

5. Poverty impacts of agricultural trade reforms

The impact of trade policy on poverty, food security and inequality in developing countries is at the centre of a crowded international debate on the role of international trade in development. The current Doha Round of trade negotiations makes development and poverty impacts a top priority. In addition, the Millennium Declaration underscores the importance of international trade in the context of development and the elimination of poverty. In the Millennium Declaration, governments committed themselves, *inter alia*, to an open, equitable, rule-based, predictable and non-discriminatory multilateral trading system.

Developing countries place great emphasis on assessing the distributional and food security consequences of trade liberalization and their domestic policy reform efforts. This growing interest has fuelled a wealth of empirical studies on the links between trade policy and complementary domestic policies and their impacts on inequality and poverty.

This chapter reviews much of this empirical evidence and examines the impacts of both unilateral domestic agricultural policy and trade reforms and multilateral trade liberalization on poverty.¹⁶ Attempts to correlate trade and trade liberalization positively with economic growth have a divisive and ambiguous history (Rodríguez and Rodrik, 1999). Studies establishing positive links between economic growth and poverty reduction are more convincing (see Bardhan, 2004, for a recent review).

Emphasis is given to agricultural trade policies. However, trade liberalization is generally an economy-wide phenomenon, with tariff cuts occurring across a wide range of commodities, so the review is not restricted to episodes where only

agricultural trade is liberalized. Furthermore, given the difficulty of isolating the effects of trade policies, the impact of other types of external shock that alter relative prices of tradeable and non-tradeable goods is considered.

By examining the ways in which households adjust to such external shocks, a great deal can be learned about how they would respond to sharp reductions in tariffs, or significant changes in a country's international terms of trade engendered by trade liberalization.

Food-insecure and poor households in developing countries are very diverse, and they are affected in different ways by agricultural trade reforms. While this discussion focuses most of its attention on how rural households respond to various trade reforms, to understand the impact of a given trade reform on national food security and poverty, the effect on urban households is equally important.

Agriculture's role in poverty reduction

The economic linkages among agriculture, trade and poverty are complex. Agriculture plays a central role in the lives of the poor, both as the main source of their livelihoods and their main consumption expenditure. Thus, to the extent that agriculture is affected by trade, trade has implications for poverty and food security.

Poverty is multidimensional and dynamic, with large numbers of vulnerable families moving in and out of poverty over time. Poverty means high levels of deprivation, vulnerability to risk and powerlessness. Seeking a better understanding of the links among poverty, economic growth, income distribution and trade remain a permanent issue in development literature (Box 6).

Agricultural growth is particularly important for poverty reduction and food

¹⁶ The conceptual framework for the trade-poverty linkages presented by Winters (2002), and the literature reviews offered by Winters, McCulloch and McKay (2004) and Hertel and Reimer (2004), provide the core background materials for this chapter

BOX 6**What do we know about poverty reduction?**

Important lessons for poverty reduction include the following:

- Poverty cannot be reduced without economic growth (or mean incomes rising) and the economic growth is neutral to income distribution or reduces income inequality.
- Large income inequalities are bad for poverty reduction and economic growth.
- Public investment and incentives for better nutrition, health and education benefit the poor through increased consumption and through higher future incomes.

- Capital-intensive technologies, import substitution and urban bias growth processes induced by price, trade and public expenditure policies are not good for reducing poverty.
- Agricultural growth, with low asset concentration and labour-intensive technologies, is good for poverty reduction.

Sources: FAO, 1993; Atkinson and Bourguignon, 2000; Lipton and Ravallion, 1995; Bruno, Ravallion and Squire, 1998; Ravallion and Datt, 1999; Aghion, Caroli and Garica-Penalosa, 1999; Khan, 2003.

security in developing countries. A number of factors help explain why.

Poverty as a rural phenomenon

First, poverty in developing countries is concentrated in rural areas, especially in those countries where the levels of undernourishment are greater than 25 percent. Most estimates suggest that more than two-thirds of the poor live in rural areas (FAO, 2004b).

While demographic and migration trends are shifting the poverty balance towards urban areas, the majority of the poor will continue to live in the countryside for at least a few more decades. In general, the more remote the location the greater is the incidence of poverty.

Moreover, urban poverty is to a large extent the result of rural deprivation, which encourages rural–urban migration. No sustainable reduction in poverty and undernourishment is possible without development of the rural areas.

Country-level surveys highlight the disparity between rural and urban areas. For example, the percentage difference between rural poverty and urban poverty in seven countries (as reported in their World Bank Poverty Reduction Strategy Papers [PRSPs]), ranged from 9 percent in Mozambique to 35 percent in Burkina-Faso, 38 percent in Nicaragua, 41 percent in Mauritania and 42 percent in Bolivia (Ingco and Nash,

2004). Furthermore, it is not just the poverty indicators that highlight the rural–urban disparity: rural populations score consistently lower on every quality of life indicator.

Economic importance of agriculture

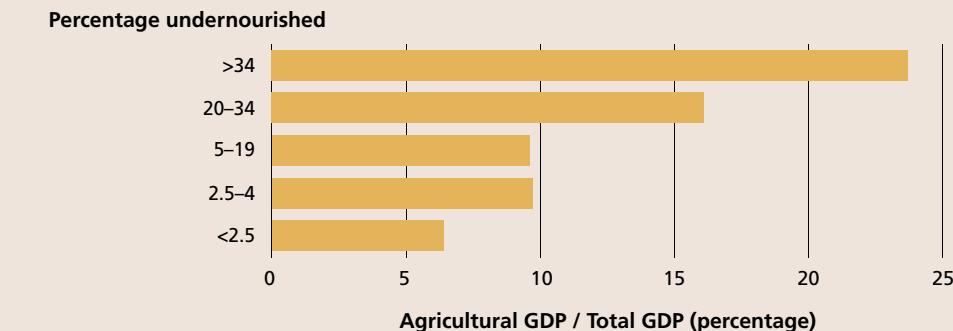
Second, the central role for agriculture in supporting poverty reduction and food security is underlined by the relative economic importance of the sector for developing countries. Seemingly paradoxically, agriculture represents a larger share of the economy in those countries with the highest percentage of poor and undernourished people in their populations.

Figure 15 presents the percentage share of agriculture in total GDP for developing countries grouped according to the prevalence of undernourishment. For countries where more than one-third of the population are undernourished, the share is almost 25 percent; this share declines with decreasing levels of undernourishment in the population.

Agriculture and employment

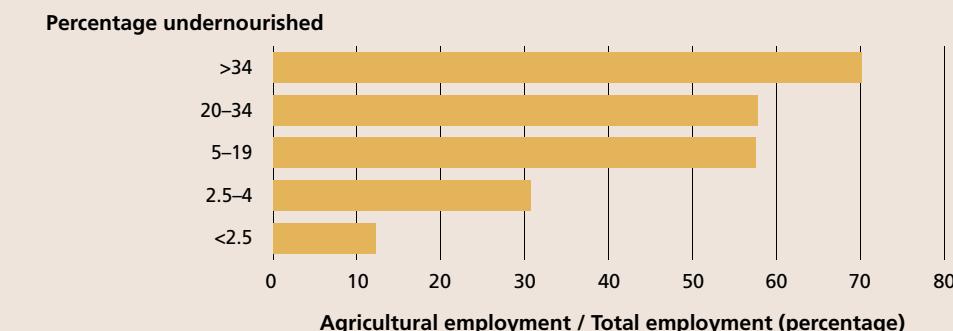
Third, most of the income-earning opportunities for the rural poor are related directly or indirectly to agriculture (Figure 16). For developing countries as a whole, agriculture accounts for about 55 percent of employment. Again, the share of agricultural employment in total employment is higher for countries with a

FIGURE 15
Agricultural GDP and undernourishment, 1998–2002



Source: FAO and World Bank.

