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Featured Article

Krueger, Schiff, and Valdés Revisited: Agricultural Price and Trade Policy Reform in Developing Countries since 1960

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Abstract *A study of distortions to agricultural incentives in 18 developing countries from 1960–84, by Krueger, Schiff, and Valdés (1988; 1991), found that policies in most of those developing countries were directly or indirectly harming their farmers. Since the mid-1980s, there has been a substantial amount of policy reform and opening up of many developing countries. Indicators of that progress have been made available recently by a new study that has compiled estimates for a much larger sample of developing countries, and for as many years as possible since 1955. The new study also covers Europe's transition economies and comparable estimates for high-income countries, thereby covering more than 90% of world agricultural output and employment. This article summarizes the methodology used in the new study, compares a synopsis of the indicators from Krueger, Schiff, and Valdés and the new study for the period to 1984, summarizes the changing extent of price distortions across countries and commodities globally since then, and concludes by evaluating the degree of distortion reduction over the years since 1984 compared with how much still remains, according to the results of a global economy wide model.*

Key words: Agricultural price distortions, trade policies, developing countries.

JEL codes: F13, F59, H20, N50, O13, Q18.

Introduction

Two decades ago, a major World Bank study of distortions to agricultural incentives in 17 developing countries, plus Portugal, was published by Krueger, Schiff, and Valdés (1988; 1991). That study covered the period of roughly 1960–84, which for many developing countries was the first 25 years of independence from a colonial power. The study found that policies in most of those developing countries were harming their farmers, either directly via taxes on agricultural exports or indirectly via manufacturing protection or overvalued exchange rates.

Since the mid-1980s there has been a substantial amount of policy reform and opening up of many developing countries, but no systematic, quantitative monitoring of those policy changes. To help fill this lacuna, a study by the World Bank has revisited this issue and provides indicators for a much larger sample of developing countries, and for as many years as possible since 1955. The new study also covers European economies in transition from socialism and, for completeness, it extends estimates for high-income countries back three decades prior to the start of comparable estimates from 1986 by the Organisation for Economic Co-operation and Development (OECD). In so doing, it covers more than 90% of world agricultural output and employment, with the focus countries accounting for 96% of global gross domestic product (GDP).

Some of the policy developments of the past half-century have happened quite suddenly and been transformational. These include the end of colonization for many African and other developing countries around 1960, the implementation of the Common Agricultural Policy in Europe from 1962, the floating of exchange rates and associated liberalization, deregulation, privatization and democratization in the mid-1980s in numerous countries of all continents, the opening of China in 1979, Vietnam in 1986, and Eastern Europe following the fall of the Berlin Wall in 1989, as well as the demise of the Soviet Union in 1991. Less newsworthy, and hence less noticed, are the influences of policies that change only gradually in the course of economic development as comparative advantages evolve, but they too have had a substantial impact on the global economy.

The present article is structured as follows. It begins with some background comments before summarizing the methodology used in the World Bank's new study, highlighting similarities to and differences with those used by the OECD and by Krueger, Schiff, and Valdés (K/S/V). It goes on to compare a synopsis of the indicators from K/S/V and the new study for the period to 1984, before summarizing the changing extent of price distortions across countries and commodities—both regionally and globally—since then. The third section reports results from a global economy-wide modeling exercise aimed at quantifying the trade and welfare effects of the reduction in price and trade distortions in the years since 1984 compared with the prospective effects of removing remaining distortions to agricultural and other merchandise trade. The final section concludes with some observations on what might influence the prospects of such reform in the years ahead.

Background

For 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. The 1958 Haberler Report to Contracting Parties to the General Agreement on Tariffs and Trade forewarned that such distortions might worsen, and indeed they did between the 1950s and the early 1980s in East Asia (Anderson and Hayami 1986). Such policies depress international prices for farm products, thereby adding to global inequality and poverty because three-quarters of the

world's poorest people live in poorer countries and depend directly or indirectly on agriculture for their main income (World Bank 2008).

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 example is the taxing of exports of plantation crops in post-colonial Africa (Bates 1981). At the same time, many developing countries also chose to overvalue their currency, and to pursue an import-substituting industrialization strategy by restricting imports of manufactured goods. The latter measures indirectly taxed producers of other tradable products in developing economies, by far the most numerous of them being farmers (Krueger, Schiff, and Valdés 1988; 1991). Thus, the price incentives facing farmers in many developing countries have been depressed by both own-country and other countries' agricultural price and international trade policies.

This disarray in world agriculture, as Johnson described it in the title of his seminal 1973 book, means there has been overproduction of farm products in high-income countries and underproduction in low-income countries. It also means there has been less international trade in farm products than would be the case under free trade, thereby thinning markets for these weather-dependent products and making them more volatile. Using a stochastic model of world food markets, Tyers and Anderson (table 6.14) found that instability of international food prices in the early 1980s was three times greater than it would have been under free trade in those products.

During the past 25 years, however, numerous countries have begun to reform their agricultural price and trade policies, typically as part of a broader reform agenda. That has raised the extent to which farm products are traded internationally, but not nearly as fast as globalization has proceeded in the nonfarm sectors of the world's economies.[1]

To what extent have reforms over the past two decades reversed the abovementioned policy developments of the previous three decades? Empirical indicators of agricultural price distortions (producer support estimates [PSEs] and consumer support estimates [CSEs]) have been provided in a consistent manner since 1986 by the Secretariat of the OECD (2008) for its 30 member countries. However, until now there have been no comprehensive time series of rates of assistance to producers of nonagricultural goods to compare with those PSEs, nor do they tell us what happened in those advanced economies in earlier decades—which are of more immediate relevance if we are to see how the two groups of countries' policies developed during similar stages of development. As for developing countries, almost no comparable time series estimates have been generated since the Krueger, Schiff, and Valdes (1988) study, which covered the period of 1960–1984 for just 17 developing countries, plus Portugal.[2] An exception is a recent set of estimates of nominal rates of protection generated by the International Food Policy Research Institute

[1] *In the two decades to 2000–04, the value of global exports as a share of GDP rose from 19% to 26%, even though most GDP is nontradable governmental and other services, while the share of primary agricultural production exported globally, including intra-European Union trade, rose from only 13% to just 16% (World Bank 2007 and FAO, as summarized in Sandri, Valenzuela, and Anderson 2007).*

[2] *A nine-year update for the Latin American countries in the Krueger, Schiff, and Valdés sample by the same country authors, and a comparable study of seven Central and Eastern European countries, contain estimates at least of direct agricultural distortions (see Valdés 1996; 2000). The Krueger, Schiff, and Valdés (1991) chapters on Ghana and Sri Lanka have protection estimates back to 1955, as*

(IFPRI) for key farm products in China, India, Indonesia, and Vietnam since 1985 (Orden et al. 2007). The OECD (2009) also has released PSEs for Brazil, China, and South Africa, as well as several more Eastern European countries.

The World Bank's new Database of Agricultural Distortions (Anderson and Valenzuela 2008) complements and extends the efforts by OECD and IFPRI and the seminal K/S/V study. The new database builds on these efforts by providing similar estimates for other significant (including many low-income) developing economies, by developing and estimating new, more comprehensive policy indicators, and by providing estimates of nominal rates of assistance (NRAs) for nonagricultural tradables to compare with those for the farm sector.[3] This new database includes estimates for 75 countries that together account for between 90–96% of the world's population, its farmers, agricultural GDP and total GDP (table 1). The sample countries also account for more than 85% of farm production and employment in Africa, Asia, Latin America, the transition economies of Europe and Central Asia, and their spectrum of per capita incomes ranges from the poorest (Zimbabwe and Ethiopia) to among the richest (Norway).[4] NRAs and consumer tax equivalents (CTEs) are estimated for more than 70 different farm products, with an average of nearly a dozen per country. In aggregate, the coverage represents around 70% of the gross value of agricultural production in the focus countries,[5] and just under two-thirds of global farm production valued at undistorted prices over the period covered. Not all countries had data for the entire 1955–2007 period, but the average number of years covered is 41 per country.[6] Of the world's 30 most valuable agricultural products, the NRAs cover 77% of global output, ranging from two-thirds for livestock, three-quarters for oilseeds and tropical crops, and five-sixths for grains and tubers. These products represent an even higher share (85%) of global agricultural exports. Having such a comprehensive coverage of countries, products and years offers the prospect of obtaining a reliable picture of both long-term trends in policies, and annual fluctuations around those trends, for

does the study by Anderson, Hayami, and Others (1986) for Korea and Taiwan (as well as Japan, and much earlier, in the case of rice).

[3]*These estimates and associated analytical narratives are discussed in far more detail in a global overview volume (Anderson 2009), and the detailed developing country case studies are reported in four regional volumes covering Africa (Anderson and Masters 2009), Asia (Anderson and Martin 2009), Latin America (Anderson and Valdés 2008) and Europe's transition economies (Anderson and Swinnen 2008).*

[4]*The only countries not well represented in the sample are those in the Middle East and the many small ones, but in total the omitted countries account for less than 4% of the global economy (made up of 0.2% from each of Sub-Saharan Africa and Asia, 0.9% from Latin America, and the rest from the Middle East and North Africa).*

[5]*Had seven key mostly-nontraded food staples (bananas, cassava, millet, plantain, potato, sweet potato and yam) been included for all instead of just some developing countries, their product coverage would have risen from around 70% to 76%; and had those staples had an average NRA of zero, they would have brought the weighted average NRA for all covered agriculture in developing countries only about half of one percentage point closer to zero each decade over the sample period (Anderson 2009, table 12.10).*

[6]*By way of comparison, the seminal multi-country study of agricultural pricing policy by Krueger, Schiff, and Valdés (1988; 1991) covered an average of 4.3 products for 23 years to the mid-1980s for each of its 18 focus countries, which together accounted for 6% of global agricultural output; the producer and consumer support estimates of the OECD (2008) cover 22 years for its 30 countries, which account for just over one-quarter of the world's agricultural output valued at undistorted prices.*

Table 1 Summary of NRA/CTE/RRA Coverage Statistics, World Bank Agricultural Distortions Project

		% of 2000–04 global:	
Number and size of countries	**Number**	**Population**	**Ag GDP**
Africa	21	11	7
Asia	12	51	37
Latin America	8	7	8
SUB-TOTAL, all developing countries	**41**	**69**	**52**
European transition economies	14	7	7
High-income countries	20	14	33
TOTAL	**75**	**92**	**92**
Number of years covered	**Maximum**	**Average per country**	
Africa	51	43	
Asia	53	42	
Latin America	51	39	
SUB-TOTAL, all developing countries	53	43	
European transition economies	47	17	
High-income countries	53	52	
TOTAL	**51**	**41**	
Number of products covered	**Maximum**	**Average per country**	
Africa	44	8	
Asia	35	8	
Latin America	27	10	
SUB-TOTAL, all developing countries	59	9	
European transition economies	25	12	
High-income countries	39	15	
TOTAL	**74**	**11**	
Total number of NRA estimates (years and products)	**Total**	**Average per country**	
Africa	7318	348	
Asia	3546	296	
Latin America	2881	360	
SUB-TOTAL, focus developing countries	13745	335	
European transition economies	2847	203	
High-income countries	13377	669	
TOTAL, focus countries	**29969**	**400**	

Source: Author's derivation based on data in Anderson and Valenzuela (2008).

individual countries and commodities, as well as for country groups, regions, and the world as a whole.

