case, maize). It is important to note that these numbers are national averages and that there may be significant within-country variations.

In the context of higher food prices, a major concern has been with the implications of more volatile food prices for urban consumers and net buyer farm households. Data on price transmission, combined with indicators of the composition of food baskets can reveal where those concerns are likely to be more acute. Many of the poorest economies are not effectively integrated with world food markets, so the concerns are likely to be most acute in middle income countries which are more integrated with world markets but where there are still large numbers of poor consumers. Among these countries, the concerns are likely to be most severe in countries with concentrated consumption baskets. Many of these countries are in Asia, but some are in Africa too.

Beyond price risk, a concern is that food may not be available at all, because of a breakdown in international trade. Almost as seriously, at a time of scarcity and high prices, suppliers could fail to honour forward contracts and countries could be forced to make spot prices at a time when prices are high. The magnitude of these risks may be low, but the consequences could be severe. A useful indicator of these risks is again a concentration ratio, in this case showing the cumulative share of food imports coming from a given number of supplier countries. Table 6 shows the one, two and three country concentration ratios for total imports of maize, rice and wheat, while Table 7 shows the same ratios for the individual staples. In the case of Table 6, the numbers are reported for net food importers, while in Table 7 the figures are given for net importers of each of the three staples. Naturally, the concentration ratios are lower for all three grains collectively, though many countries obtain a majority of their imports of grains from just two countries.¹⁰

10. These data are reported for 2012. A number of countries switch import sources sharply from one year to the next, buying predominantly from one country in your and then from another the next. A high concentration ratio might be a natural consequence of having neighbour that is a major exporter of the food staple(s) in question.

Table 5. Concentration ratios of food staples in overall calorie consumption

	C1	C2	C3		C1	C2	C3
African countries				Asian Countries			
Lesotho	55	69	74	Bangladesh	70	75	79
Madagascar	50	69	84	Cambodia	64	71	74
Malawi	50	64	73	Lao People's Democratic Republic	62	68	72
Zambia	50	66	81	Azerbaijan	54	59	64
Niger	42	54	57	Viet Nam	53	56	60
Sierra Leone	42	52	61	Turkmenistan	53	57	59
Yemen	42	49	55	Tajikistan	53	56	59
Liberia	40	61	80	Uzbekistan	52	54	57
Ghana	40	62	73	Myanmar	48	50	51
Eritrea	40	65	70	Philippines	48	54	58
Zimbabwe	40	51	54	Indonesia	48	58	64
Guinea	39	53	64	Thailand	45	48	51
Guinea-Bissau	38	47	53	Iran (Islamic Republic of)	43	51	54
Congo	38	74	93	Mongolia	41	44	48
Mozambique	35	65	85	Sri Lanka	41	52	55
Egypt	34	51	63	Nepal	31	49	64
Benin	34	52	69	Kyrgyzstan	36	43	50
Côte d'Ivoire	33	55	68	Pakistan	36	43	46
Rwanda	33	48	61	India	30	50	53
Kenya	33	42	48	China	26	46	51
Comoros	32	47	60	Malaysia	25	41	44
Mauritania	31	41	47	South American countries			
Burundi	30	44	56	Mexico	33	40	42
C. African Republic	30	47	61	Uruguay	32	38	44
Senegal	29	39	49	Chile	29	36	40
South Africa	29	46	51	Peru	21	35	49
Angola	29	49	66	Paraguay	20	33	45
Swaziland	28	45	53	Bolivia	19	32	45
Burkina Faso	26	46	61	Costa Rica	16	27	30
Namibia	25	39	51	Colombia	13	26	34
Gambia	23	42	51	Brazil	12	23	30
Uganda	22	38	50				
Mali	21	41	54				
Ethiopia	20	35	47				
Cape Verde	19	32	42				
Cameroon	19	32	45				
Chad	18	34	41				
Botswana	14	28	37				

Note: Ci = share of food staple consumption accounted for by i most important staple crops.

Source: FAOSTAT.