FIGURE 16
Agricultural employment and undernourishment, 1998–2002



Source: FAO and World Bank.

higher prevalence of undernourishment and reaches as much as 70 percent, on average, for the countries where 34 percent or more of the population are undernourished.

The rural poor face a diverse set of problems, with an equally diverse set of solutions. Many of the solutions, however, are linked to an expanding agriculture sector where the poor can find jobs related to producing, supplying, storing, transporting, processing and reselling inputs, services and products.

Higher producer incomes, more jobs and higher wages for labourers lead to increased demand for goods and services that are often difficult to trade over long distances. Additional job opportunities emerge in non-farm activities to meet increased demand for basic non-farm products and services – including tools, blacksmithing, carpentry,

clothes and locally processed foods, to name a few. These and related goods and services tend to be produced and provided locally, with labour-intensive methods, and so have great potential to create employment and alleviate poverty. Surveys in four African countries suggest that between one-third and two-thirds of income growth in rural areas is spent on such local goods and services (FAO, 2003a).

Agriculture and pro-poor growth

The concentration of poverty in rural areas and the importance of the agriculture sector in output and employment among the poor all point to a central role for the sector in addressing poverty.

Such agriculture-led growth often lowers poverty in both urban and rural areas.

A major study by FAO examined the roles of agriculture in 11 developing countries, concluding that the pro-poor role of agriculture can be dramatic and much more effective in reducing poverty and hunger than other sectors in both rural and urban areas (FAO, 2004c).

In each country case study, researchers analysed the extent to which agricultural growth reduced poverty (i.e. the elasticities of national poverty levels with respect to agricultural growth). In some countries, the studies also assessed agriculture's contribution to poverty reduction relative to other sectors and in rural areas.

This component of the FAO study, known as the Roles of Agriculture Research Project (ROA), drew its inspiration from a 1996 study by Ravallion and Datt in which they compared the poverty reduction effects of agricultural growth with those of industry and services in India. The authors of the ROA study found national-level poverty elasticities with respect to agricultural growth ranging from -1.2 to -1.9. The urban poverty elasticities ranged from -0.4 to -0.5.

The study also explored how poverty is being reduced. Four channels for poverty reduction were considered: falling real food prices, creating employment, higher real wages and rising incomes for small farm households.

The results demonstrate that agricultural growth has a strong and positive impact on poverty reduction, often significantly greater than that of other economic sectors. Noticeably, this pro-poor outcome was observed not only for the poorest and most agrarian countries (Ethiopia and Mali), but also for the higher-income economies (Chile and Mexico).

The results also suggest that poverty reduction policies should take into consideration the strategic importance of agricultural growth and its transformation, the output mix (especially towards labour-intensive exports) and the various channels through which agriculture may contribute to poverty alleviation (Valdés and Foster, 2003).

Finally, agriculture's evolving economic linkages provide multiple opportunities to contribute to growth, poverty reduction and food security (Vogel, 1994; Timmer 1995; Anderson, 2002; FAO, 2003a; Sarris 2003; de Ferranti et al., 2005).

In agrarian societies with few trading opportunities, most resources are devoted to the provision of food. As national incomes rise, the demand for food increases much more slowly than other goods and services. New technologies for agriculture lead to expanding food supplies per hectare and per worker and the increasingly modernizing economies use more intermediate inputs purchased from other sectors.

Agriculture's share in total GDP declines with economic growth as post-farmgate activities are taken over by specialists in the service sector and become more commercialized. Commercial development occurs on the input side also, as producers substitute chemicals and machines for labour.

Although agriculture's share of GDP may fall relative to industry and services, the sector can nevertheless grow in absolute terms, evolving increasingly complex linkages with non-agricultural sectors. Agriculture's productive and institutional links with the rest of the economy produce demand incentives (rural household consumer demand) and supply incentives (agricultural goods without rising prices) that promote modernization.

While poverty reduction channels are not unique to agriculture, the pro-poor role of agricultural growth raises several important questions: Is agriculture receiving the priority it deserves in national policy-making? What role can trade play in making the most of the sector's potential? What types of domestic policies and public investments are needed to make agricultural trade work for the poor and food-insecure?

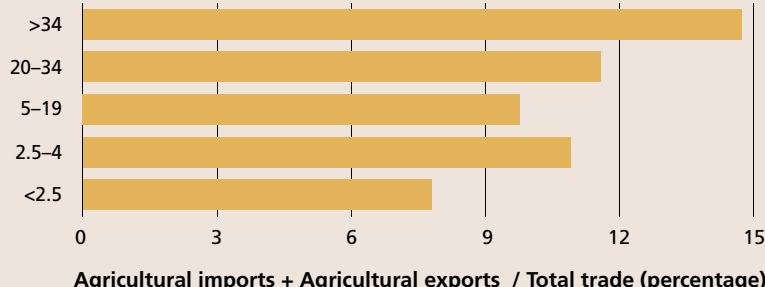
Trade's role in poverty reduction

FAO has long argued the virtues of trade's contributions to economic growth and resource efficiency, as well as its contributions to food security by providing a stable source of lower priced food from abroad. In addition, from a trade perspective, agriculture is particularly important for countries with a high prevalence of undernourishment (Figure 17).

For instance, for developing countries as a whole, agricultural products (including fisheries and forestry) account for about 9 percent of total trade (exports plus

FIGURE 17
Agricultural trade and undernourishment, 1998–2002

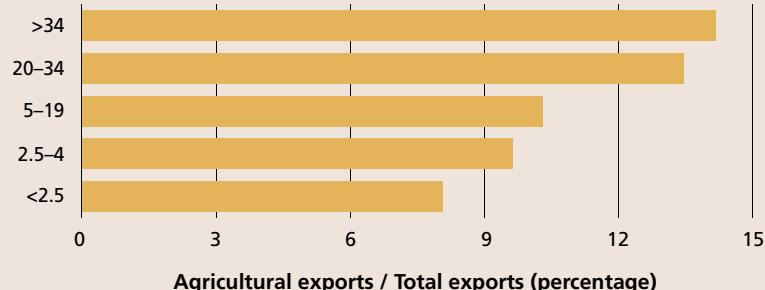
Percentage undernourished



Source: FAO and World Bank.

FIGURE 18
Agricultural exports and undernourishment, 1998–2002

Percentage undernourished



Source: FAO and World Bank.

imports), while for the countries with the highest prevalence of undernourished, the share is almost 15 percent. These numbers reflect an economy with lower levels of industrialization and little diversification within their agriculture sectors.

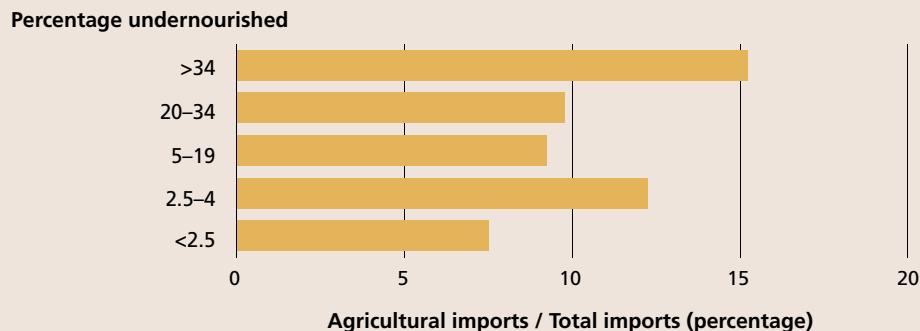
Looking at exports only, the country group with the highest levels of undernourishment is the most heavily dependent on agriculture, which accounts for more than 14 percent of their total exports (Figure 18). In spite of their high dependence on agriculture for income, employment and export earnings, countries in this group nevertheless spend more than 15 percent of their total import budget, and on average more than 12 percent of their total export earnings, to finance food imports (Figures 19 and 20).

