

Policy reforms affecting agricultural incentives: much achieved, much still needed

Kym Anderson

School of Economics
University of Adelaide
Adelaide, SA 5005, Australia
Phone +61 8 8303 4712
kym.anderson@adelaide.edu.au

Revised September 2009

Revision of a background paper for the World Bank's *World Development Report 2008: Agriculture for Development*. This is a product of an on-going World Bank research project on Distortions to Agricultural Incentives, under the author's leadership (www.worldbank.org/agdistortions). The author is grateful for helpful comments from Derek Byerlee, various workshop participants and referees; for the efforts of nearly 100 authors who provided the country case studies for the Agricultural Distortions project; for computational assistance from a team of assistants led by Ernesto Valenzuela that brought together the global Agricultural Distortions database; and for funding from various World Bank Trust Funds, particularly these provided by the governments of the Netherlands (BNPP) and the United Kingdom (DfID). Views expressed are the authors' alone and not necessarily those of the World Bank or its Executive Directors. Forthcoming in the *World Bank Research Observer* Vol. 25(1), 2010.

Abstract

For decades, earnings from farming in many developing countries have been depressed by a pro-urban bias in own-country policies, as well as by governments of richer countries favoring their farmers with import barriers and subsidies. Both sets of policies reduce national and global economic welfare and inhibit agricultural trade and economic growth. They almost certainly add to inequality and poverty in developing countries, since three-quarters of the world's billion poorest people depend on farming for their livelihood. During the past two decades, however, numerous developing country governments have reduced their sectoral and trade policy distortions, while some high-income countries also have begun reducing market-distorting aspects of their farm policies. The author surveys the changing extent of policy distortions to prices faced by developing-country farmers over the past half century, and provides a summary of new empirical estimates from a global economy-wide model that yield estimates of how much could be gained by removing the interventions remaining as of 2004. The author concludes by pointing to the scope and prospects for further pro-poor policy reform in both developing and high-income countries.

JEL codes: F13, F14, Q17, Q18.

Policy reforms affecting agricultural incentives: much achieved, much still needed

Kym Anderson

For many decades agricultural protection and subsidies in high-income (and some middle-income) countries have been depressing international prices of farm products, which lowers the earnings of farmers and associated rural businesses in developing countries (Johnson 1991; Tyers and Anderson 1992). Those policies almost certainly add to inequality and poverty, since three-quarters of the world's poorest people depend directly or indirectly on agriculture for their main income (World Bank 2007). Currently less than 15 million relatively wealthy farmers in developed countries, with an average of almost 80 hectares per worker, are being helped at the expense of not only consumers, taxpayers, and producers of other tradables in those rich countries but also the majority of the 1.3 billion relatively impoverished farmers and their large families in developing countries who, on average, have to earn a living from just 2.5 hectares per worker.

But in addition to this external policy influence on rural poverty, the governments of many developing countries have directly taxed their farmers over the past half-century. A well-known and often-cited example is the taxing of exports of plantation crops in post-colonial Africa (Bates 1981). Furthermore, many developing countries in the 1960s and 1970s chose also to pursue an import-substituting industrialization strategy, predominantly by restricting imports of manufactures. As Krueger, Schiff, and Valdés (1988, 1991) showed in their seminal multi-country study, this indirectly taxed other tradable sectors in those developing economies, including agriculture.

Thus the price incentives facing farmers in many developing countries have been depressed by both own-country and other countries' farm, food, and trade policies. I will survey the extent to which government policies at home and abroad have distorted prices faced by developing-country farmers over the past half-century. I begin with a brief examination of the methodology required to measure the extent of own-country distortions to farmer incentives. I then survey analyses of the effects of those agricultural and trade policies

on incentives over time, focusing on the worsening of that situation between the 1950s and early 1980s and on the progress that has been made over the 25 years since then.

Notwithstanding recent reforms, many price distortions remain in the agricultural sector of both developing and high-income countries. I provide a summary of new empirical estimates from a global economy-wide model that indicate how much could be gained by removing the interventions remaining as of 2004. I conclude by pointing to the scope and prospects for further pro-poor policy reform in both developing and high-income countries.

<a>National Distortions to Incentives: Basic Theory¹

Bhagwati (1971) and Corden (1997) define the concept of a market policy distortion as something that governments impose to create a gap between the marginal social return to a seller and the marginal social cost to a buyer in a transaction. Such a distortion creates an economic cost to society which can be estimated using welfare-measures techniques such as those pioneered by Harberger (1971). As Harberger notes, this focus allows a great simplification in evaluating the marginal costs of a set of distortions: changes in economic costs can be evaluated by taking into account the changes in volumes directly affected by such distortions, ignoring all other changes in prices. In the absence of divergences such as externalities, the measure of a distortion is the gap between the price paid and the price received, irrespective of whether the level of these prices is affected by the distortion.²

Importantly, the total effect of distortions on the agricultural sector will depend not just on the size of the direct *agricultural* policy measures, but also on the magnitude of distortions generated by direct policy measures altering incentives in *non-agricultural* sectors. It is *relative* prices, and hence relative rates of government assistance, that affect

1. This section draws on Anderson and others (2008).

2. Other developments that change incentives facing producers and consumers can include flow-on consequences of the distortion, but these should not be confused with the direct price distortion that needs to be estimated. If, for instance, a country is large in world trade for a given commodity, imposition of an export tax may raise the price in international markets, reducing the adverse impact of the distortion on producers in the taxing country. Another flow-on consequence is the effect of a country's trade distortions on its real exchange rate, which is the domestic price of traded goods relative to non-traded goods. Neither of these flow-on effects is of immediate concern, however, because if the direct distortions are accurately estimated, they can be incorporated as price wedges into an appropriate country or global economy-wide computable general equilibrium (CGE) model. Such models are able to capture the full general equilibrium impacts (inclusive of real exchange rate effects) of the various direct distortions to producer and consumer prices.

producers' incentives. In a two-sector model an import tax has the same effect on the export sector as an export tax: the Lerner (1936) Symmetry Theorem. This carries over to a model that has many sectors, and which is unaffected if there is imperfect competition domestically or internationally or if some of those sectors produce only non-tradables (Vousden 1990, pp. 46–7). The Symmetry Theorem is therefore also relevant for considering distortions *within* the agricultural sector. In particular, if import-competing farm industries are protected, for example via import tariffs, this has similar effects on incentives to produce exportables as does an explicit tax on agricultural exports; and if both measures are in place, this is a double imposition on farm exporters.

Direct Agricultural Distortions

Consider a small, open, perfectly competitive national economy with many firms producing a homogeneous farm product with just primary factors. In the absence of externalities, processing, producer-to-consumer wholesale plus retail marketing margins, exchange rate distortions, and domestic and international trading costs, that country would maximize national economic welfare by allowing the domestic producer and consumer prices of that product to both equal E times P , where E is the domestic currency price of foreign exchange and P is the foreign currency price of this identical product in the international market. That is, any government-imposed diversion from those two equalities, in the absence of any market failures or externalities, would be welfare-reducing for that small economy.

<c>Price-distorting Trade Measures at the National Border.</c> The most common distortion is an *ad valorem* tax on competing imports (usually called a tariff), t_m . Such a tariff on imports is the equivalent of a production subsidy and a consumption tax, both at rate t_m . If that tariff on the imported primary agricultural product is the only distortion, its effect on producer incentives can be measured as the *nominal rate of assistance* (NRA) to farm output conferred by border price support (NRA_{BS}), which is the unit value of production at the distorted price, less its value at the undistorted free market price, expressed as a fraction of the undistorted price:³

3. The NRA_{BS} thus differs from the producer support estimate (PSE) as calculated by the OECD, in that the PSE is expressed as a fraction of the distorted value. It is thus $t_m / (1 + t_m)$, and so for a positive t_m the PSE is smaller than the NRA_{BS} and is necessarily less than 100 percent.

$$(1) \quad NRA_{BS} = \frac{E \times P(1 + t_m) - E \times P}{E \times P} = t_m$$

<centre equation; label ranged left>

The effect of that import tariff on consumer incentives in this simple economy is to generate a *consumer tax equivalent* (*CTE*) on the agricultural product for final consumers:

$$(2) \quad CTE = t_m$$

<centre equation; label ranged left>

The effects of an import subsidy are identical to those in equations (1) and (2) for an import tax, but t_m in that case would have a negative value.

Governments sometimes also intervene with an export subsidy s_x (or an export tax, in which case s_x would be negative). If that were the only intervention, then:

$$(3) \quad NRA_{BS} = CTE = s_x$$

<centre equation; label ranged left>

<c>*Domestic Producer and Consumer Price-distorting Measures.*</c> Some governments provide a direct production subsidy for farmers, s_f (or production tax, in which case s_f is negative, including via informal taxes in kind by local and provincial governments). In that case, if only this distortion is present, the effect on producer incentives can be measured as the *nominal rate of assistance* to farm output conferred by domestic price support (NRA_{DS}), which is as above except s_f replaces t_m or s_x , but the *CTE* in that case is zero. Similarly, if the government just imposes a consumption tax c_c on this product (or consumption subsidy, in which case c_c is negative), the *CTE* is as above except c_c replaces t_m or s_x , but the NRA_{DS} in that case is zero.

The combination of domestic measures and border price support provides the following total rate of assistance to output, NRA_o , and total consumer tax equivalent, *CTE*:

$$(4) \quad NRA_o = NRA_{BS} + NRA_{DS}$$

<centre equation; label ranged left>

$$(5) \quad CTE = NRA_{BS} + c_t$$

<c>*What if the Exchange Rate System Is also Distorting Prices?*</c> Should a multi-tier foreign exchange rate regime be in place, then another policy-induced price wedge exists. A

simple two-tier exchange rate system creates a gap between the price received by all exporters and the price paid by all importers for foreign currency, changing both the exchange rate received by exporters and that paid by importers from the equilibrium rate E that would prevail without this distortion in the domestic market for foreign currency (Bhagwati 1978). This requires controls by the government on current account transfers. In the past it was common for exporters to be required to surrender their foreign currency earnings to the central bank for exchange to local currency at a low official rate, which is equivalent to a tax on exports to the extent that the official rate is below what the exchange rate would be in a market without government intervention. That implicit tax on exporters reduces their incentive to export and hence the supply of foreign currency flowing into the country. With less foreign currency, demanders are willing to bid up its purchase price, providing a potential rent for the government which can be realized by auctioning off the limited supply of foreign currency extracted from exporters, or by creating a legal secondary market. Either mechanism will create a gap between the official and parallel rates (Dervis, de Melo and Robinson 1981).

If the government chooses to allocate the limited foreign currency to different groups of importers at different rates, that is called a multiple exchange rate system. Some lucky importers may even be able to purchase it at the low official rate. The more that is allocated and sold to demanders whose marginal valuation is below the equilibrium rate, the greater the unsatisfied excess demand and hence the stronger the incentive for an illegal or “black” market to form, and for less-unscrupulous exporters to lobby the government to legalize the secondary market for foreign exchange and to allow exporters to retain some fraction of their exchange rate earnings for sale in the secondary market. Such a right given to exporters to retain and sell a portion of foreign exchange receipts would increase their incentives to export, and thereby reduce the shortage of foreign exchange and hence the secondary market exchange rate (Tarr 1990; Martin 1993).

For present purposes, what matters is that, where a country has distortions in its domestic market for foreign currency, the exchange rate relevant for calculating the NRA_o or the CTE for a particular tradable product depends, in the case of a dual exchange rate system, on whether the product is an importable or an exportable one, while in the case of multiple exchange rates it depends on the specific rate applying to that product each year. The precise way in which that can be handled is detailed in Anderson and others (2008).

What if Farm Production Involves not just Primary Factors but also Intermediate Inputs? Where intermediate inputs are used in farm production, any taxes or subsidies on their production, consumption, or trade would alter farm value added and thereby also affect farmer incentives. Sometimes a government will have directly offsetting measures in place, such as a domestic subsidy for fertilizer use by farmers but also a tariff on fertilizer imports. In other situations there will be farm input subsidies but an export tax on the final product. In principle all these items could be brought together to calculate an effective rate of direct assistance to farm value added. The nominal rate of direct assistance to farm output, NRA_o , is a component of that, as is the sum of the nominal rates of direct assistance to all farm inputs, call it NRA_i . Where there are significant distortions to input costs, their *ad valorem* equivalent can be accounted for by summing each input's NRA times its input–output coefficient to obtain the combined NRA_i , and adding that to the farm industry's nominal rate of direct assistance to farm output, NRA_o , to get the total nominal rate of assistance to farm production, NRA .