Table 6. Concentration ratios of country suppliers for maize, rice and wheat, 2012

	C1	C2	C3
African countries			
Botswana	87	95	96
Uganda	54	61	68
Namibia	43	63	78
Madagascar	41	71	82
Burundi	40	49	58
Senegal	40	58	68
Nigeria	32	57	81
Togo	32	62	82
Sudan	32	60	72
Egypt, Arab Rep.	31	63	74
Cameroon	31	59	76
Niger	29	52	73
Ghana	28	49	68
Tanzania	27	44	56
Mozambique	24	38	46
Cape Verde	24	44	57
Rwanda	23	42	54
Yemen	22	41	57
South Africa	19	37	53
Mauritania	18	32	47
Asian Countries			
China	48	66	83
Indonesia	40	55	68
Singapore	38	58	73
Philippines	36	63	86
Malaysia	22	44	56
South American countries			
Bolivia	90	98	100
Costa Rica	62	75	87
Colombia	54	71	86
Chile	54	76	88
Peru	48	62	72

Note: Ci = share of imports coming from i most important country suppliers.

Source: COMTRADE.

Table 7. Concentration ratios of country suppliers for maize, rice and wheat, 2012

WHEAT				RICE				MAIZE			
	C1	C2	C3		C1	C2	C3		C1	C2	C3
African countries				African countries				African countries			
Botswana	100			Botswana	96	99	99	Yemen	91	98	99
Sudan	100			Egypt, Arab Rep.	73	89	93	Mauritania	91	96	100
Niger	91	98	100	Uganda	69	77	84	Mali	84	90	97
Mali	85	89	93	Rwanda	60	84	93	Cape Verde	82	97	100
Cape Verde	79	100		Yemen	56	79	98	Sudan	77	88	94
Madagascar	76	100		Togo	53	82	87	Burundi	76	93	96
Nigeria	73	80	84	Mozambique	53	70	83	Botswana	75	92	96
Cameroon	72	91	95	Cameroon	52	79	96	Ghana	73	84	92
Ghana	65	84	99	Tanzania	51	71	88	Rwanda	71	89	98
Senegal	64	80	88	Madagascar	45	79	91	Senegal	71	79	87
Egypt, Arab Rep.	52	76	83	Nigeria	44	85	96	Togo	70	87	100
Togo	52	100		Ghana	38	63	87	Nigeria	67	100	
Namibia	48	71	90	Cape Verde	38	57	73	Uganda	66	95	98
Rwanda	46	68	79	Mauritania	36	60	70	Namibia	62	100	
South Africa	40	58	72	Sudan	35	66	79	Tanzania	56	98	99
Yemen	33	57	69	South Africa	34	67	88	Mozambique	47	91	99
Tanzania	33	53	67	Mali	33	46	58	Egypt, Arab Rep.	47	75	90
Uganda	33	53	72	Niger	32	57	80	Madagascar	46	70	93
Burundi	30	57	71	Burundi	30	67	89	Niger	39	69	77
Mozambique	27	42	53					Cameroon	27	54	77
Mauritania	24	45	65								
Asian Countries				Asian Countries				Asian Countries			
Cambodia	95	98		Philippines	82	91	94	China	98	99	99
Indonesia	66	83	94	Malaysia	69	82	93	Sri Lanka	88	93	95
Malaysia	61	76	89	China	61	84	98	Cambodia	84	100	
Singapore	57	88	95	Indonesia	60	79	92	Singapore	78	85	91
Philippines	54	95	97	Singapore	48	70	89	Indonesia	64	81	90
Thailand	50	73	83					Malaysia	45	69	91
Korea	43	82	91					Philippines	35	60	76
South American countries				South American countries				South American countries			
Guyana	100			Ecuador	97	99	99	Guyana	100		
Brazil	78	89	99	Costa Rica	84	89	93	Uruguay	82	100	
Chile	63	84	98	Colombia	76	90	98	Bolivia	81	96	100
Ecuador	61	90	95	Peru	75	87	95	Colombia	75	90	97
Colombia	47	75	94	Bolivia	68	97	99	Ecuador	66	78	86
Peru	42	74	89	Chile	48	84	90	Peru	66	82	97
								Costa Rica	62	83	100
								Chile	46	86	92

Note: Ci = share of imports coming from i most important country suppliers.