Although the share of agricultural trade in total trade is high for those countries with the worst levels of undernourishment, their agriculture sectors are relatively less integrated into international markets. This is illustrated by Figure 21, which presents the ratio of agricultural trade to agricultural GDP for country groups by level of undernourishment in the population.

Trade-poverty linkages

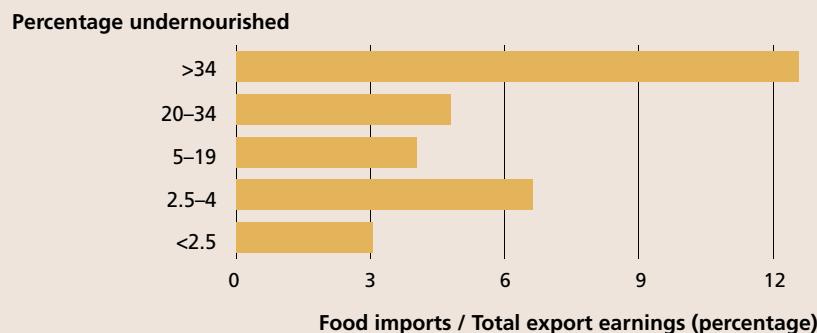
Trade-poverty linkages are complex and diverse. The first linkage is at the border. When a country liberalizes its own trade policy by, for example, reducing import tariffs, this results in lower prices for imported goods at the border. When other countries liberalize their trade policies, this

FIGURE 19
Agricultural imports and undernourishment, 1998–2002



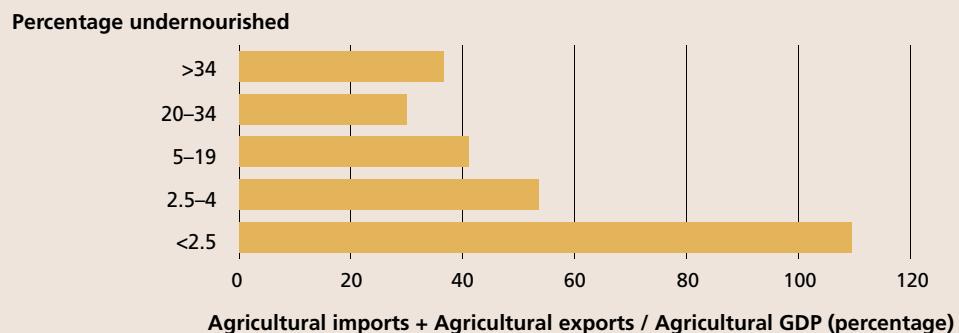
Source: FAO and World Bank.

FIGURE 20
Food imports and undernourishment, 1998–2002



Source: FAO and World Bank.

FIGURE 21
Integration of agriculture into world markets and undernourishment, 1998–2002



Source: FAO and World Bank.

affects the border prices of goods imported and exported by the first country. The direction and magnitude of the initial border price changes depend on the precise policy reforms being undertaken. As discussed in Chapter 4, the elimination of all forms of support and protection to agriculture by the OECD countries would be expected to increase the border prices of temperate-zone agricultural products by about 5–20 percent.

From the border, the focus moves to how prices are transmitted to producers and consumers, and to households in general. The extent to which households and businesses in the economy experience these price changes varies, and depends on the quality of infrastructure and the behaviour of domestic marketing margins as well as geographical factors. The empirical literature confirms this, sometimes wide, variance in the degree of price transmission from the border to the local market, even within a single country.

The initial impact of trade liberalization on households occurs once the local market price changes have been determined. Not surprisingly, households that are net sellers of products whose prices rise, in relative terms, benefit in this first round. Net purchasers of such goods lose.

However, the empirical literature demonstrates that first-round effects are altered significantly as households adjust consumption and production in response to changing relative prices. In this second round of effects, households modify their consumption basket, adjust working hours and possibly change their occupation. Evidence also suggests that changes in relative prices can even affect a household's long-term investment in human capital.

As households change their spending levels and employment patterns and as landowners and firms adjust their hiring, a wide range of effects ripple throughout the economy. For example, trade reforms that stimulate agricultural production often lead to a general increase in unskilled wages. This, in turn, benefits households that are net suppliers of unskilled labour. Finally, the long-run growth effects associated with trade liberalization need to be considered, including increases in firm productivity due to access to new inputs and technologies

as well as potential gains arising from the disciplining effect of foreign competition on domestic profit margins.

Agricultural trade reform and poverty

The importance of the agriculture sector and trade for poverty reduction are well established. Less well understood are the mechanisms through which trade liberalization in agriculture affects the poor and the capacity of the poor to adjust to the new policy environment.

Transmission of prices to consumers and producers

One of the more important issues to address when considering the potential impact of trade reforms on the poor is the extent to which changes in prices at the border even reach the households in question. An example from Mozambique underscores the significance of marketing margins in some low-income countries: the producer-consumer margins were as high as 300 percent in the case of cassava (Arndt *et al.*, 2000). In general, the biggest margins reported in this study were for food products, which tend to dominate both the consumption and production bundles of the poor in Mozambique. Thus, the existence and behaviour of producer-consumer margins are critically important for any poverty study.

If these marketing costs are solely a function of the quantity transported (i.e. *specific* as opposed to *ad valorem* in nature), then they dampen the impact of world commodity price changes on domestic consumers and at the same time exaggerate the impact of such price changes on producers of export products (Winters, McCulloch and McKay, 2004).

In Uganda, for example, transport margins protected domestic sales while taxing taxed exports over the decade 1987–97 (Milner, Morrissey and Rudaheranwa, 2001). Uganda's traditional exports include coffee, tea, cotton and tobacco and while a series of trade policy reforms over this period largely eliminated the implicit taxation of exports through trade policies, the implicit taxation caused by poor infrastructure and high transport costs remained very high

FIGURE 22
Regional impact of trade liberalization in Mexico



Source: Nicita, 2004.

relative to that of competitor countries such as Kenya. The transport-induced effective rate of taxation on exports from Uganda in 1994 was estimated to be equal to nearly two-thirds of value-added. Effective protection for domestic sales provided by the transport-induced trade barriers remained high throughout this period of reform. These "non-policy" barriers to trade represent one important reason for the sluggish response of the Ugandan economy to the extensive trade policy reforms undertaken over this period.

In Viet Nam, the geographical fragmentation of markets is a critical issue. There is a direct correlation between access to large markets and the transmission of border price changes to internal markets. For many isolated economic regions in the country, international trade (and even economic activities in other regions) is largely irrelevant (Roland-Holst, 2004).

Another recent study analysed the impact of NAFTA on rural producers and consumers in Mexico, addressing the question of price transmission from the border to domestic markets (Nicita, 2004). This report incorporates differential pass-through of Mexican tariff changes by region – estimated to be a function of the region's distance from the United States, the primary source of most Mexican imports.

Consistent with other studies of this nature, Nicita found incomplete pass-through of the tariff changes to consumers in Mexico, with the extent of pass-through being smaller for agricultural commodities

than for manufactured goods. When coupled with a rapid erosion of pass-through with increasing distance from the border, this means reductions in agricultural tariffs have little or no impact on the more remote regions of Mexico. High transportation costs and the greater competition from domestic sources faced by these products are the reasons for the low pass-through for agricultural products. Therefore, local production quickly becomes more profitable as one moves away from the border.