What about Post-farmgate Costs? If a state trading corporation is charging excessively for its marketing services and thereby lowering the farm-gate price of a product, for example as a way of raising government revenue in place of an explicit tax, the extent of that excess is treated as if it were an explicit tax.

Some farm products, including some that are not internationally traded, are inputs into a processing industry that may also be subject to government interventions. In that case the effect of those interventions on the price received by farmers for the primary product also needs to be taken into account.

The Mean and Variance of Agricultural NRAs. When it comes to averaging across countries, each polity is an observation of interest, so a simple average is meaningful for the purpose of political economy analysis. But if one wants a sense of how distorted agriculture is in a group of countries, a weighted average is needed. The weighted average NRA for covered primary agriculture can be generated by multiplying each primary industry's share of production (valued at the farm-gate equivalent undistorted prices) by its corresponding NRA and adding across industries. The overall sectoral rate, NRA_{ag} , also could include actual or assumed information for the non-covered commodities and, where it exists, the aggregate value of non-product-specific assistance to agriculture. A weighted average can be generated

also for just the tradables part of agriculture—including those industries producing products such as milk and sugar that require only light processing before they can be traded—by assuming that its share of non-product-specific assistance equals its weight in the total. Call that NRA_{ag}^t .

In addition to the mean, it is important to provide also a measure of the dispersion or variability of the NRA estimates across the covered products. The cost of government policy distortions to incentives in terms of resource misallocation tends to increase as the degree of substitution in production increases (Lloyd 1974). In the case of agriculture which involves the use of farm land that is sector-specific but transferable among farm activities, the greater the variation of NRAs across industries within the sector, the higher will be the welfare cost of those market interventions. A simple indicator of dispersion is the standard deviation around the weighted mean of industry NRAs within the agricultural sector.

Trade Bias in Agricultural Assistance. A trade bias index is also needed to indicate the changing extent to which a country's policy regime has an anti-trade bias within the agricultural sector. This is important because, as mentioned above, the Lerner (1936) Symmetry Theorem demonstrates that a tariff assisting import-competing farm industries has the same effect on farmers' incentives as if there were a tax on agricultural exports; and, if both measures are in place, this is a double imposition on farm exporters. The higher is the nominal rate of assistance to import-competing agricultural production (NRA_{ag_m}) relative to that for exportable farm activities (NRA_{ag_x}), the more incentive producers in that subsector will have to bid for mobile resources that would otherwise have been employed in export agriculture, other things being equal.

Indirect Agricultural Assistance or Taxation via Non-agricultural Distortions

In addition to direct assistance to, or taxation of, farmers, the Lerner (1936) Symmetry Theorem further demonstrates that their incentives are also affected indirectly by government assistance to non-agricultural production in the national economy. The higher is the nominal rate of assistance to non-agricultural tradables production (NRA_{nonag}^t), the more incentive producers in other tradable sectors will have to bid up the value of mobile resources that would otherwise have been employed in agriculture, other things being equal. If NRA_{ag}^t is

below NRA_{nonag}^t , one might expect there to be fewer resources in agriculture than there would be under free market conditions in the country, notwithstanding any positive direct assistance to farmers, and conversely.

One way to capture this is to calculate a Relative Rate of Assistance, RRA , defined as:

$$(6) \quad RRA = \left[\frac{1 + NRA_{ag}^t}{1 + NRA_{nonag}^t} - 1 \right]$$

<centre equation; label ranged left>

Since an NRA cannot be less than -1 if producers are to earn anything, neither can an RRA . This measure is a useful indicator for providing international comparisons over time of the extent to which a country's policy regime has an anti- or pro-agricultural bias.

<a>National Distortions to Farmer Incentives: The Evolution of Policies

Before turning to the contemporary (post-World War II) situation, it would be insightful to examine briefly the long history of government intervention in international markets for farm products by today's advanced economies, since similar political economy forces may influence policy choices in later-developing countries. Attention then turns to the price-distorting policies of developing countries since the 1950s as they became independent from their colonial masters.

The Long History in High-income Countries, Briefly

Britain was the first country to have an industrial revolution. Prior to that revolution—from the late 1100s to the 1660s—Britain used export taxes and licenses to prevent domestic food prices from rising excessively. But during 1660–90 a series of Acts gradually raised food import duties (making imports prohibitive under most circumstances) and reduced export restrictions on grain. These provisions were made even more protective of British farmers by the Corn Laws of 1815. True, the famous repeal of the Corn Laws in the mid-1840s heralded

a period of relatively unrestricted food trade for Britain,⁴ but then agricultural protection returned in the 1930s and steadily increased over the next five decades.

Similar tendencies have been observed in many other West European countries, although on the Continent the period of free trade in the 19th century was considerably shorter, and agricultural protection levels during the past 150 years have been somewhat higher on average than in Britain. Kindleberger (1975) describes how the 19th-century free-trade movements in Europe reflected the national economic, political, and sociological conditions of the time. Agricultural trade reform was less difficult for countries such as Britain with overseas territories that could provide the metropolis with a ready supply of farm products. The fall in the price of grain imports from America in the 1870s and 1880s provided a challenge for all, however. Denmark coped well by moving more into livestock production to take advantage of cheaper grain. Italians coped by sending many of their relatives to the New World. Farmers in France and Germany successfully sought protection from imports, however, and so began the post-Industrial Revolution growth of agricultural protectionism in densely populated countries. Meanwhile, tariffs on West European imports of manufactures were progressively reduced after the General Agreement on Tariffs and Trade (GATT) came into force in the late 1940s, thereby adding to the encouragement of agricultural relative to manufacturing production (Lindert 1991; Findlay and O'Rourke 2007).

Japan provides an even more striking example of the tendency to switch from taxing to increasingly assisting agriculture relative to other industries. Its industrialization began later than in Europe, after the opening up of the economy following the Meiji Restoration in 1868. By 1900 Japan had switched from being a small net exporter of food to becoming increasingly dependent on imports of rice (its main staple food and responsible for more than half the value of domestic food production). This was followed by calls from farmers and their supporters for rice import controls. Their calls were matched by equally vigorous calls from manufacturing and commercial groups for unrestricted food trade, since the price of rice at that time was a major determinant of real wages in the non-farm sector. The heated debates were not unlike those that led to the repeal of the Corn Laws in Britain six decades earlier. In Japan, however, the forces of protection triumphed, and a tariff was imposed on rice imports from 1904. That tariff then gradually rose over time, raising the domestic price of rice to

4. Exceptions were high specific taxes on wine imports from France and high excises on some other exotic imported food items (Nye 2007).

more than 30 percent above the import price during World War I. Even when there were food riots because of shortages and high rice prices just after that war, the Japanese government's response was not to reduce protection but instead to extend it to its colonies and to shift from a national to an imperial policy of rice self-sufficiency. That involved accelerated investments in agricultural development in the colonies of Korea and Taiwan behind an ever-higher external tariff wall that by the latter 1930s had driven imperial rice prices to more than 60 percent above those in international markets (Anderson and Tyers 1992). After the Pacific War ended and Japan lost its colonies, its agricultural protection growth resumed and spread from rice to an ever-wider range of farm products.

The other high-income countries were settled by Europeans relatively recently and are far less-densely populated. They therefore have had a strong comparative advantage in farm products for most of their history following Caucasian settlement, and so have felt less need to protect their farmers than Europe or north-east Asia. Indeed Australia and New Zealand until the late 20th century tended—like developing countries—to adopt policies that discriminated against their farmers (Anderson, Lloyd and MacLaren 2007).

Developing Countries since the 1950s

In the Republic of Korea and Taiwan, China in the 1950s, as in many newly independent developing countries, initially adopted an import-substituting industrialization strategy which harmed agriculture. But in those two economies that policy was replaced in the early 1960s with a more neutral trade policy that resulted in very rapid export-oriented industrialization. That development strategy in those densely populated economies imposed competitive pressure on the farm sector which, just as in Japan in earlier decades, prompted farmers to lobby (successfully, as it happened) for ever-higher levels of protection from import protection (Anderson and Hayami 1986, ch. 2).

Many less-advanced and less-rapidly growing developing countries not only adopted import-substituting industrialization strategies in the late 1950s or early 1960s (Little, Scitovsky, and Scott 1970; Balassa and Associates 1971) but also imposed direct taxes on their exports of farm products. The latter practice was especially rife in Africa (Bates 1981). It was common in the 1950s and 1960s, and in some cases even in the 1970s and 1980s, also to use dual or multiple exchange rates so as to tax indirectly both exporters and importers (Bhagwati 1978; Krueger 1978). This added to the anti-trade bias of developing countries'

trade policies. That policy history is now well known, and has been documented extensively in previous surveys (for example Krueger 1984).

Less well-known is the extent to which many emerging economies have belatedly followed the examples of Korea and Taiwan in abandoning import-substitution and opening their economies. Some (for example Chile) started in the 1970s, while others (for example India) did not do so in a sustained way until the 1990s. Some have adopted a very gradual pace of reform, with occasional reversals, while others have moved rapidly to open markets. Some have reduced export taxes but simultaneously raised import barriers. And some have adopted the rhetoric of reform but in practice have done little to free up their economies. To get a clear sense of the overall impact of these reform attempts, there is no substitute for empirical analysis that quantifies over time the types of indicators raised in the theory section above. Building on recent work by the International Food Policy Research Institute (IFPRI) and the OECD (Orden and others 2007; OECD 2007), a World Bank project recently undertook such analysis, to which we now turn.

<a>National Distortions to Farmer Incentives: Empirical Estimates post-World War II

After post-World War II reconstruction, Japan continued to raise its agricultural protection, just as had been happening in Western Europe, but to even higher levels. Domestic prices exceeded international market prices for grains and livestock products in both Japan and the European Community in the 1950s, but by less than 40 percent. By the early 1980s the difference was more than 80 percent for Japan but was still around 40 percent for the EC—and was still close to zero for the agricultural-exporting rich countries of Australasia and North America (Anderson and Hayami 1986, table 2.5). Virtually all of that assistance to Japanese and European farmers in that period was due to restrictions on imports of farm products.

Since 1986 the OECD (2008) has been computing annual producer and consumer support estimates by member countries. For the OECD member countries as a whole, producer support rose between 1986–88 and 2005–07 in US dollar terms (from \$239 to \$263 billion) but has come down when expressed as a share of support-inclusive returns to farmers

(from 37 to 26 percent). Because of some switching of support instruments, including switching to measures that are based on non-current production or on long-term resource retirement, the share of that assistance provided via market price support measures has fallen from three-quarters to one-half. When the PSE payment is expressed as a percentage of undistorted prices to make it an NRA, the NRA fall is from 59 to 35 percent between 1986–88 and 2005–07 (OECD 2008). This indicator suggests high-income country policies have become considerably less trade-distorting, at least in proportional terms, even though farmer support in high-income countries has continued to grow in dollar terms because of growth in the value of their farm output.

As for developing countries outside north-east Asia, the main comprehensive set of pertinent estimates over time is for the period just prior to when reforms became widespread. They were generated as part of a major study of 18 developing countries from the 1960s to the mid-1980s by Krueger, Schiff, and Valdés (1988, 1991). That study by the World Bank, whose estimates are summarized in Schiff and Valdés (1992), shows that the depression of incentives facing farmers has been due only partly to various forms of agricultural price and trade policies, including subsidies to food imports. Much more important in many cases have been those developing countries' non-agricultural policies that hurt their farmers indirectly. The two key ones have been manufacturing protectionism (which attracts resources from agriculture to the industrial sector) and overvalued exchange rates (which attract resources to sectors producing non-tradables, such as services). That indirect impact was negative for all four groups of countries shown in table 1, whereas the impact of direct agricultural policies was negative only for the two lowest-income country groups. In addition to the total assistance being more negative the poorer the country group, table 1 also reveals that it is lower for producers of exportables than for the subsector focused on import-competing farm products, suggesting a strong anti-trade bias for the sector as a whole.