Source: COMTRADE.

5. Trade and food utilisation

Trade raises incomes, which is essential for improving the nutrition of households that are food insecure because of their poverty. But the link between income and nutrition is an imperfect one. Work undertaken for OECD at the Institute of Development Studies (IDS) reviews the large number of econometric studies that seek to quantify the relationship between income and nutritional outcomes, and to identify the significance and importance of other complements (Masset and Haddad, 2012). A central finding of this meta-evaluation is that the elasticities of nutritional outcomes (such as stunting or underweight) are low with respect to income, and that factors other than incomes are crucial in terms of explaining nutritional outcomes. The implication is that although growth is necessary for food security to progress, growth alone will not be sufficient to accelerate progress on the MDG target of halving the prevalence of underweight among under-fives by 2015. Yet, none of the parallel causes of malnutrition are independent of income. The overall level of national income is a determinant of the state's availability to pay for key public services, while individual incomes also determine the household's uptake of education, and its access to health, water and sanitation.¹¹ The composition of income growth matters as well as the overall rate, as it is increases in the incomes of the poorest that have the greatest impact on nutritional outcomes. Moreover, in many countries, the rural poor are discriminated against in terms of the provision of basic public services.

Beyond its income effect, trade can provide consumers with more varied and diversified diets. The positive effects for those currently experiencing under-nutrition have received much less attention in the literature than the potentially negative role of trade in introducing risks of over-nutrition. More generally, Owen and Wu (2007) find that increased openness to trade is associated with lower rates of infant mortality and higher life expectancies, especially in developing countries. On the other hand, some authors have associated increased trade with a 'nutrition transition' that involves rising rates of obesity and chronic diseases such as cardiovascular disease and cancer (Kearney, 2010). However, these impacts are linked fundamentally to behavioural changes that accompany income growth. Using trade restrictions as a way to modify consumer behaviour is likely to be both inefficient and ineffective.

The fact that food availability and access are not sufficient to ensure good nutrition has led to an emphasis on "nutrition sensitive agriculture". The aim is to increase year round availability, access to and consumption of a diverse range of foods necessary for a healthy diet. That can be done via food production, dietary diversification to improve diets, and food fortification to combat micronutrient deficiencies and raise levels of nutrition.¹²

6. Managing the process of trade reform

This section summarises the trade-offs between using trade versus non-trade instruments to address food security objectives. Insofar as non-trade instruments are likely to be more effective, it then looks briefly at the institutional capacity that countries have to apply such instruments, how an appropriate pacing and sequencing of reforms can help mitigate any negative side-effects, and finally at how the difficult political economy of agricultural trade policy reform can be managed.

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11. The IDS analysis points to shortcomings with many of the studies. First, very few examine the relationship between nutrition status and income with reliable methodologies. Second, the studies are difficult to compare because they often use different nutritional indicators as the dependent variable. Third, the estimates do not consider interaction terms with, for example, food consumption, access to water and sanitation, health care or social protection.
 12. <http://www.fao.org/food/nutrition-sensitive-agriculture-and-food-based-approaches/en/>.

Trade versus non-trade options

International trade has an important and positive role to play in enhancing the different dimensions of food security, and eschewing trade in order to pursue food self-sufficiency is likely to be counter-productive. Yet trade reforms change relative prices and therefore generate a constituency of “losers”, who could potentially see their food security threatened, at least in the short term. They also introduce international price risk, even if that risk is lower than the price risk in a protected domestic market. In each case, the most effective way of dealing with these downsides is likely to be through non-trade instruments: targeted social payments to protect against losses, support to farmers in developing risk management tools, and broader investments in productivity to improve incomes and access, and ensure that households are better equipped to cope with adverse shocks.