Figure 22 reports Nicita's estimates of the regional welfare impacts of trade reforms undertaken by Mexico in the 1990s. The study illustrates a considerable regional variation in impact, with households in some regions gaining more than 5 percent of real income, while others register negligible gains. Trade liberalization can also have an impact on marketing margins, particularly to the extent that it opens up the opportunity for investment in logistics, transport and marketing activities that may have previously been dominated by monopolies. Badiane and Kherallah (1999) also explore this aspect with reference to several African countries.

Initial impacts of price changes on households

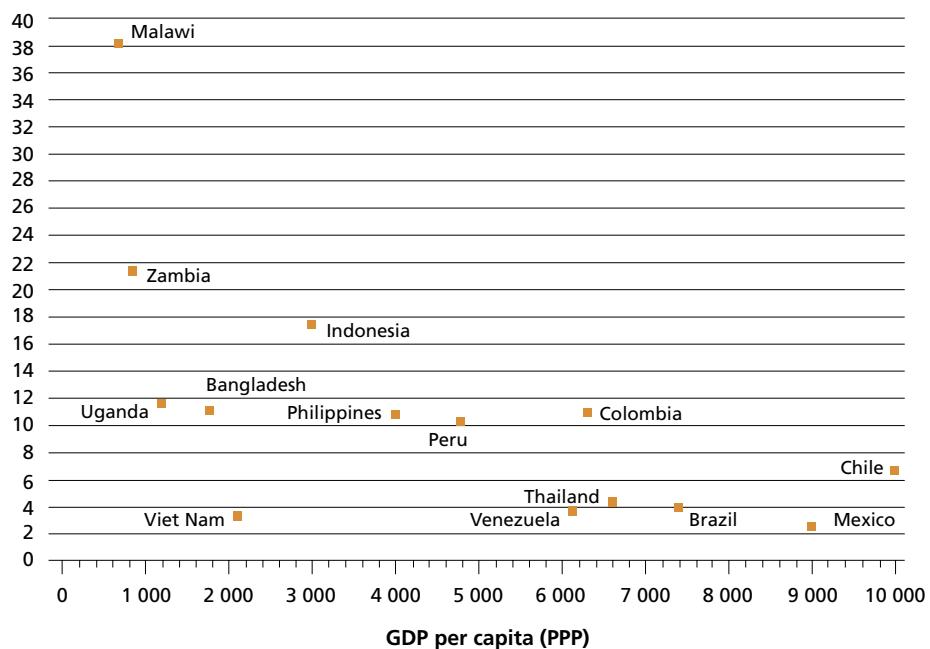
For self-employed, rural producers, the impact of a given set of border price changes, transmitted to the "farmgate" depends largely on their net sales position. Box 7 explores the impact of trade reforms on those households whose earnings are most dependent on agriculture.

BOX 7
Agricultural households

What impact do trade policy reforms have on those households whose earnings are most directly dependent on agriculture? The figure below draws on a set of 14 national household surveys for a selection of countries in Africa, Latin America and Southeast Asia. The figure plots the share of households that are specialized in agricultural income against GDP/capita, measured in purchasing power parity (PPP) terms. Here, we define "specialization" as referring to households that earn 95 percent or more of their income from agricultural profits. So, not only do they work full-time in agriculture, but they are also self-employed. This means that it may be difficult to switch to other activities if returns from farming were to fall. Likewise, because they are fully employed in agriculture, they are unable to increase

quickly the amount of effort devoted to farming if returns were to rise, short of reducing their leisure time.

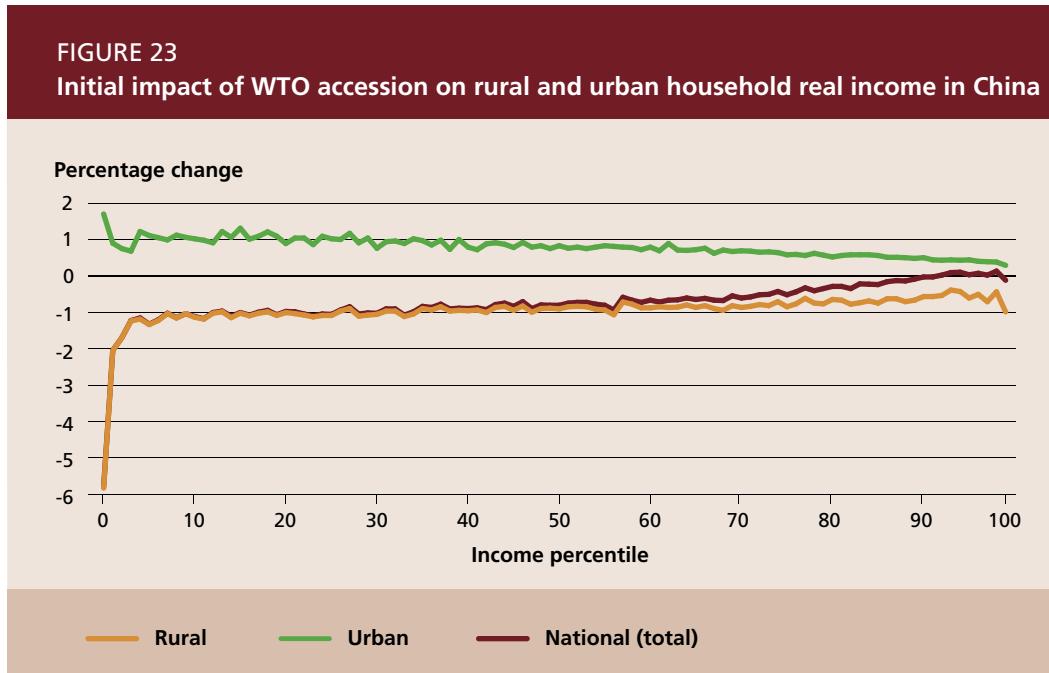
The figure shows the negative correlation between GDP per capita and the share of households specialized in agriculture. In the poorest country in the sample, Malawi, nearly 40 percent of households are specialized in farming, whereas the richest countries in the sample, Chile and Mexico, have only a fraction of that percentage specialized in agriculture. Of course, there are some outliers. For example, Viet Nam is a low-income country that also appears to have a low level of agricultural specialization. However, it is clear that, for many developing countries, the agriculture-specialized segment of the population is important, and this is generally inversely related to per capita GDP.

The share of agriculture-specialized households declines with per capita GDP
Specialized in agriculture (percentage)


Source: Hertel et al., 2004.

FIGURE 23

Initial impact of WTO accession on rural and urban household real income in China



Source: Chen and Ravallion, 2003.

If the household is a net exporter of a product whose price has risen, it benefits; if it is a net importer, then it loses. Summing over the net sales-weighted price changes estimates the overall change in household welfare. This approach was used to assess the *ex-ante* household welfare impacts of trade liberalization in the cases of China's WTO accession (Chen and Ravallion, 2003) and Morocco's unilateral trade liberalization (Ravallion and Lokshin, 2004).¹⁷

The China study found that the initial trade reform impact harms rural households, while benefiting urban households. This is because China is required to reduce protection on a number of important agricultural imports, whereas the average rate of manufacturing protection is quite low for most sectors as a result of the widespread use of duty drawbacks for manufactured goods and generally lower average tariffs.

The largest percentage change in welfare is for the poorest households (Figure 23), with the poorest rural households losing more than 2 percent of their income and the poorest urban households gaining nearly 2 percent of initial income. Overall, however, the effects of

WTO accession on China appear to be rather modest, partly because the deepest tariff cuts had already been made in anticipation of this agreement, but also because of the difficulty of quantifying the potential price effects of the accession agreement as it pertains to foreign commercial presence in the services sector of China (Walmsley, Hertel and Ianchovichina, 2005).