North America and Europe (including the newly acceded eastern members of the European Union [EU]) each account for one-third of global GDP, and the remaining one-third is shared almost equally by developing countries and the other high-income countries. When the focus turns to just agriculture, however, developing countries are responsible for around three-fifths of value added globally, with Asia accounting for over half of that. The developing countries' majority becomes stronger still in terms of global population and even more so in terms of number of farmers, almost three-quarters of whom are in Asian developing countries. Hence, there is a vast range of per capita incomes and agricultural land

per capita, and thus agricultural comparative advantages, across the country groups listed in table 1.

Asia has experienced much faster economic growth and export-led industrialization than the rest of the world: since 1980, Asia's per capita GDP has grown at four times the global average, and exports nearly two times the global average. The share of Asia's GDP that is exported is now one-third above that for the rest of the world and for Latin America, and far above that for Africa. Asia's GDP per capita is now half as high again as that of our focus African countries, though still only one-third that of Latin America. However, in the earlier half of our time series, Asia was poorer than Africa, and hence the poorest of the country groups in table 1.

By 2000–04, just 12% of Asian developing country GDP came from agriculture, on average. That contrasts with Africa, where the share for our focus countries ranges from 20–40%, and with Latin America and Europe's transition economies, where this figure is down to 6% (and to just 2% on average in high-income countries). The share of employment in agriculture remains very high in Asia though, at just under 60%—which is the same as in Africa and three times the share in Latin America and Eastern Europe, although more farmers work part-time on their farms in Asia than in other developing countries, so these data understate the productivity of labor on Asian farms. By contrast, less than 4% of workers in high-income countries are still engaged in agriculture (Sandri, Valenzuela, and Anderson 2007). Hence, both own-country and rest-of-world distortions to agricultural incentives are of great importance to not only African, but also to Asian developing country welfare, inequality, and poverty.

Methodology for Measuring Price Distortions[7]

The study's methodology focuses mainly on government-imposed distortions that create a gap between a country's domestic prices and the prices of like-tradable products at the country's border (or, in the case of nontradable farm products, what they would be in the absence of domestic price subsidies or taxes). Since it is not possible to understand the characteristics of agricultural development with a sectoral view alone, not only are the effects of direct agricultural policy measures examined (including distortions in the foreign exchange market), so are those of distortions in nonagricultural tradable sectors.

Specifically, the NRA for each farm product is computed as the percentage by which government policies have directly raised gross returns to farmers above what they would be without the government's intervention (or lowered them, if NRA < 0).[8] Included are estimates of the output-price

[7]*Only a brief summary of the methodology is provided here. For details see Anderson et al. (2008) or Anderson (Appendix A).*

[8]*Such a distortion creates an economic cost to society which can be estimated using welfare measure techniques such as those pioneered by Harberger (1971), who notes that this focus allows a great simplification in evaluating the marginal costs of a set of distortions: changes in economic costs can be evaluated 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. 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 estimated here. If, for instance, a country is large in world trade for a given*

equivalent of product-specific input subsidies. A weighted average NRA for all covered products for a country is derived using the value of production at undistorted prices as product weights. Those production weights are also used to obtain weighted average NRAs across countries for individual or sets of products.

While most of the focus is on agricultural producers, we also consider the extent to which consumers are taxed or subsidized. Thus, we calculate a CTE by comparing the price that consumers pay for their food and the international price of each food product at the border. Differences between the NRA and the CTE arise from distortions in the domestic economy that are caused by transfer policies and taxes/subsidies that cause the prices paid by consumers (adjusted to the farmgate level) to differ from those received by producers. In the absence of any other information, the CTE for each tradable, covered farm product is assumed to be the same as the NRA from border distortions, and the CTE for nontradable farm products is assumed to be zero. The value of consumption at undistorted prices is used to obtain product weights to generate weighted average CTEs across products or countries.[9]

An estimate of the NRA for noncovered products (on average around 30% of the total) is combined with the NRA for covered products, as is an estimate of the NRA from non-product-specific forms of assistance or taxation, including for inputs.[10] Since the 1980s, some high-income countries' governments have also provided so-called "decoupled" assistance to farmers, but because that support in principle does not distort resource allocation, its NRA has been computed separately and is not included for direct comparison with the NRAs for other sectors or for developing countries. Each farm industry is classified as import-competing, as a producer of exportables, or as producing a nontradable (with its status sometimes changing over the years), so as to generate for each year the weighted average NRAs for the two different groups of tradable farm products. We also generate a production-weighted average NRA

commodity, imposition of an export tax may raise the price in international markets, thus reducing the adverse impact of the distortion on producers in the taxing country. Another flow-on consequence is the effect of trade distortions on the real exchange rate, which is the price of traded goods relative to non-traded goods. Neither of these flow-on effects are 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, which in turn will be able to capture the full general equilibrium impacts (inclusive of real exchange rate effects) of the various direct distortions to producer and consumer prices. Such price wedges are provided for 2004 by Valenzuela and Anderson 2008, and are used in a global CGE model by Valenzuela, van der Mensbrugghe, and Anderson 2009 (results from which are summarized below).

[9]Again, this is valued at the farmgate level following the OECD's approach. The CTE so estimated is probably larger in ad valorem terms than it would be had it been estimated at the retail level, but may be smaller in dollar terms, depending on the nature of markups along the value chain.

[10]Not all country authors were able to estimate all farm input subsidies, and, following the OECD, no authors included subsidies to water use. India has relatively large input subsidies, but even there they added only a few percentage points to the NRA. In some cases input subsidies would have been more or less than offset by restrictions on imports of intermediate inputs (or by imperfect domestic competition in their provision, e.g., by para-statal monopolies). Hence, their fuller estimation for other countries is unlikely to have made much difference to the aggregate NRA for developing country agriculture, particularly in poorer countries where only the wealthiest farmers are major users of modern inputs. Had the focus been on effective *rates of assistance to value added, the extent of rate underestimation could have been greater, but that is irrelevant for present purposes, where the focus is on nominal rates.*

for nonagricultural tradables, for comparison with that for agricultural tradables via the calculation of a percentage relative rate of assistance (RRA), defined as:

$$RRA = 100^{*}[(100 + NRAag^{t})/(100 + NRAnonag^{t}) - 1], \quad (1)$$

where $NRAag^{t}$ and $NRAnonag^{t}$ are the percentage NRAs for the tradables segments of the agricultural (including noncovered) and nonagricultural sectors, respectively.[11] Since the NRA cannot be less than 100% if producers are to earn anything, neither can the RRA (since the weighted average $NRAnonag^{t}$ is nonnegative in all our country case studies). And if both of those sectors are equally assisted, the RRA is zero. This measure is useful in that if it is below (above) zero, it provides an internationally-comparable indication of the extent to which a country's sectoral policy regime has an anti- (pro-)agricultural bias.

This approach is not well suited to analysis of the policies of Europe's or Asia's former socialist economies prior to their reform era, because prices then played only an accounting function, and currency exchange rates were enormously distorted. During these countries' reform era, however, the price comparison approach provides as valuable a set of indicators for them as for other market economies of distortions to incentives for farm production, consumption and trade, and of the income transfers associated with interventions.[12]

In addition to the mean NRA, a measure of the dispersion or variability of the NRA estimates across the covered farm products is also generated for each economy. The cost of government policy distortions to incentives in terms of resource misallocation tends to be greater as the degree of substitution in production increases. In the case of agriculture which involves the use of farmland that is sector-specific but transferable among farm activities, the greater the variation of NRAs across industries within the sector, then the higher will be the welfare cost of those market interventions. A simple indicator of dispersion is the standard deviation of the covered industries' NRAs.

Anderson and Neary (2005) show it is possible to develop a single index that captures the extent to which the mean and standard deviation of protection together contribute to the welfare cost of distortionary policies. This index recognizes that the welfare cost of a government-imposed price distortion is related to the square of the price wedge, and so is larger than the mean and is positive regardless of whether the government's agricultural policy is favors or harms farmers. In the case where it is only import restrictions that distort agricultural prices, the index provides a percentage tariff equivalent which, if applied uniformly to all imports, would generate the same welfare cost as the actual intra-sectoral structure of protection from import competition. Lloyd, Croser, and Anderson (2010) show that,

[11] *Farmers are affected not just by prices of their own products, but also by the incentives that nonagricultural producers face. That is, it is* relative *prices and hence* relative *rates of government assistance that affect producer incentives. More than seventy years ago, Lerner (1936) provided his Symmetry Theorem, which proved that in a two-sector economy, an import tax has the same effect as an export tax. This carries over to a model that also includes a third sector producing only nontradables (Vousden 1990, pp. 46–47).*

[12] *Data availability also affects the year from which NRAs can be computed. For Europe's transition economies, that starting date is 1992 (2000 for Kazahkstan), while for Vietnam it is 1986, and for China it is 1981.*

once NRAs and CTEs have been calculated, they can be used to generate such an index even in more complex situations where there may be domestic producer or consumer taxes or subsidies in addition to not only import tariffs, but any other trade taxes or subsidies or quantitative restrictions. The authors call it a welfare reduction index (WRI). Such a measure is the percentage of agricultural trade tax (or uniform NRA and CTE) which, if applied equally to all agricultural tradables, would generate the same reduction in national economic welfare as the actual intrasectoral structure of distortions to the domestic prices of tradable farm goods. The authors also show that, if one is willing to assume that domestic price elasticities of supply (demand) are equal across farm commodities, then the only information needed to estimate the WRI, in addition to the NRAs and CTEs, is the share of each commodity in the domestic value of farm production (consumption) at undistorted prices.

To obtain dollar values of farmer assistance and consumer taxation, we have taken the country authors' NRA estimates and multiplied them by the gross value of production at undistorted prices to obtain an estimate in USD of the direct gross subsidy equivalent (GSE) of assistance to farmers. These GSE values are calculated in constant dollars, and are also expressed on a per-farm worker basis. Likewise, a value of the consumer transfer is derived from the CTE by assuming the consumption value is the gross value of production at undistorted prices divided by the self-sufficiency ratio for each product (production divided by consumption, derived from national volume data or the Food and Agriculture Organization's [FAO's] commodity balance sheets). These transfer values are helpful for generating an estimate of the contribution of each policy instrument to the overall NRA, and the trade data that provide the self-sufficiency ratio helped each country author attach a trade status to each product each year (also bearing in mind the likely impact of the NRAs and CTEs on the observed self-sufficiency ratio).

