DISCUSSION PAPER SERIES

No. 9221

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INTERNATIONAL TRADE AND REGIONAL ECONOMICS

Centre for Economic Policy Research

www.cepr.org

Available online at: **www.cepr.org/pubs/dps/DP9221.asp**

ISSN 0265-8003

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Discussion Paper No. 9221
November 2012

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CEPR Discussion Paper No. 9221

November 2012

ABSTRACT

Political Economy of Public Policies: Insights from Distortions to Agricultural and Food Markets*

The agricultural and food sector is an ideal case for investigating the political economy of public policies. Many of the policy developments in this sector since the 1950s have been sudden and transformational, while others have been gradual but persistent. This article reviews and synthesizes the literature on trends and fluctuations in market distortions and the political-economy explanations that have been advanced. Based on a rich global data set covering a half-century of evidence on commodities, countries, and policy instruments, we identify hypotheses that have been explored in the literature on the extent of market distortions and the conditions under which reform may be feasible.

JEL Classification: D72, D78, F13, F14, N50, Q17 and Q18
Keywords: distortions to agricultural markets and economics of farm and food politics

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*We thank Signe Nelgen for assistance with the figures and tables.

Submitted 12 November 2012

1. Introduction

Throughout the world and over much of history, the agricultural and food sector has been subjected to some of the most heavy-handed governmental interventions. The economic importance of those interventions to the wider community escalates periodically, and now is such a time. As the World Trade Organization (WTO) struggles to conclude the Doha Round of multilateral trade negotiations, agricultural policy reform is once again a contentious issue. In 2004, existing agricultural and trade policies accounted for an estimated 70 percent of the global welfare cost of all merchandise trade distortions, even though the agricultural sector contributes only 6 percent of global trade and 3 percent of global GDP (Anderson, Cockburn, and Martin 2010, Table 2.3).

Agricultural policies have been newsworthy since 2008 as food prices have spiked upward. Biofuel policies have partly caused these price spikes, and in turn, the effects of biofuel policies have been exacerbated by the trade-policy responses of numerous countries at a time of low global grain stocks. Responses by food-surplus developing countries typically have involved restrictions on exports, while those by food-deficit developing countries have involved a lowering of import barriers. Policymakers' ostensible motivation has been to prevent a decline in national food security; each country has aimed to protect its domestic consumers (and indirectly, to protect government officials currently in power). Together, however, these actions have amplified international price spikes so that each country's measures have harmed other countries' consumers (Martin and Anderson 2012; Carter et al. 2011).Thus, although trade-related policy interventions are less newsworthy than price and supply fluctuations, they may have more influence on long-run economic growth, investment incentives, and the distribution of global welfare.

For advancing economies, the most commonly articulated reason to restrict food trade has been to protect domestic producers from import competition as they come under competitive pressure to shed labor. However, such measures harm not only domestic consumers and exporters of other products but also foreign producers and traders of food products. Accordingly, these measures also diminish national and global economic welfare. For decades, agricultural protection and subsidies in high-income (and some middle-income) countries have depressed international prices of farm products (Tyers and Anderson 1992; Rausser and de Gorter 2012), lowering the earnings of farmers and associated rural businesses in developing countries. The Haberler (1958) Report to GATT forewarned that such distortions might increase, and indeed, they did rise between the 1950s and the early 1980s.

Changes in food prices also create winners and losers among the poor. Recent spikes in food prices have led to greater emphasis in the literature on the impact of food prices—and thus of rich countries' agricultural policies—on global poverty (e.g., Swinnen and Squicciarini 2012). It has been argued for decades that such distortions have added to global inequality and poverty, since three-quarters of the world's poorest people depend, directly or indirectly, on agriculture as their major source of income (World Bank 2007). Accordingly, protectionist policies of high-income countries have been partly responsible for international income inequality and poverty in developing countries (Anderson, Cockburn, and Martin 2010).

Of course, the agricultural policies of rich countries have not been motivated by their effects on global poverty but instead by their domestic concerns. But it is important to observe that developing countries' policies have further depressed the price incentives for their farmers, thus exacerbating the deleterious effects of the richer countries' narrow focus on domestic consumers. The governments of many developing countries have taxed their farmers more heavily than producers in other sectors. A well-known example is the taxing of

exports of plantation crops in post-colonial Africa (Bates 1981). Many developing countries have also chosen to overvalue their currency and to pursue an import-substituting industrialization strategy by restricting imports of manufactures. Together, these measures have indirectly taxed producers of other tradable products in developing economies, most of whom have been farmers (Krueger, Schiff, and Valdés 1988; 1991). In other words, policies in developing countries have not been motivated by a desire to alleviate poverty in their rural areas (where most of the world's poor reside) any more than have been the policies of developed countries. The resulting disarray in world agriculture, as D. Gale Johnson (1973) described it in the title of his seminal book, has manifested itself in overproduction of agricultural products in high-income countries and underproduction in low-income countries. This disarray also means that there has been less international trade in such products than would have been the case under free trade. The end result is thinner and thus more volatile markets for these weather-dependent products.[2]

In developed countries, agricultural policy remains disproportionately important compared to the relatively small shares of the upstream agriculture component in GDP and employment. For example, the Common Agricultural Policy (CAP) continues to absorb 40 percent of the entire EU budget. Agricultural and farm employment and output in developed countries has declined markedly, yet agriculture and agricultural policy are still such a priority in these countries' trade negotiations that they appear willing to let the current round of WTO negotiations—on which the future growth of global income and the trade of all goods and services depend—collapse over disputes on agricultural-policy reforms. To be sure, symptoms of widespread policy and international governance failures can be found in both developing and developed countries. Although economists have argued against agricultural subsidies and trade barriers for decades (e.g., Irwin 2002), vested interests' political forces continue to dominate domestic agricultural policy in both rich and poor countries.

The objective of this article is to review and synthesize the literature that investigates trends and fluctuations in agricultural- and food-policy distortions as well as the political-economic theories that have been advanced to explain such distortions. We identify hypotheses that have been explored in the literature concerning the extent of price distortions and the potential for the adoption of sustainable unilateral and multilateral policy reforms in developed, developing, and transition economies. We emphasize that although many countries have recently begun to adjust their agricultural and trade policies, these reforms have not kept up with the effects of globalization in the non-agricultural sectors of the world economy. We examine the extent to which these more-recent agricultural-policy reforms have succeeded in reversing the prior era's policy distortions, and we explore the sustainability of these reforms.

Throughout our assessment, we emphasize the potential empirical insights that are embedded in a global five-decade database of evidence recently compiled by the World Bank. This database updates and dramatically expands our understanding of the distortions to market incentives across the globe. The recently improved political-economic conceptual lenses, combined with the new global database, allow the empirical testing of a rich menu of hypotheses about patterns across countries, commodities, and policy instruments.

Recent political-economic frameworks have focused on issues beyond the structural economic factors on which most earlier research concentrated. [3] These conceptual frameworks

[2] Using a stochastic model of world food markets, Tyers and Anderson (1992) found that instability of international food prices in the early 1980s was three times greater than it would have been under free trade in food products.

[3] Our paper is a successor to the paper published by *JEL* by Binswanger and Deininger (1997). It makes three additional contributions. First, we cover the full spectrum of countries (not only developing countries). Our empirical evidence covers countries that account for 92 percent of the world's population and agricultural production and 96 percent of global GDP. Second, our paper covers agricultural price- and trade-distorting

have focused on micro-foundations for political and economic decision making by establishing stronger links between theory and empirics, emphasizing forces such as governance structures, political institutions, and ideology. These developments include extensions of the Grossman and Helpman (1994; 1995) model on political economy of trade policies: work by Acemoglu and Robinson (2001; 2006) on the interactions between institutions and policymaking; applications of Baron and Ferejohn's (1989) model of decision-making rules and the role of agenda setting; work by Roland (1994; 2000) on the political economy of transition; by Shleifer (1997) on the role of bureaucracies and corruption in policymaking; by Persson and Tabellini (2000; 2003) on the political economics of fiscal policy and macro-economic policy and on the role of constitutions; and by Rausser, Swinnen, and Zusman (2011) on how integrating the four major analytical dimensions of public-policy analysis (incidence, mechanism design, political economy, and governance structures) can facilitate the separation of the public interest from specialized interests in any attempts to sustain policy reforms conditioned on political-economic equilibria.

In our presentation, we first document the key data and stylized facts that have emerged from the new global five-decade database. We present a series of tables and figures that show quantitative indicators of the extent of policy interventions, as well as statistical estimates of the degree of price distortion. We then review the political-economic hypotheses that have been explored in the literature to explain these patterns and assess the empirical evidence that has emerged. Finally, we draw implications from this empirical evidence and identify directions for new research, with an emphasis on the potential for agricultural-policy reforms.

2. Stylized Facts

Many agricultural- and trade-policy developments of the past half-century have happened quite suddenly and been transformational. Such events include decolonization in Africa and elsewhere around 1960; the creation of the Common Agricultural Policy (CAP) in Europe in 1962; the introduction of flexible exchange rates from the 1970s; liberalization, deregulation, privatization, and democratization in many countries from the mid-1980s; the opening of markets in China in 1979, in Vietnam in 1986, and in Eastern Europe (following the fall of the Berlin Wall) in 1989; and the demise of the Soviet Union in 1991. More subtle are the influences of policies that change gradually in the course of economic development, as incomes grow and comparative advantages evolve. But what do the quantitative measures of distortions and reforms reveal?

Empirical indicators of agricultural price distortions (called Producer Support and Consumer Subsidy Estimates, or PSEs and CSEs) have been provided consistently for 25 years by the Secretariat of the OECD (2011) for its thirty member countries. However, the OECD provides no comprehensive time-series rates of assistance to producers of non-agricultural goods to compare with the PSEs, nor of what took place in those advanced economies during earlier decades. Data for these earlier decades from developed economies is needed in order to assess how various countries' policies evolved during stages of development similar to those of today's middle-income countries. As for developing countries, almost no comparable time-series estimates were generated in the two decades

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policies more thoroughly (while giving somewhat less attention to factor market distortions). And third, we place particular emphasis on the substantial body of theoretical and empirical research that has been published during the past fifteen years (that is, since the most recent citations in Binswanger and Deininger).

following the seminal work of Krueger, Schiff, and Valdés (1988; 1991), which covered between 15 and 25 years prior to 1985 for just 17 developing countries.[4]

Fortunately, a new database of agricultural distortions has been developed recently by the World Bank (Anderson and Valenzuela 2008, updated and extended by Anderson and Nelgen 2012b). This new data complements and extends the OECD's PSE/CSEs and the Krueger, Schiff, and Valdés studies. It builds on those earlier databases by providing similar estimates for other significant (including many low-income) developing economies, by estimating new and more comprehensive policy indicators, and by providing measures of price distortions also for non-agricultural tradables.

The new World Bank database includes estimates for 82 countries, which together account for between 90 and 96 percent of the world's population, farmers, extreme poor living on less than $1.25 per day, agricultural GDP, and total GDP. The sample countries also account for more than 85 percent of agricultural production and employment in each of Africa, Asia, Latin America, and the transition-economies region of Europe and Central Asia, as well as for all of agricultural production and farm employment in OECD countries. In the data set, the spectrum of per-capita incomes ranges from some of the poorest countries (Zimbabwe and Ethiopia) to some of the richest (Norway). Not all countries had annual data for the entire 1955–2010 period, but the average number of years covered is 45 per country. (The full list of developing countries by region, plus lists of the transition economies and high-income countries in the data set, is provided in the Appendix Table.)

Nominal Rates of Assistance (NRAs) and Consumer Tax Equivalents (CTEs) are computed for 75 different farm products, with an average of almost eleven per country. This product coverage represents about 70 percent of the gross value of agricultural production in each of the focus countries and just under two-thirds of global agricultural production, valued at undistorted prices over the period covered. Of the world's 30 most valuable agricultural products, the NRAs cover 77 percent of global output (ranging from two-thirds for livestock to three-quarters for oilseeds and tropical crops and five-sixths for grains and tubers). These products represent 85 percent of global agricultural exports.

Such comprehensive coverage of countries, products, and years offers the prospect of generating a reliable picture of long-term trends in policy indicators for individual countries and commodities, as well as for country-groups, regions, and the world as a whole. This data set reveals distinct patterns of price distortions across countries and over time, only some of which has the literature to date identified and explained. These patterns are summarized here under four headings: sectoral distortion variation across countries; intrasectoral variation across products; year-to-year variations in rates of distortion; and policy-instrument choices. Before presenting estimates for each of these pattern categories, we first present the price-distortion measures used.

2.1. Measures of Price Distortions

Historically, agricultural and non-agricultural trade measures (border taxes and protectionist Non-Tariff Barriers, or NTBs), together with multiple exchange rates, have distorted product prices more commonly than have trade subsidies, direct domestic producer or consumer subsidies, or domestic taxes or quotas that alter product or input prices. However, in high-income countries since the 1970s, export subsidies have grown in importance; and, since the

[4] An exception is a set of estimates of nominal rates of protection for key farm products in China, India, Indonesia, and Vietnam since 1985 by Orden et al. (2007). The OECD (2009) also has released PSEs for Brazil, China, and South Africa, as well as several Eastern European countries, which have since been updated to 2010 (OECD 2011).

1980s, domestic support measures that (to varying extents) are decoupled from production decisions have begun to play a larger role. Furthermore, since the inception of the WTO in 1995, most NTBs have been converted to tariffs. In many countries, however, those tariffs have been legally bound at well above applied rates, so that such countries have been able to continue to vary border measures as international prices or domestic supplies have fluctuated from year to year.