Tariff cuts on cereal imports in Morocco have adverse impacts on rural poverty while contributing to a fall in urban poverty. One of the more interesting results in the Morocco study is the decomposition of the aggregate change in inequality (which increases) into its vertical and horizontal components. The vertical component evaluates the change in inequality arising from differential impacts on households at different pre-reform levels of welfare. By this measure, inequality declines slightly following reforms because the poor tend to spend a disproportionate share of their income on grains, and grain prices fall under the reforms.

However, the dominant impact of reforms is to increase horizontal inequality – which is measured by assessing the impact on different households at the same level of pre-reform welfare. This is explained by the fact that many of the rural poor in Morocco tend to be net sellers of grains, and thereby

¹⁷ However, like most studies of this sort, these two do not take account of incomplete price transmission from the border to the local level.

BOX 8

Impact of agricultural liberalization on poverty in Brazil

Because different households have different income profiles, they are affected differently by changes in policy. To illustrate this point, Hertel and Ivanic (2005) use a global general equilibrium model to track the impact of a global round of agricultural trade liberalization on the different income strata of Brazilian society. The results highlight the differential impact that changes in consumer prices, urban and rural wages, and capital income can have across different households.

The poverty impact across income strata in Brazil is illustrated in the table below. Basically, with poverty rising in some strata and falling in others, it is not clear, *a priori*, whether overall poverty in Brazil will rise or fall following multilateral

agricultural trade liberalization. Focusing on the relative concentration of poverty in these strata does shed some light on the question, however. The poverty rate among the agriculture-specialized households in Brazil is much higher than that in the nation as a whole. As a consequence, this group accounts for 27.5 percent of total poverty – roughly equal to the share contributed by the urban, wage-earning stratum. Because of the overall importance of self-employed farm households in the national poverty picture, and the sharp reduction in their poverty rate following agricultural liberalization, the national poverty rate also falls in both the short-run (–2.9 percent) and the long-run (–1.6 percent) despite the increases in poverty in other strata.

Agricultural trade liberalization and poverty: impacts in Brazil

Stratum	Initial poverty share	Percentage change in poverty	
		Short-run	Long-run
Agricultural	0.275	–11.5	–1.9
Non-agricultural	0.111	1.3	–1
Urban labour	0.276	0.8	–2.2
Rural labour	0.154	0.5	–1.3
Urban diverse	0.039	–0.8	–2.1
Rural diverse	0.039	–4.5	–1.7
Total		–2.9	–1.6

Source: Hertel and Ivanic, 2005.

lose from the price declines; the poor in urban areas are net buyers and therefore gain. Because the horizontal component dominates, overall inequality rises following cereals import reforms in Morocco.

Box 8 presents the impact of agricultural liberalization for households with different income profiles in Brazil, where households specializing in agriculture account for more than one-quarter of total poverty.

A study of the distributional consequences of devaluation in Rwanda emphasizes the importance of home production (Minot, 1998). This study concluded that a devaluation that raises the price of tradeables relative to non-tradeables by

about 40 percent has only a modest negative impact on the poorest rural households, whose cash purchases comprise only about one-third of total expenditure.

The largest proportional losses accrue to the wealthiest urban households, who devote 96 percent of their income to cash purchases. Because one of the most important features of trade liberalization is often a change in the real exchange rate, this point is worth bearing in mind. Rural and low-income households are likely to be less severely affected either positively or negatively, because home production is more prominent in their overall consumption profile.

How households adjust to terms of trade shocks

With the exception of the Rwanda study, the analyses referred to in the preceding sections have simply used the households' initial sales and expenditure weights in the welfare analysis, thereby ignoring any potential for adjustment in response to the price changes. Of course, households tend to reduce consumption of higher-priced goods, while at the same time increasing their supply, thereby enhancing the potential for gains from a given set of exogenous price changes. Some studies have attempted to measure the potential for such adjustments and how they can affect the impact of external shocks on the rural poor.

One recent study of the potential of consumer substitution in the face of higher border prices estimated the effect of the Indonesian financial crisis on consumer welfare assuming (i) no substitution (as with the studies by Ravallion and co-authors) and (ii) substitution among goods and services based on estimated own- and cross-price elasticities of demand (Friedman and Levinsohn, 2002). In this particular case, the study found that substitution in consumption dampens the welfare losses from the Asian crisis by about 50 percent.

The Indonesian crisis has also provided a laboratory for understanding household responses on the income side of the picture. A study by Smith *et al.* (2002) offers a comprehensive analysis of changes in employment, wages and family incomes during the 1986–98 period, with a special focus on household responses to the crisis of 1997/98. They found that, while real wages were sharply reduced during the crisis – by as much as 60 percent in the case of formal sector employment in rural areas – combined family income in these rural areas fell by only about 37 percent during the crisis.

The dampening effect is attributed to the relatively stable returns to self-employment activities (primarily agriculture) and the increased allocation of family labour to self-employment. The study found that when the value of production for home use was included in the calculations, "full" family incomes (wages, plus self-employment income, plus production for home consumption) in rural areas fell by 21 percent, or about one-third of the decline in wages.

The urban households in Indonesia were not so fortunate. While urban wages fell by somewhat less than rural wages (55 percent), full family income in the urban areas fell by twice as much as in the rural areas (43 percent compared with 21 percent in rural areas) during the first year of the crisis. The relative increase in the price of food and farmers' ability to increase production in response to higher food prices were important factors in the rural households' ability to withstand the Indonesian crisis.

In fact, during this crisis, the agriculture sector demonstrated a remarkable capacity to absorb workers, with the farm labour force expanding by 20 percent (7.2 percentage points when measured relative to the entire workforce) during just one year. This flexibility in the face of external shocks suggests that considerable potential exists for such rural economies to adapt to, and benefit from, the higher world prices for agricultural products that are expected to follow multilateral trade liberalization.

Another way to assess the potential for developing countries to benefit from higher agricultural prices in the wake of trade liberalization is by estimating the agricultural commodity supply elasticity. Households gain from a price increase if they are net suppliers, but even if a household is not a net supplier prior to the reforms, given sufficient output response to the price hike, it might become a net supplier after the price increase. Thus, its chances of a welfare gain are considerably enhanced in the presence of large supply elasticities.

The evidence on agricultural supply response in developing countries suggests that the supply elasticities for individual crops are substantial, while those for the sector as a whole are quite small (Sadoulet and de Janvry, 1995). Infrastructure has a significant impact on supply response (Binswanger, 1989). The inability of the poorest households to increase production may be constrained by the lack of key productive assets (Deininger and Olinto, 2000). In summary, limited supply response can hinder the potential for such commodity price increases to pull households out of poverty in the absence of complementary policies aimed at improving access to credit and improved technology.

One study of the effects of agricultural trade reforms on poverty and inequality that takes into account both consumer demand and producer supply response to commodity price changes is that by Minot and Goletti (2000). In this study, rice production and consumption were subjected to a series of policy experiments, including (i) removing the rice export quota, (ii) changing the quota level, (iii) replacing the quota with a tax and (iv) removing restrictions on the internal movement of food. The aim was to understand how rice market liberalization in Viet Nam affects income and poverty in that country.

The distributional consequences of these policy scenarios were determined by way of the net rice sales position of different household classes, but these sales positions can change in response to how rice prices change. For instance, export liberalization raises prices within the country, particularly in the rice-exporting areas. The higher prices have a positive effect on rural incomes, and are generally favourable with regard to the number of people in poverty. Relaxing the restrictions on the internal movement of rice from south to north generates net benefits for the country, without increasing most measures of poverty.