With respect to food availability, there are legitimate concerns about trade interruptions. The optimal way of managing these risks is through joint commitments to desist from beggar-thy-neighbour trade restrictions, on both the export side and the import side. Agreements to do so can be reached at the bilateral, regional or multilateral levels. The pursuit of food self-sufficiency to mitigate international risks is a costly policy that undermines the function of the international trading system, making markets thinner, more volatile and therefore riskier than if countries were to adopt open trade policies. In the face of both international and domestic risks, such as that of a failed harvest, a country which uses trade barriers to promote self-sufficiency because of the fear of trade interruptions may find itself exposed to greater potential losses than if it had remained open to international trade.

Confidence in the multilateral trading system was shaken during the 2007-08 food price crisis, when many countries applied counter-cyclical trade policies (restricting exports or waiving tariffs) that exported instability. At the national level, some developing countries may be vulnerable to imported instability, notably if their consumption is centred around just one or two food staples, and if their imports are sourced from just one or two countries. These risks can be mitigated by promoting more diversified diets (something that happens naturally to a degree as incomes rise) and by diversifying trading partners.

In terms of food access, overall incomes should rise with greater trade openness, but here too there may be concerns about losses among those who formerly benefited from trade protection, and the possibility that that group could include people who are food insecure. OECD analysis suggests that controlling the *level* of food prices is a poor tool with which to try to influence households' food security, not least because there are poor people who buy food and poor people who sell food, and helping one group by definition harms the other.

Price stabilisation via border measures may be perceived as providing an administratively simpler way of mitigating the impacts of price shocks on the poor than market based forms of risk management or the provision of income safety nets. Stable prices may promote a more predictable investment climate. Against this, they deter private risk management and export instability onto world markets. A further problem is that efforts to stabilise prices often turn into system support (or implicit taxation) according to the political weight of vested interests, with the result that they eventually become unsustainable from a budgetary point of view. Government interventions can also exacerbate instability if they are mis-timed, or if they induce strategic behaviour by traders (such as delaying imports in the anticipation that tariffs will be waived).

In addressing the issue of price volatility, it is important to identify the origin of risk (international or domestic), the degree of exposure, and the nature of the consequences. The role for national policies to combat price volatility will depend partly on the extent to which price volatility is contained at the international level. World price changes may be transmitted onto domestic markets more fully in some countries than others, and more in some years than in others. Domestic shocks, stemming chiefly from production shortfalls, are typically more frequent than international shocks, so market openness may help reduce the frequency of shocks.

However, trade openness may create vulnerability to rare but severe international shocks. At the macro level, governments may be able to use market based mechanisms to help mitigate such shocks that can affect the balance of payments and lessen their ability to implement social programmes. For example, Malawi has implemented a subsidised weather-indexed insurance programme, which helps to finance food imports when weather related domestic production shortfalls occur. Governments may also use option contracts to lock in future food import purchases, so that future import costs are known in advance. Increased international assistance – financial and technical – may be required to help put these mechanisms in place.

The ultimate aim should be to move away from market interventions and associated trade instruments towards instruments that are likely to be more effective in the long term. In order for that goal to be achieved: (i) the supporting institutions needed to implement alternative non-trade instruments must be developed; (ii) the pace and sequencing of reforms, and the use of flanking policies, needs to be such that any adverse impacts are contained; and (iii) the political economy forces that lead policymakers to favour trade measures need to be managed. The challenges involved in making these steps are discussed below.

Institutional capacity

A country's capacity to use non-trade instruments to address potentially negative implications of greater trade openness (including for food security) depends on whether effective institutional mechanisms are in place and, if not, the timeframe over which they can be developed. A general presumption has been that poorer countries – however defined – do not have the capacity to employ targeted interventions and therefore need more latitude in their scope to use trade policies. Yet that presumption may be increasingly less valid. The World Bank has noted prolific growth in social protection, with at-scale safety net programs expanding at a rate of two countries per year. A recent report notes that social safety net programs are being built on a national scale in 98 countries, up from just 72 in 2000 (World Bank, 2013). In addition, some 33 countries currently are experimenting with innovative pilot initiatives, 22 of which are in Sub-Saharan Africa. Similarly, while developing country farmers may have greater difficulty managing price risk than their counterparts in developed countries, new approaches to risk management are offering alternatives to trade protection. Tools to enable developing country governments and farmers to better manage agricultural risks are also being developed, including through the Platform on Agricultural Risk Management (PARM).