<insert table 1>

Since there were no comprehensive multiregion studies of the Krueger, Schiff, and Valdés type for developing countries that monitored progress over the subsequent reform period,⁵ a new study was recently launched by the World Bank aimed at filling this lacuna. The new study covers not only 41 developing countries but also 14 European transition

5. There is, however, an update for Latin America and a similar study for a few transition economies available in Valdés (1996, 2000).

economies as well as 20 high-income countries. The results from that study⁶ do indeed reveal that there has been a substantial reduction in distortions to agricultural incentives in developing countries over the past two to three decades. They also reveal that progress has not been uniform across countries and regions, and that—contrary to some earlier claims (for example from Jensen, Robinson, and Tarp 2002)—the reform process is far from complete. In particular, many countries still have a wide dispersion in NRAs for different farm industries and in particular have a strong anti-trade bias in the structure of assistance within their agricultural sector; and some countries have “overshot” in the sense that they have moved from having an average rate of assistance to farmers that was negative to one that is positive, rather than stopping at the welfare-maximizing rate of zero. Moreover, the variance in rates of assistance across commodities within each country, and in aggregate rates across countries, remains substantial; and the beggar-thy-neighbor practice of insulating domestic markets from international food price fluctuations continues, thereby exacerbating that volatility.

The global summary of those new results is provided in figure 1. It reveals that the nominal rate of assistance (NRA) to farmers in high-income countries rose steadily over the post-World War II period through to the end of the 1980s, apart from a small dip when international food prices spiked around 1973–74. After peaking at more than 50 percent in the mid-1980s, the average NRA for high-income countries has fallen a little, depending on the extent to which one believes some new farm programs are “decoupled” in the sense of no longer influencing production decisions. For developing countries, too, the average NRA for agriculture has been rising, but from a level of around –25 percent during the period from the mid-1950s to the early 1980s to a level of nearly 10 percent in the first half of the present decade. Thus the global gross subsidy equivalent of those rates of assistance have risen very substantially in constant (2000) US dollar terms, from close to zero up to the mid-1970s to more than \$200 billion per year at the farm gate since the mid-1990s (figure 2).

<insert figures 1 and 2>

When expressed on a per farmer basis, the gross subsidy equivalent (GSE) varies enormously between high-income and developing countries. In 1980–84 the GSE in high-

6. A global overview of the results is provided in Anderson (2009), and the detailed country case studies are reported in four regional volumes covering Africa (Anderson and Masters 2009), Asia (Anderson and Martin 2009), Latin American (Anderson and Valdés 2008), and Europe’s transition economies (Anderson and Swinnen 2008).

income countries was already around \$8,000 and by 2000–04 it had risen to \$10,000 on average (and \$25,000 in Norway, Switzerland, and Japan), or \$13,500 when “decoupled” payments are included. By contrast, the GSE in developing economies was –\$140 per farmer in the first half of the 1980s, which is a non-trivial tax when one recalls that at that time the majority of these people’s households were surviving on less than \$1 a day per capita. By 2000–04 they received on average around \$50 per farmer (Anderson 2009a, ch. 1). While this represents a major improvement, it is less than 1 percent of the support received by the average farmer in high-income countries.

The developing economies of Asia—including Korea and Taiwan, which were both very poor at the start of the period—have experienced the fastest transition from negative to positive agricultural NRAs. Latin American economies first increased their taxation of farmers but gradually moved during the mid-1970s to the mid-2000s from around –20 percent to 5 percent. Africa’s NRAs were similar though slightly less negative than those of Latin America until the latter 1980s, before they fell back to –7 percent (implying a gross tax equivalent per farmer of \$6). In Europe’s transition economies farmer assistance fell to almost zero at the start of their transition from socialism in the early 1990s; but since then, in preparation for EU accession or because of booms in exports of raw materials for energy production, assistance has gradually increased to nearly 20 percent, or \$550 per farmer (Anderson 2009a, ch. 1).

The developing country average NRA also conceals the fact that the exporting and import-competing subsectors of agriculture have very different NRAs. Figure 3 reveals that while the average NRA for exporters in developing countries has been negative throughout (coming back from –50 percent to almost zero in 2000–04), the NRA for import-competing farmers in developing countries has fluctuated around a trend rise from 10 and 30 percent (and it even reached 40 percent in the years of low international prices in the mid-1980s). Having increased in the 1960s and 1970s, the anti-trade bias within agriculture for developing countries has diminished considerably since the mid-1980s, but the NRA gap between the two subsectors still averages around 20 percentage points.

<insert figure 3>

That anti-trade bias means that the rates of assistance are not uniform across commodities, which indicates that the resources that are being used within the farm sector are not being put to their best use. The extent of that extra inefficiency, over and above that due

to too many or too few resources in aggregate in the sector, is indicated by the standard deviation of NRAs among covered products in each focus country. This dispersion index has fluctuated between 43 and 60 percent throughout the past five decades, with no discernible trend (Anderson 2009a, table 1.6). Figure 4 shows that rice, sugar, and milk (the rice pudding ingredients) are by far the most assisted farm industries in both high-income and developing countries. Beef and poultry meat have the next highest NRAs in high-income countries followed by cotton – while in developing countries cotton has the lowest (most negative) NRA.

<insert figure 4>

A further decomposition of the developing countries' NRAs worth commenting on is the contribution to them from trade policy measures at each country's border as distinct from domestic output or input subsidies or taxes. Often political attention is focused much more on direct domestic subsidies or taxes than on trade measures, because those fiscal measures are made so transparent through the annual budgetary scrutiny process, whereas trade measures are reviewed only infrequently and are far less transparent, especially if they are not in the simple form of *ad valorem* tariffs. That attention would appear to be misplaced, however, because between 80 and 90 percent of the NRA for developing country agriculture (not including non-product-specific support, which is very minor) comes from border measures such as import tariffs or export taxes (Anderson 2009a, ch. 1).

The improvement in farmers' incentives in developing countries is understated by the above NRA_{ag} estimates, because those countries have also reduced their assistance to producers of non-agricultural tradable goods, most notably manufacturers. The decline in the weighted average NRA for the latter, depicted in figure 5, was clearly much greater than the increase in the average NRA for tradable agricultural sectors for the period to the mid-1980s, consistent with the finding of Krueger, Schiff, and Valdés (1988, 1991). For the period since the mid-1980s, changes in both sectors' NRAs have contributed almost equally to the improvement in farmer incentives. The Relative Rate of Assistance, captured in equation (6) above, provides a useful indicator of relative price change: the RRA for developing countries as a group went from –46 percent in the second half of the 1970s to 1 percent in the first half of the present decade. This increase (from a coefficient of 0.54 to 1.01) is equivalent to an almost doubling in the relative price of farm products, which is a huge change in the fortunes of developing country farmers in just a generation. This is mostly because of the changes in

Asia, but even for Latin America that relative price hike is one-half, while for Africa that indicator improves by only one-eighth (figure 6).

<insert figs 5 and 6>

One of the main contributors to the Asian changes is China, and a non-trivial part of its reform came through reducing its overvalued official exchange rate. There, as in some other developing countries, the distortion in the domestic market for foreign currencies was gradually reduced in an indirect way, namely, by allowing exporters to sell an increasing share of their foreign currency earnings on a higher-priced secondary market. This lowered the trade tax equivalent of that distortion over time, and hence its impact on the NRA for farm and non-farm sectors, depending on the changing extent to which they are net-exporting or net-importing sectors. The impact of China's dual exchange rate system is shown in table 2: it made the RRA estimates about one-fifth larger in the mid-1980s, but that difference gradually fell to zero by the mid-1990s.

<insert table 2>

Finally, even though the developing country average agricultural NRA and RRA are now close to zero, and those for high-income countries have been moving towards zero since the late 1980s, there remains a huge spectrum of national averages (figure 7). This suggests there is still a great deal to be gained through international relocation of farm production between countries. That possibility, together with the possibility of gains from reducing the dispersion between product NRAs within countries, can best be explored with the use of a global economy-wide model. Attention thus now turns to estimates of the market, welfare and distributional effects of the distortions to agricultural incentives that remain in both high-income and poorer countries. This is done using a global model calibrated to 2004.

<insert figure 7>

<a>Market, Welfare, and Distributional Effects of Remaining Trade-distorting Policies

The new World Bank distortion estimates summarized above and available in downloadable detail (Anderson and Valenzuela 2008) show that while average distortions facing developing country farmers are now much less than in earlier decades, nonetheless there

remains a considerable range of distortions, including a strong anti-trade bias in agricultural policies for many countries. Furthermore, non-agricultural protectionism is still rife in some developing countries and agricultural supports are still substantial in high- (and some middle-) income countries.

This section addresses two questions: To what extent are government trade and subsidy policies still reducing farm incomes in developing countries and thereby prolonging inequality *across* countries in farm household incomes? And are those policy-induced price distortions depressing value added more in primary agriculture than in the rest of the economy of developing countries, thereby potentially raising inequality and poverty *within* those countries? With farm incomes well below non-farm incomes in most developing countries, and with agriculture there being intensive in the use of unskilled labor, policies that lower agricultural relative to non-agricultural value added, and wages for the unskilled relative to skilled wages and capital earnings, would tend to exacerbate inequality and poverty.

Answers to these two questions are provided in Anderson, Valenzuela, and van der Mensbrugge (2007). They first draw on the above-mentioned new database of distortions to agricultural markets in developing countries to amend the latest Global Trade Analysis Project (GTAP) protection database (pre-release Version 7.5, which refers to 2004).⁷ They then employ that amended database in a global computable general equilibrium model (LINKAGE—see van der Mensbrugge 2005) to assess how agricultural markets, factor prices, and value added in agriculture versus non-farm sectors would change if all such distortionary policies were removed (holding aggregate government taxes and spending constant by use of a lump-sum consumption tax). The comparative static results (assuming full adjustment) are presented first for the key regions of the world, beginning with national economic welfare where the impact of agricultural versus non-farm policies is highlighted.⁸ While no-one anticipates a move to completely free markets in the near future, the analysis serves as a benchmark to suggest what is at stake in terms of further reforms, either unilaterally or via

7. These and related questions were addressed a little earlier but using the GTAP Version 6 protection database (for 2001), with which the results presented below can be compared. See Anderson, Martin, and van der Mensbrugge (2006) for a LINKAGE model analysis and Anderson and Valenzuela (2007) for one using the GTAP model.

8. Results are also available for numerous individual countries, where the relative importance of own-country versus rest-of-world's policies can be shown. Krueger, Schiff, and Valdés (1988), like Jensen, Robinson, and Tarp (2002), focus on effects of just own-country policies, the first using partial equilibrium and the second using national general equilibrium models. On the relationship between those two methodologies, see Bautista

World Trade Organization (WTO) rounds of multilateral trade negotiations. It also provides a better indication of agricultural comparative advantages in different parts of the world than is available by looking at actual trade and self-sufficiency indicators in the current distortion-ridden situation.

According to the amended dataset, the average import-weighted applied tariff for agriculture and lightly processed food in 2004 was 11 percent for high-income countries and 14 percent for developing countries, while for non-farm goods it was 7 percent for developing countries and just 1 percent for high-income countries. Export subsidies for farm products exist for a few high-income regions, and export taxes are still in place in a few developing countries (notably Argentina since late 2001). Production subsidies and taxes also are much less prevalent than import tariffs, even though they include, in the case of developing countries, the output subsidy or tax equivalents of any subsidies or taxes on purchased farm inputs (table 3).

<insert table 3>

Global and National Economic Welfare Effects

The LINKAGE model's 2004 baseline of the world economy is first compared with a simulation in which all agricultural subsidies or taxes plus import tariffs on other merchandise, as summarized in table 3, are removed. That removal would lead to a global gain of \$192 billion per year.⁹ The distribution across regions of that economic welfare (or equivalent variation in income) gain, reported in table 4, suggests two-thirds of those dollars would accrue to high-income countries. However, as a share of national income, developing countries would gain more, with an average increase of 0.8 percent compared with 0.5 percent for high-income countries. The results vary widely across developing countries, ranging from slight losses in the case of some South Asian and Sub-Saharan African countries who suffer exceptionally large adverse terms of trade changes, to several percentage point gains in other cases.

<insert table 4 here>

and others (2001). For detailed country case studies using the World Bank's new agricultural distortions database, see Anderson, Cockburn, and Martin (2009).

9. That compares with an earlier estimate, using the GTAP 2001 database, of \$156 billion per year (Anderson, Martin, and van der Mensbrugge 2006, table A12.3).

The second column of numbers and those in parentheses in table 4 show the amount of that welfare gain due to changes in the international terms of trade for each country. For developing countries as a group, the effect of the terms of trade change on their welfare is negative, reducing somewhat the gains from improved efficiency of domestic resource use.