Because rice production is relatively labour-intensive in Viet Nam, a rise in prices tends to increase demand for agricultural labour, and consequently the agricultural wage rate. Higher rice prices then lead to a greater decrease in poverty, particularly in households that derive a share of their income from agricultural labour. The counterfactual analysis in this work assumes that labour demand and wage rates remain constant because landlessness and the use of hired labour are considered not to be widespread in Viet Nam. However, as is clear from the next section, this is not necessarily the case in other countries.

Impact of trade reforms on factor markets

In the longer run, by stimulating the demand for unskilled labour in rural areas, higher agricultural prices tend to result in higher rural wages, thereby benefiting wage labour households in addition to self-employed

farmers. Ravallion (1990) addresses this issue in a study of rural labour markets in Bangladesh that measures both the short- and long-run impacts of an increase in the price of rice on rural wages and poverty. A simple condition was used to determine whether such households gain from an increase in the price of rice. The condition required the elasticity of wages with respect to the price of rice to exceed the ratio of net food (rice) expenditures divided by net wage income.

On this basis, Ravallion concluded that the average landless poor household loses from an increase in the rice price in the short run, but gains in the long run (five years or more). This is because the increase in household income (dominated by unskilled wages) is large enough to exceed the increase in household expenditures, of which less than half is comprised of rice for the poorest households.

Two studies by Porto (2003a, 2003b) offer a natural generalization of Ravallion's work for the case of Argentina. Adopting a general equilibrium approach, a set of wage equations for unskilled, semi-skilled and skilled labour were estimated where the explanatory variables were international prices for all merchandise commodities (not just agricultural goods), educational attainment and individual household characteristics. The resulting wage–price elasticities were used to estimate the impact on wages of potential changes in domestic commodity prices arising from trade reforms.

These relationships were used to provide an *ex-post* analysis of the distributional consequences of the Southern Common Market (MERCOSUR) for households in Argentina (Porto, 2003b). The results, summarized in Figure 24, illustrate that MERCOSUR benefited the poorest households in Argentina substantially (6 percent of income), while the wealthiest households may well have lost (the dotted lines give the 95 percent confidence interval on these results). By removing policies that favoured the wealthy relatively more, MERCOSUR is estimated to have had a positive impact on the distribution of income in Argentina.

A separate paper by Porto (2003a) uses the same framework to conduct an *ex-ante* assessment of prospective reforms in domestic and foreign trade policy. In this case, he drew on outside estimates of the

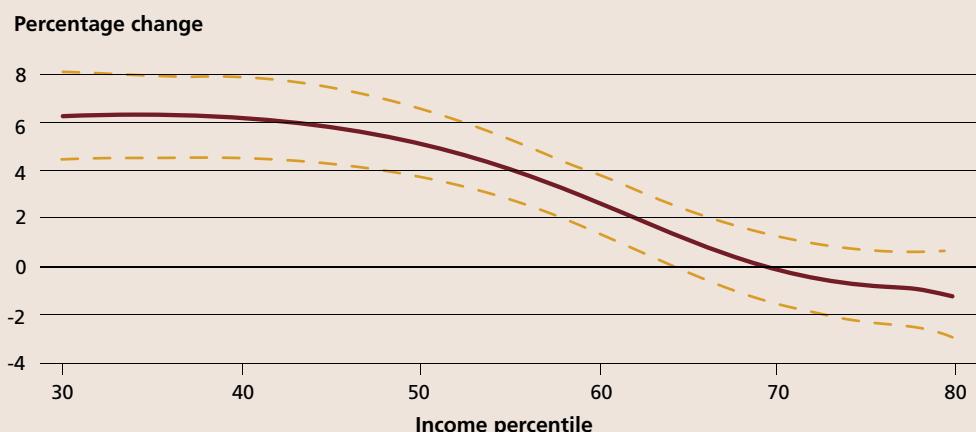
impact of foreign trade reforms on world prices. He concluded this work by noting that foreign reforms are more important than domestic reforms when it comes to potential poverty alleviation in Argentina.

Nicita's (2004) study of Mexican trade reforms referred to above uses the same approach as Porto to estimate how Mexican trade liberalization in the 1990s affected wages. Low-income households gained from lower-priced consumption goods, but these gains were largely offset by reductions in unskilled wages and agricultural profits. As a consequence, the poorest households

gained much less than the wealthy ones. In fact, while all households appeared to have gained from the reforms, the wealthiest households gained three times as much as the poorest. These findings are summarized in Figure 25.

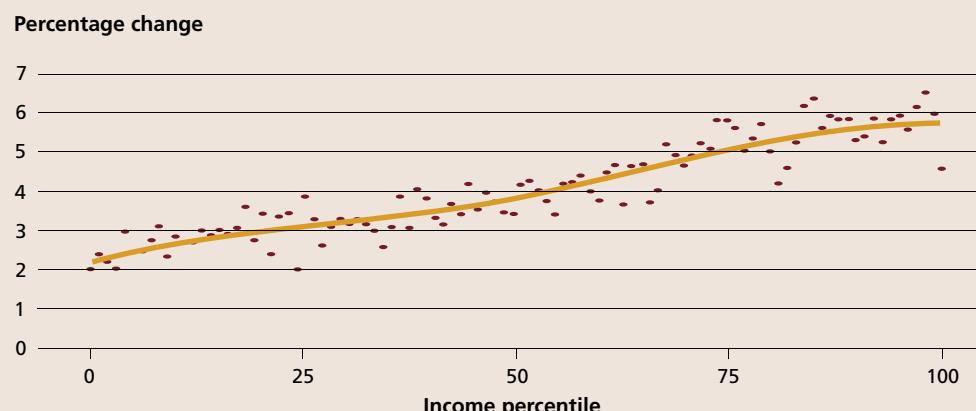
The preceding analyses are premised on the assumption that commodity price changes are eventually translated into factor market changes and that the subsequent changes in wages affect household welfare. However, in some cases, transaction costs may be high enough to preclude household participation in these markets (e.g. the

FIGURE 24
Impact of MERCOSUR on household real income in Argentina



Source: Porto, 2003b.

FIGURE 25
Impact of trade liberalization on household real income in Mexico



Source: Nicita, 2004.

cost of travelling to the nearest job may be prohibitive). This factor can have effects that go well beyond the "missing market" itself.

A study of the role of market failure in peasant agriculture found that missing markets for labour and/or staple foods serve to dampen substantially the supply response of peasant households to changes in cash crop prices (de Janvry, Fafchamps and Sadoulet, 1991). This line of reasoning, coupled with the prevalence of subsistence producers in Mexico in the early 1990s led de Janvry, Sadoulet and Gordillo de Anda (1995) to conclude that the majority of the maize producers in the *ejido* or communal sector would be little affected by the declines in grain prices expected to occur under NAFTA. As a consequence, their estimates of the overall reduction in maize production were considerably smaller than those of the models assuming a fully functioning labour market.

In fact, maize production in Mexico has not fallen in the wake of these price declines. Attempts to explain this phenomenon using a village-level CGE analysis emphasize the role of local labour and land markets in redistributing land away from the large commercial producers towards smaller subsistence farmers as land rents paid by these farmers have dropped, and wages received for working on the commercial farms have also declined (Taylor, Yunez-Naude and Dyer, 2003). The subsistence producers, who have expanded the cultivated area, bolstered maize production in the wake of the price drops.

Given that the main endowment of the poor is their own labour, the market that merits greatest attention by those studying trade and poverty is clearly the labour market. Assessing how well the labour market functions in a given economy becomes a central empirical question. Fortunately, there is an emerging body of literature aimed at testing for market failure – or as the issue is often framed, testing for the separation of household and firm decisions. If the labour market is functioning effectively, the amount of labour used on a farm should depend only on the wage rate and not on the number of working-age individuals in the farm households.