The Nominal Rate of Assistance (NRA) measures distortions imposed by governments that create a gap between current domestic prices and the prices that would exist under free markets. Under the "small-country" assumption, this rate has been computed for each commodity product as the percentage by which government policies have raised gross returns to farmers above what they would have been had the government not intervened (or the percentage by which government policies have lowered gross returns, if NRA<0). The rate includes the output-price-altering equivalent of any product-specific input subsidies or taxes.[5] A weighted-average NRA for all available products is derived using the value of production at undistorted prices as product weights. To this NRA for available (covered) products is added a "guesstimate" of the NRA for noncovered products (on average, about 30 percent of the total in value terms), along with an estimate of the NRA from non-product-specific forms of assistance to (or taxation of) farmers.

Since the 1980s, some high-income governments have also provided decoupled assistance to farmers. Because that support, in principle, does not distort resource allocation, its NRA has been computed separately and is not included for comparison with the NRAs for other sectors or for agriculture in developing countries. Each year, each covered commodity's industry is classified as either import-competing, as producing exportables, or as producing a nontradable. The aggregate non-covered industry group is also subdivided into these three categories. This classification allows the generation each year of the weighted-average NRAs for exporting versus import-competing producers.

Also reported is a production-weighted average NRA for non-agricultural tradables, so that this rate may be compared to the rate for agricultural tradables via the calculation of a Relative Rate of Assistance (RRA).[6] The latter is defined in percentage terms as:

$$RRA = 100*[(100+NRAag^t)/(100+NRAnonag^t)-1]$$

Here, $NRAag^t$ and $NRAnonag^t$ are the percentage NRAs for the tradable parts of the agricultural (including noncovered) and non-agricultural sectors, respectively.[7] (Note that if both of these sectors are equally assisted, the RRA is zero.) This measure is useful, since if it is below (or above) zero, it provides an internationally comparable indication of the extent to which a country's sectoral policy regime has an anti- (or pro-) agricultural bias.

The cost of government policy distortions in terms of resource misallocation tends to be greater as the degree of substitution in production increases. In the case of agriculture,

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[5] The NRA differs from the OECD's PSE in that the PSE is expressed as a percentage of the distorted rather than the undistorted price. Hence, the PSE is typically smaller than the NRA, and it cannot exceed 100 percent.

[6] The RRA recognizes that farmers are affected not just by prices of their own products but also by the incentives faced by non-agricultural producers bidding for the same mobile resources. That is, it is *relative* prices, and hence *relative* rates of government assistance, that affect incentives to producers. Nearly eight decades ago, Lerner (1936) advanced his Symmetry Theorem to prove that in a two-sector economy, an import tax has the same effect as an export tax. This result also holds for a model that includes a third sector producing only nontradables (Vousden 1990).

[7] K. Anderson, Kurzweil, et al. (2008) explain that the NRA estimates for non-agricultural tradables are a weighted average of assistance to manufacturing and to non-farm primary production, using sectoral GDPs as weights. This approach thus avoids the complication of estimating assistance to the services sectors (many of which involve governmental and other nontradable activities). For most countries, industrial import tariffs and the tariff equivalent of quantitative import restrictions dominate this measure. Insofar as some developing-country case studies had access only to tariffs, K. Anderson et al. understate the denominator of the RRA formula and hence, the size of the negative RRA for such countries.

which involves the use of land that is sector-specific but transferrable among farm activities, the greater the dispersion of NRAs across industries within the sector, the higher will be the welfare cost of those market interventions. As a result, a measure of the dispersion of the NRA estimates across the covered products is also generated for each country.

Following J. Anderson and Neary (2005) and Lloyd, Croser, and Anderson (2010), we also report from the database a Welfare Reduction Index (WRI) and a Trade Reduction Index (TRI). The former measure recognizes that the welfare cost of a price distortion imposed by a government is related to the square of the price wedge and thus is positive, regardless of whether the government's policy favors or hurts producers in a particular sector. The TRI measures the extent to which import protection or export taxation reduces the volume of trade. In our analysis, TRI is the percentage uniform trade tax which, if applied equally to all agricultural tradables, would generate the same reduction in trade volume as the actual intrasectoral structure of distortions to domestic prices of such tradable goods. Similarly, the WRI is the percentage uniform trade tax 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 domestic prices of these tradable goods.

The empirical measures outlined above allow us to ferret out key stylized facts. In our presentation, we divide the world economy into high-income countries (Western Europe, the United States/Canada, Japan, and Australia/New Zealand); three emerging-country regions (Africa, Asia, and Latin America), which we refer to as "developing countries"; and European economies that were in transition from socialism in the 1990s, plus Turkey and Israel.[8] When the last of these three groups is not shown explicitly in the Figures and Tables, its economies are included with those of the other high-income countries.

2.2. Sectoral Distortion Variation

Historically, the higher a country's per capita income, the higher have tended to be its nominal—and especially relative—rates of assistance to agriculture (NRAs and RRAs). More generally, policy regimes, on average, have had a pro-agricultural bias in high-income countries and an anti-agricultural bias in developing countries. However, since the 1980s, both the anti-agricultural policy bias in developing countries and the pro-agricultural bias in high-income countries have diminished, and the two groups' average RRAs have converged toward zero (Figures 1 and 2).

In the case of developing countries, it is clear from Figure 2(a) that the rise in their average RRA is due as much to a decline in assistance to nonfarm sectors (especially cuts to manufacturing protection) as to declines in agricultural disincentives (especially cuts to export taxes). However, the extent and speed of convergence vary across regions. Among developing countries, convergence has been greatest for Asia and least for Africa; among high-income countries, it has been greatest for the European Union and almost non-existent for other Western European countries (non-EU WE). The sole exception is the dip for most countries in 2005–10, when international food prices rose steeply (Figure 3).[9] For EU members, the RRA declined from an average of 77 percent in the 1980s to 11 percent in 2005–10. Consequently, the trade- and welfare-reduction indexes of the two main country-

[8] There are no other Middle East countries in the data set. Sub-Saharan Africa refers to Africa excluding the only two North African countries in the set, namely, Egypt and Morocco (the subregion's two largest economies).

[9] Australia and New Zealand are exceptional in that they had an anti-agricultural policy bias for most of the twentieth century because their manufacturing tariff protections far exceeded agricultural supports. Both sectors' distortions were reduced in the final third of the century and are now close to zero (K. Anderson, Lloyd, and MacLaren 2007).

groups have traced an inverted-U shape, rising to the mid-1980s before more than halving since then (Figure 4).

The averages reported in Figures 1-4 hide the fact that both the level and rate of change in distortion indicators still vary considerably across countries. National RRA estimates for 2005–09 varied from around -40 percent for several African countries to around 100 percent for a few high-income countries (Figure 5). Clearly, much could be gained from international relocation of production and consumption to remove these cross-country differences.

Over the fuller time series from 1955 to 2007, the extent to which RRAs vary at any level of per capita income or comparative advantage is substantial (Figure 6). Based on regression analysis, those two variables, per capita income and comparative advantage, account for 59 percent of the variation in RRAs globally. However, the adjusted R^2 is only 0.42 for high-income countries, 0.33 for Latin America, and 0.07 for Africa (Table 1). These differences suggest that the causes that underlie RRA changes may vary significantly across regions.

The adjusted R^2 for high-income countries is lower for the post-1985 period than for the pre-1985 period, but only slightly so (0.40 vs. 0.47). This lack of significant change is consistent with the observation that among high-income countries, only those in the European Union have experienced significant declines in RRAs in the four half-decades to 2004 (Figures 3(b) and 7). For the developing-country regions, by contrast, the adjusted R^2 is slightly higher post-1985 than pre-1985. This small increase is consistent with the slightly steeper rise in these countries' average RRA from the 1980s (Figure 2(a)).

Of particular note is that the average RRA for developing countries, which converged toward zero from the 1980s, did not stop at zero but "overshot" after the early 1990s. For Korea and Taiwan, this evolution to a positive RRA occurred in the early 1970s. For the Philippines, it happened in the latter 1980s, and for China, India, Indonesia, and Malaysia, it happened in the first decade of the current century (Table 2). We present a mapping of those changes against per capita income in Figure 8.

2.3. Intrasectoral Distortion Variation

Within a country's agricultural sector, whether the country is developed or developing, product NRAs vary widely (Figure 9). Some commodity product NRAs are positive and high in almost all countries (sugar, rice, and milk). Others are positive and high in developed economies but highly negative in developing countries (most noticeably, cotton). Still other product NRAs are relatively low in all countries (feed grains and soybeans as inputs into intensive livestock; pork and poultry as standard-technology industrial activities). The variability of NRAs across commodities around the overall national sectoral average NRA was slightly lower in the most recent decade than it was in the 1960s and 1970s for the world as a whole. But the picture is mixed: NRA variability was substantially lower only for Western Europe and Australia/New Zealand and somewhat lower for Latin America. In contrast, NRA variability was a bit higher for Africa and North America and substantially higher for Asia including Japan (Table 3). The failure of global variability across commodities to decrease significantly suggests that the movement of the mean-NRA toward zero has not been accompanied by a fall in the variance across commodities within the sector. This pattern explains why the WRI in Figure 4(b) is still well above zero, since the welfare cost of a sector's policy regime is greater as commodity NRAs within that sector are more dispersed. As is the case for variations in sectoral distortion across countries, much could be gained from intra-country resource re-allocation within the agricultural sector and from the altered consumption patterns that would emerge from removing cross-product differences.

A crucial component of the NRAs' product dispersion is that the agricultural-policy regimes across countries tend to have an anti-trade bias. This bias has declined over time for the developing-country group, mainly owing to declines in agricultural-export taxation, and despite growing agricultural-import protection. For the high-income group, the anti-agricultural trade bias has shown less of a downward trend over time, because agricultural export subsidies rose and then declined, as did import protection (Figure 10). These factors explain the smaller decline in the TRI for high-income versus developing countries (Figure 4[a]).

2.4. Year-to-Year Variation

Around the long-run trend for each country, we see much fluctuation from year to year in individual product NRAs. This tendency has not diminished since the mid-1980s for developing countries, and it has even increased for high-income countries (Table 4). The negative correlation of NRA country commodities with movements in the international price of the product in question is largely responsible for this pattern. As shown in Table 5, on average, barely half of the change in an international price is transmitted to domestic markets within the first year.

As noted earlier, governments are keen to prevent domestic prices from being affected by spikes in international prices. In both agricultural-exporting and agricultural-importing countries, and in high-income as well as developing countries, large changes in nominal assistance coefficients (NAC = 1+NRA)/100) occur during periods of international price spikes—whether up, as in 1974 and 2008, or down, as in 1986 (Table 6).

2.5. Relative Contributions of Policy Instruments

Across countries and time periods, governments have used a broad array of policy instruments. They include distortions to input markets (largely subsidies, plus controls on land use), production quotas, marketing quotas, target prices, price subsidies or taxes in output markets, and especially, border measures that directly tax, subsidize, or quantitatively restrict international trade. Meanwhile, public agricultural-research investments in 2000–04 amounted to less than 2 percent of the gross value of agricultural output at undistorted prices in high-income countries. In developing countries, an even smaller percentage (1 percent) of public-sector investment has been devoted to research and development (Anderson 2009, Table 1.11).

On an expenditure-flow basis, country expenditures on research public-good investments pale in comparison to losses resulting from commodity price distortions. The major vehicles responsible for these losses are trade-policy instruments such as export and import taxes and subsidies or quantitative restrictions, along with multiple exchange rates. These trade-policy instruments account for no less than three-fifths of agricultural NRAs globally. As a result, they are responsible for an even larger share of global welfare cost and agricultural WRIs.[10] In contrast, internal domestic agricultural policies that directly subsidize or tax outputs and inputs contribute only minimally to NRAs. However, from a domestic political viewpoint, in some countries it is not very meaningful to separate internal redistributive policy instruments from border measures, since the latter are often implemented in order to rationalize the former (Rausser 1995).

[10] This is because trade measures also tax consumers, and welfare costs are proportional to the square of a trade tax.

Given the dominance of trade-distorting policy instruments, what does the World Bank panel data reveal with respect to policy reforms? Figure 10(a) shows the phasing out of export taxes by most developing countries. This reform has been particularly striking, although it has been reversed in a few developing countries—most notably, in Argentina following a major devaluation in late 2001 (Sturzenegger and Salazni 2008). In sharp contrast, as assistance to import-competing agricultural subsectors of developing countries has grown (Figure 10[a]), the relative importance of import taxes has increased dramatically (Figure 11). In Western Europe, the growth of decoupled, more-direct income-support measures, along with the virtual abolition of all support measures in Australia and New Zealand, reveals a far different pattern than in high-income countries in East Asia, where border-measure supports continue to dominate (Figure 12).

Input subsidies are a relatively minor component of most countries' assistance to farmers. But they lingered on in Australia and New Zealand when most other forms of assistance were being phased out, and such subsidies have also remained about one-fifth of the total NRA in the United States (Anderson 2009, Chaps. 4–5). With two notable exceptions, input subsidies are even less common in developing countries, where funds for such direct subsidies are scarcer. The important exceptions are India and Indonesia. In India, input subsidies contributed 7 to 9 percentage points to the agricultural NRA in the 1990s and 10 points in 2000–04. In Indonesia, such subsidies have contributed 2 to 4 percentage points to the agricultural NRA since 1990. (They also contributed from 5 to 9 points in the 1970s and 1980s—even at times when the overall agricultural sector of those countries had a negative NRA.)

Up to the 1980s—and in some cases the early 1990s—it was quite common for developing-country governments to intervene in the market for foreign exchange. Such interventions added to the anti-trade biases that were targeted at tradable sectors, including agriculture. However, these interventions largely disappeared by the mid-1990s, as initiatives took hold to reform overall macroeconomic policy. In China, for example, trade taxation associated with the country's dual-exchange-rate system accounted for almost one-fifth of the (negative) RRA in the 1980s. However, since the mid-1990s, that system has been abolished (Huang et al. 2009).