Regional and Sectoral Distribution of Welfare Effects

There are several ways to decompose the real income gains from full removal of price distortions globally so as to better understand the sources for each region. One way is to assess the impacts of developing country liberalization versus high-income country liberalization in different economic sectors. That decomposition suggests global liberalization of agriculture and food markets contributes 66 percent of the total global gains from merchandise reform. This is the same as Hertel and Keeney (2006) found for 2001 using the GTAP Model, and similar to the 63 percent found for 2015 by Anderson, Martin, and van der Mensbrugge (2006) using the LINKAGE Model. This robust “two-thirds” result is due to the high tariffs in agriculture and food versus other sectors shown in table 3, but is nonetheless remarkable given the low shares of agriculture and food in global GDP and global merchandise trade (less than 9 percent). For developing countries, the importance of agricultural policies is even greater at 70 percent, compared with 64 percent for high-income countries.

Quantities Produced and Traded

The full liberalization results suggest there would be little change in the developing countries’ aggregate shares of global output and exports of non-farm products other than apparel. Their shares in agricultural and food markets, however, change noticeably: the export share rises from 54 to 64 percent and the output share rises from 50 to 53 percent. More significantly, the rises occur in nearly all agricultural industries. As a result, the share of global production of farm products that is exported rises dramatically for many industries and, for the sector as a whole, increases from 7 to 12 percent excluding intra-EU trade (table 5). That “thickening” of international food markets would have a substantial dampening effect on the instability of prices in those markets.

<insert table 5>

The impact of full trade reform on global farm trade is to enhance it by more than one-third, whereas the global value of output is virtually unchanged, dropping just 2 percent. This suggests that, in aggregate, the pro-agricultural policies of high-income countries are not quite fully offset by the anti-agricultural policies of developing countries—whereas the anti-trade biases in policies of both groups of countries reinforce each other. The increase in exports of those goods from developing countries would be a huge \$158 billion per year. Latin America accounts for nearly half of that projected increase, but all developing regions' exports would expand. The share of production exported would increase for almost all major developing countries, rising in aggregate from 8 to 15 percent.

Effects on Factor Rewards

The relatively small percentage changes in net national economic welfare, reported in table 4, hide the fact that redistributions of welfare among groups within each country following trade reform can be much larger. This is clear from the impacts on real rewards to labor, capital, and land that are reported in table 6, where factor rewards are deflated by the overall consumer price index (CPI). It happens that food prices would fall more than the overall CPI index; so insofar as unskilled workers spend a higher share of their income on food than others, these results understate the extent of their gain. The results also support the expectation from trade theory that returns to unskilled labor in developing countries rise most, followed by wages of skilled workers, which in turn rise more than the earnings from produced capital. Returns to immobile agricultural land also rise in developing countries, but by less than for more mobile factors. That suggests it is necessary to drill down more to see what happens to returns from farming in aggregate to get a clearer idea of whether full reform would be likely to improve equity and reduce poverty in developing countries (bearing in mind that the vast majority of their poor earn income as farmers and unskilled laborers).

<insert table 6 here>

Effects on Sectoral Value Added

Of crucial interest in terms of these policies' impact on inequality and poverty is how they affect value added in agriculture, in other words net farm income or gross income minus purchased farm inputs. For poverty it matters how much that indicator changes in absolute

terms, while for inequality it matters also how much it changes relative to value added in non-farm sectors (which is a proxy for incomes of non-farm households). These results for full global reform, reported in table 7, show that for developing countries as a group, real value added in agriculture (net farm income) would rise by 5.2 percent, compared with 2.1 percent for non-agriculture. Latin America is where net farm income expands most, averaging 29 percent. In East Asia it also expands considerably, and twice as much as non-agricultural value added. However, in Africa net farm incomes would increase substantially only in Mozambique, Zambia, and Zimbabwe, and for the continent as a whole they would fall very slightly (by less than 1 percent). Partly that fall is because non-agricultural primary sectors—in which numerous African countries have a strong comparative advantage—would expand (raising self-sufficiency in that sector from 182 to 191 percent), and that in turn would boost non-tradables production and employment. Net farm incomes are estimated to fall also in South Asia (by 5 percent), but there it is textiles and clothing that expand (raising self-sufficiency from 144 to 153 percent) and, in India where the skilled or unskilled wage differential rises, skill-intensive goods and service sectors also expand.

<insert table 7 here>

<a>Prospects for Further Reductions in Distortions

It is not obvious how future policies might develop. A quick glance at the above policy indicators could lead one to view developments from the early 1960s to the mid-1980s as an aberrant period of welfare-reducing policy divergence (negative and declining RRAs in low-income countries, positive and rising RRAs in most high-income countries) that has given way to welfare-improving and poverty-reducing reforms during which the two country groups' RRAs are converging. But on inspection of the NRAs for exporting and import-competing subsectors of agriculture (figure 3), it is clear that the convergence of NRAs to near zero is mainly with respect to the exporting subsector, while NRAs for import-competing farmers are positive and trending upwards over time at the same rate in both developing and high-income countries—notwithstanding the Uruguay Round Agreement on Agriculture which was aimed at tariffing and reducing import protection. True, applied tariffs have been lowered or suspended as a way of dealing with the international food price spike in 2008, but this, and the food export taxes or quantitative restrictions imposed that

year by numerous food-exporting developing countries, may be only until international prices return to trend (as happened after the price hike of 1973–74 and the price dip of 1986–87).

The indications are very mixed as to why some countries appear to have reformed their price-distorting agricultural and trade policies more than others in recent decades, and why some have stubbornly resisted reform. Some reforming countries have acted unilaterally, apparently having become convinced that it is in their own national interest to do so. China is but the most dramatic and significant example of the past three decades among developing countries, while among the high-income countries only Australia and New Zealand are in that category. Others may have done so partly to secure bigger and better loans from international financial institutions and then, having taken that first step, they have continued the process, even if somewhat intermittently. India is one example, but there are numerous others in Africa and Latin America. Few have gone backwards in terms of increasing their anti-agricultural bias, but Zimbabwe and perhaps Argentina qualify during the present decade—and numerous others have joined them in 2008, at least temporarily, in response to the sudden upward spike in international food prices. And some have reduced their agricultural subsidies and import barriers at least partly in response to the GATT's multilateral Uruguay Round Agreement on Agriculture, the European Union (EU) being the most important example (helped by its desire also for otherwise-costly preferential trade agreements, including its recent expansion eastwards).

The EU reforms suggest agricultural protection growth can be slowed and even reversed if accompanied by reinstrumentation away from price supports to decoupled measures or more direct forms of farm income support. The starker examples of Australia and New Zealand show that one-off buyouts can bring faster and even complete reform.¹⁰ But in the developing countries, where levels of agricultural protection are generally below high-income levels, there are fewer signs of a slowdown of the upward trend in agricultural protection from import competition over the past half-century.

Indeed, there are numerous signs that developing-country governments want to keep open their options to raise agricultural NRAs in the future, particularly via import restrictions. One indicator is the high tariff bindings developing countries committed themselves to following the Uruguay Round: as of 2001, actual applied tariffs on agricultural products averaged less than half the corresponding bound tariffs for developing countries of

48 percent, and less than one-sixth in the case of least-developed countries (Anderson and Martin 2006, table 1.2).

Another indicator of reluctance in agricultural trade reform is the unwillingness of many developing countries to agree to major cuts in bound agricultural tariffs in the WTO's on-going Doha round of multilateral trade negotiations. Indeed, many of them believe high-income countries should commit to reducing their remaining farm tariffs and subsidies before developing countries should offer further reform commitments of their own. Yet modeling results reported in Anderson, Valenzuela, and van der Mensbrugghe (2010) suggest that if high-income countries alone were to liberalize their agricultural markets, such a subglobal reform would provide less than two-thirds of the potential gains to developing countries that could come from global agricultural policy reform.

More than that, the current negotiations have brought to prominence a new proposal for agricultural protectionism in developing countries. This is based on the notion that agricultural protection is helpful and needed for food security, livelihood security, and rural development. This view has succeeded in bringing "Special Products" and a "Special Safeguard Mechanism" into the multilateral trading system's agricultural negotiations, despite the fact that such policies, which would raise domestic food prices in developing countries, may worsen poverty and the food security of the poor (Ivanic and Martin 2008).

To wait for reform in high-income countries before liberalizing the farm trade of developing countries is unwise as a poverty alleviating strategy, not least because the past history revealed in the NRAs summarized above suggests that such reform will be at best slow in coming. In the US, for example, the most recent two five-year farm bills were steps backwards from the previous regime which at least sought to reinstrument protection toward less trade-distorting measures (Gardner 2009). Nor have the world's large number of new regional integration agreements of recent years been very successful in reducing farm protection. Furthermore, for developing countries to postpone their own reform would be to forego a major opportunity to boost theirs and (given the size and growth in South-South trade of late) their neighbors' economies. As Anderson and Winters (2009) argue, it would be doubly wasteful if, by being willing to commit to reform in that way, they would be able to

10. For a detailed analysis of the buyout option versus the slower and less complete cashout option (moving to direct payments), as well as the uncompensated gradual squeeze-out or sudden cut-out options, see Orden and Diaz-Bonilla (2006).

convince high-income countries to reciprocate by signing on to a more ambitious Doha agreement, the potential global benefits from which are very considerable.

Developing countries that continue to free up domestic markets and practice good macroeconomic governance will keep growing, and typically the growth will be more rapid in manufacturing and service activities than in agriculture, especially in the more densely populated countries where agricultural comparative advantage is likely to decline. Whether such economies become more dependent on imports of farm products depends, however, on what happens to their RRAs. The first wave of Asian industrializers (Japan, and then Korea and Taiwan) chose to slow the growth of food import dependence by raising their NRA for agriculture even as they were bringing down their NRA for non-farm tradables, such that their RRA became increasingly above the neutral zero level. A key question is: will later industrializers follow suit, given the past close association of RRAs with rising per capita income and falling agricultural comparative advantage? Figure 8 suggests developing countries' RRA trends of the past three decades have been on the same upward trajectory as the high-income countries prior to the 1990s. So unless new forces affect their polities, the governments of later industrializing economies may well follow suit.

<insert figure 8>

One potential new force is disciplines on farm subsidies and protection policies of WTO member countries following the Uruguay Round. Earlier industrializers were not bound under GATT to keep down their agricultural protection, and the legal constraints on developing countries have been even less constraining. For India, Pakistan, and Bangladesh, for example, their estimated NRAs for agricultural importables in 2000–04 are 34, 4, and 6 percent, respectively, whereas the average bound tariffs on their agricultural imports are 114, 96, and 189 percent, respectively (WTO, ITC, and UNCTAD 2007). Also, like other developing countries, they have high bindings on product-specific domestic supports of 10 percent and another 10 percent for non-product specific assistance, a total of 20 more percentage points of NRA (17 percent in China's case) than legally could come from domestic support measures—compared with currently 10 percent in India and less than 3 percent in the rest of South Asia.

Hopefully developing countries will choose not to make use of the legal wiggle room they have allowed themselves in their WTO bindings to follow Japan, Korea, and Taiwan into high agricultural protection. A much more efficient and equitable strategy would be instead to treat agriculture in the same way they have been treating non-farm tradable sectors.

That would involve opening the sector to international competition and relying on more efficient domestic policy measures for raising government revenue (for example income and consumption or value-added taxes in lieu of trade taxes)¹¹ and assisting farm families (for example public investment in rural education and health, rural infrastructure, and agricultural research and development). Investments in public agricultural R&D in developing countries as a group is currently equivalent to less than 1 percent of the gross value of farm production (about half the intensity of high-income countries). Given the extremely high rates of return at the margin to such investments (see, for example, Fan 2008), expenditure on that would be far wiser than providing farm price supports as middle-income economies develop.

As for high-income countries, the above distortion estimates show that they have all lowered the price supports for their farmers since the 1980s. In some countries that has been partly replaced by assistance that is at least somewhat decoupled from production. If that trend continues at the pace of the past quarter-century, and if there is no growth of agricultural protection in developing countries, then before the middle of this century most of the disarray in world food markets will have been removed. However, if the WTO's Doha Development Agenda collapses, and governments thereby find it more difficult to ward off agricultural protection lobbies, it is all the more likely that developing countries will follow the same agricultural protection path this century as that which was taken by high-income countries last century. One way to encourage developing countries to follow a more liberal policy path could be to extend the Integrated Framework's Diagnostic Trade Integration Study (DTIS) process to a broader range of low-income countries. That process, which provides action plans for policy and institutional reform and lists investment and technical assistance needs, could be expanded to include the "aid for trade reform" proposal that has been discussed in the context of the Doha round (Hoekman 2005)—regardless of the fate of that round.