Benjamin (1992) provides an excellent example of how to test the separation hypothesis. He does so, in the context of rice production in Indonesia, by incorporating

demographic variables in the farm firm's labour demand equation and testing for the significance of the associated coefficient. Interestingly, he fails to reject the separation hypothesis, meaning that markets appear to be working.

However, the lack of wage labour income among many of the poorest rural households in some of the poorest countries suggests that this hypothesis might well be rejected in other cases. Hertel, Zhai and Wang (2004) note that nearly 40 percent of households in the poorest developing countries are completely specialized in farm income. These households are also disproportionately poor. Therefore, further examination of the separation hypothesis appears warranted.

The more general question of labour mobility – both across sectors and between the formal and informal (self-employed) sectors of the economy is crucial to understanding the impacts of trade liberalization on poverty. If workers and physical capital are immobile across sectors, then the pattern of poverty impacts that arises following trade liberalization is relatively heterogeneous, because trade reforms invariably help some sectors and regions at the expense of others.

However, with increased labour and capital mobility between agriculture and non-agriculture sectors, a much more uniform pattern of poverty reduction emerges, with real unskilled wages being the driving force behind these changes (Hertel *et al.*, 2003).

Recent econometric evidence from rural China suggests that the degree of off-farm labour mobility is quite low, particularly for households with low educational attainment (Sicular and Zhao, 2002). Hertel, Zhai and Wang, (2004) found that off-farm mobility is the key determinant of whether poverty among agricultural households is reduced following China's accession to the WTO. At higher levels of off-farm mobility, the boost in unskilled manufacturing wages is transmitted back to the farm and lifts the welfare of low-income households, despite lower farm prices.

Trade reforms, productivity and economic growth

Large, permanent reductions in poverty inevitably require economic growth (see Box 9). So the question naturally arises: to

what extent will trade reforms stimulate such growth? There are numerous mechanisms through which this can work. Three possibilities are presented here: increased investment in physical or human capital, access to improved technology, and increased competition.

A recent study of Viet Nam's rice market reforms of the 1990s demonstrates that the resulting boost to agricultural prices and hence rural incomes enabled the rural poor to invest in human capital (Edmonds and Pavcnik 2002). The trade reforms that raised the price of rice, and hence rural incomes, substantially reduced the incidence of child labour, while simultaneously increasing the rate of school attendance. In fact, the rise in rice prices during the reform period of the 1990s explains fully half of the decline in child labour that occurred at this time. This is precisely the kind of effect that will result in long-run reductions in poverty.

Of course, this process can also work in reverse. The impacts of the Indonesian financial crisis on household spending resulted in substantial reductions in the amount allocated to education and health care in the wake of this external shock (Thomas *et al.*, 1999). Moreover, the reductions were most pronounced among the poor. As Thomas and co-authors note, this reduction in human capital investment "suggest[s] that for these households the impact of the crisis is likely to be felt for many years to come".

Increased trade can also bring with it access to new technologies that can, in turn, have a significant impact on productivity. High trade barriers, both tariff and non-tariff in nature, often prevent access to some technologies or goods altogether, thereby impeding productivity growth (Romer, 1994). The case of maize production in Turkey provides a compelling example of the importance of imported technology (Gisselquist and Pray, 1997). Prior to 1982, Turkey restricted the importation of new varieties of agricultural commodities through a single-channel system, which gave the Ministry of Agriculture authority over seed production and trade. Between 1982 and 1984, these restrictions were relaxed, permitting foreign investment in this sector, the importation of new varieties and the elimination of price controls on seeds.

The impact on yields was dramatic. Comparing actual with predicted yields

under previous technologies shows that these reforms contributed to a 50 percent increase in maize yields in Turkey. The increase in average returns to maize production was estimated at 25 percent of gross economic value.

There is also evidence that exporting can lead to enhanced productivity and that imports can effectively discipline domestic mark-ups in imperfectly competitive industries, thereby encouraging firms to move down their average total cost curve. In addition, many trade agreements have explicit components aimed at stimulating foreign direct investment (FDI), which can stimulate growth by adding to the host country's capital stock as well as bringing with it new technologies and managerial capacity.

For example, in a study of FDI, research and development, and spillover efficiency in Taiwan Province of China, Chuang and Lin (1999) used firm-level data to confirm the existence of beneficial spillovers from FDI. They found that a 1.0 percent increase in an industry's FDI ratio produces an increase of 1.4–1.88 percent in domestic firms' productivity.

Model-based evidence

Cline (2003) modelled the links among trade liberalization, productivity growth and poverty. Specifically, he combined econometrically estimated elasticities of growth with respect to trade, as well as the elasticity of growth with respect to poverty, with a CGE analysis of global trade liberalization. This permitted him to synthesize an estimate of the aggregate, long-run poverty reduction that might arise from such a policy change. Cline began with the global CGE model of Harrison, Rutherford and Tarr (1997), augmenting the static gains from trade (the focus of the studies cited above) with the "steady-state" quasi-dynamic gains that follow in the long run from increased investment.

To this, he added another pure productivity effect, which he inferred by multiplying the increase in trade for each region – as estimated by the CGE model – by a "central estimate" of the elasticity of output with respect to trade, distilled from a review of the now vast cross-country growth regression literature. With the estimate of long-run growth in per capita income resulting from

BOX 9

Why trade matters for reducing poverty and improving food security?¹

Supachai Panitchpakdi, former Director-General, World Trade Organization

Technology and modern agriculture has transformed the nature of the quest for food security but in one respect there has been no significant change. Despite the impressive material progress that our civilization has made, hunger and starvation have sadly not been eradicated in all parts of the world.

Today there is the realisation that a sustainable domestic food supply cannot be ensured by each government acting individually. History has repeatedly shown that protectionism and isolation from world markets have never been the right answer. Food self-sufficiency is not equivalent to food security. The goal of self-sufficiency is illusory in today's world where a vast range of inputs constitute the full production equation. Nor is any country insulated from sudden adverse climatic effects which can dramatically reduce domestic agricultural output.

The WTO's contribution to efficient production is obvious and actually requires no elaboration. What is perhaps less obvious is the WTO's contribution to keeping the peace which is so vital to ensuring that supply channels remain open. Let us not forget that international trade conflicts have historically been a frequent cause of war, which jeopardizes directly people's access to food. The GATT/WTO system has, since 1948, provided a framework for the rule of law, peaceful negotiation and conflict resolution in international trade relations. Moreover, economic integration through trade provides a powerful incentive for political cooperation among nations. If I may quote from Montesquieu: "Peace is the natural effect of trade".

It is therefore no coincidence that the multilateral trading system is an essential pillar of the global political system. Stable trading relationships are vital not only for food security but also for global security. It is also no coincidence that more than two-thirds of WTO Members are developing

countries. After all clear and strong rules are of particular value to smaller and less powerful nations.

The WTO also contributes in more specific ways to food security. Ensuring efficient production and distribution of food supplies is, however, only part of the food security equation. Hunger and malnutrition are almost always the result of poverty. While many other factors play their role, the vast majority of the hungry and malnourished suffer from inadequate income, not from inadequate food supplies. The poor often lack purchasing power even when food supplies are domestically relatively plentiful or are readily available through world markets. A real lack of food supplies due to war, civil strife or natural disaster is comparatively small.

Seen in this light, one of the most concrete ways which the WTO can contribute to improving food security is by providing the opportunity to raise income levels through economic growth. As is recognized in the Rome Declaration and Plan of Action – trade is a key element for food security – as it stimulates economic growth. It permits the efficient transfer of food supplies from surplus to deficit regions. It allows countries to become self-reliant rather than trying to become self-sufficient, regardless of cost.

Since 1948, tariffs in the industrialized world have been cut by more than 80 percent in eight successive rounds of negotiation, and a vast range of quantitative restrictions and bureaucratic controls have been removed. Since 1948, trade has grown faster than international output in all but eight years. Trade liberalization has also been an important stimulus for the expansion of knowledge, technology and capital.