As governments seek to prevent domestic prices from being affected by periodic spikes in international prices, large changes in the relative importance of different policy instruments occur. This is evident when we examine the estimated contributions to total agricultural TRIs of various policy instruments during the upward price spikes around 1974 and 2008 and the downward spike around 1986. In some cases, trade taxes even temporarily disappeared; in other cases, trade subsidies emerged or expanded. Table 7 reveals that even when aggregated over all developing or high-income countries, the contribution of export taxes and import subsidies to the overall TRI rises and falls with international prices, while the opposite is true of import taxes and export subsidies.

2.6. Summary

From the analysis of the data, it is clear that major differences in public-policy distortions in food and agricultural markets exist among countries, among agricultural subsectors within countries, among policy-instrument choices, and over time within a particular country. We observe important changes in sectoral distortions over time. Developing countries, on average, are gradually phasing out anti-agricultural policies, and some are increasingly protecting their import-competing farmers. The evolution in high-income countries is mixed: some high-income countries are reducing assistance to farmers, while Australia and New Zealand have also greatly reduced manufacturing protections that had been indirectly

harming agricultural producers. But in all high-income countries, the relative importance of various farm-policy instruments has changed significantly, and the contribution of price-distorting measures has declined.

Some important stylized facts apply with little differentiation over time or between high-income and developing countries. The first, already mentioned, is the propensity for governments of both agricultural-exporting and agricultural-importing countries to insulate their domestic markets from international price fluctuations despite globalization tendencies elsewhere in the economy (Tables 6 and 7). The second stylized fact is that a strong anti-trade bias for agricultural industries persists (Figure 10), even though significant market-opening policy reforms have been instituted over the past few decades. This persistent anti-trade bias is also reflected in the stylized fact that the relationship between RRAs and agricultural comparative advantage is negative (Figure 6[b]). The third general stylized fact is the persistence of the individual dispersion in commodity assistance within the agricultural sectors of most countries (Table 3).

3. Explanation of the Stylized Facts: A Political-Economy Lens

The lens of political economy provides a framework for identifying the causal mechanisms behind the variations in policy interventions over time and across sectors, individual commodities, and alternative policy instruments. It also allows us to draw implications for agricultural policy reform. In short, political and economic forces influence the strategic interactions among various interests in any public policy–making process. Various schools of thought in political economy[11] have provided insights into the conflicts between the public interest and special interests that naturally emerge in the design and implementation of public policies, including those that affect agricultural and food markets. Research in this field and many applications to agricultural and food policies have shown how various forces influence policy decisions and their implementation. Included among these factors are income distribution, economic structure, governance structures (including domestic political institutions and international organizations), ideology, and political organization.

Armed with the rich political-economic formulations that have emerged over the last few decades, it is possible to explain several of the stylized facts presented in Section 2.[12] They include not only the general tendency of countries in the course of their economic development to gradually move from taxing to subsidizing agriculture but also to counter international price –, to adopt policies with an anti-trade bias, to adopt new types of instruments, and, in some high-income countries, to reduce agricultural production assistance to farmers.

[11] The historical origins of the political-economic lens can be traced back to the original architects of the economics discipline, namely Adam Smith, Mill, Wicksell, and Marshall, none of whom was a stranger to political-economic analysis. Modern political-economic analysis was initiated by Anthony Downs with his seminal 1957 book, *An Economic Theory of Democracy.* Many publications have surveyed the political-economic literature during the last few years. General reviews of the literature have been presented by Mueller (2003) and Weingast and Whitman (2006). For reviews from leading economic journals focusing on game-theory formulations since the year 2000, the surveys of Dewan and Shepsle (2008a; 2008b) are invaluable. More specific reviews are available for trade policy (Grossman and Helpman 2001; 2002; Rodrik 1995); fiscal and monetary policy (Persson and Tabellini 2000); the relationship between governance structures and fiscal and growth-promoting policies (Persson and Tabellini 2003); and agricultural policies (de Gorter and Swinnen 2002; Rausser and Goodhue 2002).

[12] For a review and assessment of six alternative schools of political-economic thought, see Rausser, Swinnen, and Zusman 2011, Chap. 1.

3.1. Income Distribution and Countercyclical Bias

Distortions in agricultural and food markets result from policies designed to alter the resulting distribution of income from what would otherwise emerge under unfettered market outcomes. As a result, the "without-policy" income distribution plays a major role in policy decisions. Income distribution may change for structural or cyclical reasons. For example, overall economic development is typically associated with some sectors growing and some declining faster than others. Growth and decline of specific sectors affect the intersectoral distribution of income. In addition, agricultural markets and food prices fluctuate around longer-term trends, causing important short-term changes in income and welfare distribution. Historically, this has induced governments to intervene in order to (partially) offset these market developments. In particular, as we have seen in section 2, governments continue to intervene in order to insulate their domestic agricultural markets from international price fluctuations. This tendency involves increasing import tariffs or export subsidies when market prices decline and suspending import tariffs or export subsidies (or increasing export taxes) when market prices rise. The persistence of such policy responses is particularly evident when international prices for staple foods spike. At such times, both exporting and importing nations alter their trade taxes (Tables 6 and 7), but in opposite directions.[13]

Change in incomes in different sectors (or between different groups in society) creates political incentives—both on the demand (farmers' and consumers') side and the supply (politicians') side—to exchange government transfers for political support. When farm incomes from agricultural markets decline relative to producers' incomes in other sectors, farmers will seek non-market sources of income, such as government support. They do so either because the return to investment is greater from lobbying activities than from market activities, or because the willingness to vote for and support politicians grows as the political rents that are generated increase.

The nature of the mechanism through which these changing political incentives operate has been modeled in various ways. For example, Swinnen (1994) has used a politician-voter interaction model, in which differences in marginal utility determine political support and induce politicians to implement policies to counter market developments.[14] Others focus on interest groups' unequal ability to appropriate the benefits of lobbying (Baldwin and Robert-Nicoud 2007). In an expanding industry with low barriers to entry, policy-created rents attract new entries that erode those rents (Krueger 1974). In declining industries, this is not the case. Since the sunk costs of market entry create quasi-rents, profits in declining industries can be raised without attracting entry as long as the level of quasi-rents does not rise above a normal rate of return on the sunk capital. The result is that losers invest more resources in lobbying activities. Still other economists, such as Freund and Özden (2008) and Tovar (2009), focus on the importance of aversion to loss in determining political reactions in order to explain why in some countries, declining sectors such as agriculture receive support and why governments alter their trade restrictions in response to volatility in

[13] Thus, such events exacerbate the international price spike. They cause large transfers between food-exporting and food-importing countries by amplifying changes in the terms of trade, favoring food exporters during upward price spikes and food importers when prices slump. Since each country group's action reduces the capacity of the other country group to insulate its domestic markets, little stands to be gained from such measures—and much stands to be lost (at least for one group each time, via the terms of trade). Multilateral agreements to desist from such insulating actions have been elusive. Bound tariffs were agreed to in the Uruguay Round Agreement on Agriculture, but tariff bindings were set well above applied rates for many countries. Meanwhile, food-export subsidies are still permitted, and export taxes and import subsidies remain undisciplined by the WTO.

[14] Swinnen's work builds on the earlier notions of a conservative social welfare function (Corden 1997, 74–76) and of support to senescent industries (Hillman 1982).

international prices of food products. In their framework, governments support groups or industries that would face significant *short-term* loss from a temporary move in prices away from trend.

3.2. Elimination of Disincentives in Developing Countries

The second stylized fact is the evolution of agricultural versus non-agricultural governmental assistance in developing countries. This trend is reflected in the observed correlation between RRAs and economic development: in many countries, as the economy has developed, the RRA has risen over time. This correlation is particularly strong for developing countries as a group (and especially for Asia's rapidly emerging countries) as well as for Australia and New Zealand. This relationship is sourced with the gradual decline in manufacturing protection and the phasing out of developing countries' multiple exchange rates as well as the phasing out of explicit taxation of agricultural exports. As we see from Figures 10(a) and 11, export taxation (including the component contributed by multiple exchange rates) persisted for decades, to the mid-1980s, and then almost disappeared within the next ten years. (Note also that some countries later reversed this reduction in disincentives, most notably Argentina in 2002 with the re-introduction of export taxes on agricultural products.) Overall, the observed correlation between RRAs and economic development can be explained largely by fundamental economic forces, including growth, structural adjustments, information costs, and changes in governance structures.

3.2.1. Economic Growth, Restructuring, and Political Incentives

Economic growth typically coincides with a rise in urban-rural income disparities, as growth in industry and services outpaces growth in the agricultural sector, whose specific assets make it slow to adjust. This income gap creates incentives for agricultural entities to demand—and politicians to supply—policies that redistribute income in order to reduce that income gap. Moreover, the structural changes that accompany economic development alter the costs and benefits of raising the RRA and thus, adjust the political-economic equilibrium. Such shifts in the equilibrium can and have led countries to move gradually from taxing to subsidizing agriculture relative to other tradable sectors.

Economic structural factors other than income distribution affect political incentives for setting agricultural policies. Several theoretical studies explain how differences (or changes) in structural conditions coincide with economic development, or are associated with different commodities for a given level of development. Market structures affect the rents generated and the costs and benefits of policy distortions to various interest groups, and thus the incentives for political activities to be undertaken in order to influence governments (Gardner 1983, 1987; Anderson 1995; Rausser 1982, 1992; Swinnen 1994). These costs and benefits, in turn, determine the government's political incentives. As a result, they help explain why RRAs may be correlated with economic development.

The real income–distributional effects of a policy that alters the domestic price of food products relative to non-food tradable products is vastly different in a poor agrarian economy than in a rich industrial economy. In a poorer economy, most workers are agricultural, and laborers (especially nonfarm laborers) spend a large share of their income on food. Accordingly, the benefit to industrialists of a border tax—regardless of whether it targets manufacturing imports or food exports—is proportionately far greater than the loss it imposes on farm income. By contrast, in an advanced industrial economy, in which a lower percentage of workers labor on farms and in which workers generally spend a smaller share of their income on food, a rise in the relative price of farm products benefits farm households proportionately far more than it harms non-farm households and industrialists (Anderson

1995). The per-unit political cost of increasing farm incomes by raising the RRA thus decreases as the economy becomes less agrarian. In other words, even though the share of farmers in the voting population declines, less opposition to protecting farmers arises when there are fewer of them. Studies by de Gorter, Nielson, and Rausser (1992) and Swinnen (1994) show that under plausible assumptions, the second of those two effects dominates.

Ample evidence supports these theoretical predictions. Moreover, these empirical findings are consistent across (a) empirical, mostly cross-sectional, studies on agricultural protection in the 1980s and 1990s that use reduced-form econometric models; (b) studies using long-term time-series data and econometric analyses; and (c) recent empirical studies using new data sets.[15]

3.2.2. Change in Political Institutions

Several developing countries have experienced democratization over the past three decades. Theoretical formulations have been advanced to explain how democratization will affect public policies.[16] Models based on the median-voter theorem predict that democracies tend to redistribute from the rich to the poor. This is expected in democracies because the distribution of political power (measured by votes) is typically more equal than the distribution of income and wealth (Alesina and Rodrik 1994; McGuire and Olson 1996; Persson and Tabellini 1994). Similarly, democratic regimes could lead to economic-policy reforms if these reforms created more winners than losers (Giavazzi and Tabellini 2005).

The implications for agricultural policies are not straightforward. The very factors that make it difficult for farmers to organize politically (such as their large geographic dispersion) render them potentially very powerful in electoral settings (Bates and Block 2010; Varshney 1995). Since greater insulation of decision-makers implies that they can follow their personal preferences to a greater extent in selecting policies, their ideologies or other types of preferences are a key variable. However, while it is intuitively obvious that when decision-makers are more insulated from repercussions, they can follow their preferences to a greater extent, this likelihood, by itself, has little predictive power in the absence of specific information about those preferences. Moreover, applying a simple left-/right-wing model to agricultural policy is not straightforward, since higher food costs that result from agricultural protection adversely impact both urban workers (left-wing interests) and industrial capitalists (right-wing interests). Hence, rulers who support either labor or capital should oppose agricultural protection—as they did historically in Europe (Kindleberger 1975; Schonhardt-Bailey 1998; Findlay and O'Rourke 2007).[17] One implication, however, is that if dictatorial leaders are less constrained in setting policies, all else constant, there should be more variation in observed policy choices under dictatorial regimes than under democracy.[18]

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[15] Type (b) studies include those of K. Anderson, Hayami and Monma (1986); de Gorter, Nielson, and Rausser (1992); Rausser and de Gorter (1989); Gardner (1987); and Swinnen, Banerjee, and de Gorter (2001). Type (c) studies include those by by Gawande and Hoekman (2006; 2010); López and Matschke (2006); Masters and Garcia (2010); Olper and Raimondi (2010); and Olper, Falkowski, and Swinnen (2011).

[16] Although the importance of governance structures for public policy has long been recognized (for example, in the seminal work by Buchanan and Tullock [1962]), a growing body of economics literature has emerged that analyzes the role of political regimes in policymaking. The political regime determines to what extent the government, once appointed, can rule with ex post control, what type of majorities the government needs in order to ensure its ability to pass legislation, and whether some groups have effective veto power. Various mechanisms can translate the preferences of citizens into controls on the government or majority formations, and, hence, on public policies.

[17] Dutt and Mitra (2005) empirically find a conditional impact of ideology on trade policy: a more left-wing government (i.e., one that assigns greater weight to the welfare of workers and labor) is more protectionist in the case of capital-abundant countries but less protectionist in the case of capital-scarce countries.

[18] Olper (2007) does find more variation in policy choices under dictatorial regimes than under democracy.