Pacing and sequencing of reforms, and complementary policies

A collection of FAO case studies from 2006, i.e. before the 2007-08 price spike, notes that while trade reforms may be ultimately beneficial to developing countries, there may be damaging effects in the short to medium term if those reforms are not accompanied with parallel policies to offset negative effects on groups that could include the poor and food insecure. A country's ability to move towards more effective long-term policies could also be compromised. The lessons from those case studies, in terms of how the shift towards greater openness can be managed, are summarised in Box 4.

Box 4. Trade reforms and food security: FAO findings from 15 case study countries

In this study, 15 countries were selected, which were representative of different regions of the world and different stages of development, with the main concentration on low-income countries at greater risk of food insecurity. The 15 countries were Cameroon, Chile, China, Ghana, Guatemala, Guyana, India, Kenya, Malawi, Morocco, Nigeria, Peru, Senegal, United Republic of Tanzania, and Uganda.

The study pre-dates the 2007-08 food price crisis, and at the time the trend in all fifteen countries was towards greater openness towards international trade and greater competition in national markets. But the institutional and infrastructural environments in which these reforms took place varied widely, as did the pace and sequence with which reforms were introduced.

In general, where reform packages were carefully designed and implemented in the short and medium run as well as the long run, reforms were conducive to poverty reduction and improved food security. The mixed pattern of successes and relative failures suggested the following lessons:

Greater attention needs to be paid to the sequencing of reforms in markets for inputs and outputs. More thought should be given to ways to assist the private sector to fill more completely the gap left by dismantling state agricultural marketing institutions, including support for the development of effective marketing and distribution systems.

Improving rural infrastructure is an important concomitant for successful policy reform in most countries, but it is particularly needed in low-income areas, along with support for productive investments by small farmers. Without such investments it is difficult for such farmers to respond to price incentives. Policies to encourage the development of rural non-farm employment are also important for the rural poor. These can include the development of micro-finance, simplification of regulatory regimes, infrastructure improvement, and special incentives for rural industrialization in poor areas.

As complementary policies to facilitate adjustment of the kind mentioned above can take time to bear fruit, transitional compensatory measures, targeted on lower-income groups, may be needed. The absence of measures to protect the poor, and the problems of targeting the most vulnerable groups, were noted in several of the case studies.

For countries with a large proportion of low income and resource poor people living in rural areas and who depend on agriculture, reforms aimed at raising productivity and at non-agricultural employment creation are essential for enhancing food security in the medium to long term. However, since such reforms may take some time to yield results, it seems preferable that these reforms be set in motion before (or at least at the same time as) implementing measures such as removing subsidies on agricultural inputs, and reducing tariffs on key crops grown by low-income households.

Source: FAO (2006).

Managing the political economy of reform

Trade policy instruments are often politically attractive to policymakers, because they can be adjusted relatively quickly, can in some cases be implemented without requiring the use of budgetary resources, and are a politically visible way of responding, and being seen to respond, to events such as the 2007-08 food price crisis. Case study work for a UNU-WIDER project shed light on the nature of these political economy forces and suggested ways in which they could be managed in order to deliver more efficient, and more equitable, policies. A recent set of case studies undertaken by FAO draws complementary conclusions on how the “mainstreaming” of agricultural trade policies into development strategies can help build support for policies that can help trade contribute more effectively to national food security. The findings of these two case study projects are summarised in Boxes 5 and 6.