The other major contribution that the WTO can make is, of course, in terms of the impact of trade policy on agricultural production. A common policy

for governments seeking to enhance food security via self-sufficiency is to maintain high border protection and high internal prices to encourage domestic production. This, however, has adverse impacts on food security. High internal prices can act as a regressive tax. Poorer consumers tend to be hardest hit by high food prices. Reducing their purchasing power undermines their food security. Subsidies and other measures to induce production may also inadvertently benefit those members of the farming community, particularly rich farmers and landowners for example, who need it the least. It is clear that for these countries the pursuit of self-sufficiency will be an expensive, and arguably less than optimal, route to food security.

The distortion introduced by such policies also affects other countries. Its most direct effect is to curtail the agricultural exports of countries and regions where food can be produced at lower cost. This aspect is particularly important for developing countries. For many of these countries, including the poorest amongst them, how well they do economically depends on how well they do in agriculture. Of course, improvements in agricultural output and export performance depend on a wide range of factors outside the trade policy sphere. But it is widely accepted and understood that a further reduction of trade barriers and trade-distorting subsidies will help boost the economic performance of developing country agricultural producers.

The elimination of subsidies may, in the short-term, have terms-of-trade consequences for net food importing developing countries, as world prices have been kept artificially low for so many years. This is an important consideration and the special problems of net food importing developing countries deserve attention. The WTO provides some mechanisms to help. However, to address this problem in a definitive way we will need a broader response that involves the

international development and financial agencies.

From a development perspective, the outcome of the Doha Round must be more ambitious than what was achieved in the Uruguay Round, and we are on track for an ambitious outcome. But I must stress that to reach this outcome we will need meaningful results across the board, but especially in agriculture. All WTO Members will have to show considerable flexibility to reach an outcome which is ambitious and at the same time achieves a balance between import sensitivities and export interests.

Let us not forget that food has always been an important element of trade, with markets integrated to a greater or lesser extent for thousands of years. But during the twentieth century, trade in basic foodstuffs was subjected to increasingly higher impediments. The Doha Round gives us the opportunity to reverse this trend. We have in the Doha Development Agenda an obligation we must live up to, not only as trade negotiators but also as representatives of governments that have committed themselves to meet the Millennium Development Goals and other vitally important international development initiatives. The longer the reforms are delayed, the longer the development gains are postponed. Food security is a complex matter. Enhancing food security requires initiatives and policy actions on many fronts, with trade being only one element among others. That being said the successful completion of the Doha Round from a food security perspective can only be viewed as positive. The path to food security is through integration and interdependence, not protection and autarchy.

¹This box is extracted from the former WTO Director-General's speech to the High-Level Round Table on Agricultural Trade Reform and Food Security, held in Rome on 13 April 2005. The full text may be accessed at http://www.wto.org/english/news_e/spsp_e/spsp37_e.htm.

trade reform, Cline applied a country-specific "poverty elasticity" with respect to growth, based on an assumed log-normal income distribution for each region, to obtain his final estimate for poverty reduction.

The estimates are large, totalling nearly 650 million people – the bulk of these in Asia, where the absolute number of poor (based on a \$2/day metric) is large and trade growth is relatively high following multilateral trade liberalization.

Cline's growth-based estimates of poverty reductions stemming from trade liberalization are considerably larger than those obtained by the World Bank Development Prospects Group (2003). These authors used a recursively dynamic CGE model to estimate the poverty reduction in 2015 arising from gradual global trade liberalization between 2005 and 2010. Like Cline, they used a poverty elasticity with respect to income (in this case uniformly assumed to be 2.0 – a high number based on existing evidence) to convert economic growth into poverty reductions. Unlike Cline, they tracked the accumulation of capital in response to increased investment, and the openness/productivity multiplier is also an explicit part of their model. They concluded that such trade reforms reduce the number of people living in poverty (\$2/day) by 320 million – roughly half of Cline's estimate.

Cline's synthetic estimates – as well as those of the Development Prospects Group (2003) – highlight the potential for trade liberalization to have a substantial long-run impact on poverty. However, in order to arrive at this estimate, he had to follow a long and arduous path, crossing several research "minefields" in the process: "steady-state" CGE analysis, growth theory and cross-country regression analysis, in addition to the literature on income distribution and poverty.

It will be some time before these individual pieces are strong enough to support anything more than back-of-the-envelope estimates of potential long-run poverty impacts of trade reform. In the meantime, most of this literature will continue to emphasize the short- to medium-run income distributional impacts of trade reform on poverty resulting from comparative-static estimates of the ensuing commodity and factor price changes. To the extent that most

policy-makers focus on this shorter time frame, and because short-run impacts are especially important for households facing extreme poverty, FAO believes this emphasis is justified.

Implications for policy research

Agricultural trade liberalization can have an important impact on poverty and inequality. Because the bulk of the world's poor live in rural areas where the dominant livelihood is farming, any trade reforms that boost agricultural prices and agricultural activity tend to reduce poverty. However, the specific impacts depend on a number of factors.

The extent of price transmission from the border to local markets can vary widely – even within a given country – as was seen in the case of Mexico. Poor infrastructure and high transaction costs serve to insulate rural consumers from world price rises, while penalizing exporters. Any policies aimed at reducing domestic marketing costs will enhance rural welfare and improve the chances of rural producers benefiting from trade reform.

The ability of households to adjust to the price changes flowing from trade reform also varies considerably across countries, localities and types of households. The more responsive households are to the price changes, the greater the chance that they will be able to gain from trade reform. If they can increase supplies of products whose price has risen, while reducing consumption of these same goods, then any initial losses will be lessened, and gains will be enhanced. Of course, their ability to increase supplies is likely to be greater if they have adequate access to capital assets and credit – something that is notably difficult for the poorest farmers.

In the medium run, labour markets play a strong role in determining the poverty impacts of trade reform. Net purchasers of agricultural commodities can gain from higher prices – provided these prices translate into higher wages and provided they have access to employment at these higher wages. In fact, the impact of trade reforms on unskilled wages is central to the poverty story. Hence the importance of domestic policy reforms aimed at improving

the functioning of labour markets.

Long-run poverty reductions from trade reform hinge critically on economic growth. The impact of trade liberalization on economic growth is an area of intense research at present. Preliminary findings, based on the currently available empirical evidence on the trade-growth linkage suggest that this can be an important vehicle for reducing poverty.

Key findings

- Labour markets play a key role in determining the poverty impacts of trade liberalization. Net purchasers of agricultural commodities, who initially lose owing to higher prices, can ultimately gain if these prices translate into higher wages and more jobs.
- The dominant endowment of the poor is their labour, and the impact of trade reforms on unskilled wages is central to the poverty story, underscoring the importance of complementary domestic policy reforms aimed at improving the functioning of labour markets.
- Preliminary findings, based on the currently available empirical evidence

suggest the trade-growth linkage can be an important vehicle for reducing poverty. As our knowledge about this linkage improves in the future, our ability to assess the long-run impact of trade reforms on poverty will be greatly enhanced.

- The potential for trade to contribute to poverty reduction and food security depends on effective investments in infrastructure, institutions, education and health.
- Removing taxes on agricultural exports and tariffs on agricultural inputs (machinery, fertilizers and pesticides) in developing countries would improve the terms of agricultural trade and help producers compete on international markets and in their domestic markets.
- Safety nets and food distribution schemes are essential to ensure that low-income consumers are not penalized by rises in the prices of food imports.
- For many developing countries, the positive food-security impacts of trade on non-agricultural incomes, especially jobs and wages, are the biggest promises of trade.