A newer class of theories incorporates more constitutional details, including the comparison of electoral rules and of different mechanisms for choosing and ousting the executive and for designing and making legislative decisions.[19] These theories predict that compared with majoritarian and presidential systems, proportional electoral systems[20] and parliamentary regimes[21] will be associated with broad forms of redistribution, such as welfare programs, as well as with higher levels of government spending and redistribution.[22]

What are the implications of political institutions for the political economy of agricultural distortions? If those distortions mainly take the form of local-public-goods or redistributive policy instruments (for example, via special subsidies to agriculture), then we should observe relatively more distortions in presidential systems than in parliamentary systems for developed countries and vice versa for developing countries, where rural areas represent a larger proportion of the voting population. The theory also predicts that the countrywide public-good component of support to agriculture is likely to be stronger in parliamentary systems (Rausser and Roland 2010). In developed countries, everything else equal, one should observe relatively more distortions under majoritarian electoral rule than under proportional electoral rule. This result follows from the likelihood that agricultural voters will be pivotal under majoritarian rule but not under the proportional system. (It is much more likely that a farmer's income would be median in a rural district than for the entire country, and this reality has been pivotal in some elections [Rausser and Roland 2010].) Moreover, in all countries, we expect to see a larger number of parties, more coalition governments, and higher government expenditures under proportional electoral rule than under majoritarian electoral rule (Persson, Roland, and Tabellini 2007).

Early econometric studies find mixed and often only weak evidence of the effect of democracy on agricultural protection (Lindert 1991; Beghin and Kherallah 1994; Swinnen et al. 2000; Olper 2001, 2007).[23] These studies predominantly rely on cross-section variation in the data and are subject to problems of reverse causality (policies may also influence governance structures) and omitted-variables bias. Studies using long-run historical data allow more careful measurement of the impact of shifts from one set of political institutions to another. Swinnen, Banerjee, and de Gorter (2001) show that changes in electoral rules that

[19] Electoral systems can be classified across several dimensions, such as the electoral formula (how votes translate into seats) and the magnitude of the electoral district (the number of legislators elected in an average district). Because these dimensions are closely related across electoral systems, it is common to contrast majoritarian election (with plurality rule and smaller districts) with proportional election (where the seats are attributed in proportion to votes in larger districts). Regarding forms of government, the classical distinction is between presidential and parliamentary forms of government. In the former, citizens elect the chief executive directly. In the latter, the executive is appointed indirectly, through a vote of confidence from an elected parliament.

[20] Persson and Tabellini 2000; Austen-Smith 2000; Iversen and Soskice 2006; Lizzeri and Persico 2001; Milesi-Ferretti, Perotti, and Rostagno 2002; Persson, Roland, and Tabellini 2007; Ticchi and Vindigni 2010.

[21] Persson, Roland, and Tabellini 1997; 2000; Persson and Tabellini 2000.

[22] In terms of trade policy, Roelfsema (2004) identifies a positive effect of majoritarian elections on trade protection. Grossman and Helpman (2005) predict that tariffs will be higher under a majoritarian regime, because in a proportional system, all regional interests will receive equal support.

[23] Empirical evidence on trade policy yields mixed results. Some studies suggest that democracy positively affects economic (trade) liberalization (e.g., Banerji and Ghanem 1997; Milner and Kubota 2005; Giavazzi and Tabellini 2005; Eichengreen and Leblang 2008; Giuliano, Mishra, and Spilinbergo 2010). Other studies argue that this effect depends on other factors. O'Rourke and Taylor (2007) find that although democratization generally reduces trade protection, it does so only in countries where workers stand to gain from free trade. Kono (2006) shows that democracy leads to liberalization of trade in wealthier countries but to increased protection in poorer ones. Several scholars have criticized the methodologies of these studies, citing data problems, spurious correlation between democracy and economic reforms (Eichengreen and Leblang 2008), and potential feedback effects (Giavazzi and Tabellini 2005; Milner and Mukherjee 2009).

have disproportionately benefitted agriculture (e.g., extending voting rights to small farmers and tenants in the early twentieth century) have induced an increase in protectionism. In contrast, other electoral changes have not affected agricultural protection because they increased the voting rights of both those in favor and those against protection.

Olper, Falkowski, and Swinnen (2011) employ both difference-in-differences regressions and semi-parametric matching methods, exploiting the time-series and cross-sectional variation in the World Bank's data showing that democratization causes an increase in RRAs (that is, democratization tends to reduce agricultural taxation and/or increase agricultural subsidization). However, they do not find any support for a reduction in positive RRAs. In other words, a country's transition to democracy may change the distribution of policy rents but need not lead to more-efficient policies. Moreover, the study also finds that the reverse political transition (from democracy to autocracy) does not affect agricultural protection.

Some researchers have empirically assessed the impact of rulers' preferences. It appears that agricultural interests have been protected mostly by right-wing governments. Olper (2001) found that in OECD countries, on average, right-wing governments are more protectionist in the case of agriculture than are left-wing governments. This is consistent with other empirical analyses, such as that of Bates (1983), who argues that socialist rulers in Africa taxed farmers (by imposing low commodity prices). Similarly, Tracy (1989) finds that right-wing governments in Europe (such as those dominated by Catholic parties and conservative parties, including the Nazi party in Germany) tended to support farm interests and protectionism. Although, on average, left-wing governments support agriculture less, they tend to support farmers more in unequal societies (Olper 2007). For example, for more than a century in France, large farms and landowners have been associated with right-wing political parties and small farms with left-wing parties (Swinnen 2010). This empirical result also holds more generally: right-wing dictators are more inclined to support agriculture if the sector is dominated by large-scale farms and estates, whose owners typically support right-wing rules.

As economies develop, so do rulers' preferences. One illustration is the fact that as their economies evolved, agricultural policies of left-wing Communist autocracies shifted from taxing to subsidizing agriculture (as was also true in democracies). Communist dictators of poor countries (such as Stalin in Russia, Mao in China, and Hoxha in Albania) heavily taxed agriculture. However, farmers were subsidized at higher incomes in the Soviet Union under Brezhnev and in most East European Communist countries in the 1970s and 1980s (Rozelle and Swinnen 2010).

Finally, rulers' preferences are not restricted to left-wing or right-wing ideologies; they may also reflect regional interests. Bates and Block (2010) show that the regional backgrounds of leaders in Africa significantly affected their policy preferences, given the autocratic political systems' influence on policies. Leaders who drew their political support from cities and semi-arid regions (as in Tanzania and Ghana) seized a major portion of revenues generated by the export of cash crops (coffee and cocoa). In contrast, in countries where leaders came from (and were supported by) regions where cash crops were important sources of income (such as in Kenya and Ivory Coast), leaders employed the power of the state to defend the fortunes of their (wealthy) regions and imposed little, if any, taxation on coffee and cocoa exports.

3.2.3. Organization

Improvements in rural infrastructure have affected agricultural interests' ability to organize for political action. Regardless of governance structures, in order to influence political choices effectively, interest-group members must act in unison. For their collective action to yield meaningful results, organizational structures must be established that can mobilize

resources and direct individual action. The greater the number in an organization of politically active members whose interests are aligned, and the more resources at the organization's disposal, the greater its political power base will be.

However, as Olson (1965) and Harsanyi (1962, 1977) have emphasized, an individual guided primarily by concern for her own personal material well-being will choose to join the collective action only if the material benefits she derives from this decision exceed her cost of membership or political effort**.** Since no one can be excluded from the material benefits of the selected policy, individuals who are solely concerned with their own personal costs and benefits will often prefer to free-ride. As Olson argues, under such circumstances, collective action by relatively large groups can come about only if free-riding is controlled by means of "selective incentives." That is, the group must provide private goods desired by individual members on favorable terms only to those who decide to join the politically active organization. Examples of the selective incentives often presented by interest-group organizations to their members include insurance and information important to the members. In contrast, within relatively small groups, collective action may be induced by intragroup direct interactions or by peer pressure, without the need for selective incentives.

Factors contributing to lower organizational set-up and maintenance costs enhance the group's political power. Geographic concentration of group members, a strong commitment to a broadly shared ideology, and closely knit inter-member communication networks (which often result from members' organized activities, such as trade and professional associations) contribute to cohesiveness within the interest group and decrease the organizational set-up and maintenance costs. Such forces strengthen the group's political power.[24]

This collective-action theory predicts that in poor countries, food consumers (net buyers of food) will wield more political power than farmers (and even more than the subset of net sellers of food). Consumers are often concentrated in cities, where political action–coordination and enforcement costs are more favorable than in the rural areas where farmers reside. However, as the economy develops—and especially, as the share of agriculture in employment declines and rural infrastructure improves—the cost of political organization for farmers decreases. This cost reduction is likely to increase the effectiveness of farmers' representation of their interests and, as a consequence, of their lobbying activities (Rausser, Swinnen, and Zusman 2011, Chap. 8).

Researchers debate whether changes in relative collective-action costs can explain major changes in agricultural policies. Although rural infrastructure and information have improved significantly as countries have developed, even in developed countries, there remain a very large number of farmers (Rausser and Foster 1990; de Gorter and Swinnen 2002). The persistence of such large numbers of farmers (whose interests are not necessarily aligned) implies that collective-action obstacles persist**.**

The structure of the agri-food system also determines the effectiveness of collective political action. It is generally expected that a sector with mainly large-holding farmers can more easily overcome collective-action problems because its members are typically fewer and its collective-action costs lower relative to the political rents they might capture (Peltzman 1976). However La Ferrara (2002) argues that inequality among farmers may make it harder for collective action to succeed because small and large farmers often have conflicting incentives and because free-riding is likely to be more common in a heterogeneous group setting. Historical evidence from Europe also supports this result

[24] Personal material interest need not be the sole force motivating potential participants to join the political organization as active members. Nonmaterial motivations may also play an important role, such as social pressures, loyalty and a belief in the common cause, belief in duty, common ideology, or enjoying participating. Sugden (1986) argues that an organized interest group is, in fact, a convention that has emerged in the course of an iterated prisoner's dilemma game.

(Schonhardt-Bailey 2006). Significant inequality among farmers in England, Germany, and France at the end of the nineteenth century weakened the pro-tariff demands of major grain farmers because they were opposed by small farmers, many of whom were livestock producers. In many countries, small and large farmers are organized in different collective-action groups (Swinnen 2009).

Nonetheless, the growth and concentration of agribusinesses and food-processing companies, which are sometimes aligned with farm interests in lobbying for agricultural policies, serve to strengthen pro-farm interests (Anderson 1995; Rausser, Swinnen, and Zusman 2011). Since farm lobbies and agribusiness interests can coalesce and are increasingly well capitalized and concentrated, they have been an important force in orchestrating public policies that benefit their interests. In Europe, the growth of agricultural protection has been associated with the growth of cooperative agribusiness and food-processing (and even transport and storage) companies.

Econometric studies by Gawande and Hoekman (2006) and López (2008) show empirically the influence of agribusiness and food companies' political contributions on US policies. Similar arguments have been advanced by François, Nelson, and Pelkmans-Balaoing (2008), who explicitly integrate vertical relationships in the agri-food system. By integrating factor-market rivalry and input-output linkages in a Grossman-Helpman model, Cadot, de Melo, and Olarreaga (2004) show that protection escalates with the degree of processing. This finding helps explain why rich countries protect agriculture more than they do manufacturing, whereas poor countries do the reverse.

3.2.4. Information

Information plays a crucial role in political markets, organization, and policy design. Downs's (1957) "rationally ignorant voter" principle means that it is rational for voters to be ignorant about certain policy issues if the costs of information are higher than the (potential) benefit of being informed. This argument immediately implies that policies will be introduced that create concentrated benefits and dispersed costs, since the information costs are relatively large for those who carry the burden of financing transfers and relatively small for those who receive the benefits (Rausser 1992). As a result, forces that change information costs may cause changes in public policies, including agricultural protection. One example is enhanced rural communication infrastructure, which occurs either through public investments (as in many high-income countries earlier in the twentieth century) or through technological innovations and commercial distributions (as in the recent dramatic increase in mobile-phone use in developing countries).

Another influencing factor is the spread of commercial mass media (McCluskey and Swinnen 2010).[25] While television and radio were always commercial in some rich countries (such as the United States), that was not the case in European countries, where, until the 1980s, radio and television were mostly publicly owned (and many newspapers were linked to political parties). Only in the past 20 years has rapid growth of commercial mass media occurred in most countries. Access to mass media empowers people politically, and a more informed and politically active electorate increases the incentives for a government to be responsive (Besley and Burgess 2001; Strömberg 2004a). This influence has been found for various types of government programs, such as unemployment programs and disaster relief (Eisensee and Strömberg 2007; Strömberg 2004b; Francken, Minten, and Swinnen 2012),

[25] Mass media can also affect policymaking by creating a bias in the provision of information (Baron 2006; Gentzkow and Shapiro 2006; Groseclose and Milyo 2005; Sutter 2001). Media bias can take various forms, and there is no generally accepted definition. Media bias can result from preferences of owners, editors, or journalists. It can also result from falsehoods or from information hidden or distorted by sources or journalists eager for a scoop or under pressure to attract attention, or it can result from consumers' preferences.

better governance and less corruption in public food provision (Besley and Burgess 2002), and rural educational spending (Reinikka and Svensson 2005).

Mass media can also play an important role in agricultural policy by altering the landscape of political competition. As explained above, the literature on the political economy of agricultural policy suggests that group size (e.g., the number of farmers versus the number of food consumers in the economy) helps determine lobbying effectiveness (Rausser, Swinnen, and Zusman 2011). Mass media alter these political-economy mechanisms between group size and political mobilization by providing more information to larger groups (Kuzyk and McCluskey 2006; Oberholzer-Gee and Waldfogel 2005). Strömberg (2001; 2004a) refers to this outcome as "mass-media competition-induced political bias." He also shows that mass media bias their information toward groups which are more attractive to advertisers. Typically, this bias benefits urban interests over rural ones.[26]

Following Strömberg's (2004a) theory, Olper and Swinnen (2009) argue that mass media will increasingly weaken the political power of small groups (in rich countries, farmers; in poor countries, consumers) and reinforce that of large groups and groups attractive to advertisers (in rich countries, consumers and urban interests; in poor countries, farmers). Thus, a nonlinear effect of mass media on agricultural policies favors rural interests (and thus higher RRAs) in poor countries but urban interests (and thus lower RRAs) in rich countries. Using the World Bank data set, Olper and Swinnen analyze empirically whether there is evidence of such an effect of mass media on global agricultural and food policies. They find that mass media does indeed have a substantive impact on food policy.