Once each farm industry is classified either as import-competing, or a producer of exportables, or as producing a nontradable, it is possible to generate for a given year the weighted average NRAs for the two different groups of tradable farm industries. They can then be used to generate an agricultural trade bias index defined as:

$$\mathrm{TBI} = \left[\frac{1 + \mathrm{NRAag_x}}{1 + \mathrm{NRAag_m}} - 1\right]. \tag{2}$$

where $\mathrm{NRAag_m}$ and $\mathrm{NRAag_m}$ are the average NRAs for the import-competing and exportable parts of the agricultural sector (their weighted average being $\mathrm{NRAag^t}$). This index has a value of zero when the import-competing and export sub-sectors are equally assisted, and its lower bound approaches -1 in the most extreme case of an anti-trade policy bias.

Part of the anti-trade bias in developing countries in the past was the result of government intervention in the domestic market for foreign currency. The most common arrangement was a dual exchange rate, whereby exporters had to sell part or all of their foreign currency to the government at a low price. This effectively taxed and thus discouraged production of exportables. At the same time, it created an artificial shortage of foreign currency so that potential importers bid up its purchase price, which had the same effect as an import tax and thus encouraged import-competing

production (Dervis, de Melo, and Robinson 1981). The size of these effective if implicit trade taxes depends on the extent to which the government purchase price differs from what would be the free-market equilibrium price, the price elasticities of demand for and supply of foreign currency, and the retention rate (i.e., the extent of the requirement to sell a portion to the government). In some countries there were more complex multiple exchange rates, whereby traders of some products were subject to more favorable treatment than others. In estimating NRAs in developing countries, participants in the Agricultural Distortions project endeavored to include the effects of these implicit trade taxes, and to show how much of an impact they had on the NRAs and RRA. The practice was rife in newly independent developing countries in the 1960s and 1970s, but was gradually phased out during the 1980s and early-1990s as part of overall macroeconomic policy reform initiatives.[13]

Anderson and Neary (2005) also show that it is possible to develop a single index that captures the extent to which import protection reduces the volume of trade. Once NRAs and CTEs have been calculated, Lloyd, Croser, and Anderson show how they can be used to generate a more general trade reduction index (TRI) that also allows for the trade effects of domestic price-distorting policies, and regardless of whether they (or the trade measures) are positive or negative. Such a measure is the percentage agricultural trade tax (or uniform NRA and CTE) which, if applied equally to all agricultural tradables, would generate the same reduction in sectoral trade volume as the actual intra-sectoral structure of distortions to domestic prices of tradable farm goods. They show also that, if the domestic price elasticities of supply (demand) are equal across farm commodities, then the only information needed to estimate the TRI, in addition to the NRAs and CTEs, is the share of each commodity in the domestic value of farm production (consumption) at undistorted prices.

Needless to say, there are numerous challenges in applying the above methodology, especially in less developed economies with poor-quality data. Ways to deal with the standard challenges are detailed in Anderson et al. (2008) and the country-specific challenges are discussed in the analytical narratives in the regional and global volumes listed in footnote 3.

The NRAs and CTEs are similar to the PSEs and CSEs computed by the OECD (2008), except that each of the OECD's measures is expressed as a percentage of the distorted rather than the undistorted price. Thus, it is lower than the comparable NRA or CTE, and has a maximum value of 100%. The OECD does not attempt to estimate rates of distortion to prices of noncovered farm products, thereby implicitly assuming they are the same as the average for the roughly 70% of farm production that is

[13]*There were many other reasons for exchange rate movements that affected the international competitiveness of farmers, but they also affected producers of other tradable products. Where exchange rate movements are due to the actions of international borrowers and lenders (as in the 1990s in Latin America—see Quiroz and Opazo 2000), they cannot be interpreted as price distortions in the same way as captured in NRA estimation. Where misalignment arises because of government macroeconomic policy, such as a delay in the adjustment of a fixed exchange rate when the government increases its borrowing from abroad, symmetric treatment of any such "overvaluation" during a heavy borrowing period would require taking into account exchange rate "undervaluation" during periods of low foreign borrowing or repayment of foreign debt. For these reasons, we do not follow K/S/V in including deviations of real exchange rates from benchmark values unless these deviations arise from direct distortions, as with dual or multiple exchange rates.*

covered by direct price comparisons. Nor does the OECD take into account distortions to nonfarm sectors or to the market for foreign exchange, and it does not estimate indicators such as the WRI and TRI.

The estimates by Krueger, Schiff, and Valdés (1988; 1991) distinguish for each country a "direct" and "indirect" rate of "protection" as measures of distortion to agricultural incentives. Their "direct" rate is not identical to the agricultural NRA described above, but is the closest for comparative purposes.[14] Their "indirect" rate is the number of percentage points by which the "direct" rate for each product, or the production-weighted average for a country's covered farm products, should be reduced because of the adverse macroeconomic influence on farmer incentives of that country's nonfarm policies (most notably protection to the manufacturing sector and overvaluation of the country's currency). Their "total protection" rate, therefore, is not identical to the above RRA, but again it is the closest for comparative purposes. It is not identical to the RRA partly because the K/S/V measure is an attempt to estimate econometrically the indirect effect on farm distortions of those nonfarm policies, whereas the RRA explicitly uses an estimate of the NRA for nonfarm tradable sectors alongside the estimated NRA for the tradable farm sector and both of those NRAs explicitly incorporate an estimate of the trade-taxing effect of multiple exchange rates. Since there are now plenty of sectoral and economy-wide models of national and global markets available, the study summarized in Anderson leaves it to modelers to determine how much the estimated domestic price distortions influence a country's real exchange rate and the international relative price of farm products (see footnote 8). The other important differences between the K/S/V study and that summarized in Anderson are that the former's product sample is smaller, its country sample is smaller (in particular, it omits the largest developing countries, i.e., China, India and Indonesia), and it provides only unweighted averages of distortions to farmer incentives across its developing countries.

Distortions to Agricultural Incentives in Developing Countries before 1985

This section summarizes the stylized facts that emerged from K/S/V for the period up to 1984 as compared with the findings of Anderson and Valenzuela's (2008) compilation and aggregation of NRAs and related indicators. It begins by focusing on just those developing countries included in the K/S/V sample, and then show how much the new estimates for the fuller sample of 41 developing countries differ from those for the more-limited K/S/V sample of 17 countries. The following two sections discuss the estimates for more advanced economies pre-1985, and of the period since the K/S/V era for both sets of countries.

The key empirical findings from the study by Krueger, Schiff, and Valdés (1988; 1991), and their authors' detailed country case studies, are based on the estimates shown in table 2, for 4 groups of countries classified according to their level of national per capita income at the time.

[14]*Formally, K/S/V's "direct protection" measure is the ratio of (a) the difference between the relative producer price and the relative border price, and (b) the relative adjusted border price measured at the equilibrium exchange rate and in the absense of all trade policies, where the "relative price" refers to the price of the farm product relative to the price of all nonfarm products.*

Table 2 Estimates by K/S/V of the Direct, Indirect and Total Rates of Assistance[a] to Farmers in 17 Developing Countries, by Income Group,[b] and Comparable NRA and RRA Estimates, 1960–1984 and 1985–2004 (%, Unweighted Averages across Countries)

(a) K/S/V estimates, circa 1960–84

	Direct rate of assistance to farmers					
Income group (poorest first):	Import-competing	Exportable	*All farm products incl. nontradables (DRA)*	Indirect rate of assistance to farmers[c]	*Total rate of assistance (TRA)*	Trade bias index[e]
Group 1	18	−21	*−23*	−29 (−26)	*−52*	−0.33
Group II	10	−16	*−12*	−25 (−35)	*−37*	−0.24
Group III	14	2	*−0*	−16 (−23)	*−16*	−0.11
Group IV	28	1	*24*	−14 (−14)	*10*	−0.21
All 17 countries	**16**	**−12**	***−8***	**−23 (−29)**	***−30***	**−0.24**

(b) Anderson and Valenzuela estimates (circa 1960–84)

	Nominal rate of assistance to farmers			Nominal rate of assistance, non-agric	*Relative rate of assistance*	Trade bias index[e]
Income group (poorest first):	Import-competing	Exportable	*Total (incl. nontradables)[d]*			
Group 1	−16	−50	*−22*	14	*−44*	−0.40
Group II	4	−26	*−13*	49	*−38*	−0.29
Group III	12	−7	*−4*	19	*−21*	−0.14
Group IV	40	0	*26*	13	*18*	−0.29
All 17 countries	**7**	**−25**	***−8***	**34**	***−29***	**−0.30**
All 41 countries[f]	*13*	*−44*	*−22*	*47*	*−49*	*−0.50*

(c) Anderson and Valenzuela estimates (1985–2004)

Income group (poorest first):	Nominal rate of assistance to farmers			Nominal rate of assistance, non-agric	*Relative rate of assistance*	Trade bias index[e]
	Import-competing	Exportable	*Total (incl. nontradables)*[d]			
Group 1	3	−45	*−21*	10	*−35*	−0.47
Group II	30	−10	*5*	17	*−8*	−0.31
Group III	38	−5	*2*	7	*−4*	−0.31
Group IV	122	7	*87*	2	*101*	−0.52
All 17 countries	**38**	**−15**	***10***	**12**	***1***	**−0.38**
All 41 countries[f]	*26*	*−16*	*1*	*15*	*−14*	*−0.33*

[a] *The three rates of assistance shown here are what Schiff and Valdes call "direct protection," "indirect protection," and "total protection". Apart from rounding errors, column 3 is the production-weighted average of columns 1 and 2 and an unreported direct rate of assistance for nontradable farm products, and column 5 is the sum of columns 3 and 4.*

[b] *Group 1 is Cote d'Ivoire (1960–82), Ghana (1955–77), and Zambia (1966–84); Group II is Argentina (1960–84), Colombia (1960–83), Dominican Rep. (1966–85), Egypt (1964–84), Pakistan (1960–86), Philippines (1960–86), Sri Lanka (1960–85), Thailand (1962–84), and Turkey (1961–83); Group III is Brazil (1969–83), Chile (1960–83), and Malaysia (1960–83); and Group IV is Rep. of Korea (1960–84) and Portugal (1960–84). In the full K/S/V set of countries, Morocco is included in Group II and the total, but its exclusion makes no more than 1 percentage point difference to rows 2 and 5 of the K/S/V unweighted averages. It is therefore excluded here to aid in comparison because Morocco was not included in the more recent study reported in Anderson year.*

[c] *Numbers in parentheses are due to manufacturing protection, which accounts for most of the indirect rate of assistance.*

[d] *Includes also non-product-specific assistance to farmers and estimated NRAs for noncovered products (neither of which are included in the first two columns). In deriving the RRA, the NRA for just agricultural tradables is used.*

[e] *Trade bias index, TBI = (1 + NRAag$_x$/100)/(1 + NRAag$_m$/100) — 1, where NRAag$_x$ and NRAag$_m$ are the weighted average percentage NRAs for the exportable and import-competing parts of the agricultural sector shown in columns 1 and 2, with weights based on production valued at undistorted prices; and similarly for part (a) of the table using DRAs.*

[f] *The full sample of 41 focus developing countries reflected in the subsequent tables.*

Source: Schiff and Valdés (1991, tables 2.1 and 2.2) and author's derivation from Anderson and Valenzuela (2008).