Box 5. The political economy of food price policy

This UNU-WIDER project on the Political Economy of Food Price Policy looked at the main drivers of policy responses to the recent food price crisis. The supporting case studies looked at the underlying political economy of policy decisions in 14 countries: Bangladesh, Brazil, China, Egypt, Ethiopia, India, Kenya, Malawi, Mozambique, Nigeria, Senegal, South Africa, Viet Nam, and Zambia. The case studies revealed some important findings that might usefully be absorbed in preparing for, and responding to, future crises:

The case studies revealed a genuine desire to address food security, which was seen primarily as an access issue, with high prices the cause of diminished access. However, less attention was paid to other fundamental causes of food insecurity, or to nutrition. This focus led to the use of short term policies, rather than policies that would likely be better at addressing food security issues in the long term. In general, this involved “ramping up” the use of existing instruments (mostly market interventions), rather than the introduction of new measures or changes in the direction of policy.

In most countries the main consideration was for the welfare of urban consumers. In several cases, food protests in major cities made these concerns more keenly felt. By contrast, there was little consideration of the international spill-overs of these policies, or of how those spill-over effects would rebound on the domestic economy. In general, policy uncertainty and weak information systems made policies less effective than they would otherwise have been.

The main conclusions from the project focused on the need to have effective long-term policies in place and to put in place mechanisms to address unanticipated shocks that may arise. The specific recommendations were:

1. More attention should be paid to the fiscal costs of policies. For many developing countries, market-distorting policies are unlikely to be sustainable from a budgetary standpoint in the long-term, but they may not be sustainable in the short-term either. With limited budgetary resources, ad hoc market responses were found to create an uncertain environment that reduced investment incentives.
2. The trade-offs between short and long term policies need to be acknowledged. Money spent on short-term emergency measures cannot be spent again on long-term evidence based policies. Equivalently, proven policies adopted before a crisis should not be abandoned for unproven policies when a crisis hits.
3. Policy responses should as far as possible be prepared in advance of a crisis. Those policies should be framed on the basis of sound evidence. Many governments responded to the crisis on the basis of ill-informed perceptions about the impacts of high international price, putting in place inappropriate and sometimes excessive responses that in some cases exacerbated the domestic impacts of the shock and generally made the international price surge worse.
4. In preparing policies there is a need for transparent rule-based policymaking, and for structural checks and balances. During the price spike interested stakeholders became involved in policy processes, but often there were not effective mechanisms for mediating between competing concerns. Governments are in a better position to establish those mechanisms when market conditions are relatively calm.

Source: UNU-WIDER (2013).

Box 6. Mainstreaming agricultural trade policies

FAO undertook five country case studies in order to shed light on how appropriate agricultural trade policies and accompanying support measures can advance development and poverty reduction. The five countries covered were Bangladesh, Ghana, Nepal, Sri Lanka and Tanzania, all of which had developed poverty reduction strategies.

In general there was sparse coverage of trade policy issues in general, and agricultural trade policy issues in particular, in countries' poverty reduction strategies. A main conclusion was that trade and related support policies would be more effective and coherent if such issues were integrated into poverty and other national strategies, such as Comprehensive African Agricultural Development Programme (CAADP) compacts.

Mainstreaming agricultural trade policies, and related support measures such as trade facilitation, into national development can help countries identify priorities, as well as trade-offs and complementarities between different instruments. In general it is likely to lead to greater emphasis on investments as opposed to subsidies, and can strengthen support for the development of agricultural value chains. In general it was noted that strategies which focused on the development implications of policies in both export and import-competing sectors were more effective in terms of development results than those which focused purely on the former. A further suggestion was that trade policy decisions should come in the light of decisions on domestic policy needs, not be decided beforehand.

Mainstreaming of agricultural trade policy can also help identify and resolve incoherencies. For example, policies may provide infrastructure for the development of exports, while at the same time suppressing export incentives via export taxes. Formal policy processes, such as PRSPs or the development of CAADP compacts, can be used to address these inconsistencies. So too can wider consultation, internally and externally, including at the bilateral and regional levels.