3.2.5. Structural-Adjustment Programs and Policy Conditionality

Another key issue is the impact of international financial institutions (such as the World Bank and the International Monetary Fund) and the policy conditions they impose on developing countries as part of their lending. The structural-adjustment programs in Africa and Latin America in the 1980s and the programs in the transition countries in Europe and Asia in the 1990s were very controversial. These programs often required the borrowing governments to liberalize their policies and reduce distortions, with the justification that such changes would enable them to repay the loans on schedule. Some policy reforms were reversed after the loans were in place, but many appear to have stuck (Akiyama et al. 2001; Kherallah et al. 2002). Williamson and Haggard (1994) suggest that the most useful effect of these conditions came not in the form of hard conditionality ("leverage") but rather from shifting the domestic intellectual climate and public discourse in these countries towards favoring freer markets.

In the transition countries of Europe and Central Asia, this shift has caused a significant reduction of subsidies to agriculture (Anderson and Swinnen 2010). In Sub-Saharan Africa, the structural-adjustment programs are partially responsible for a significant reduction of taxes on farmers (i.e., an increase in RRAs of approximately 20 percentage points, on average) (Swinnen, Vandeplas, and Maertens 2011).

3.2.6. Summary

The reduction of anti-agricultural and food policies in developing countries during the past decade has been caused by economic growth, by the shift in the political-economic equilibria induced by such growth, and by changes in governance and media structures. Reduced

[26] Gabszewicz, Laussel, and Sonnac (2008) and Petrova (2008) have found that the media's incentives to appeal to a larger audience and to attract advertisers may induce editors to moderate their political messages. Biased information will affect agents' behavior in economic and political markets. These studies have been found to be material to agricultural and food policy (Marks, Kalaitzandonakes, and Zakharova 2003; Swinnen and Francken 2006).

taxation of agriculture in many developing countries that experienced income growth during recent decades is consistent with the identified forces sourced with the political-economic lens. The average RRA for developing countries has risen toward zero in the past decades, as incomes in these countries have grown, and variations in income growth explain many of the differences within the developing-country group. Income growth has been stronger in Asia than in Latin America and even stronger in both of these regions than in Africa. Similarly, RRA growth has been strongest in Asia and weakest in Africa (Figure 3[a]).

In terms of interest-group organizations, as rural infrastructure improves and communications costs fall, farmers become more aligned and politically more effective. This development again contributes to a shift in the power balance in favor of rural interests. Moreover, as economies develop, the role of agribusiness and food companies—often with cooperative roots—expands. These more concentrated and better capitalized organizations often form powerful lobby coalitions with farmers' interest groups.

Empirical analyses suggest that the reduction of anti-agricultural and food policies over the last two decades has been reinforced by changes in media structure and political institutions. In many cases, income growth has coincided with political reforms (democratization) and with the growth of commercial media. Democratic reforms have, on average, motivated increases in RRAs, although in notable cases there have been important policy reforms without political liberalization (as in China since the late 1970s)**.** The impact of the change in political institutions on agricultural distortions is complex, but at a minimum, empirical evidence suggests that democratization has helped reduce taxation of farmers.The growth of commercial media may have contributed to less distortion, including the reduction of taxation of agriculture in developing countries.[27]

3.3. Plateau and Subsequent Reduction of Assistance in High-Income Countries

Based on empirical evidence, one would expect further increases in RRAs as countries' incomes have grown. This was indeed the case from the 1950s to the mid-1980s, but since then, there has been a change in trend for some high-income countries. The latter shift has been particularly pronounced in the EU. Several factors seem to have played a role in this recent reversal of the positive relationship between income and RRAs for higher-income countries. In this subsection, we will discuss the impact of the WTO, of information and mass media, and of EU-specific effects.

The change in the relationship between income and RRAs coincides with the integration of agricultural policies in the GATT/WTO as part of the Uruguay Round Agreement on Agriculture (URAA) in 1994. The relationship between the URAA and RRAs in high-income countries is complex: many of these countries were involved in the URAA negotiations, and from a political-economy perspective, at least before an agreement is forged there is potential bicausality between countries' RRA and the WTO negotiations.[28] However, once an agreement is inked, any causal flow should largely go in one direction.

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[27] Note, however, that in Asian countries, the eventual removal of agricultural taxation did not end policy changes. Rather, less agricultural taxation was part of a continuum that subsequently involved rising subsidization, reflecting a steadily changing political-economic equilibrium. This pattern raises two questions: whether these countries' RRAs will continue to rise, and whether other lower-income countries will follow their evolution of policy interventions. Indeed, some East Asian countries already have done so, and in China, too, signs of pressure to increase subsidies to agriculture have appeared.

[28] For example, during the Reagan administration in the United States, the executive branch recognized that it was only possible to reform domestic agricultural policies by changing the international governance structure. This recognition helps explain why the United States supported including agriculture in the Uruguay Round of GATT negotiations in the fall of 1986 (Rausser 1995). In addition, the inability of the EU's trading partners to

While several studies simulated the impact of the URAA (and other scenarios) ex ante, there is very limited ex post empirical evidence on the impact of the URAA. What evidence is available suggests that (a) the impact differs strongly between countries that participated in the negotiations and those that joined later; and (b) that the WTO/ URAA has done little directly to reduce RRAs. For the countries that were contracting parties to the GATT during the trade negotiations, the URAA may have constrained the growth of agricultural protection afterwards (Anania et al. 2004; Swinnen, Olper, and Vandemoortele 2012). However, Orden, Blandford, and Josling (2010) argue that the WTO's impact on agricultural policy in the United States over the past two decades has been very limited, and that agricultural lobbies have been quite successful in continuing to advance their domestic interests.

As noted, the URAA's effects were different for countries that joined afterwards or went through institutional changes that affected their WTO constraints. For example, among the transition countries, the WTO's impact on their agricultural policies differs considerably depending on whether or not they were part of the GATT before the end of 1994, the year in which the URAA was completed (Anderson and Swinnen 2010). Similarly, the WTO conditions imposed on China and Russia during their WTO accession processes have been much more stringent than was the case for some of the older WTO members (Drabek and Bacchetta 2004; Evenett and Primo Braga 2006). Hence, the impact of the WTO on agricultural distortions depends on countries' institutional stage of entry.

A somewhat different effect occurred in the European Union, where new countries' accession to the Union has required reforms of the Union's agricultural policy in order to avoid conflicts with WTO governance rules. While probably the most important aspect of the reforms has been a shift to less-trade-distorting instruments, a substantial decline in the Union's RRAs has also occurred. Although the Union's economy grew robustly (at least until the global financial crisis that began in 2008), agricultural protection has declined considerably from the early 1990s (beginning with the so-called MacSharry reforms of 1992), as depicted in Figure 3(b). For the EU-15 members, the RRA declined from around 70 percent in the 1980s to less than 40 percent at the turn of the century, and for those 15 countries, the RRA was just 11 percent in 2005–10 (Figure 7).

This overall decline in the European Union's RRAs is notable, given that the expansion of the Union started with the integration of the richest countries. Since the 1980s, mostly poorer countries have joined (e.g., Spain, Portugal, and Greece in the 1980s and ten East European countries in the 2000s).[29] Some of these poorer countries (such as Poland and Romania) have brought millions of new and predominantly poor farmers into the Union.[30] However, this factor has reduced the pressure to increase RRAs (following the logic presented in subsection 3.2). In addition, several of these poorer countries were not part of the GATT, and their integration in the European Union caused GATT constraints for the Union as a whole in the 2000s. These constraints not only induced a change in policy instruments (as detailed in subsection 3.4) but also generated pressure to reduce total agricultural support. The change in policy instruments from market interventions (including border measures) to direct payments shifted a significant share of the costs of supporting farmers from consumers to

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constrain the EU's subsidization of exports induced these countries to insist on including agriculture in the GATT (Sumner and Tangerman 2002).

[29] Three richer but small countries joined in 1995: Austria, Sweden, and Finland.

[30] Ten Eastern European countries moved from being fully integrated in the Soviet Union up to the 1980s, where economic policy was set by Communist rule in Moscow, to being completely independent from the early 1990s. Ten years after this transition began, many of those newly independent states decided to shift much decision-making power to international governance structures by acceding to the WTO and the European Union. These international governance changes induced reforms from a highly distortive price and trading regime in the 1980s to a much more liberal system in the 1990s, and then to a renewed use of subsidies, albeit in a very different form, in the 2000s.

taxpayers. It also increased the visibility of the transfers, as they occupied a large share of the European Union's budget. This increased transparency of the transfers may have been an additional cause of gradual reductions in RRAs[31] in the Union: over the past two decades, taxpayers have continuously pressured the Union's leaders to reduce agricultural subsidies.

In high-income countries generally, the growth of commercial mass media may have played a role in reducing RRAs. Whereas the effect of mass media in developing countries is to reduce agricultural taxation, in rich countries, mass media typically helps reduce agricultural support. Olper's and Swinnen's (2009) findings imply that by increasing government accountability, competition in the mass-media market often reduces distortions to agricultural and food prices.

3.4. Re-Instrumentation of Assistance in High-Income Countries

As revealed by the stylized facts described in section 2, material re-instrumentation of assistance has occurred in some but not other high-income countries. This re-instrumentation has involved a movement away from market-price support and toward domestic decoupled measures (Figure 12).

The public sector's selection of policy instruments is influenced by several factors. First, different instruments imply different deadweight costs in redistribution. All else equal, this implies that competition in the political marketplace (e.g., among interest groups or political parties) induces governments to choose policy instruments that minimize market distortions (Becker 1983; Gardner 1983; Wittman 1989; Rausser and Foster 1990; Besley, Persson, and Sturm 2010). Based on this argument, Swinnen, Olper, and Vandemoortele (2012) hypothesize that the share of market-distorting instruments in total transfers is negatively related to export share. When exports are large, countries are more likely to use non- or less-distortionary instruments than border measures.

Second, policy instruments typically differ not only in deadweight costs but also in implementation costs. The most obvious explanation for the broad use of trade taxes (either import tariffs or export taxes) is that they are easiest and least costly to implement (Dixit 1996; Rodrik 1995). In many developing countries, the system for administering and enforcing income taxes and/or subsidies may simply not exist (or be too costly to implement). Nevertheless, the existence of transaction costs has been used to both defend and to criticize the use of particular policies. Coase (1989) concludes that by ignoring transaction costs, most studies underestimate the total costs of government policy, so that existing policies are even more inefficient than is typically recognized. In contrast, Munk (1989; 1994) argues that including transaction costs in the analysis implies that existing agricultural policies are more efficient than is often claimed. Similarly, Vatn (2002) concludes that the profession's preference, based on deadweight cost arguments, for decoupled and better-targeted policies over price-support policies is unjustified when transaction costs are taken into account. But Corden (1997, pp. 74–76) cogently argues that transaction costs rarely suffice to make trade-distorting policies the most efficient instruments for achieving domestic social and environmental objectives. Generally, it is expected that governments will chose trade (and market) interventions less often as their administrative capacity to tax and subsidize incomes improves, along with their ability to provide public goods (especially agricultural research) and to address efficiently any externalities that may arise.

Third, instruments also differ in their "transparency," the information available concerning policies and their incidence. Tullock (1983) and Olson (1982) argue that

[31] A similar shift in the burden of financing agricultural subsidization with increased transparency occurred in the United States (Rausser and Irwin 1989).

politicians have an incentive to select less-efficient policy instruments if the costs of more-efficient ones are more transparent (Tullock 1983; Olson 1982). Thus, governments use policies that mask the costs of the policies or use policies that obfuscate the transfer itself.[32] This obfuscation perspective helps explain the persistence of agricultural price supports and tariffs in OECD countries and why non-budget methods of redistribution, such as tariffs, are politically preferable to production subsidies and direct-income payments.

Fourth, the mix of policy instruments can involve price-distorting compensation for other policy instruments that adversely impact powerful interest groups.[33] Foster and Rausser (1993) show that governments may prefer price supports over lump-sum transfers because the more-distorting instruments allow discrimination among heterogeneous producers. As a consequence, the total transfers—even in the face of deadweight costs—may be lower than would be the case with lump-sum transfers. This outcome is sourced with the compensation of more-efficient producers in order to deter a blocking coalition from vetoing efficiency-enhancing or public-good government policies. This argument is related to more-recent theories of inefficient redistribution based on contractual problems, such as those proposed by Acemoglu and Robinson (2001) and Acemoglu (2003). In these analyses, "inefficient" policies are chosen because they serve the interests of politicians or interest groups that hold political power and are reluctant to make commitments that bind their future actions. Mitchell and Moro (2006) advance a related argument: they maintain that compensation through distortive policies, such as tariffs, may be more attractive if the amount of transfer needed is unknown ex ante, resulting in inefficient targeting.

Accessions to the GATT and WTO may have influenced—for obvious reasons—the *nature* of the policy-instrument interventions more than the total *level* of policy transfers. Since a key purpose of the WTO is to reduce trade distortions, accession to the WTO should cause a shift toward less trade-distorting policies.