The most important findings, based on the unweighted average estimates across developing countries for the entire period from 1960 to 1984 (see exact years for each country in note b of table 2), are:

- The direct rate of assistance (DRA) to farmers due to agricultural policies was negative (average DRA of −8%), but tended to be more negative the lower a country's per capita income was (as low as −23% for the lowest-income group, but +24% for the highest-income group).
- Even more important were nonagricultural policies, particularly manufacturing protection, which on average were three times as harmful to farmers as agricultural policies.
- Thus, direct plus indirect policy influences mean that developing country farmers faced prices that were an estimated 30% below what they would have been without distortionary farm price, trade and exchange rate policies on average.
- Within the agricultural sector, the producers of exportables tended to be taxed by agricultural policies (average DRA of −12%) and those producing import-competing farm products tended to be protected (average DRA of 16%). But when the indirect impact is included (which reduces the DRA by 23 percentage points), the TRA for both sub-sectors were negative on average for the 17 countries and for all but Group IV countries (South Korea and Portugal).

For the K/S/V sample of 17 developing countries from 1960–84, there was therefore a severe anti-trade bias in farm policies and also a severe anti-agricultural bias that was reinforced by nonfarm policies, particularly manufacturing protection. Furthermore, the biases against farmers—especially those capable of exporting—tended to be greater the lower was the national per capita income.

The unweighted NRAs and RRAs in the recent World Bank project, for the same developing countries and years, are shown in part (b) of table 2. The estimates of agricultural NRAs, however, include a larger sample of covered products (more than twice as many as in K/S/V, including livestock products which were mostly ignored in K/S/V). The total agricultural NRAs (but not the NRAs for exporting and import-competing farmers) also include, unlike in K/S/V, non-product-specific assistance and estimates of assistance to the roughly 30% of the value of farm products that has not been included in the new study's explicit price comparison exercise. Recall too that the NRA estimates incorporate the trade-taxing effects of multiple exchange rates, hence they can be expected to have more of an anti-trade bias than K/S/V's DRA measure.

The new NRA and RRA estimates reinforce the conclusions from K/S/V for the period up to 1984. Specifically, the new agricultural NRAs are very similar to the comparable DRAs (both averaging -8%, and within 4 percentage points for the four income groups). Second, nonagricultural policies were even more important in depressing the new RRA than agricultural policies, with their NRA averaging 34% compared with the average NRA for agriculture of −8%. Third, the estimated direct plus indirect policy influences on farmers' incentives are, on average, very similar in the two studies: a TRA of −30% by K/S/V, and an RRA of −29% from the new study. Fourth, as anticipated (because of the inclusion of the impact of multiple exchange rates), within the agricultural sector the new NRA for producers of exportables is more negative than the DRA (average NRA of −25

compared with a DRA of −12%). However, the new NRA for producers of import-competing farm products is lower than the DRA except for Group IV countries. This is mainly because of the broader product coverage in the new dataset, plus the estimated presence of import subsidies for some food staples in Zambia. Nevertheless, the trade bias index for each of the four income groups is shown, in the final column of table 2, to be more negative based on the new NRAs than on K/S/V's DRAs, such that the average over the 17 countries is one-quarter larger for the new estimates (−0.30 compared with −0.24).

The comparison between parts (a) and (b) of table 2 thus suggests the new agricultural NRAs and RRAs are indeed similar in magnitude to the K/S/V's DRA and TRA. That gives us confidence to ask two further questions. One, to be addressed in the next section, is how have distortions in those 17 developing countries changed since the mid-1980s? The other is question is, how much do those average NRAs and RRAs for just 17 countries up to 1984 change when the new database's fuller sample of 41 developing countries is included?[15] Table 3 includes 5-year average NRAs by geographic region for the full time series, where it is again apparent that the NRAs tend to be higher, the higher is a region's income per capita (indicated in column 1). It is also apparent that the NRA trend over the period 1960 to 1984 was flat for each of the three developing country regions. For developing countries as a whole during 1960–1984, their weighted average NRA was −22%, which compares with an unweighted average NRA (and DRA) of −8% in the K/S/V sample of countries for most of that period. This inclusion of more developing countries in the sample, including from Sub-Saharan Africa but especially China, suggests K/S/V underestimates the DRA for developing countries.

Table 4 shows the NRAs for the farm sector's import-competing and exportable sub-sectors, together with the trade bias index. Again, the trend up to 1984 in the weighted average NRA for each of the two subsectors for the full sample of developing countries is flat. But note that the degree of anti-trade bias in the agricultural NRAs is greater for the full sample than it was for the K/S/V sample of 17 developing countries: the NRA averages for exportables is −44% and for importables is 13% for the full sample, compared with −25 and 7%, respectively, for the sample of just 17 countries. Thus, the anti-trade bias index for the full sample is shown in the final column of table 2 to be much greater for the full sample than for the 17 countries: −0.50 compared with −0.30 (or −0.24 according to K/S/V's DRAs).

Table 5, which includes NRAs for nonfarm tradable sectors, reveals that for the full sample the RRA too is lower than for the K/S/V sample of 17 countries in the period to 1984. Latin America and Asia had very high rates of manufacturing protection in that period, and they were especially high in China and India, which were not included in the K/S/V study. Since those two are large economies, the weighted average NRA for all developing country producers of nonfarm tradables is estimated to be 47% for the 1960–84 period, generating a weighted average RRA of −49% compared with the unweighted average rate of −29% for the K/S/V sample (or −30% based on K/S/V's TRA).

[15] *Turkey is not included in the developing country grouping hereafter, but rather with the European transition economies.*

Table 3 Nominal Rates of Assistance to Agriculture,[a] Focus Countries, 1955 to 2007[c] (%)

	1955–59	1960–64	1965–69	1970–74	1975–79	1980–84	1985–89	1990–94	1995–99	2000–04	2005–07
Africa (14% of global per capita GDP in 2000–04)	−14	−8	−11	−15	−13	−8	−1	−9	−6	−7	na
Asia (20% of global per capita GDP)	−27	−27	−25	−25	−24	−21	−9	−2	8	12	na
Latin America (64% of global per capita GDP)	−11	−8	−7	−21	−18	−13	−11	4	6	5	na
All developing countries	−26	−23	−22	−24	−22	−18	−8	−2	6	9	na
Eastern Europe and Central Asia[b] (48% of global per capita GDP)	na	na	na	na	na	na	na	10	18	18	25
High-income countries (540% of global per capita GDP)	22	29	35	25	32	41	53	46	35	32	17
All focus countries (weighted average):	3	5	6	0	2	5	17	18	17	18	na

[a] *Weighted average for each country, including non-product specific assistance, as well as authors' estimates for noncovered farm products (but not decoupled assistance), with weights based on gross value of agricultural production at undistorted prices. Estimates for China pre-1981 and India pre-1965 are based on the assumption that the nominal rate of assistance to agriculture in those years was the same as the average NRA estimates for those countries for 1981–84 and 1965–69, respectively, and that the gross value of production in those missing years is that which gives the same average share of value of production in total world production in 1981–84 and 1965–69, respectively.*
Developing country and world aggregates are computed accordingly.
[b] *The transition economies of Central and Eastern Europe and the former Soviet Union are not included in the high-income or developing country aggregates.*
Source: Author's derivation, using data in Anderson and Valenzuela (2008).

Table 4 Nominal Rates of Assistance to Agricultural Exportables, Import-Competing Products, and the Trade Bias Index,[a] Focus Regions, 1955 to 2007 (%)

	1955–59	1960–64	1965–69	1970–74	1975–79	1980–84	1985–89	1990–94	1995–99	2000–04	2005–07
Africa											
NRA agric. exportables	na	−30.1	−38.4	−42.6	−42.6	−35.0	−36.7	−35.8	−26.1	−24.6	na
NRA agric. imp-comp	na	18.6	11.8	1.9	14.5	13.2	58.3	5.2	9.8	1.6	na
Trade Bias Index	na	−0.41	−0.45	−0.44	−0.50	−0.43	−0.60	−0.39	−0.33	−0.26	na
Latin America											
NRA agric. exportables	na	−20.4	−12.8	−27.0	−25.2	−27.1	−25.0	−10.5	−3.5	−4.6	na
NRA agric. imp-comp	na	26.3	8.7	−2.8	1.1	13.6	5.1	19.4	12.5	20.6	na
Trade Bias Index	na	−0.37	−0.20	−0.25	−0.26	−0.36	−0.29	−0.25	−0.14	−0.21	na
South Asia[c]											
NRA agric. exportables	na	−37.5	−37.2	−30.0	−36.1	−27.9	−20.6	−15.8	−12.0	−6.2	na
NRA agric. imp-comp	na	39.2	41.2	39.4	45.1	37.9	63.3	25.1	14.5	26.5	na
Trade Bias Index	na	−0.55	−0.56	−0.50	−0.56	−0.48	−0.51	−0.33	−0.23	−0.26	na
China and Southeast Asia[c]											
NRA agric. exportables	na	−55.5	−55.1	−51.8	−50.1	−50.0	−41.0	−20.8	−2.2	0.1	na
NRA agric. imp-comp	na	−10.3	−8.9	−9.4	−2.6	0.5	15.1	3.3	13.3	12.3	na
Trade Bias Index	na	−0.50	−0.51	−0.47	−0.49	−0.50	−0.49	−0.23	−0.14	−0.11	na
Developing countries[c]											
NRA agric. exportables	na	−46.5	−44.6	−45.4	−43.9	−41.4	−35.8	−18.7	−5.5	−3.0	na
NRA agric. imp-comp	na	12.7	13.5	7.8	12.8	16.5	37.7	22.6	22.0	23.0	na
Trade Bias Index	na	−0.53	−0.51	−0.49	−0.50	−0.50	−0.53	−0.34	−0.23	−0.21	na
European transition econs.											
NRA agric. exportables	na	na	na	na	na	na	na	−3.2	−1.0	−1.0	15.2
NRA agric. imp-comp	na	na	na	na	na	na	na	32.5	35.4	35.7	32.3
Trade Bias Index	na	na	na	na	na	na	na	−0.27	−0.27	−0.27	−0.13

Continued

Table 4 *Continued*

	1955–59	1960–64	1965–69	1970–74	1975–79	1980–84	1985–89	1990–94	1995–99	2000–04	2005–07
High-income countries											
NRA agric. exportables	4.2	7.4	13.5	10.3	11.3	12.1	22.3	15.9	8.1	6.9	2.9
NRA agric. imp-comp	31.2	45.9	50.2	36.5	47.4	58.1	71.4	62.4	53.9	50.7	30.8
Trade Bias Index	−0.21	−0.26	−0.24	−0.19	−0.24	−0.29	−0.29	−0.29	−0.30	−0.29	−0.21
World[c]											
NRA agric. exportables	na	−23	−20	−23	−25	−24	−17	−7	−1	0	na
NRA agric. imp-comp	na	35	37	27	34	38	57	43	38	36	na
Trade Bias Index	na	−0.43	−0.42	−0.39	−0.44	−0.45	−0.47	−0.35	−0.28	−0.26	na

[a] *NRAs for noncovered products are included here (unlike in figure 1).*
[b] *Trade bias index, TBI = (1 + NRAag$_x$/100)/(1 + NRAag$_m$/100) — 1, where NRAag$_x$ and NRAag$_m$ are the weighted average percentage NRAs for the exportable and import-competing parts of the agricultural sector, with weights based on production valued at undistorted prices. TBIs shown here are calculated using the regional 5-year averages of NRAag$_x$ and NRAag$_m$.*
[c] *Estimates for China pre-1981 and India pre-1965 are based on the assumption that the nominal rate of assistance to agriculture in those years was the same as the average NRA estimates for those countries for 1981–84 and 1965–69, respectively, and that the gross value of production in those missing years is that which gives the same average share of value of production in total world production in 1981–84 and 1965–69, respectively. The developing country and world averages are computed accordingly.*
Source: Author's derivation, using data in Anderson and Valenzuela (2008).