Finally, mainstreaming agricultural trade policy into development programmes can provide a mechanism for overcoming divergent policy views. With respect to the use of border measures, support for one constituency typically comes at the expense of another and there are often competing views, even within government. Wide consultation, a requirement of PRSPs, can help in resolving such issues. A further benefit of wider consultation is that terminology can be clarified. For example, the term food security is used in some quarters to mean food self-sufficiency. Such ambiguities can stand in the way of a clear assessment of policy choices.

Source: FAO (2008).

7. Conclusion

The main argument in favour of trade openness across sectors (and reforms to achieve it) is that it raises incomes and contributes to faster economic growth. Low incomes and poverty, and an associated lack of **access** to food, are the principal causes of food insecurity, as manifested in indicators of hunger and undernourishment. Raising the incomes of the poor is the main channel through which trade can contribute to food security. At the same time, trade can make an important contribution to the other dimensions of food security. Trade in food and agricultural products in particular increases the **availability** of food by enabling products to flow from surplus to deficit areas. Open trade can also improve **utilisation** and nutrition by increasing the diversity of national diets. Finally, open markets generally improve the **stability** of availability of access, for the simple reason that international markets pool production risks across individual markets.

Yet across each dimension of food security there is a mixture of positive and negative effects from trade openness, and the prospect that some may lose, at least in the short term. In terms of food access, reforms that lead to higher food prices will benefit farmers with net sales of those products, but harm net buyers and non-farming consumers. The opposite is true for reforms that lower food prices. The very poorest farmers may not be integrated with markets, and for them trade openness is equivalent to building a road that connects them to markets – providing opportunities for sales and for purchases of traded inputs, but also exposing them to competitive forces.

The **availability** of food should increase with trade openness but increased trade raises concerns about import dependence for countries without a comparative advantage in food production. The **utilisation** of food should improve with openness and the associated increase in incomes, as the poorest

households increasing meet their basic energy requirements, while consuming more proteins and other nutrients. Yet rising incomes imply complex dietary changes are associated with a “nutrition transition”, with negative impacts that need to be managed by a range of non-trade policies. Finally, while trade openness should improve the **stability** of food supplies and of peoples’ access to food, consumers with access to open markets may be exposed to periodic shocks on international markets such as those experienced in the 1970s and in 2007-08.

The conclusion of a wide body of work, undertaken at OECD and elsewhere, is that there are important net gains agricultural trade reform, and the associated increases in trade openness, and that the challenge for policymakers is to design flanking policies which enable countries to reap the aggregate gains yet mitigate specific losses. Those policies include social protection and the provision of risk management tools, allied with investments in productivity so that average incomes rise to the extent that any adverse shock to incomes is unlikely to jeopardise food security (OECD, 2012; OECD, 2013).

This advice may be more difficult to implement in developing countries, where systems of social protection may not be fully developed, there are fewer options in terms of market instruments for managing risk, and where agricultural productivity often lags. Using trade policy to systemically support or suppress agricultural and food prices nevertheless tends to be ineffective at helping the poor and food insecure, not least because in most low-income countries there are poor people who buy food and poor people who sell food, so changing prices to help one constituency by definition harms the other. There are more plausible arguments for seeking to influence the stability of prices when market-based risk management tools are weakly developed and social protection (including safety nets) is not widely available. However, such policies are not the most effective that are potentially available, even in low-income countries, and may even be counter-productive. It is also important to recognise that they are not a cooperative international solution: efforts to stabilise domestic prices export instability onto world markets, while export bans have resulted in some countries experiencing difficulties in sourcing imports. Further international support could also help some poorer countries insure themselves against spikes in their food import bills.

The broader aim, however, should be to move towards policies that are likely to be more effective than trade interventions in the long term. The scope for doing so is accelerating, with developing countries increasingly able to deploy instruments that traditionally have been associated with higher incomes countries, including measures to protect incomes via direct payments and support for market based risk management tools. Lessons are also being learned with respect to the political economy of trade reform, such that changes can be introduced in a way that minimises adjustment stresses and helps build the consensus needed to lock in the benefits of trade policy reform.

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