Given that that the decline in the EU's RRAs plays an important role in the overall RRA decline of high-income countries (see Figure 7), it is interesting to observe that the URAA (and later WTO Doha Round) negotiations have triggered an important change in agricultural policy–instrument choice in the EU over the past decades: the shift in the 1990s from price support to direct payments (Moehler 2008). Later, the interaction between the WTO constraints and EU enlargement triggered further agricultural policy–instrument changes at the end of the 1990s (under the Agenda 2000 reforms). In addition, the 2003 Reform of the Common Agricultural Policy (CAP) was influenced by the ongoing WTO discussions. In particular, anticipation arose that agreement to cut agricultural assistance further could develop once the Doha Round concludes (Pirzio-Biroli 2008). These consecutive reforms not only helped reduce total agricultural support in the EU but also strongly reduced the extent of trade distortion by encouraging a shift to more-decoupled policy instruments.

As noted earlier, the URAA has had less impact on US agricultural policies. Nonetheless, it appears that the US administration has attempted to introduce policy reforms with an eye toward insuring that many US agricultural subsidies are classified as "green box" (i.e. non–trade distorting) under the WTO agreement (Orden, Blandford, and Josling 2010). In

[32] For examples, see, e.g., Rausser 1982, 1992; Coate and Morris 1995; Magee, Brock, and Young 1989; Hillman and Ursprung 1988; Ray 1981; Trebilcock, Waverman, and Prichard 1982.

[33] In the context of compensation, redistributive policies may be integrated and/or complementary with public-good policies. Compensation through redistributive policies may be required in order to reduce opposition from those harmed by policy reforms that increase aggregate welfare but embed unfavourable distributional consequences for powerful interest groups. In "packages of policies," policy analysis of public-good and redistributive policies is determined in political-economic equilibria (Rausser 1982; Rausser and de Gorter 1989; Rausser, Swinnen, and Zusman 2011). Notice that a "package of policies" may also imply that food policies are reformed as part of a broader economic-reform strategy, as, for example, in Eastern Europe in the 1990s (Rozelle and Swinnen 2010).

this sense, the motivation for its policy reforms appears to be similar to the EU's. These common outcomes for both the EU and the US suggest that WTO constraints could play an increasingly important role in reducing distortions if a substantive agreement could be reached in the current Doha Round. Such WTO constraints could induce emerging countries (such as China) to choose non-distorting (or less-distorting) policy instruments as they attempt to support the incomes of agricultural households.

3.5. Anti-Trade Bias and the Persistence of Intrasectoral Dispersion of Assistance

Other stylized facts relate to the intrasectoral dispersion of NRAs. Why is it so large in so many countries? Why has this dispersion not diminished as countries have reduced their overall sectoral level of distortion (Table 3)? Why are some commodities (rice, dairy, sugar) assisted in virtually all countries (Figure 9)?

There are several reasons to expect differences in NRAs not only among countries but also among specific agricultural commodities within a country. One explanation relates to the stylized fact that a strong anti-trade bias persists despite liberalizations over the past decades: export industries, as a group, are assisted less/taxed more than import-competing agricultural industries (Figure 10). For reasons similar to those that underlie countercyclical support, theory predicts that governments are more likely to support (sub-) sectors with a comparative disadvantage (imports) than (sub-) sectors with a comparative advantage (exports). Since benefits from market returns are lower in sectors with a comparative disadvantage, those sectors' incentives to seek income from government support are also relatively higher. In these (sub-) sectors, returns to investment in lobbying activities dominate returns from market activities and so indirectly support an anti-trade bias.

Differential effects on government revenues also help explain why protection of sectors decreases as their trade surplus increases and why taxation is higher for industries that are net exporters. Obviously, tariff revenues and export taxes increase government revenues, while export and import subsidies require outlays. It is always less contentious for governments to tax than to subsidize trade: taxing raises government revenue and, in the case of larger economies, improves their terms of trade, whereas trade subsidies do the opposite.

Moreover, in poor countries in which tax-collection institutions are weakly developed, trade taxes (either import tariffs or export taxes) are often an important—or the only substantive—source of tax revenue (Rodrik 1995). This revenue motive for governments will affect not only total RRAs but also, as noted earlier, the choice of policy instruments. If the tax infrastructure is less developed, governments have greater incentives to use tariffs instead of direct income support to assist farmers. However, this argument has weakened as developing countries have learned to introduce and apply value-added taxes more efficiently (Tanzi and Zee 2000) and as new information technologies have greatly lowered the cost of providing conditional cash transfers to targeted groups (Alatas et al. 2012).

It should be no surprise that demand and supply characteristics matter as well. Raising tariffs on commodities which are more important for consumers, such as staple foods, will be opposed more often than will raising tariffs on commodities which are less important as a consumption item, and vice versa for producers (Anderson 1995; Swinnen 1994). Demand and supply elasticities also affect the distortions and costs of policies (Gardner 1983, 1987; Rausser and de Gorter 1989; de Gorter, Nielson, and Rausser 1992). The distortions (deadweight costs) and budgetary costs of policy intervention typically increase with higher supply elasticities and with the commodity's trade balance (that is, when its net exports increase). Because of the inherent changes in the distribution of costs and benefits of policies and the associated political incentives, political-economy theories predict that exports (and

sectors with higher supply elasticities in general) will be subsidized less often (or taxed more often) and that commodity support is negatively related to supply elasticities. Again, these factors are likely to affect also the choice of policy instruments, as, for example, when governments restrain supply responses through such additional regulations as marketing quotas and/or land controls (Rausser 1992; Rausser, Zilberman, and Just 1984).

Another explanation for intrasectoral NRA dispersion has already been identified as a cause of high-income countries' policy shifts (subsection 3.4): the costs of implementing various policies. When implemented, policies that change incentives to producers and consumers also provide incentives for avoiding the incidence of such policies. The costs of implementing (and enforcing) certain policies can be quite substantial. Since large differences exist in the way commodities are marketed, these differences affect the costs of intervening in the market. For example, commodities which are perishable and require processing (with scale economies), such as sugar and dairy products, are typically marketed through processing companies—a point at which governments can intervene at relatively low cost. In contrast, it can be more costly to intervene in the case of products that are easily storable and/or which farmers can market directly to consumers (or to other farmers).[34]

Finally, McMillan (2001) argues that in developing countries, governments have treated perennial crops differently than annual crops due to farmers' flexibility and the role of sunk costs. Once farmers have incurred the costs of establishing a perennial plantation, they will continue to produce the exportable as long as the price they receive covers incremental or harvesting costs. Other things equal, national welfare cost is lower (at least in the short term) from taxing perennial than annual crops. Gawande and Hoekman (2010) find empirical support for this hypothesis. Moreover, Masters and Garcia (2010) find that governments with a lower political discount rate (i.e., those that are less likely to lose power in the future, which presumably includes more autocratic regimes) are more likely to tax perennials than annual crops.

Ample empirical evidence shows that governmental support to specific agricultural commodities is negatively related with structural factors. The latter factors include not only the share of food in consumers' expenditures and the share of agricultural employment in the economy but also trade balances, supply elasticities, and indicators of comparative advantage and deadweight costs.[35] However, evidence for the government-revenue motive is mixed. Dutt and Mitra (2010) find some support for it, but Masters and Garcia (2010) and Bates and Block (2010, for Africa in particular) find either mixed or conflicting evidence.

4. Implications for Further Research and the Potential for Policy Reforms

From our assessment, it is clear that much progress has occurred in the past decade or so in improving our understanding of why governments distort incentives facing agriculture. Certainly, more empirical testing of hypotheses suggested by theorists could be done, but considerable light has already been shed on most of the stylized facts raised by the World Bank's new documentation of the evolution of global price distortions since the 1950s.

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[34] Supply and demand elasticities and the nature of the marketing chain may also work together. For example, in many rich countries, high price supports for certain commodities are associated with supply-control policies, which are implemented in order to limit the distortions caused by these policies (and to avoid spreading their benefits to new entrants). However, such supply control is easier to implement for some commodities (e. g., those with concentrated processing or marketing channels) than for others.

[35] See de Gorter and Swinnen (2002) for a list of extensive empirical evidence on this relationship.

However, several unresolved questions, or puzzles, remain. In this final section, we focus on several of these remaining questions and assess the prospects for further reforms.

4.1. Unresolved Questions and Potential Future Research

The first remaining unresolved question is why per capita income and comparative advantage contribute so unevenly to explaining differences among RRAs within each of the three regions of developing countries (Table 1). The fact that faster economic growth and a decline in agricultural comparative advantage have occurred in Asia versus Africa helps to explain the inter-regional difference in the rate of rise in the RRA. But changes in the inter-country differences within Africa require additional explanation. Several hypotheses suggested by our assessment in Section 3 could be tested (and some are being tested, for example, by Bates and Block [2010]), but considerable scope remains for more research in explaining this puzzle.

Another question that remains relates to the variation across countries in the extent and speed with which they have shifted from having negative to having positive RRAs. Figure 8 reveals substantial differences in the rate of transformation within the Asian region, but it also hides differences within the Association of Southeast Asian Nations (ASEAN) country group. Meanwhile, some high-income, agricultural-exporting countries also have removed their negative RRAs. For example, Australia's RRA averaged -22 percent during 1946–54 and -10 percent in 1955–69, but since the early 1990s, it has been virtually zero (Anderson, Lloyd, and MacLaren 2007). In contrast, in Asia, the RRA has "overshot"; that is, it has moved from negative to positive. Different rates of decline in agricultural comparative advantage and associated concerns with food security partially explain these variations.

A third puzzle concerns why a few developing countries (notably India and Indonesia), but not many, have provided large farm input subsidies even in periods when their overall RRA is negative. This phenomenon is ironic for at least three reasons. One reason is that evidence suggests that subsidized inputs have been used excessively (even to the point of lowering yields, in the case of fertilizer in Indonesia [Osorio et al. 2011]). Another reason is that such subsidies are counterproductive because negative environmental externalities often result from their use. To be sure, governments could redirect their scarce resources and achieve a much higher social payoff relative to any returns generated from input subsidies. Most notably, expanded investments in agricultural R&D might be much more productive. Yet policy makers tend to shun them (López and Galinato 2007). The visibility and immediacy of subsidies to agriculture versus long-term public-good investments likely play a role in this strange aversion. This outcome may also be partially explained by input-supplying agribusinesses' interests in supporting subsidies, particularly in the case of such inputs as fertilizer.

A fourth puzzle is why RRA variations are due to such a wide range of changes in policies affecting non-agricultural goods. From our data analysis (see Figure 2[a]), it is clear that in the case of developing countries, the rise in average RRA is due as much to a decline in assistance to non-agricultural sectors (especially cuts to manufacturing protection and the phasing out of developing countries' multiple exchange rates) as to declines in agricultural disincentives (especially cuts to export taxes).

This fourth puzzle is related to a broader research agenda aimed at providing a better understanding of the interactions between different types of policies. It is important to bear in mind that agricultural-policy changes may be components of broader reform packages. This occurred, for example, when macro-economic reforms (e.g., in India and Africa) or even broad liberalizations (e.g., in Eastern Europe, the Soviet Union, and China) integrated changes to distortions in agricultural markets. Alternatively, agricultural-policy changes can incorporate compensation as an integral element of reform adjustments. For example,

agricultural-protection adjustments may be part of a "social contract" to cushion the blow for the least mobile factors (Just and Rausser 1992). Limited empirical evidence suggests that such "cushioning" has taken place (Swinnen et al. 2000). Unfortunately, quasi-natural experiments that could make it possible to identify such causal relationships are currently not available.

Much also remains to be learned about how changes in international governance structures affect agricultural-policy distortions and policy reforms in particular countries. While this subject has received considerable attention over the past decade (examples include structural-adjustment programs, the establishment of the URAA/WTO and NAFTA, and EU enlargement),[36] most of this research has focused on ex ante studies. Relatively little econometric work has quantified the effects of these institutional changes. In particular, there is little evidence regarding the effect of the structural-adjustment programs that were required in order for developing nations to secure loans from international agencies. This lack of attention is surprising, given that such programs have been hotly debated in recent decades. Nor has strong evidence emerged regarding the impact of the WTO on agricultural policies. An exception is the recent analysis of Grant and Boys (2012), which finds the GATT/WTO has delivered significant positive benefits to members' agricultural trade.[37]

4.2. Prospects for Further Policy Reform

The RRAs presented in Section 2 reveal the stylized fact that although significant changes to agricultural policies have occurred, many countries have nonetheless maintained consistent policies over time. More specifically, the empirical data show that although minor adjustments occur frequently, major reforms are difficult to achieve—not unlike the status-quo bias that is well known to exist in trade policy (Fernandez and Rodrik 1991). Major obstacles to substantial reform are sourced with institutional factors and political power. Institutions induce interest groups, including bureaucracies, to organize themselves in fashions that enhance their political power. This process leads to "political-economic equilibria" that reflect relative political power (Rausser, Swinnen, and Zusman 2011). In such equilibria, policy inertia is often the consequence of a stationary equilibrium. Clearly, large external changes ("crises") are often needed in order to overcome the status quo that characterizes such equilibria.

The role of crises in stimulating reform has long been recognized (see, e.g., Williamson and Haggard 1994), but insights concerning that role have not yet been integrated into econometric studies. In order to incorporate the crisis factor, such studies would have to address several challenges. One is that crises' effects are rarely linear. In order to trigger policy change, changes in external and/or influencing variables may need to overcome certain threshold levels that depend on the decision-making rules. In this context, a major empirical challenge relates to data problems. What "crisis" and which "external changes" the analyst chooses to include as explanatory variables are extremely important. While those undertaking single-country or regional econometric analysis may recognize key external factors that need to be incorporated, it is far more difficult to select such variables for studies using a global data set. Reform packages such as those triggered by global financial, institutional, and

[36] In a different context, Mayer and Mourmouras, in a series of insightful theoretical papers (2005; 2008; 2009; 2010), have investigated the effects on countries' economic policies of conditionality imposed by the IMF and other international financial institutions (IFIs). They focus on foreign-investment flows. Their various theoretical frameworks explain, from a political-economic perspective, why only limited success has been achieved in sustaining policy reform when the benefits of the bargain include the loans and aid from the IFIs.