<a>Areas for Further Research

11. Developing countries are becoming less and less reliant on trade taxes as a source of government revenue, with even very poor countries realizing that a tax imposed at the border, if called a consumption tax rather than

Clearly there have been dramatic changes in distortions to agricultural incentives over the past half-century. They worsened up to the 1980s in most regions, but since then there has been substantial reform in many (but not all) developing and high-income countries. Nonetheless, net farm incomes in developing countries as a group are still depressed by the policies in place in both sets of countries as of 2004, in the sense that removing all distortions to goods markets globally would raise agricultural value added in developing countries by 5.2 percent, while value added in the rest of their economies would rise only 2.1 percent on average. That average hides considerable diversity across developing countries though, so its impact on inequality and poverty at the individual country level needs to be assessed for different types of households on a case by case basis—as is being done in a forthcoming set of national and global modeling studies reported in Anderson, Cockburn, and Martin (2009).

Why some countries have reformed more or later than others, why some developing countries have “overshot” in the sense of moving from taxing to subsidizing farmers relative to producers of other tradables, and why assistance rates still vary so much across countries and commodities are puzzles that can be examined more easily now that there is a comprehensive global database of distortion estimates for the full spectrum of countries at varying stages of development (Anderson and Valenzuela 2008), building on earlier insights from the Krueger, Schiff, and Valdés study and more recent reform studies (Krueger 1992, 2000; Rodrik 2003; Ndulu and others 2008) as well as advances in political economy theory (for example Grossman and Helpman 2001, 2002; Acemoglu and Robinson 2006; North, Wallis, and Weingast 2009). A beginning to such political econometric analysis is under way and one set of studies is reported in Anderson (2010b), but much more exciting research in that area remains to be undertaken.

<a>Notes

Kym Anderson is the George Gollin Professor of Economics at the School of Economics, University of Adelaide, Adelaide, SA 5005, Australia. Phone +61 8 8303 4712; email address: kym.anderson@adelaide.edu.au. The author is grateful for helpful comments from Derek Byerlee, various workshop participants, and referees; for the efforts of nearly 100 authors who provided the country case studies for the Agricultural Distortions project; for computational assistance from a team of assistants led by Ernesto Valenzuela that brought together the global Agricultural Distortions database; and for funding from various World Bank Trust Funds, particularly those provided by the governments of the Netherlands (BNPP) and the United Kingdom (DfID). Views

a tariff, does not induce protected domestic production and yet can raise the same revenue at the same collection cost as a tariff.

expressed are the author's alone and not necessarily those of the World Bank or its executive directors. This paper is a revision of a background paper for the World Bank's *World Development Report 2008: Agriculture for Development*. This is a product of an ongoing World Bank research project on Distortions to Agricultural Incentives, under the author's leadership (www.worldbank.org/agdistortions).

<setter: take in footnotes here>

<a>References

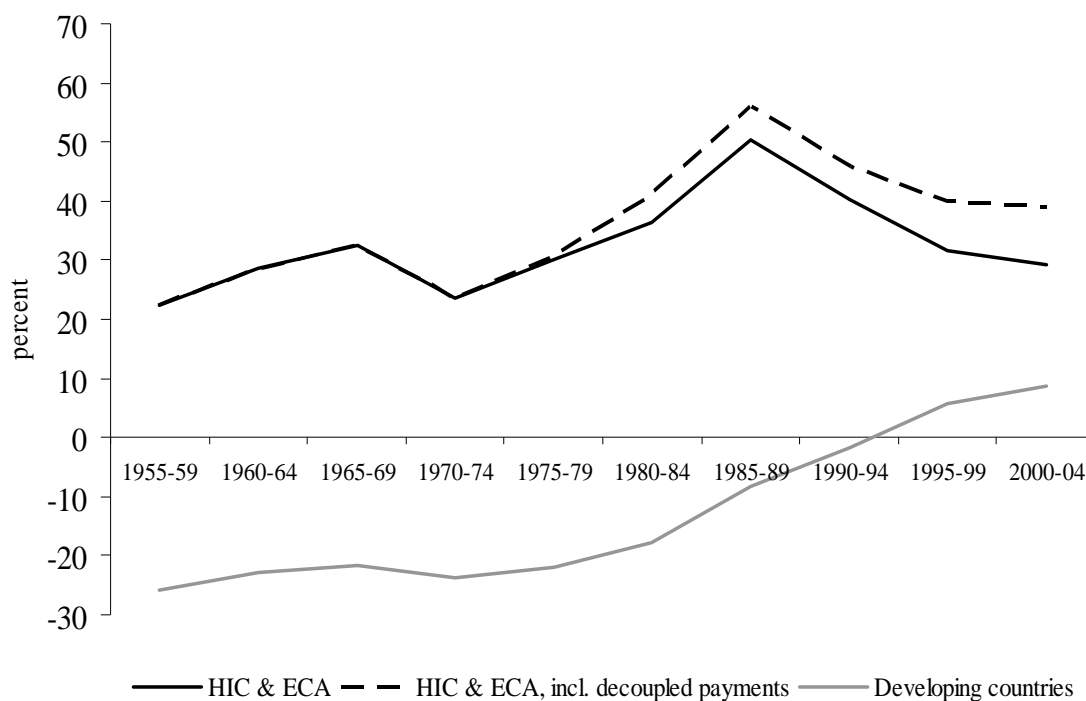
- Acemoglu, D., and J.A. Robinson. 2006. *Economic Origins of Dictatorship and Democracy*. New York: Cambridge University Press.
- Anderson, K. (ed.). 2009. *Distortions to Agricultural Incentives: A Global Perspective, 1955–2007*. London: Palgrave Macmillan; Washington, DC: World Bank.
- . 2010a. “Krueger/Schiff/Valdés Revisited: Agricultural Price and Trade Policy Reform in Developing Countries Since the 1980s.” *Applied Economic Perspectives and Policy* 1, forthcoming.
- . 2010b. *The Political Economy of Agricultural Price Distortions*. Cambridge and New York: Cambridge University Press, forthcoming.
- Anderson, K., J. Cockburn, and W. Martin (eds.). 2010. *Agricultural Price Distortions, Inequality and Poverty*. Washington DC: World Bank, forthcoming.
- Anderson, K., and W. Martin (eds.). 2006. *Agricultural Trade Reform and the Doha Development Agenda*. London: Palgrave Macmillan; Washington, DC: World Bank.
- . 2009. *Distortions to Agricultural Incentives in Asia*. Washington, DC: World Bank.
- Anderson, K., and W. Masters (eds.), 2009, *Distortions to Agricultural Incentives in Africa*, Washington, DC: World Bank.
- Anderson, K., and J. Swinnen (eds.). 2008. *Distortions to Agricultural Incentives in Europe’s Transition Economies*. Washington, DC: World Bank.
- Anderson, K., and R. Tyers. 1992. “Japanese Rice Policy in the Interwar Period: Some Consequences of Imperial Self Sufficiency.” *Japan and the World Economy* 4(2): 103–27.
- Anderson, K., and A. Valdés (eds.). 2008. *Distortions to Agricultural Incentives in Latin America*. Washington, DC: World Bank.
- Anderson, K., and E. Valenzuela. 2007. “Do Global Trade Distortions Still Harm Developing Country Farmers?” *Review of World Economics* 143(1): 108–39.
- . 2008. *Global Estimates of Distortions to Agricultural Incentives, 1955–2007*. Spreadsheet available at www.worldbank.org/agdistortions.
- Anderson, K. and Y. Hayami. 1986. *The Political Economy of Agricultural Protection*. Boston, London, and Sydney: Allen and Unwin.
- Anderson, K., M. Kurzweil, W. Martin, D. Sandri, and E. Valenzuela. 2008. “Measuring Distortions to Agricultural Incentives, Revisited.” *World Trade Review* 7(3): 675–704.
- Anderson, K., P.J. Lloyd, and D. MacLaren. 2007. “Distortions to Agricultural Incentives in Australia Since World War II.” *The Economic Record* 83(263): 461–82.
- Anderson, K., W. Martin, and D. van der Mensbrugghe. 2006. “Distortions to World Trade: Impacts on Agricultural Markets and Farm Incomes.” *Review of Agricultural Economics* 28(2): 168–94.
- Anderson, K., E. Valenzuela, and D. van der Mensbrugghe. 2010. “Global Welfare and Poverty Effects Using the Linkage Model.” In *Agricultural Trade Distortions, Inequality and Poverty*, Washington, DC: World Bank (forthcoming).
- Anderson, K., and L.A. Winters. 2009. “The Challenge of Reducing International Trade and Migration Barriers.” In B. Lomborg, ed., *Global Crises, Global Solutions*, 2nd edn. Cambridge and New York: Cambridge University Press.
- Balassa, B. and Associates. 1971. *The Structure of Protection in Developing Countries*. Baltimore: Johns Hopkins University Press.
- Bates, R.H. 1981. *Market and States in Tropical Africa: The Political Basis of Agricultural Policies*. Berkeley: University of California Press.

- Bautista, R.M., S. Robinson, P. Wobst, and F. Tarp. 2001. "Policy Bias and Agriculture: Partial and General Equilibrium Measures." *Review of Development Economics* 5(1): 89–104.
- Bhagwati, J.N. 1971. "The Generalized Theory of Distortions and Welfare." In J.N. Bhagwati, R.W. Jones, R.A. Mundell and J. Vanek, eds., *Trade, Balance of Payments and Growth*. Amsterdam: North-Holland.
- . 1978. *Foreign Trade Regimes and Economic Development: Anatomy and Consequences of Exchange Control Regimes*. Cambridge, MA: Ballinger.
- Corden, W.M. 1997. *Trade Policy and Economic Welfare*, 2nd edn. Oxford: Clarendon Press.
- Dervis, K., J. de Melo, and S. Robinson. 1981. "A General Equilibrium Analysis of Foreign Exchange Shortages in a Developing Country." *Economic Journal* 91: 891–906.
- Fan, S. 2008. *Public Expenditures, Growth and Poverty in Developing Countries: Issues, Methods and Findings*. Baltimore: Johns Hopkins University Press.
- Findlay, R., and K. O'Rourke. 2007. *Power and Plenty: Trade, War and the World Economy in the Second Millennium*. Princeton, NJ: Princeton University Press.
- Gardner, B. 2009. "United States and Canada." In K. Anderson, ed., *Distortions to Agricultural Incentives: A Global Perspective, 1955-2007*. London: Palgrave Macmillan; Washington, DC: World Bank.
- Grossman, G.M., and E. Helpman. 2001. *Special Interest Politics*. Cambridge, MA: MIT Press.
- . 2002. *Interest Groups and Trade Policy*. Princeton, NJ: Princeton University Press.
- Harberger, A. 1971. "Three Basic Postulates for Applied Welfare Economics: An Interpretative Essay." *Journal of Economic Literature* 9(3): 785–97.
- Hertel, T.W., and R. Keeney. 2006. "What's at Stake: The Relative Importance of Import Barriers, Export Subsidies and Domestic Support." In K. Anderson and W. Martin, eds., *Agricultural Trade Reform and the Doha Development Agenda*. London: Palgrave Macmillan; Washington, DC: World Bank.
- Hoekman, B. 2005. "Making the WTO More Supportive of Development." *Finance and Development* 42(1): 14–18.
- Huang, J., S. Rozelle, W. Martin, and Y. Liu. 2009. "China." In K. Anderson and W. Martin, eds., *Distortions to Agricultural Incentives in Asia*. Washington, DC: World Bank.
- Ivanic, M., and W. Martin. 2008. "Implications of Higher Global Food Prices for Poverty in Low-Income Countries." *Agricultural Economics* 39: 405-16.
- Jensen, H.T., S. Robinson, and F. Tarp. 2002. "General Equilibrium Measures of Agricultural Policy Bias in Fifteen Developing Countries." TMD Discussion Paper 105, IFPRI, Washington, DC, October.
- Johnson, D.G. 1991. *World Agriculture in Disarray*, revised edn. London: St Martin's Press.
- Kindleberger, C.P. 1975. "The Rise of Free Trade in Western Europe, 1820–1875." *Journal of Economic History* 35(1): 20–55.
- Krueger, A.O. 1978. *Foreign Trade Regimes and Economic Development: Liberalization Attempts and Consequences*. Cambridge, MA: Ballinger.
- . 1984. "Trade Policies in Developing Countries." In R.W. Jones and P.B. Kenen, eds., *Handbook of International Economics, Vol. 1: International Trade*. Amsterdam: North-Holland.
- . 1992. *The Political Economy of Agricultural Pricing Policy, Vol. 5: A Synthesis of the Political Economy in Developing Countries*. Baltimore: Johns Hopkins University Press for the World Bank.
- (ed.). 2000. *Economic Policy Reform: The Second Stage*. Chicago and London: University of Chicago Press.