Table 5 Nominal Rates of Assistance to Agricultural and Nonagricultural Tradables, and the RRA,[a] by Region, 1955 to 2007 (%)

	1955–59	1960–64	1965–69	1970–74	1975–79	1980–84	1985–89	1990–94	1995–99	2000–04	2005–07
Africa											
NRA agric.	na	−13.3	−19.6	−25.0	−22.1	−13.5	−0.3	−15.4	−8.7	−12.0	na
NRA non-agric.	na	3.7	2.7	1.5	5.7	1.6	9.2	2.7	2.0	7.3	na
RRA	na	−15.2	−21.4	−26.0	−25.9	−13.1	−8.3	−17.1	−10.4	−18.0	na
Latin America											
NRA agric.	na	−11.4	−9.3	−23.0	−19.0	−12.9	−11.2	4.4	5.5	4.9	na
NRA non-agric.	na	26.9	31.3	27.8	23.3	18.5	16.8	7.3	6.6	5.4	na
RRA	na	−30.2	−30.9	−39.8	−34.2	−26.6	−24.0	−2.7	−1.0	−0.5	na
South Asia[b]											
NRA agric.	na	4.1	4.4	9.7	−7.7	1.8	47.1	0.2	−2.4	12.7	na
NRA non-agric.	na	114.4	117.8	81.7	57.8	54.6	39.9	18.6	15.0	10.1	na
RRA	na	−51.5	−51.9	−39.8	−41.6	−33.3	5.1	−15.5	−14.9	3.4	na
China and Southeast Asia[b]											
NRA agric.	na	−43.6	−42.6	−40.1	−35.7	−34.5	−27.8	−12.0	4.9	7.1	na
NRA non-agric.	na	36.5	36.5	33.7	30.8	20.6	23.3	19.8	9.6	5.5	na
RRA	na	−58.7	−58.0	−55.2	−50.8	−43.4	−41.6	−26.4	−4.2	1.5	na
Developing countries[b]											
NRA agric.	na	−24.0	−27.3	−31.9	−25.5	−21.0	−15.6	−3.9	4.0	7.4	na
NRA non-agric.	na	58.3	60.0	45.8	37.3	34.6	27.0	16.7	9.8	6.3	na
RRA	na	−52.0	−54.5	−53.3	−45.8	−41.3	−33.6	−17.6	−5.3	1.1	na
European transition econs.											
NRA agric.	na	na	na	na	na	na	na	10.0	18.3	16.1	17.0
NRA non-agric.	na	na	na	na	na	na	na	9.8	5.5	4.6	2.7
RRA	na	na	na	na	na	na	na	0.1	12.2	11.0	13.9

Continued

Table 5 *Continued*

	1955–59	1960–64	1965–69	1970–74	1975–79	1980–84	1985–89	1990–94	1995–99	2000–04	2005–07
High-income countries											
NRA agric.	23.0	30.9	36.8	26.5	34.7	43.0	55.5	48.2	36.6	33.9	18.3
NRA non-agric.	7.5	8.5	7.7	5.4	3.6	3.4	3.2	2.5	1.7	1.3	−0.7
RRA	14.3	20.6	27.1	19.9	30.1	38.3	50.6	44.6	34.3	32.1	19.2
World[b]											
NRA agric.	na	5.6	7.6	0.8	2.6	5.7	18.7	19.7	18.4	18.6	na
NRA non-agric.	na	19.0	20.5	16.1	13.7	10.0	9.8	7.6	6.0	4.0	na
RRA	na	−11.3	−10.7	−13.2	−9.8	−3.6	8.1	11.3	11.8	14.0	na

[a] *The RRA is defined as 100*[(100 + NRAag^t)/(100 + NRAnonag^t) − 1], where NRAag^t and NRAnonag^t are the percentage NRAs for the tradables parts of the agricultural and nonagricultural sectors, respectively.*

[b] *Estimates for the RRA for China pre-1981 and India pre-1965 are based on the assumption that the agricultural NRAs in those years were the same as the average NRA estimates for those countries for 1981–84 and 1965–69, respectively, and that the value of production in those missing years is that which gives the same average share of value of production in total world production in 1981–84 and 1965–69, respectively. Developing and world country aggregates are computed accordingly.*

Source: Author's derivation, using data in Anderson and Valenzuela (2008).

Taken together, these new findings suggest that the broad qualitative conclusions drawn from the K/S/V study two decades ago would not have altered had they included more products and more countries in their sample. However, with a larger sample they would have been able to stress their policy implications even more forcefully, as the estimated magnitudes of the anti-agricultural and anti-trade bias indicators would have both been larger by two-thirds.

Distortions to Agricultural Incentives in High-Income Countries prior to 1985

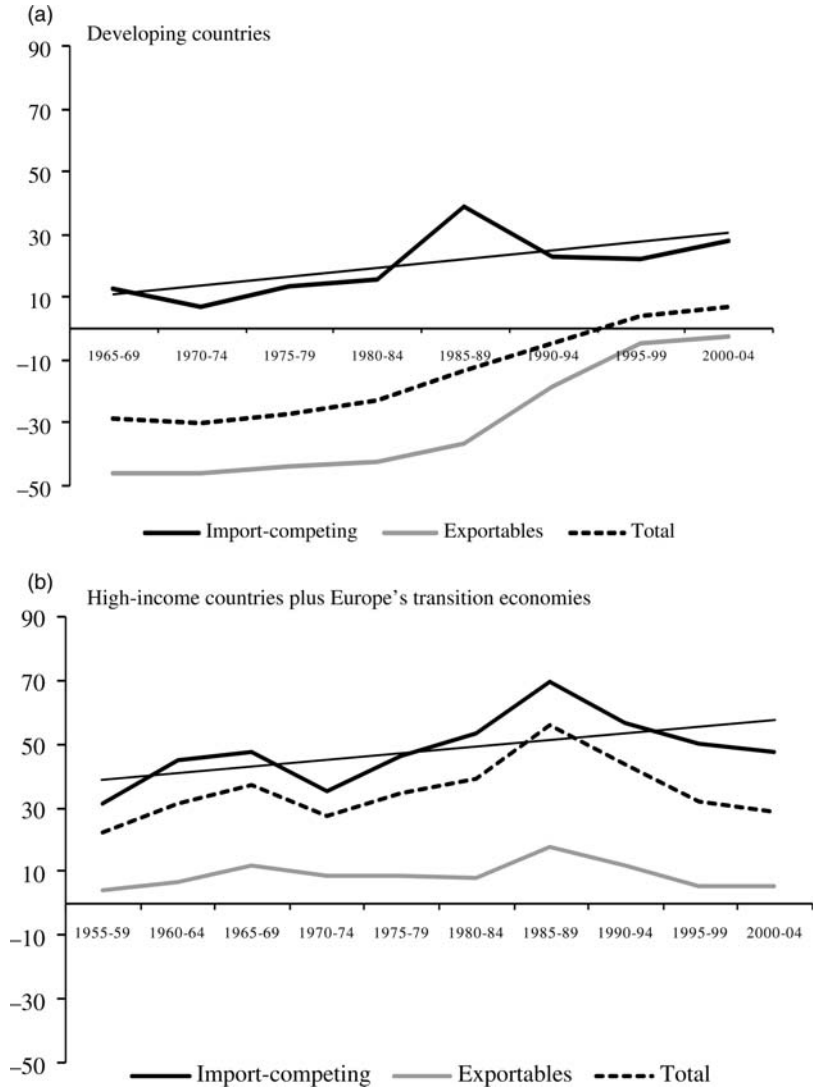
Tables 3 to 5 also show the new project's estimated weighted average NRAs and RRAs for high-income countries, which include all the significant economies of Western Europe plus Australia, Canada, Japan, New Zealand, and the United States, from which several points are worth stressing. First, the agricultural NRAs were already more than 20% by the late-1950s, and they doubled over the period to 1984 (dipping only slightly in the mid-1970s when international food prices spiked upwards). This contrasts markedly with the developing country average NRA of below −20% in that era. Second, even exporting farmers in high-income countries were assisted, although much less so than import-competing farmers who enjoyed an NRA average that was more than three times that of import-competing farmers in developing countries. And third, with declines in manufacturing protection in high-income countries, their RRA average rose even more than their agricultural NRA average, from 14% from 1955–59 to 38% from 1980–84, and 51% in 1985–89. These estimates indicate that farmers in developing countries were harmed in the K/S/V era not only by their own countries' agricultural and nonfarm policies, but also—and increasingly from the late-1950s to the late-1980s—by competition in world markets from high-income countries that was enhanced by those countries' pro-agricultural policies.

Distortions to Agricultural Incentives since 1985

The bottom panel of table 2 provides NRA and RRA estimates post-1984 for the 17 countries in the K/S/V sample. Comparing them with the middle panel reveals that those countries substantially reduced their taxation of export agriculture, raised their protection of import-competing agriculture, and as a result their overall agricultural NRA switched from an average of −8% from 1960–84 to 10% in 1985–2004. Meanwhile, the NRA for nonfarm tradables fell by two-thirds, such that the RRA for this sample rose from −29% to 1%. The anti-agricultural bias in those 17 developing countries thus disappeared on average, although the anti-trade bias within their farm sectors increased slightly (the trade bias index rose from −0.30 to −0.38). These broad findings are also true for the larger sample of 41 developing countries (with the exception of the anti-trade bias, which diminished), even though the magnitudes are generally larger—see the final row of the middle and bottom panels of table 2.