[37] There has, however, been a recent surge of econometric work on the impact of WTO membership on overall trade flows. See, for example, Chang and Lee (2011).

political crises are well-known. But what about less well-known cases, which are evident and have been evaluated in many single-country studies (e.g., by Anderson 2009; 2010; Bates 1989; Moyer and Josling 2002; Orden, Paarlberg, and Roe 1999; Swinnen 2008)?

Significant policy changes are not possible unless changes, whether external or internal, are sufficiently large. Moreover, the influence of the bureaucracy crucially depends upon voting rules. Pokrivcak, Crombez, and Swinnen (2006) present one of the few theoretical analyses of how political institutions affect agricultural policy reforms in their study of the impact of decision-making rules for agricultural policy in the European Union. They show that agricultural-policy reforms are determined by a complex interaction of voting rules, changes in the external environment, and the preferences of member states and of the European Commission (the agenda-setting bureaucracy in Brussels). When external changes are sufficiently large and the voting rules require approval by a simple majority rather than unanimity, the preferences of the agenda-setting bureaucracy can determine a pro-reform or anti-reform outcome.

The major reform of the European Union's agricultural policy in the 2000s, which contributed to significant reductions in RRAs and in trade distortions, is consistent with these patterns. The critical forces included increased trade tensions due to subsidized food exports, the constraints imposed by the integration of agriculture into the GATT, the pressure from the Union's nonfarm sectors to reduce farm trade distortions and budgetary outlays, the accession of new member states with more liberal policy preferences (such as Sweden) and lower-income countries (such as Poland and Romania), changes in decision-making procedures (doing away with effective veto power of member states through the unanimity rule), and changes in the EU Commission's agenda-setting procedures. In combination, these forces led to a series of reforms that induced a dramatic shift from a highly distortionary system to one that, while still involving large subsidies, results in considerably fewer trade distortions.[38]

What does our assessment suggest about the prospects for future agricultural-policy reform? Our overall message is one of cautious optimism. Evidently, some countries have not even paused at zero in their march from negative to positive RRAs. However, others (e.g., Australia and New Zealand) do appear to have converged at zero, and still others (the EU members) have been lowering their RRAs non-trivially since the late 1980s. Institutions appear to have played an important role in contributing to those reforms. Of particular importance to the decline in the RRA for the European Union has been the institution of the GATT (and now WTO). But the WTO could do much more to reduce both the mean and variance of agricultural NRAs and their dispersion across commodities, if a cooperative solution could be found in the Doha Round. More specifically, a lowering of bound tariffs and the binding of export taxes could reduce the contribution of individual countries' policies to the instability of international food prices (François and Martin 2004; Anderson and Nelgen 2012a).

[38] Evidence from other regions confirms that dramatic changes in agricultural-policy distortions have often been triggered by significant external changes, particularly crises. For example, major budgetary problems played an important role in stimulating agricultural-policy liberalization in Sweden and New Zealand in the 1980s (K. Anderson 2009). Policy reforms were also triggered by global financial (institutional/political) crises, including the financial crises in Latin America in the 1980s and in Asia in the late 1990s; the liberalization reforms after the political changes in the Soviet Union in the 1990s; and the structural-adjustment programs in Africa in the 1980s and 1990s (Bates 1989; Moyer and Josling 2002; Orden, Paarlberg, and Roe 1999). In Africa, important changes in agricultural policies in the 1980s and 1990s followed a combination of fiscal crises and democratization (Bates and Block 2010). Similarly, in China in the mid-1970s, the combination of widespread hunger in the countryside and leadership change after the death of Mao allowed major reforms to occur (Rozelle and Swinnen 2010).

The prospects for policy reform will also be influenced by the changing landscape of organized economic interests, particularly the formation of coalitions among agricultural interests and food-policy groups. Interactions between the interests of farmers and those of landowners, agribusiness, food and retail companies, and other groups have always been complex.[39] Clearly, in all countries, these interests influence agricultural-policy negotiations and debates. Moreover, their positions often shift in relation to each other. Agribusiness and food companies differ from farmers in their capital-labor ratios, their mobility, the votes they can muster, and their ability to organize. They are also typically more capital-intensive than farms, so that as the economy develops, their share of GDP declines much more slowly than does primary agriculture's share. Nevertheless, the vertical relationships between farmers and agribusinesses are often critical.[40]

Similarly, while the interests of farmers' groups have often conflicted with those of environmental groups or food consumers, the nature of these conflicts has evolved as increasing opportunities to cooperate have arisen. In high-income countries, farm organizations have often formed coalitions with environmental groups and energy interests (in particular biofuels)—and even with food consumers—as a way to sustain continuing farm subsidies. Since the 1990s, for example, some countries have increasingly insisted that agriculture deserves support because its outputs are "multifunctional." In fact, some countries have increasingly offered to pay farmers for environmental services or to support agriculture's role as a provider of local public goods. Such measures often receive political support from environmental groups (Baylis et al. 2008; OECD 2008). Furthermore, concerns regarding plant, animal, and human health often lead to import bans rather than less draconian ways of reducing the risk of importing disease (James and Anderson 1998).

Similarly, faced with dramatic food-safety crises and animal-welfare problems, farm organizations have sought to obtain political support from food consumers in order to receive subsidies to "compensate" them for the regulatory burden of tightened food-safety and animal-welfare standards (Josling, Roberts, and Orden 2004; Swinnen and Vandemoortele 2011). For example, in the case of genetically modified food, the farm lobby in Europe has joined forces with several constituencies in order to prevent domestic production and importation of products that may contain genetically modified organisms (Graff, Hochman, and Zilberman 2009; Evenson and Raney 2007). These constituencies include environmentalists concerned with the impact on the local environment of growing genetically modified crops, consumers worried about the safety of food containing genetically modified organisms, and life-science companies with patents threatened by the emergence of genetic crop-protection products.

Another issue related to potential policy reform that has received little attention is the role of bureaucratic organizations and political entrepreneurs (Rausser 1990, 1992; Rausser and Johnson 1993; Prendergast 2007). While the literature in economics and econometrics on the role of entrepreneurship has grown, the same is not true in formal political-economic studies. Political scientists may emphasize the role of individuals in narrative analyses of policy reform, but more quantitative approaches rarely do so. Nonetheless, political entrepreneurs may play a role in organizing interest groups and making their own preferences more influential.

Still another challenge is the need to distinguish between short- and long-term effects of external crises. From a dynamic perspective, a frequent approach is to analyze the pre- and

[39] The relationship between farmers, agribusinesses, food processors, and supermarkets is sometimes mentioned but seldom tested in studies. Exceptions are studies such as that of Lopez (2008), who focuses explicitly on the US food industry.

[40] The importance of vertical linkages and differentiation is emphasized, for example, by Cadot, de Melo, and Olarreaga (2004).

post-crisis periods. During the pre-crisis period, policy adjustments may "undershoot", since institutions constrain policy adjustments in response to pressures for change. Conversely, during the post-crisis period, policy adjustments may "overshoot." The latter phenomenon seems to have occurred, for example, in the transition countries of Eastern Europe, where extreme liberalization of trade policies in the early 1990s—in the wake of the dramatic changes in institutions and politics—largely eliminated agricultural market and trade distortions. As the future unfolded, however, in the mid-1990s, protection in this region gradually increased toward moderate levels (Anderson and Swinnen 2010).

Recent analysis from the World Bank data set on NRAs, as well as the OECD reporting of PSEs, has revealed declining trends for high-income countries. These recent trends for this group of countries do not necessarily reflect actual changes in their distorting policy instruments. Instead, higher world food prices largely explain these outcomes. This result is entirely consistent with the "countercyclical bias" that we have assessed in subsection 3.1. Regardless, the more recent biofuel and crop-insurance policies in the United States and other high-income countries have reversed the historical coupled-subsidy agricultural policies and their ultimate world price–depressing effects (Tyers and Anderson 1992; Rausser and de Gorter 2012).[41]

The recent shift in agricultural policies focusing on renewable energy has major implications for world food prices and security. The trade-offs between food and fuel continue to be examined (e.g., Rajagopal et al. 2009; Chakravorty, Hubert, and Nøstbakken 2009). These policy shifts also have implications for the subsidies that result from current farm-insurance programs.[42] However, unraveling these recent trends and the higher world food prices also establishes a causal connection with recent focus on biofuel and corn-ethanol energy production (Rausser and de Gorter 2012). In the case of at least the world corn commodity market, the small-country assumption invoked in the calculation of NRAs in the United States could well have been violated. Herein lies a research opportunity: to develop counterfactual world prices that net out the cloudy-measurement effects that result from active biofuel policies in high-income countries. The goal of this research would be to make as transparent as possible the continued pursuit of protectionist policies by various countries.

Along with these recent changes in high-income countries, agricultural-protection and market-distortion growth has recently emerged in two of the most important developing countries, China and India. In China's case, this protection has mainly taken the form of market-price support for outputs; in India, the increase is largely due to input subsidies. While both of these countries' reported NRAs actually fell during 2007–09 due to world price spikes, they may well rise again once international prices return to trend.

In conclusion, we find that our profession has made material progress in the political-economic analysis of agricultural and food-policy distortions across the globe. Some have suggested that the lens of political economy is depressing because it leaves little room for economists to offer policy advice. But our analysis leads to a more optimistic perspective. In particular, based on enlightened political-economic analysis, sustainable policy reform can be implemented, inter alia, by sound advice in the face of crises, by changes in governance structures, by political entrepreneurship, by provision of information and mass media, by

[41] One of the major economic motivations for the renewable-energy legislation (and the US biofuel policies that resulted) was the political desire to reduce program-commodity subsidies (deficiency payments) due to their favorable impact on the prices of corn, oilseeds, and wheat. This legislation and policies led to increased demand for corn, oilseeds, and wheat as feed-stocks for biofuel production. Between 2003 and 2012, US corn-based ethanol production increased sevenfold, EU oilseed-based biodiesel production increased sevenfold, and Brazilian sugar-based ethanol production increased threefold.

[42] As the prices of the basic commodities increase, the magnitude of such subsidies also expands (Rausser and de Gorter 2012).

effective compensation to counter recalcitrant interest groups, and by breaking up powerful coalitions that detract from the public interest. Moreover, understanding the forces that drive agricultural-policy choices can ultimately contribute to designing policy options to address a number of current global concerns, such as food security, energy security, and climate change.

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Table 1. Regression results by region to account for variations in national RRAs, 1955–2007

	Asia	Africa	Latin America	High-income countries	All focus countries
Log (real GDP per capita)	-1.85***	-0.48***	-1.63***	-1.87*	-0.713***
	(0.16)	(0.19)	(0.37)	(1.10)	(0.07)
Log (real GDP/cap.)squared	0.16***	0.045***	0.112***	0.122**	0.063***
	(0.011)	(0.014)	(0.024)	(0.058)	(0.004)
Log (arable land per capita)	-0.10***	-0.017	-0.22***	-0.31***	-0.23***
	(0.024)	(0.017)	(0.018)	(0.018)	(0.009)
Constant	4.89***	0.948	5.46***	6.90	1.38***
	(0.558)	(0.597)	(1.407)	(5.245)	(0.250)
Number of observations	405	619	295	872	2336
Adjusted R-squared	0.72	0.07	0.33	0.42	0.59

Source: Anderson, Cockburn, and Martin 2010, Table 2.12, based on data in Anderson and Valenzuela 2008.

Note: Results are calculated using ordinary least squares. Numbers in parentheses are the standard errors; *** p<0.01, ** p<0.05, * p<0.10.

Table 2. RRAs to agriculture, Asian developing economies, 1960–2009 (percent)

	1960–69	1970–79	1980–89	1990–99	2000–09
Korea	-13	42	126	180	148
Taiwan	-4	3	20	47	63
China	na	na	-54	-17	2
Indonesia	na	-19	-18	-20	-3
Malaysia	-14	-17	-6	-1	-3
Philippines	-10	-20	-5	16	10
Thailand	na	-31	-15	-11	-6
Vietnam	na	na	-19	-9	0
Bangladesh	na	-24	-15	-28	-19
India	-51	-41	-11	-13	0
Pakistan	-63	-47	-37	-29	-13
Sri Lanka	-67	-53	-45	-25	-16

Source: Updated from Anderson and Martin 2009, Table 1.17, using estimates in Anderson and Nelgen 2012b.

Table 3. NRA dispersion across covered agricultural products in focus regions, 1960–2009 (percent)

	1960–69	1970–79	1980–89	1990–99	2000–09
Africa	31	33	36	29	36
Asia	45	45	59	57	69
Latin America	59	48	48	37	41
E. Europe-Central Asia	-	-	-	48	39
Western Europe	104	99	108	75	60
United States-Canada	24	23	67	35	31
Australia-New Zealand	36	35	18	13	6
Japan	55	119	159	149	124
All focus countries (unweighted average)	**59**	**55**	**63**	**48**	**47**

Source: Updated from Anderson, Cockburn, and Martin 2010, Table 2.4, using estimates in Anderson and Nelgen 2012b.

Note: For each region, dispersion is a simple average of the country-level annual standard deviations around a production-weighted mean of NRAs, across covered products, per country, per year.

Table 4. National NRA deviation and weighted-average NRAs for 10 key commodities in developing and high-income countries, 1965–1984 and 1985–2010 (percent)

	Deviation of national NRAs				Weighted average of NRAs			
	Developing countries		High-income countries		Developing countries		High-income countries	
	1965–84	1985–09	1965–84	1985–10	1965–84	1985–09	1965–84	1985–10
Rice	32	59	66	186	-20.1	0.9	136.8	351.8
Wheat	33	43	52	76	5.5	9.1	12.2	20.5
Maize	36	33	40	48	-3.4	2.3	6.9	11.9
Soybean	46	120	75	54	2.7	-2.1	0.1	5.2
Sugar	53	64	168	152	17.2	18.0	107.6	108.1
Cotton	38	32	42	30	-16.0	-2.7	21.3	10.4
Coffee	41	29	na	na	-37.3	-11.6	na	na
Beef	45	56	84	109	-12.4	2.6	22.7	37.9
Pork	81	58	73	69	23.6	-4.6	37.1	15.0
Poultry	109	69	91	175	26.3	11.8	24.5	25.4

Source: Updated from Anderson, Cockburn, and Martin 2010, Table 2.6, using estimates in Anderson and Nelgen 2012b.