- Krueger, A.O., M. Schiff, and A. Valdés. 1988. "Measuring the Impact of Sector-specific and Economy-wide Policies on Agricultural Incentives in LDCs." *World Bank Economic Review* 2(3): 255–72.
- . 1991. *The Political Economy of Agricultural Pricing Policy, Vol. 1: Latin America, Vol. 2: Asia, Vol. 3: Africa and the Mediterranean*. Baltimore: Johns Hopkins University Press for the World Bank.
- Lerner, A. 1936. "The Symmetry Between Import and Export Taxes." *Economica* 3(11): 306–13.
- Lindert, P. 1991. "Historical Patterns of Agricultural Protection." In P. Timmer, ed., *Agriculture and the State*. Ithaca: Cornell University Press.
- Little, I.M.D., T. Scitovsky, and M. Scott. 1970. *Industry and Trade in Some Developing Countries: A Comparative Study*. London: Oxford University Press.
- Lloyd, P.J. 1974. "A More General Theory of Price Distortions in an Open Economy." *Journal of International Economics* 4(4): 365–86.
- Martin, W. 1993. "Modeling the Post-Reform Chinese Economy." *Journal of Policy Modeling* 15(5–6): 545–79.
- van der Mensbrugge, D. 2005. "LINKAGE Technical Reference Document: Version 6.0." Unpublished, World Bank, Washington, DC, January. (www.worldbank.org/prospects/linkagemodel).
- Ndulu, B.J., S.A. O'Connell, R.H. Bates, P. Collier and C.C. Soludo, eds. 2008. *The Political Economy of Economic Growth in Africa 1960-2000, Vols. 1 and 2*. Cambridge and New York: Cambridge University Press.
- North, D.C., J.J. Wallis, and B.R. Weingast. 2009. *Violence and Social Orders: A Conceptual Framework for Interpreting Recorded Human History*. Cambridge and New York: Cambridge University Press.
- Nye, J.V.C. 2007. *Wine, War and Taxes: The Political Economy of Anglo-French Trade, 1689–1900*. Princeton, NJ: Princeton University Press.
- OECD (Organisation for Economic Co-operation and Development). 2007. *Agricultural Policies in Non-OECD Countries: Monitoring and Evaluation*. Paris: OECD.
- . 2008. *Producer and Consumer Support Estimates*. Online database accessed at www.oecd.org.
- Orden, D., and E. Diaz-Bonilla. 2006. "Holograms and Ghosts: New and Old Ideas for Reforming Agricultural Policies." In K. Anderson and W. Martin, eds., *Agricultural Trade Reform and the Doha Development Agenda*. London: Palgrave Macmillan; Washington, DC: World Bank.
- Orden, D., F. Cheng, H. Nguyen, U. Grote, M. Thomas, K. Mullen, and D. Sun. 2007. *Agricultural Producer Support Estimates for Developing Countries: Measurement Issues and Evidence from India, Indonesia, China and Vietnam*. IFPRI Research Report 152, Washington, DC: International Food Policy Research Institute.
- Rodrik, D. ed. 2003. *In Search of Prosperity: Analytical Narratives on Economic Growth*. Princeton NJ: Princeton University Press.
- Schiff, M., and A. Valdés. 1992. *The Political Economy of Agricultural Pricing Policy, Vol. 4: A Synthesis of the Economics in Developing Countries*. Baltimore: Johns Hopkins University Press for the World Bank.
- Tarr, D. 1990. "Second-Best Foreign Exchange Policy in the Presence of Domestic Price Controls and Export Subsidies." *World Bank Economic Review* 4(2): 175–93.
- Tyers, R., and K. Anderson. 1992. *Disarray in World Food Markets: A Quantitative Assessment*. Cambridge and New York: Cambridge University Press.

- Valdés, A. 1996. "Surveillance of Agricultural Price and Trade Policy in Latin America During Major Policy Reforms." World Bank Discussion Paper 349, Washington, DC, November.
- (ed.). 2000. "Agricultural Support Policies in Transition Economies." World Bank Technical Paper 470, Washington, DC, May.
- Valenzuela, E., D. van der Mensbrugghe and K. Anderson 2009. "General Equilibrium Effects of Price Distortions on Global Markets, Farm Incomes and Welfare", In K. Anderson, ed., *Distortions to Agricultural Incentives: A Global Perspective, 1955-2007*. London: Palgrave Macmillan; Washington, DC: World Bank.
- Vousden, N. 1990. *The Economics of Trade Protection*. Cambridge: Cambridge University Press.
- World Bank. 2007. *World Development Report 2008: Agriculture for Development*. Washington, DC: World Bank.
- WTO, ITC, and UNCTAD. 2007. *Tariff Profiles 2006*. Geneva: World Trade Organization.

Figure 1. Nominal Rates of Assistance to Agriculture in High-income and European Transition Economies and in Developing Countries, 1955 to 2004
(percent, weighted averages, with “decoupled” payments included in the dashed higher income countries line)

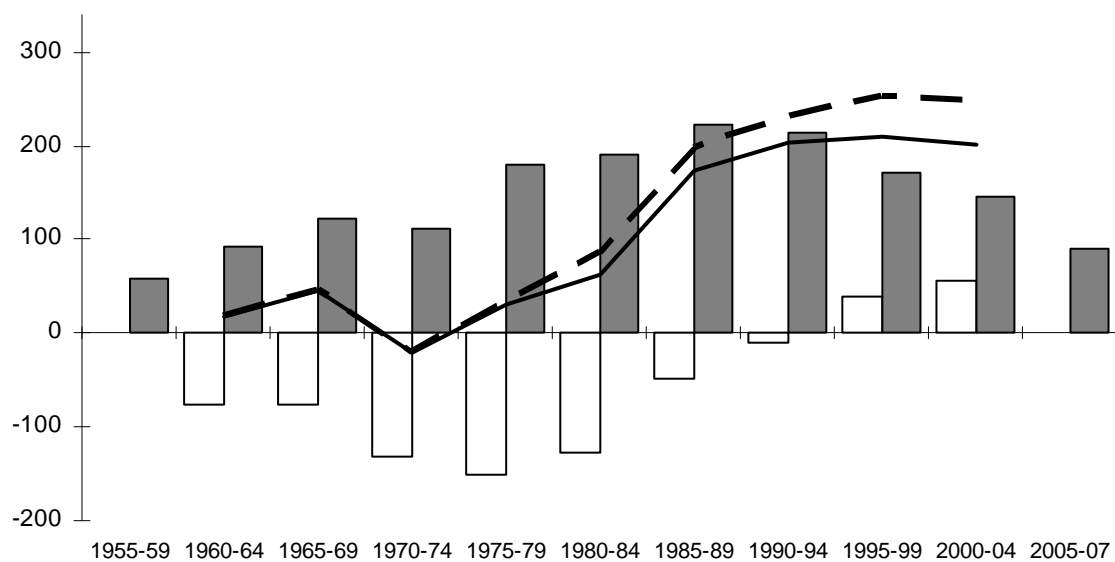


— HIC & ECA — — HIC & ECA, incl. decoupled payments — Developing countries
<setter: change HIC & ECA to Higher income countries and European transition economies' twice; place legends to the three line types on separate lines; use en-rules for minus signs and year ranges>

Source: Anderson (2009).

Figure 2. Gross Subsidy Equivalent of NRAs in High-income and European Transition Economies and in Developing Countries, 1960 to 2007

(constant 2000 US\$ billion)



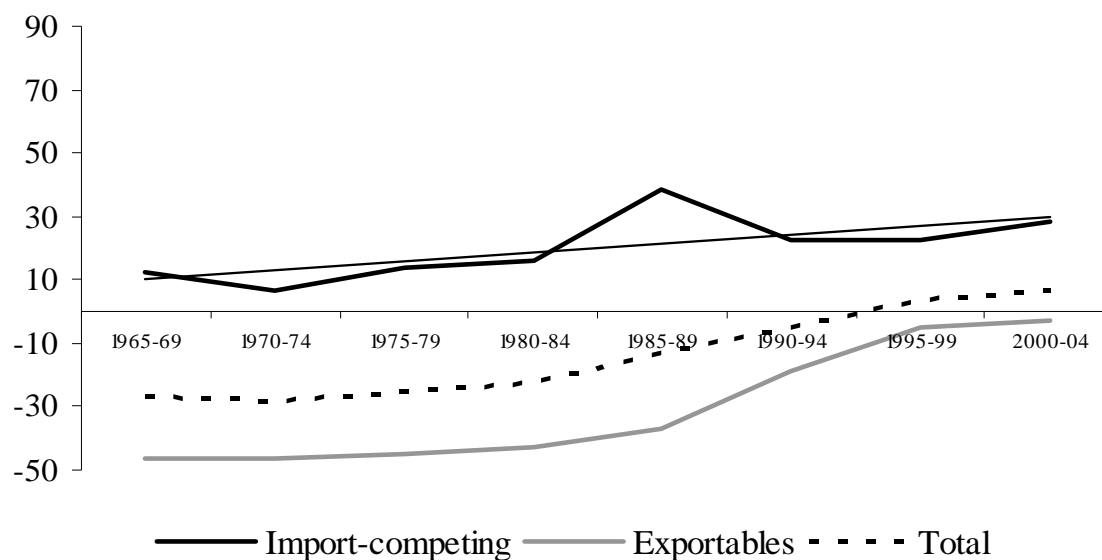
- Developing countries (no averages for periods 1955-59 and 2005-07)
- High-income countries and Europe's transition economies
- Net, global (decoupled payments are included in the higher, dashed line)

Source: Anderson (2009).

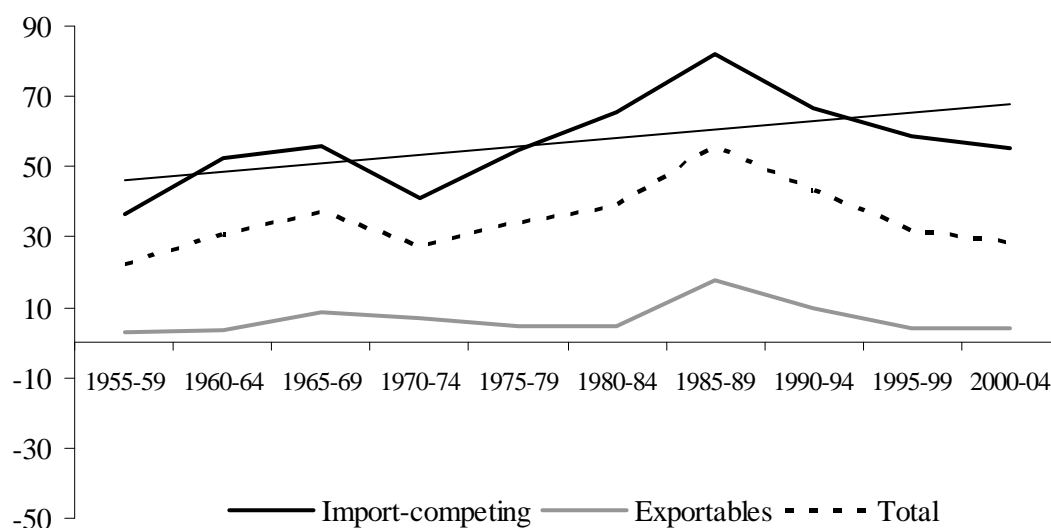
<setter: use en-rules for minus signs and year ranges>

Figure 3. Nominal Rates of Assistance to Exportable, Import-competing, and All Covered Agricultural Products,^a High-income and Developing Countries, 1955 to 2007 (percent)