To focus on just the covered farm products for which direct price comparisons have been made, figure 1 summarizes the trends in NRAs and reveals a marked difference in the levels of support to import-competing versus exportable farm products. Exportables in developing countries were

Figure 1 Nominal rates of assistance to exportable, import-competing and all covered agricultural products,[a] high-income and developing countries, 1955 to 2004 (%)

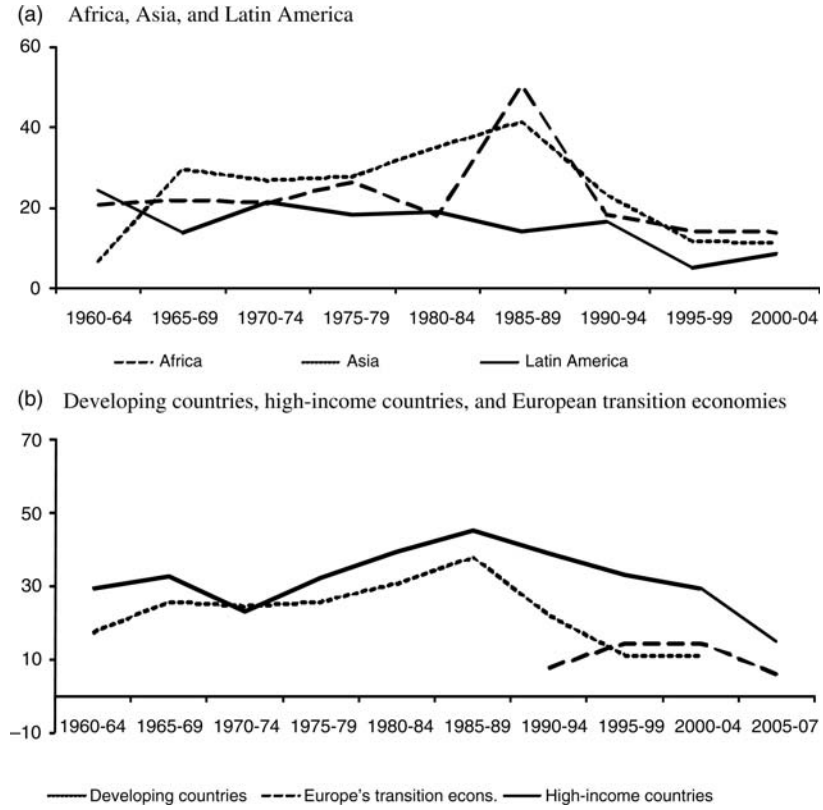


[a] Covered products only. The total also includes non-tradables.
Source: Author's derivation, using data in Anderson and Valenzuela (2008).

heavily taxed from the late 1950s until the mid-1980s, but then that taxation was gradually phased out (although some taxes remained in 2000–04, for example in Argentina). Importables, by contrast, have been assisted increasingly throughout the past five decades in developing countries on average (even though some import subsidization of staple foods occurred from time to time in low-income countries), and the long-run fitted trend line has almost the same slope for developing countries as for high-income countries (compare the upper and lower graphs in figure 1).[16]

[16]*Both developing and high-income country NRAs for import-competing farm products rose in the late-1980s. This is because of the slump in international food prices in 1986, which was far from fully transmitted to domestic markets, and so lowered the denominator far more than the numerator of the NRA calculation.*

Figure 2 Trade Reduction Indexes for covered tradable farm products, by region, 1960 to 2007 (%)



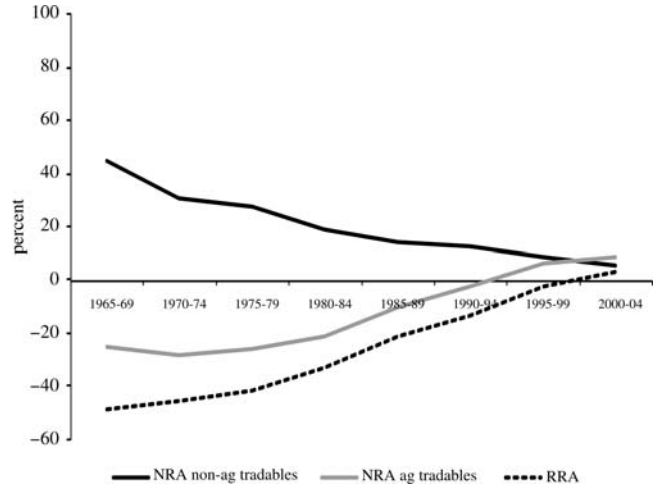
Source: Lloyd, Croser, and Anderson (2010) using data in Anderson and Croser (2009).

The net effect of all the explicit and implicit trade taxes and subsidies, together with domestic taxes and subsidies on tradable farm products, is that the NRA for exportable farm products is typically well below the NRA for importables, so that the trade bias index, as defined in the methodology section above, is negative. Table 4 shows that the agricultural trade bias index has steadily become less negative since the late 1980s for the developing country group, but mainly because of the decline in agricultural export taxation and in spite of growth in agricultural import protection.

The two sub-sectors to which that trade bias index's NRAs refer (exportable and import-competing farm products, respectively) are not equal contributors to overall farm production, however, so the TBI when weighted across numerous products/countries is not a perfect indicator. The TBI also ignores distortions to consumer prices which need not be identical to producer distortions. A superior indicator is the trade reduction index discussed in the methodology section above. The TRI associated with NRAs and CTEs for covered agricultural products has fallen substantially from its peak in the mid-1980s for Africa and Asia, as it has for high-income countries (figure 2). That is, the considerable extent of decline in the anti-trade bias in farm policies indicated by the trade bias index is confirmed by the TRI measure.

Because of the fall in national mean NRAs, the fall in the TRI has been greater than in their variance, however. The regional average NRAs hide a

Figure 3 Nominal rates of assistance to agricultural and nonagricultural tradable products and relative rate of assistance, with a focus on developing countries,[a] 1965 to 2004 (%)



[a] Weighted averages across countries, using agricultural production valued at undistorted prices as weights.
Source: Author's derivation, using data in Anderson and Valenzuela (2008).

great deal of diversity across products and countries, including within each region. One way of summarizing the within-country NRA diversity across products is to calculate the standard deviation around the mean NRA for all covered farm products each year. Even when that is averaged over whole geographic regions, the diversity is still evident, and it has not declined much since the K/S/V era for Africa and Latin America (from 34 and 49% from 1965–1984, respectively, to 29 and 40% from 1985–2004), and it has risen for Asian developing countries (from 50 to 61%—see Anderson 2009, table 1.6). This has important welfare implications, because the cost of government policy distortions to incentives in terms of resource misallocation tends to be greater the greater is the degree of substitution in production (Lloyd 1974), which is high in the case of agriculture where farmland is sector-specific but transferable among farm activities.

The increase in the RRA for developing countries began slowly in the 1970s but accelerated in the 1980s and 1990s. Indeed, the RRA was slightly above zero by the end of the 20th century (table 5 and figure 3). That is, the removal of the anti-agricultural bias in developing countries has been a gradual process, but it is nonetheless remarkable that in just the one generation since the K/S/V era, that bias has all but disappeared except in Africa. Slightly over half of the rise in the RRA for developing countries since the mid-1980s is due to falls in the protection to producers of nonfarm tradable goods, suggesting that much of the reduction in relative prices faced by farmers over the past two decades can be attributed to general trade liberalization rather than to farm-specific policy reform.

Governments in the past tried to alter not only the trend level of farm prices, but also to reduce their year-to-year fluctuations. Typically, this was done by varying the restrictions on international trade according to seasonal conditions domestically and changes in prices internationally.

Table 6 Deviation of National NRA around Its Trend Value,[a] 12 Key Covered Farm Products,[b] Developing and High-income Countries, 1965–84 and 1985–2004 (NRA Percentage Points)

	Developing countries		High-income countries	
	1965–1984	1985–2004	1965–1984	1985–2004
Grains, oils, sugar				
Rice	32	64	66	229
Wheat	33	47	80	91
Maize	36	33	53	58
Soybean	46	117	75	61
Sugar	53	66	179	173
Tropical cash crops				
Cotton	38	33	42	28
Coconut	22	20	na	na
Coffee	41	27	na	na
Livestock products				
Milk	76	69	239	190
Beef	45	52	128	127
Pigmeat	81	60	92	77
Poultry	109	74	164	197

[a] *Deviation is computed as the absolute value of (residual—trend NRA) where trend NRA in each of the two sub-periods is obtained by regressing NRA on time.*
[b] *Unweighted average of national deviations.*
Source: Author's derivation, using data in Anderson and Valenzuela (2008).

Effectively, this involves exporting domestic instability and not importing instability from abroad. When many countries indulge in such insulating behavior, it 'thins' international markets for farm products, making them more volatile and thereby encouraging even more countries to insulate. To see how much that type of intervention has changed since the K/S/V era, table 6 reports the average across focus countries of the percentage-point deviation each year for national NRAs of 12 key farm products around their trend value, for the sub-periods before and after 1985. For the majority of products, that indicator is lower in the latter period in both developing and high-income countries.[17] This is yet another way in which distortions to agricultural incentives for developing countries have diminished since the mid-1980s—but note the important exceptions of rice and wheat in table 6.

How has the importance of different policy instruments changed since the K/S/V era? Traditionally in developing countries, trade measures at the border (export and import taxes or subsidies and their equivalent from quantitative trade restrictions and multiple exchange rates) have been the dominant forms of intervention. Table 7 shows the various contributions of different policy measures to the overall estimated NRAs from 1981–84 and 2000–04. In the earlier period, trade measures accounted for more than three-quarters of the total agricultural NRA for developing (and high-income) countries. In the latter period, trade measures were

[17] *That this indicator tends to be much less in developing than high-income countries is mainly a reflection of the fact that the absolute values of the agricultural NRAs tend to be smaller in developing countries (see table 5).*

Table 7 Contributions to Total Agricultural NRA and CTE from Different Policy Instruments,[a] Developing and High-income Countries, 1981–84 and 2000–04 (%)

	1981–84		2000–04	
	All developing countries	**High-income countries**	**All developing countries**	**High-income countries**
(a) NRA				
Border measures				
Import tax equivalent	6	34	8	24
Export subsidies	1	2	1	1
Export tax equivalent	−20	0	−3	0
Import subsidy equivalent	−2	0	−1	0
ALL BORDER MEASURES	**−15**	**36**	**5**	**25**
Domestic measures				
Production subsidies	1	2	1	1
Production taxes	−5	0	−1	0
Net subsidies to farm inputs	1	3	2	2
Non-product-specific assistance	1	1	2	5
ALL PRODUCTION SUPPORTS	**−2**	**6**	**4**	**8**
Decoupled payments to farmers	0	6	0	11
TOTAL NRA (including decoupled)	**−17**	**48**	**9**	**44**
(b) CTE				
Border measures				
Import tax equivalent	10	46	10	32
Export subsidies	1	2	1	1
Export tax equivalent	−22	0	−2	0
Import subsidy equivalent	−3	0	−1	0
ALL BORDER MEASURES	**−14**	**48**	**8**	**33**
Domestic measures				
Consumption subsidies	−1	0	−1	−6
Consumption taxes	0	0	1	0
ALL CONSUMPTION MEASURES	**−1**	**0**	**0**	**−6**
TOTAL CTE	**−15**	**48**	**8**	**27**

[a] *In the absence of data, we assume the share of input tax/subsidy, domestic production tax/subsidy and border tax/subsidies for noncovered farm products is the same as that for covered farm products. The first period begins in 1981 because that was the first year for which estimates for China are available.*

[b] *All table entries have been generated by dividing the gross subsidy equivalent of all (including decoupled) measures by the total agricultural sector's gross production valued at undistorted prices. Source: Author's derivation, using distortion data in Anderson and Valenzuela (2008).*