(a) Developing Countries



(b) High-income Countries plus Europe's Transition Economies

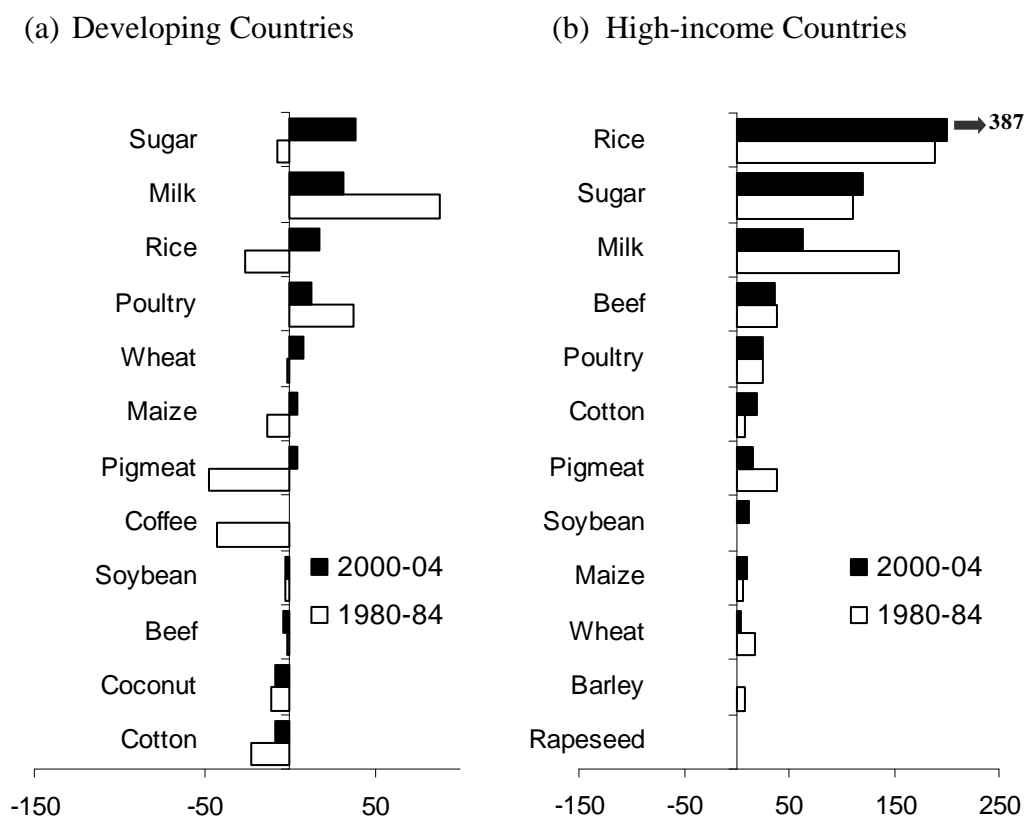


^a Covered products only. The total also includes non-tradable goods. The sloped straight line is an ordinary least squares regression trend line over the period shown.

Source: Anderson (2009).

<setter: use en-rules for minus signs and year ranges>

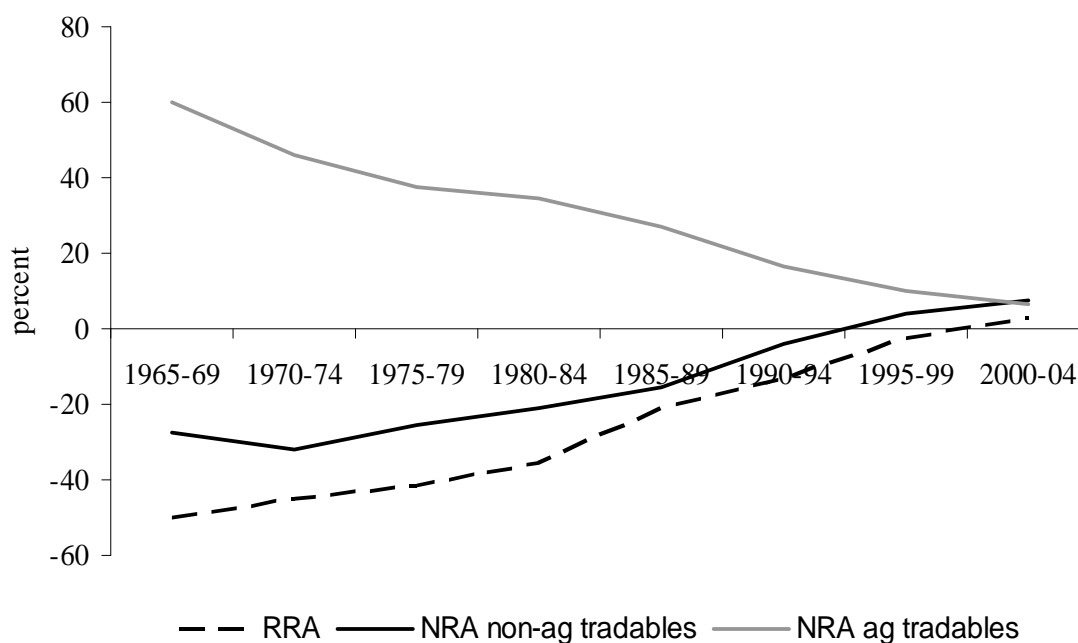
Figure 4. Nominal Rates of Assistance, Key Covered Products, High-income and Developing Countries, 1980–84 and 2000–04 (percent)



Source: Anderson and Valenzuela (2008), based on estimates reported in the project's national country studies.

<setter: use en-rules for minus signs and year ranges>

Figure 5. Nominal Rates of Assistance to Agricultural and Non-agricultural Sectors and Relative Rate of Assistance,^a Developing Countries, 1965^b to 2004
(percent, weighted averages)



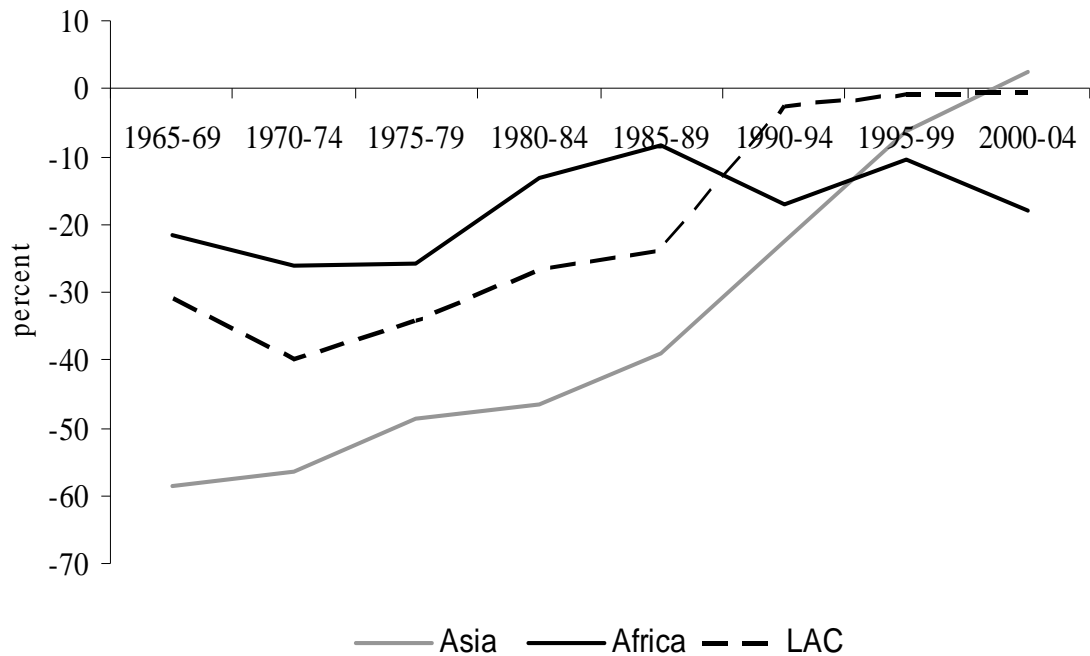
^a The RRA is defined as $100 * [(100 + NRA_{ag}^t) / (100 + NRA_{nonag}^t) - 1]$, where NRA_{ag}^t and NRA_{nonag}^t are the percentage NRAs for the tradables parts of the agricultural and non-agricultural sectors, respectively.

^b Assumes China's NRA values pre-1981 were the same as in 1981-84.

Source: Anderson (2009).

<setter: use en-rules for minus signs and year ranges>

Figure 6. Relative Rates of Assistance to Tradables,^a Asia, Africa and Latin America, 1965 to 2004
(percent)

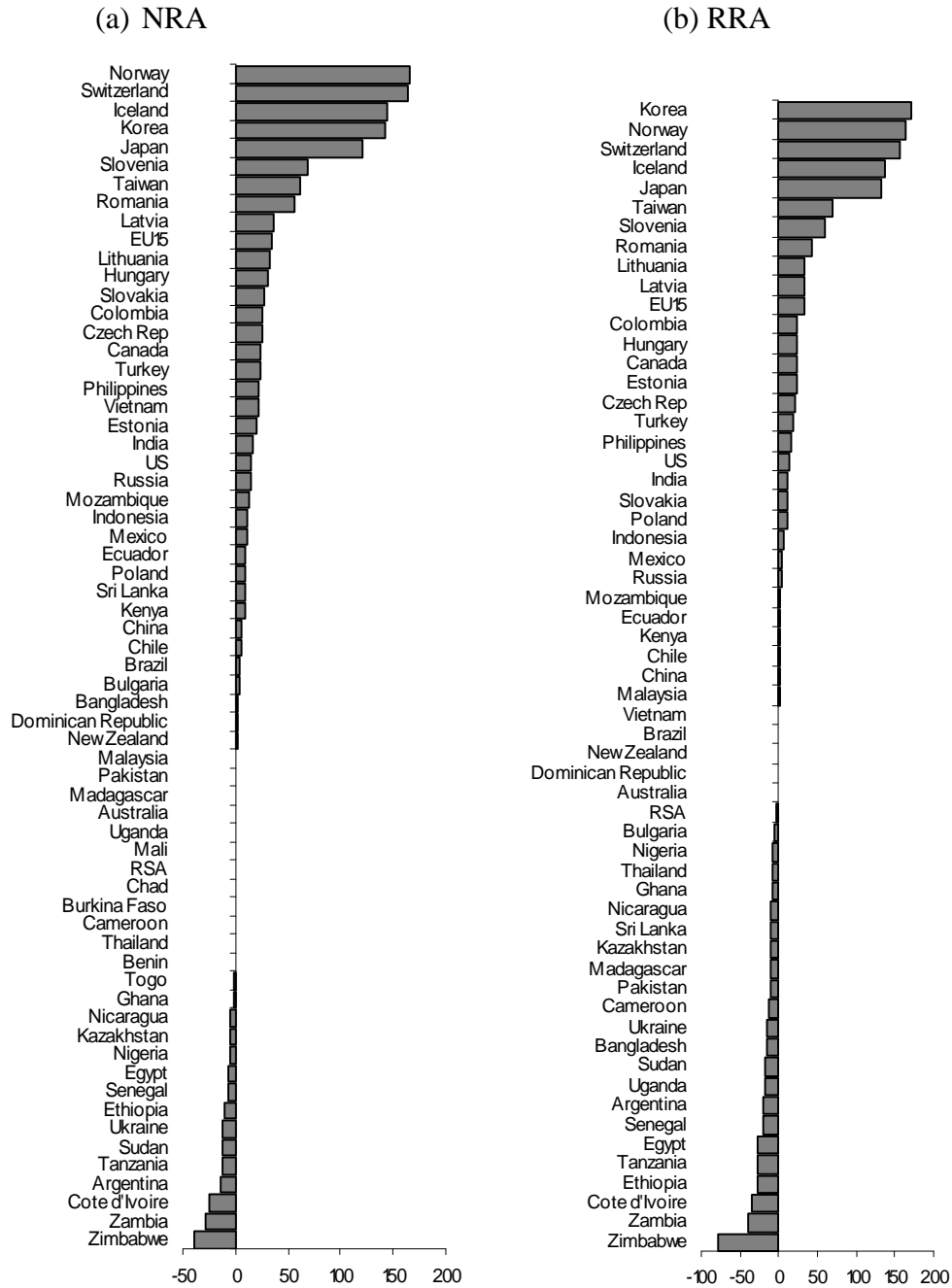


^a Five-year weighted averages with value of production at undistorted prices as weights. In Asia, estimates for China pre-1981 are based on the assumption that the nominal rate of assistance to agriculture and non-agricultural tradables, and hence the RRA in those earlier years, were the same as the average NRA estimates for China in 1981–89.

Source: Anderson (2009).