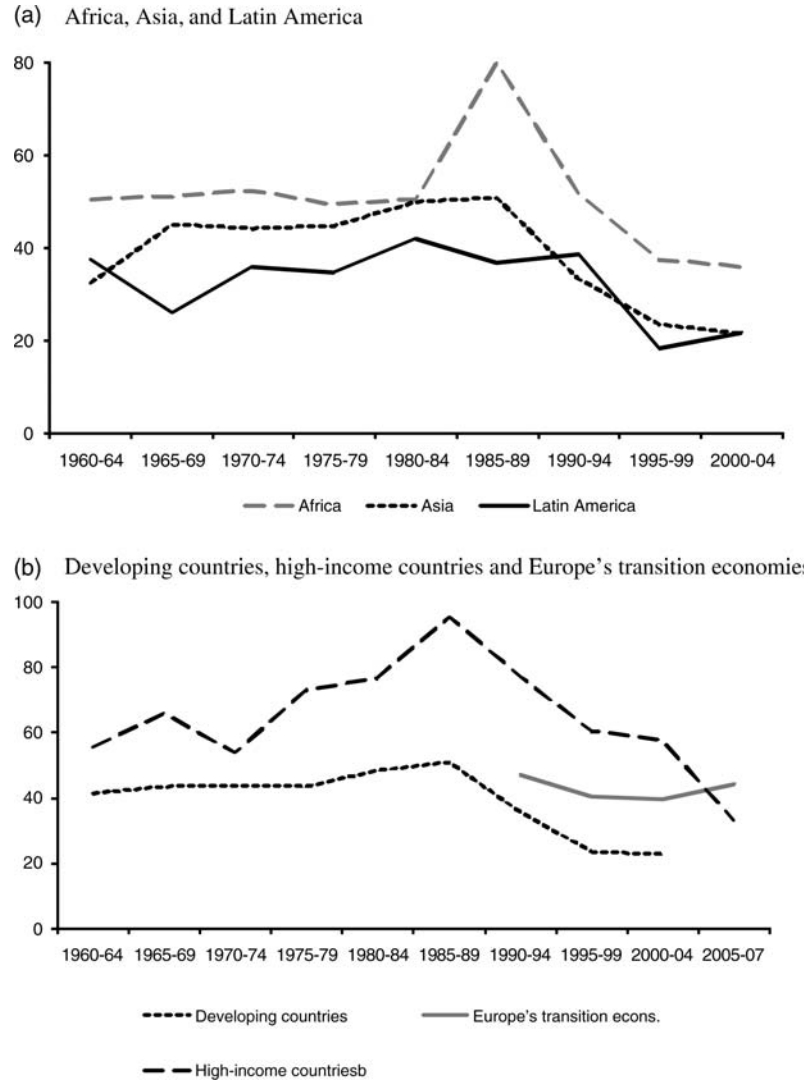
much less of a contributor in developing countries, and most of that came from import barriers, whereas in the earlier period it came mainly from export barriers. Production taxes have also declined substantially. What is now more important in developing countries, both relatively and absolutely, are net subsidies to farm inputs and other non-product-specific assistance. The most notable case is India, where large subsidies to fertilizer, water and power for irrigation add several percentage points to India's agricultural NRA (Anderson 2009, Ch. 10).

Trade measures are responsible for an even larger share—over 90%—of the distortion to consumer prices of food, since direct domestic consumer subsidies or taxes, as distinct from the indirect ones provided by border measures, are relatively rare (lower half of table 7). The dominance of trade measures in both consumer tax equivalents (CTEs) and NRAs for agricultural products means we should expect those two indicators to be highly correlated. And indeed, that is the case: for all focus countries, all covered products and all available years in the panel set, the coefficient of correlation between farm product NRAs and CTEs is 0.93.

Finally, how are the above policy reforms reflected in the welfare reduction index? This single indicator captures the partial equilibrium welfare effect of each country's regime of price distortions for covered agricultural products in place at any time (while ignoring noncovered farm products and indirect effects of sectoral and trade policy measures directed at nonagricultural sectors). The WRI measure reflects the welfare cost of agricultural price-distorting policies better than the NRA or CTE because it includes the distortions on both sides of a market, and it recognizes that the welfare cost of a government-imposed price distortion is related to the square of the price wedge. The measure thus captures the disproportionately higher welfare costs of peak levels of assistance or taxation, is larger than the mean, and is positive regardless of whether the government's agricultural policy favors or harms farmers. Thus, the WRI goes some way towards indicating what a computable general equilibrium (CGE) can provide in the way of estimates of the welfare effects of the price distortions captured by the product NRA and CTE estimates, while having the advantage of providing an annual time series of this sectoral indicator.

The WRI five-year results in figure 4 indicate a fairly constant tendency in developing countries for their covered products' policies to reduce economic welfare from the 1960s to the mid-1980s, but that indicator nearly halves during the 1990s. This pattern is generated by different policy regimes in the different country groups though, as the WRI has the desirable property of correctly identifying the welfare consequences that result from both positive and negative assistance regimes, and the larger the variance in assistance levels, the greater the potential for resources to be used in activities which do not maximize economic welfare, and hence the larger the WRI. One consequence is that the WRI for Africa spikes in the mid-1980s, in contrast to the NRA, which moves close to zero. This is because while Africa was still taxing exportables, it had moved (temporarily) from low to very high positive levels of protection for import-competing farm products when international food prices slumped in 1986 (table 4). At the aggregate level, African farmers received almost no governmental assistance then (NRA close to zero), but the welfare cost of its mixture of agricultural policies as a whole was at its highest

Figure 4 Welfare Reduction Indexes for covered tradable farm products, by region, 1960 to 2007 (%)



Source: Lloyd, Croser, and Anderson (2010).

according to the WRI. Another consequence is that for developing countries, the average WRI from 1995 to 2004 is around 20%, even though the average NRA for covered products in those years is close to zero (see figure 1(a)), again reflecting the high dispersion across product NRAs—particularly between exportables and import-competing goods—in each country.

By way of summary for both the WRI and TRI estimates, table 8 provides the mean and the log-linear regression growth rate for each of those indicators for the K/S/V era, and for the period since 1984. It shows estimates separately for the K/S/V countries broken down into their income groups, as well as for all developing countries in the new database, and for high-income countries. Several points are worth noticing in this table.

Table 8 WRI and TRI Averages and Growth Rates,[a] Developing and High-income Countries,[b] 1960–1984 and 1985–2004 (%)

	1960–1984				1985–2004			
	Mean (%)		Growth rate (% p.a.)		Mean (%)		Growth rate (% p.a.)	
K/S/V income group (poorest first):	WRI	TRI	WRI	TRI	WRI	TRI	WRI	TRI
Group 1	45	23	0.8	1.1	42	24	−0.7	0.1
Group II	38	12	−0.1	0.0	37	16	−0.4	−0.4
Group III	31	15	0.6	0.5	23	7	−1.8	−0.9
Group IV	63	42	2.2	3.1	155	128	0.6	0.3
17 K/S/V countries	**44**	**23**	**0.9**	**1.2**	**64**	**44**	**−0.6**	**−0.2**
All 41 developing countries	**44**	**25**	**0.2**	**0.4**	**34**	**21**	**−1.4**	**−1.4**
Africa	43	25	0.5	0.9	33	23	−1.4	−1.6
Asia	51	22	0.0	0.0	51	24	−1.5	−1.5
LAC	35	19	0.3	−0.1	30	11	−1.0	−0.5
All high-income countries	**65**	**32**	**0.6**	**0.3**	**73**	**37**	**−1.3**	**−0.7**
EU15	110	55	0.2	0.0	75	42	−2.2	−1.3
Other high-income	33	15	1.0	0.6	72	34	−0.7	−0.3

[a] *The average annual compound growth rates are the beta coefficients from a regression of the log variable on time for the period shown. In order to obtain a natural logarithm, the WRI indicator used is not as a percentage but rather as a coefficient, defined as (1 + WRI/100), and similarly for the TRI.*
[b] *See table 2 for the classification of K/S/V's 17 developing countries in the 4 income groups shown.*
Source: Author's calculations based on estimates in Anderson and Croser (2009).

First, in terms of the mean WRI and TRI, the 17 K/S/V countries have almost the same values as the fuller sample of 41 developing countries for the period 1960–84, at around 44 and 24%, respectively. The two samples differed in terms of growth in those indexes over those years, however: the trade- and welfare-reducing effects of policies in the smaller K/S/V sample increased 3 or 4 times faster than in the fuller sample of 41 developing countries, suggesting the more-limited sample would have exaggerated growth in those indexes for developing countries.

Second, the K/S/V sample was not very representative of the fuller developing country sample in the more recent 1985–2004 period: the mean WRI and TRI are each more than half as large again in the latter period as in the former period for the K/S/V countries, whereas for the fuller sample those means fell by roughly one-fifth. That contrast is also clear in the rates of (negative) growth of the indexes over the latter 25 years, which fell much faster in the full sample than in the sample of just 17 countries.

Third, there is a U shape in the mean WRI and TRI values across income groups: they become lower as one moves from the lowest income group to Group II and then Group III, but then are highest for Group IV. This is consistent with the decline in the negative agricultural NRA as one goes from Group I through to Group III, and then the move to a large

positive NRA for Group IV (see middle panel of table 2 above). That U shape is similar in the later period, except the means for Group III are lower (its policies are less welfare- and trade-reducing than in the earlier period) and those for Group IV are higher (its policies are more than twice as welfare- and trade-reducing as those of the earlier period).

Fourth, by region it is only in Latin America that the trade-reducing aspect of agricultural policies has diminished substantially, and it is more in Africa than in Latin America that the welfare-reducing aspect of agricultural policies has diminished. For Asia, both indexes are similar in the two periods, but that hides much diversity of reform experiences within the region, with protection growth in countries such as South Korea offsetting the dramatic reforms in countries such as China.

Lastly, the mean WRI and TRI in the earlier period were half as large again for high-income countries as for the 41 developing countries (and 2.5 times larger for the European Union), and that gap became even wider in the more recent period. This is also reflected in the faster increase in these indexes during the early period and their slower decline (especially for non-EU countries) in the later period.

Economy-Wide Effects of Reforms since 1984 and of Remaining Policies

It is clear from the above that there has been a great deal of change over the past 25 years in policy distortions to agricultural incentives throughout the world, and considerable diversity in the rates and types of change. In addition to the anti-agricultural and anti-trade biases of policies of many developing countries being reduced since the K/S/V era, export subsidies of high-income countries have been cut and some re-instrumentation toward less inefficient and less trade-distorting forms of support, particularly in Western Europe, has begun. However, protection from agricultural import competition has continued its upward trend in developing countries, if one ignores the latter 1980s, when the limited transmission of the slump in international food prices to domestic markets led to NRAs spiking upwards.

What, then, have been the net economic effects of agricultural price and trade policy changes around the world since the early 1980s? Also, how do the effects on farm incomes and economic welfare in developing countries compare with the effects of those price distortions still in place as of 2004? Valenzuela, van der Mensbrugghe, and Anderson (2009) use a global economy-wide model (the World Bank's Linkage model—see van der Mensbrugghe 2005) to provide a combined retrospective and prospective analysis that seeks to assess how far the world has come, and how far it still has to go, in removing the disarray present in world agriculture. This model quantifies the impacts both of past reforms and current policies by comparing the effects of the above NRA and CTE distortion estimates for the period of 1980–84 with those of 2004.