<setter: use en-rules for minus signs and year ranges; change 'LAC' to 'Latin America'>

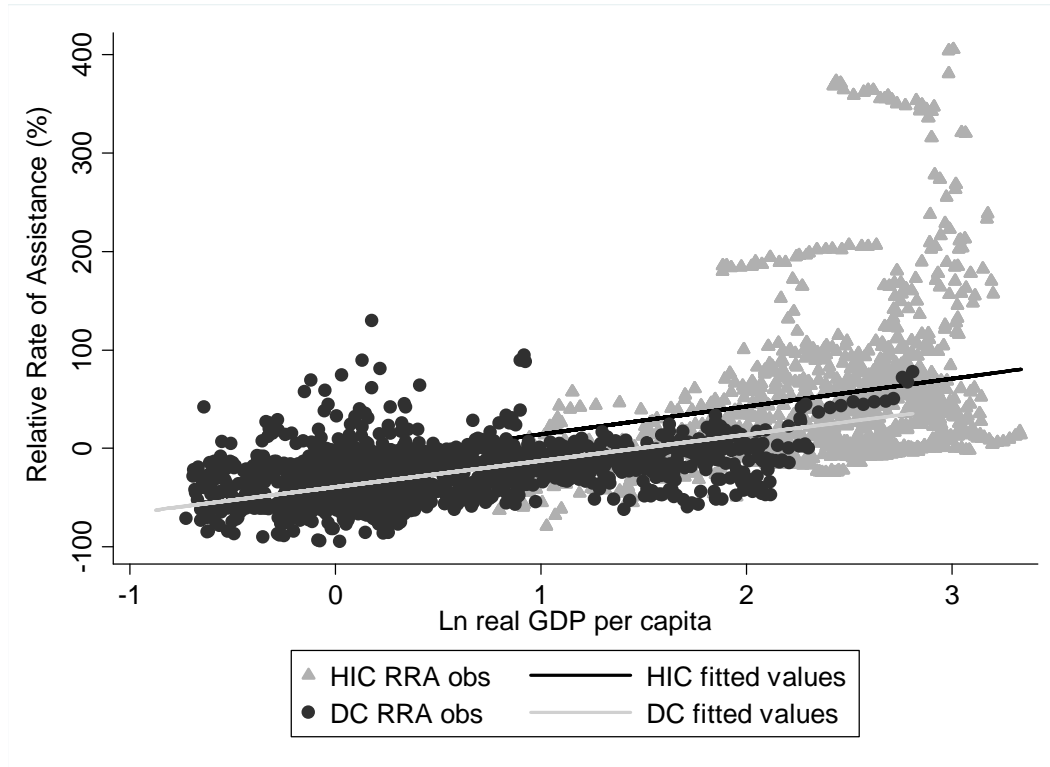
Figure 7. Cross-country Dispersion of NRA (All Agriculture Products, including NPS) and RRA, 2000–04
(percent)



Source: Anderson and Valenzuela (2008), based on estimates reported in the project's national country studies.

<setter: line 3 up: change 'Cote' to 'Côte' in both panels; use en-rules for minus signs; ensure country names are large enough to be legible>

Figure 8. Relationships between Real GDP per capita and RRA,^a All Focus Countries, 1955 to 2007



	Coefficient	Standard error	R ²
DCs	0.26	0.02	0.17
HICs	0.28	0.03	0.14

^a Relative rate of assistance

Sources: Anderson (2009) using country fixed effects and the RRA estimates in Anderson and Valenzuela (2008).

Table 1. Direct and Indirect Nominal Rates of Assistance to Farmers in 18 Developing Countries, 1960 to mid-1980s
(percent)

<i>Country group</i>	<i>Direct assistance</i>	<i>Indirect assistance</i>	<i>Total assistance^a</i>	<i>Assistance to agric. export subsector^a</i>	<i>Assistance to agric. import-competing subsector^a</i>
Very low income	-23	-29	-52	-49	-11
Low income	-12	-24	-36	-40	-13
Lower middle income	0	-16	-16	-14	-2
Upper middle income	24	-14	10	-1	15
Unweighted sample average	-8	-22	-30	-35	-9

^a Total assistance is the weighted average of assistance to the agricultural subsectors producing exportables, importables, and non-tradables (the latter not shown above).

Source: Anderson (2010a), summarized from estimates reported in Schiff and Valdés (1992, tables 2.1 and 2.2).

Table 2. Impact of Exchange Rate Distortions on Nominal Rates of Assistance to Agricultural Relative to Non-agricultural Industries, China, 1981 to 2004
(percent)

	1981–84	1985–89	1990–94	1995–99	2000–05
<i>Including exchange rate distortions</i>					
NRA, all agric. products (excl. NPS)	-47.6	-37.9	-17.2	3.5	2.0
Trade bias index, all agric. ^a	-50	-55	-23	-15	-7
Relative rate of assistance, RRA ^b	-60.6	-49.9	-31.1	-3.0	1.3
<i>Ignoring exchange rate distortions^c</i>					
NRA, all agric. products (excl. NPS)	-34.9	-27.1	-11.6	3.5	2.0
Trade bias index, all agric. ^a	-33	-38	-13	-15	-7
Relative rate of assistance, RRA ^b	-52.2	-41.0	-26.5	-3.0	1.3

^a Trade bias index is $100 * [(1 + NRA_{ag,x}) / (1 + NRA_{ag,m}) - 1]$, where $NRA_{ag,m}$ and $NRA_{ag,x}$ are the average percentage NRAs for the import-competing and exportable parts of the agricultural sector.

^b The RRA is defined as $100 * [(100 + NRA_{ag}^t) / (100 + NRA_{nonag}^t) - 1]$, where NRA_{ag}^t and NRA_{nonag}^t are the percentage NRAs for the tradables parts of the agricultural and non-agricultural sectors, respectively.

^c Here is shown how the average NRA_{ag}, trade bias index, and RRA would be affected if the distortions in the market for foreign currency, as captured by the methodology outlined in Anderson and others (2008), are ignored.

NPS: non-product-specific assistance.

Source: Summarized from Huang and others (2009).

Table 3. Import Tariffs and Production and Export Subsidies or Taxes for Agriculture, and Import Tariffs for Other Merchandise, by Region, 2004

(percent)^a

	<i>Agriculture and lightly processed foods</i>			<i>Other manufacturing</i>
	<i>Import tariff</i>	<i>Export subsidy^b</i>	<i>Production subsidy^b</i>	<i>Import tariff</i>
Developing countries	14.4	-1.4	0.2	6.8
North Africa	18.6	0.1	-1.7	15.4
Sub-Saharan Africa	17.2	-0.5	-0.2	10.3
East Asia	21.2	-0.4	-0.4	7.0
South Asia	12.1	0.7	5.1	14.3
Latin America	6.8	-4.4	0.1	7.0
Middle East	8.6	0.0	-8.6	6.7
E. Europe and Central Asia (ECA)	10.8	3.9	-0.1	3.0
High-income countries	11.1	1.7	1.0	1.0
High-income plus ECA	11.1	1.9	0.7	1.2
World total	12.5	0.4	0.5	3.1

^a Weighted averages using imports, exports, or production at undistorted prices as weights.

^b Negative if a tax.

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

Table 4. Impact on Real Income from Full Liberalization of Global Merchandise Trade, by Region, 2004

(relative to the benchmark data, in 2004 US dollars and percent)

	<i>Total real income gain (\$billion)</i>	<i>Change in income due just to change in terms of trade (\$billion)</i>	<i>Total real income gain as percentage of benchmark^a</i>	
Developing countries	67.8	-17.8	0.8	(-0.2)
North Africa	7.5	-3.2	3.4	(-1.4)
Sub-Saharan Africa	-0.1	-2.5	0.0	(-0.6)
East Asia	30.5	-5.2	0.9	(-0.2)
South Asia	-4.9	-3.5	-0.7	(-0.5)
Latin America	16.0	0.1	0.9	(0.0)
Middle East	4.8	-0.5	0.7	(-0.1)
E. Europe and Central Asia (ECA)	14.2	-3.1	1.0	(-0.2)
High-income countries	124.7	16.9	0.5	(0.1)
High-income plus ECA	138.9	13.8	0.5	(0.1)
World total	192.5	-0.9	0.6	(0.0)

^a Numbers in parentheses refer to that due to terms of trade effects.

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

Table 5. Impact of Full Global Liberalization on Shares of Global Output Exported, and Developing Country Shares of Global Output and Exports^a, by Product, 2004

(percent)

	<i>Share of global output exported^a</i>		<i>Developing countries' share of global output</i>		<i>Developing countries' share of global exports^a</i>	
	<i>Benchmark</i>	<i>Full global liberalization</i>	<i>Benchmark</i>	<i>Full global liberalization</i>	<i>Benchmark</i>	<i>Full global liberalization</i>
Paddy rice	1	2	82	83	57	44
Wheat	14	19	75	78	27	40
Other grains	10	13	70	74	36	59
Oil seeds	20	27	70	75	54	70
Plant-based fibers	24	22	72	80	36	69
Vegetables and fruits	9	14	73	78	69	78
Other crops	11	14	53	53	76	62
Cattle, sheep, and so on	2	2	52	59	56	57
Other livestock	3	4	68	69	43	46
Wool	10	12	77	75	17	21
Beef and sheep meat	6	19	30	43	32	69
Other meat products	6	11	34	37	45	48
Vegetable oils and fats	19	28	52	58	80	83
Dairy products	4	10	33	36	31	40
Processed rice	4	7	78	80	85	87
Refined sugar	7	38	57	88	80	92
Other food, beverages	8	12	38	40	50	61
All agriculture and food	7	12	50	53	54	64
Agriculture	7	10	67	70	55	65
Processed foods	8	14	40	43	53	64
Other primary products	30	32	64	64	77	78
Textile and wearing apparel	27	34	55	58	75	76
Other manufacturing	24	26	37	37	49	50
Services	3	3	21	21	30	29

^a Excluding intra-EU15 trade.

Source: Valenzuela, van der Mensbrugge and Anderson (2009)

Table 6. Impacts of Full Global Merchandise Trade Liberalization on Real Factor Prices,^a

2004

(relative to the benchmark data, percent)

	<i>Unskilled wages</i>	<i>Skilled wages</i>	<i>Capital^b user cost</i>	<i>Land^b user cost</i>	<i>Aggregate CPI</i>	<i>Food CPI</i>
Developing countries	3.8	3.5	3.1	1.6	-1.0	-2.7
North Africa	10.7	13.7	9.9	0.3	-9.0	-16.5
Sub-Saharan Africa	3.3	3.3	3.9	-0.2	-3.9	-5.4
East Asia	4.6	4.1	4.0	2.0	0.0	-2.8
South Asia	-0.7	2.4	0.6	-5.4	-0.9	1.6
Latin America	4.6	2.3	1.4	16.3	0.6	1.6
Middle East	6.9	2.8	4.7	37.4	-2.8	-9.9
E. Europe and Central Asia (ECA)	1.7	3.1	2.4	-3.6	-2.0	-3.7
High-income countries	0.3	1.0	0.6	-21.3	-0.9	-4.1
High-income plus ECA	0.3	1.1	0.7	-15.8	-1.0	-4.1
World total	1.0	1.4	1.4	-3.4	-0.9	-3.5

^a Nominal factor prices deflated by the consumer price index (CPI).^b The user cost of capital and land represents the subsidy inclusive rental cost.*Source:* Valenzuela, van der Mensbrugghe and Anderson (2009).

Table 7. Effects on Agricultural and Non-agricultural Sectoral Value Added of Full Global Liberalization and Own-liberalization of Agricultural and All Sectors' Merchandise Trade Reform, 2004

(relative to benchmark data, percent)

	<i>Global liberalization</i>			
	<i>Agricultural policies</i>		<i>All sectors' policies</i>	
	<i>Agric. value added</i>	<i>Non-ag. value added</i>	<i>Agric. value added</i>	<i>Non-ag. value added</i>
Developing countries	5.1	1.0	5.2	2.1
North Africa	-0.8	1.8	-5.0	1.4
Sub-Saharan Africa	0.2	0.3	-0.9	-0.5
East Asia	2.9	0.6	5.2	4.2
South Asia	-4.1	0.8	-5.4	0.0
Latin America	28.4	2.8	29.1	1.7
Middle East	23.8	0.4	21.9	1.2
E. Europe and Central Asia (ECA)	-3.3	0.4	-4.1	0.5
High-income countries	-13.9	0.2	-15.3	-0.2
High-income plus ECA	-11.2	0.2	-12.4	-0.1
World total	-1.0	0.4	-1.3	0.3

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