Several key findings from that economy-wide modeling study, summarized in table 8, are worth emphasizing. First, the policy reforms from the early 1980s to the mid-2000s are estimated to have improved global economic welfare by $233 billion per year, and removing the distortions remaining as of 2004 would add another $168 billion per year. This

suggests that in a global welfare sense, the world moved three-fifths of the way towards global free trade in goods over that quarter century.

Second, developing countries benefited proportionately more than high-income economies (1.0% compared with 0.7% of national income) from those past policy reforms, and would gain nearly twice as much as high-income countries by completing the reform process (an average increase of 0.9% compared with 0.5% for high-income countries). Of those prospective welfare gains from global liberalization, 70% would come from agriculture and food policy reform. This is a striking result given that the shares of agriculture and food in global GDP and global merchandise trade are only 3% and 6%, respectively. The contribution of farm and food policy reform to the prospective welfare gain for just developing countries is slightly greater, at 72%.

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

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

Why Does This Matter? Where to From Here?

The degree of distortions to K/S/V mattered in the late 1980s because policies in many developing countries at that time were harming their respective economies, and especially their farmers. Since farm households were much poorer on average than nonfarm households, these policies not only were national welfare-reducing, but also contributed to inequality and poverty. The above comparison of K/S/V results and those of the new World Bank study reported in Anderson (2009) deepens our understanding of 1960–1984 and of the subsequent 20 years in the following ways:

- Had K/S/V had the same broader range of covered products, the larger sample of developing countries and the greater variety of indicators as does the new study, it would not have altered the study's key conclusions, but it would have enabled the authors to stress their policy implications even more forcefully, as the estimated magnitudes of the anti-agricultural and anti-trade bias indicators would have been larger by about two-thirds.[18]

[18]*Indeed, even the new results for 41 developing countries may understate the degree of anti-agricultural bias in policies, since those 41 are larger, richer and less agrarian than the non-focused developing countries. A new study using simple political econometrics suggests the agricultural NRA of the latter group in 2000–04 could be 10 percentage points lower than for the 41 focus countries. Even so, their share of all developing country agriculture is sufficiently small that their inclusion*

- The new measures of distortions to farmer incentives in high-income countries confirm that developing country farmers were also being increasingly harmed by rich-country policies from 1960 to the mid-1980s.
- Since the mid-1980s, many developing countries have undertaken national policy reforms that have substantially reduced the inter-sectoral bias against agriculture and, within the farm sector, the anti-trade bias of the past—and even more so, and at a faster pace, for the fuller sample of developing countries than for the K/S/V sample.
- Nonetheless, many distortions remain within the agricultural sector, even in those countries with RRAs close to zero, and even where import restrictions are the main distortionary measure (suggesting tariffs are far from uniform, not to mention subsidies).
- In a global welfare sense, the world moved three-fifths of the way towards global free trade in goods over the quarter century since the early 1980s, which, while impressive and gratifying, means there is still another two-fifths of the way to go before these wasteful policies are finally abandoned.
- Developing countries have benefited proportionately (as a share of their GDP) more than high-income economies from those policy reforms, and would gain nearly twice as much as high-income countries by completing that reform process (of which 72% of those prospective gains to developing countries would come from agriculture and food policy reform).
- Net farm income (agricultural value added) in developing countries is estimated to be 5% higher than it would have been without the reforms of the early 1980s, which is more than ten times the proportional gain to nonagricultural households, and if policies remaining in 2004 were removed those net farm incomes would rise a further 6%.

Together, these findings suggest both inequality and poverty could be further alleviated by such reform, given that three-quarters of the world's poor are in farm households in developing countries (World Bank 2008).[19] Furthermore, those latter results are from a comparative, static economy-wide model and so underestimate the gains by ignoring the dynamic gains that typically accompany market liberalization.

Ideally the reform processes of the past quarter century would continue, boosting global economic growth, reducing inequality within and between countries, and alleviating poverty. If the convergence of national RRAs towards zero continues (from below by most developing countries and from above by higher-income countries), there would continue to be a relocation of global farm production (in global share terms) from high-income to developing countries, thus reversing the policy distortion-driven opposite trend in the quarter century prior to the mid-1980s. Whether international food prices would rise or fall would depend on the relative size of the two groups of countries and which had the larger RRA

would have lowered the aggregate NRA for developing countries by 10 percentage points, from 9% to 8% (Anderson et al. 2010, table 2.13).

[19] *A new set of economy-wide national and global modeling studies that uses the NRA agricultural distortion estimates in Anderson 2009 finds that their removal, as well as distortions to other tradable goods markets, does indeed lower estimated inequality and poverty. See Anderson, Cockburn, and Martin 2010.*

change (bearing in mind that some export restrictions still remain, including in Argentina). According to the global modeling exercise reported in table 9, the net change in international prices would be very small if all market distortions for goods were removed globally as of 2004. Those results also suggest that international markets would be "thicker," so their volatility from year to year would be less, further boosting global food security.

That rosy scenario would imply that the early 1960s to the mid-1980s was an aberrant period of welfare-reducing policy divergence (negative and very low RRAs in newly-independent developing countries, positive and rising RRAs in most high-income countries) that has given way to growth-enhancing, welfare-improving and inequality- and poverty-reducing reforms during which the two country groups' RRAs, like their NRAs, are converging towards zero. In this view, the reforms could be seen as the result of learning from the differing growth experiences of more- and less-open developing economies.

An alternative interpretation of history is that it is actually the most recent 25-year period of RRA changes that is aberrant. The RRA declines in high-income countries, according to this alternative view, are associated more with, in the case of the EU, its 1992 single market initiative and subsequent EU enlargements than with external reform pressure from other World Trade Organization (WTO) members,[20] and with the fact that the high protection rates of the mid-1980s represent a temporary spike above trend caused by the very low international commodity prices at the time, and conversely for the low rates in 2007–08 reported by the OECD. As for the rise of developing country RRAs in this alternative view, that simply follows the example of higher-income countries and will not stop when those RRAs reach zero. Inspection of the NRAs in figure 1 for exporting and import-competing sub-sectors of developing country agriculture reveals that the convergence of aggregate NRAs to near zero mainly pertains to the exporting sub-sector. NRAs for import-competing farmers in developing countries, by contrast, are positive and (if one ignores the latter 1980s, when international food prices spiked downwards) are trending upwards over time.

Moreover, when the RRA is plotted against the log of real per capita income, and straight regression lines are estimated for developing and high-income countries, they both slope upward and at the same rate (figure 5). True, the intercept on the vertical axis for the developing countries' trend line is lower than that for high-income countries. Nonetheless, in developing countries there are few signs of a slowdown of the upward trend in agricultural protection from import competition over the time period studied.[21] On the contrary, 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

[20] *See Swinnen 2008. As explained by Josling 2009, the budgetary cost of continuing with the EU's past levels of support would have skyrocketed following the EU membership expansion eastwards, with little if any of those extra payments going to the traditional lobbyists for the CAP.*

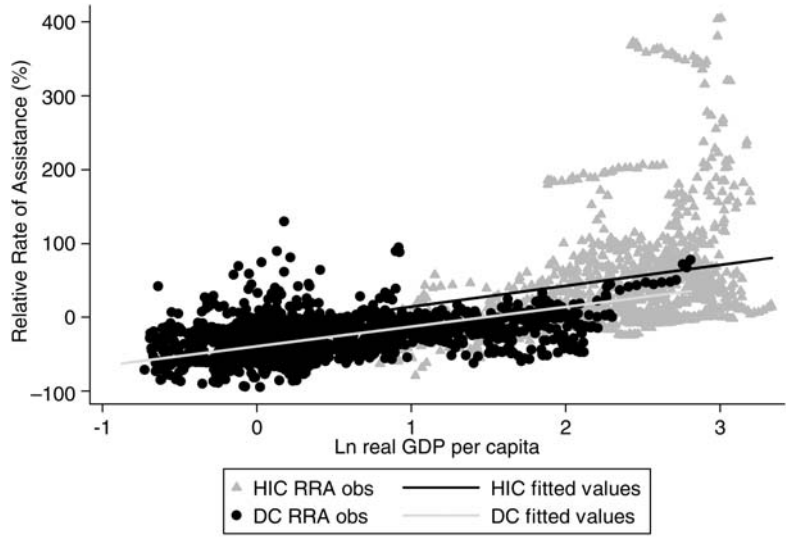
[21] *It is true that applied tariffs were lowered or suspended as a way of dealing with the international food price spike in 2008, but initial indications are that this, and the food export taxes or quantitative restrictions imposed that year by numerous food-exporting developing countries, lasted only until international prices returned close to their trend levels in 2009 (as happened after the price hike of 1973–74, and the price dip of 1986–87).*

Table 9 Effects of Reforming Global Goods Markets between 1980–84 and 2004, and of Removing Remaining Price and Trade Distortions as of 2004

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

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

Figure 5 Relationships between real GDP per capita and RRA, all 75 focus countries, 1955 to 2007



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

Source: Author's derivation with country fixed effects, using data in Anderson and Valenzuela (2008).

indicator is the high tariff bindings that 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%, and less than one-sixth in the case of least-developed countries (Anderson and Martin 2006, table 1.2). Another indicator of agricultural trade reform reluctance is the unwillingness of many developing countries to agree to major cuts in bound agricultural tariffs in the WTO's ongoing Doha Round of multilateral trade negotiations. 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 necessary 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).

These two alternative interpretations of history have profoundly different implications for the future. The first suggests that the WTO's Doha Round of multilateral trade negotiations is likely to conclude with substantial cuts to agricultural tariff and subsidy bindings that lock in recent reforms, and go close to relegating protectionism in agricultural markets to history. In that case, world food price trends would simply depend on whether improvements in farm versus nonfarm technologies could keep pace with the growth in global demand for farm products. That was certainly possible in the twentieth century (see Pfaffenzeller, Newbolt, and Rayner 2007), but given the pace of climate change and the recent growth in demand for biofuels, it may be more of a challenge in the twenty-first century, especially if much of the world continues to shun genetically modified food. In particular, the emerging economies of China and India would become more food import-dependent as they continue to rapidly industrialize, should their RRAs cease rising and instead stay at their present near-zero levels.

The other interpretation of history—one that views as normal the movement from taxing to subsidizing farmers as an economy develops—suggests the Doha Round will struggle to reach an ambitious reform outcome in agriculture, and that developing countries will make use of the legal wiggle room they have allowed themselves in their WTO bindings to follow Japan, Korea, and Taiwan into higher levels of agricultural protection. In that case international food prices would rise less than in the first scenario, but domestic food prices in developing countries, particularly for importables, would rise relative to international prices. If this is the more realistic interpretation of history, it places much more weight on the role of the economics profession in contuning to expound the virtues of governments staying out of markets that would otherwise function well.

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