Note: Deviation, measured in NRA percentage points, is computed as the absolute value of (residual − trend NRA), where national-trend NRA in each of the two subperiods is obtained by ordinary-least-squares linear regression of the national NRA on time. Estimates shown are an unweighted average of national NRA deviations each year, averaged over the number of years in each period.

Table 5. Global averages of national price-transmission elasticities for 10 key agricultural products in 82 focus countries, 1985–2010

	Coeff. of corr. between NRA and int'l price	Short-run price-transmission elasticity
Rice	-0.85	0.49
Wheat	-0.48	0.55
Maize	-0.41	0.63
Soybean	-0.38	0.73
Sugar	-0.80	0.43
Cotton	-0.08	0.57
Milk	-0.74	0.71
Beef	-0.50	0.66
Pork	-0.43	0.51
Poultry	-0.70	0.68
Unweighted average, ten products	**-0.54**	**0.56**

Source: Anderson and Nelgen 2012a.

Note: Short-run price-transmission elasticity is the weighted average of national elasticities for the period 1985–2010, using the value of national production at undistorted prices as weights. The elasticities are based on partial adjustment according to a geometric distributed lag formulation (Nerlove 1972).

Table 6. Annual NACs for all 75 covered agricultural products by country group, 1972–1976, 1984–1988, and 2005–2009

	1972	1973	1974	1975	1976	1984	1985	1986	1987	1988	2005	2006	2007	2008	2009
World importers	1.51	1.31	1.23	1.40	1.60	1.73	1.88	2.06	2.24	1.88	1.56	1.43	1.37	1.28	1.30
World exporters	0.95	0.83	0.81	0.87	0.80	0.86	1.00	1.17	1.16	1.05	1.15	1.12	1.14	1.08	1.07
High-income countries	1.46	1.34	1.26	1.40	1.61	1.77	1.91	2.19	2.37	1.97	1.41	1.32	1.28	1.21	1.19
Developing countries	1.02	0.88	0.86	0.95	0.93	0.99	1.09	1.10	1.11	1.05	1.23	1.18	1.17	1.11	1.15
Asia	1.30	1.04	0.98	1.09	1.16	1.29	1.45	1.46	1.42	1.36	1.45	1.50	1.37	1.21	1.38
Africa	0.90	0.80	0.78	0.83	0.80	0.80	0.85	0.90	0.97	0.91	1.16	1.08	1.10	1.07	1.04
Latin America	1.01	0.92	0.92	1.08	1.06	1.10	1.28	1.16	1.03	0.99	1.04	1.03	0.93	0.91	1.03

Source: Updated from Anderson and Nelgen 2012a, based on NRA estimates from Anderson and Nelgen 2012b.

Note: NAC = 1 + NRA/100. The national NACs are unweighted averages. International agricultural prices spiked upwards in 1974 and 2008 and downwards in 1986.

Table 7. Contributions to total TRIs from various policy instruments in developing and high-income countries, 1965–2010 (percent)

Developing countries	1965-1971	’72	’73	’74	’75	’76	1977-1983	’84	’85	’86	’87	’88	1989-2004	’05	’06	’07	’08	’09
Import tax	9	13	3	2	10	11	9	10	13	14	16	11	9	5	6	5	3	5
Export tax	19	15	29	32	26	17	22	28	20	26	32	30	9	3	4	11	13	10
Import subs.	-3	-3	-8	-7	-3	-2	-4	-2	-2	-1	-2	-2	-2	0	-1	-2	-2	-2
All measures	**25**	**22**	**20**	**28**	**37**	**25**	**27**	**39**	**32**	**38**	**45**	**39**	**15**	**5**	**4**	**11**	**11**	**9**

High-income countries	1965-1971	’72	’73	’74	’75	’76	1977-1983	’84	’85	‘86	’87	’88	1989-2004	’05	’06	’07	’08	’09	’10
Import tax	36	30	21	17	25	36	38	41	42	62	61	52	36	17	13	10	0	1	1
Export subs.	-4	-4	-2	-1	-2	-2	-3	-3	-5	-8	-8	-6	-3	-1	-1	-1	0	0	0
All measures	**31**	**25**	**16**	**13**	**22**	**33**	**34**	**37**	**37**	**54**	**55**	**48**	**33**	**15**	**12**	**9**	**0**	**1**	**1**

Source: Updated from Anderson and Nelgen 2012a, based on NRA estimates from Anderson and Nelgen 2012b.

Note: International agricultural prices spiked upwards in 1974 and 2008 and downwards in 1986. “All measures” includes farm domestic support/tax measures. Trade tax equivalents of quantitative measures are included in the trade tax rows.

Appendix: List of 82 Countries in the Updated Agricultural Distortions Database[a]

Sub-Saharan African developing
Benin
Burkina Faso
Cameroon
Chad
Côte d'Ivoire
Ethiopia
Ghana
Kenya
Madagascar
Mali
Mozambique
Nigeria
Senegal
South Africa
Sudan
Tanzania
Togo
Uganda
Zambia
Zimbabwe

Asian developing
Bangladesh
China
India
Indonesia
Korea, Rep. of
Malaysia
Pakistan
Philippines
Sri Lanka
Taiwan, China
Thailand
Vietnam

Latin American developing
Argentina
Brazil
Chile
Colombia
Dominican Republic
Ecuador
Mexico
Nicaragua

European transition and Mediterranean
Bulgaria
Czech Republic
Egypt, Arab Rep. of
Estonia
Hungary
Israel
Kazakhstan
Latvia
Lithuania
Morocco
Poland
Romania
Russian Federation
Slovak Republic
Slovenia
Turkey
Ukraine

Other high-income countries
Australia
Austria
Belgium
Canada
Cyprus
Denmark
Finland
France
Germany
Greece
Iceland
Ireland
Italy
Japan
Luxembourg
Malta
Netherlands
New Zealand
Norway
Portugal
Spain
Sweden
Switzerland
United Kingdom
United States

[a] NRA updates are computed in part from OECD (2011) PSEs for all high-income and European transition countries, plus Brazil, Chile, China, Israel, Korea, Mexico, South Africa, and Turkey.

Source: Anderson and Nelgen 2012b.

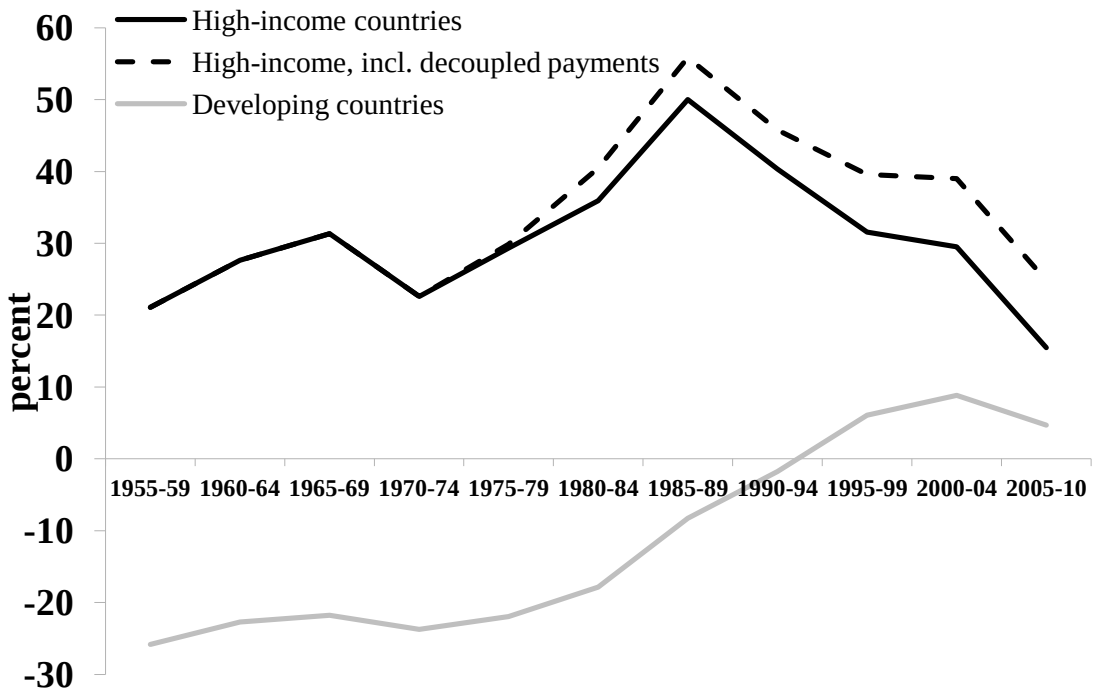
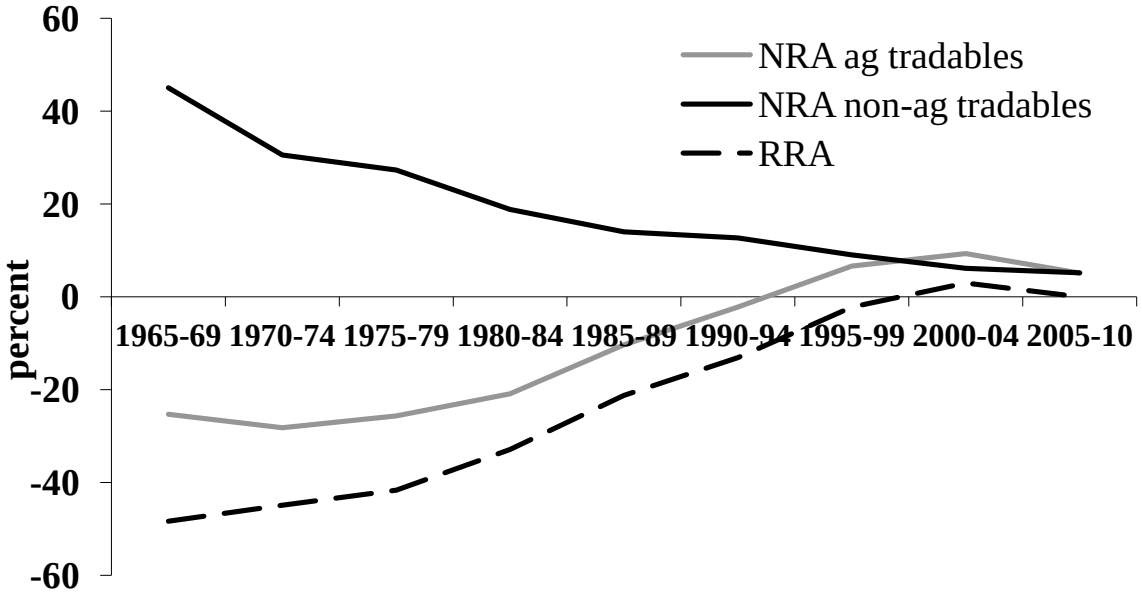


Figure 1. NRAs to agriculture in high-income (HIC), transition (ECA),[a] and developing countries, 1955–2010 (%). Five-year weighted averages, with decoupled payments included in the dashed line.

[a] ECA is a term used by the World Bank to denote the transitional economies of Central and Eastern Europe and Central Asia.

Source: Anderson 2009, Chap. 1, updated from estimates in Anderson and Nelgen 2012b.

(a) Developing countries



(b) High-income countries

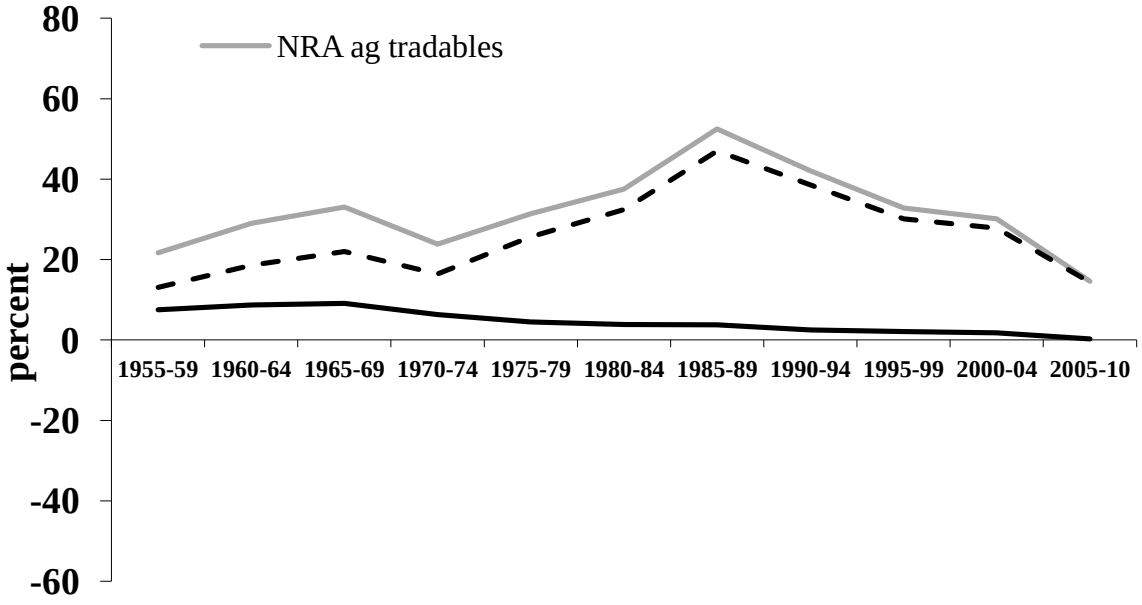
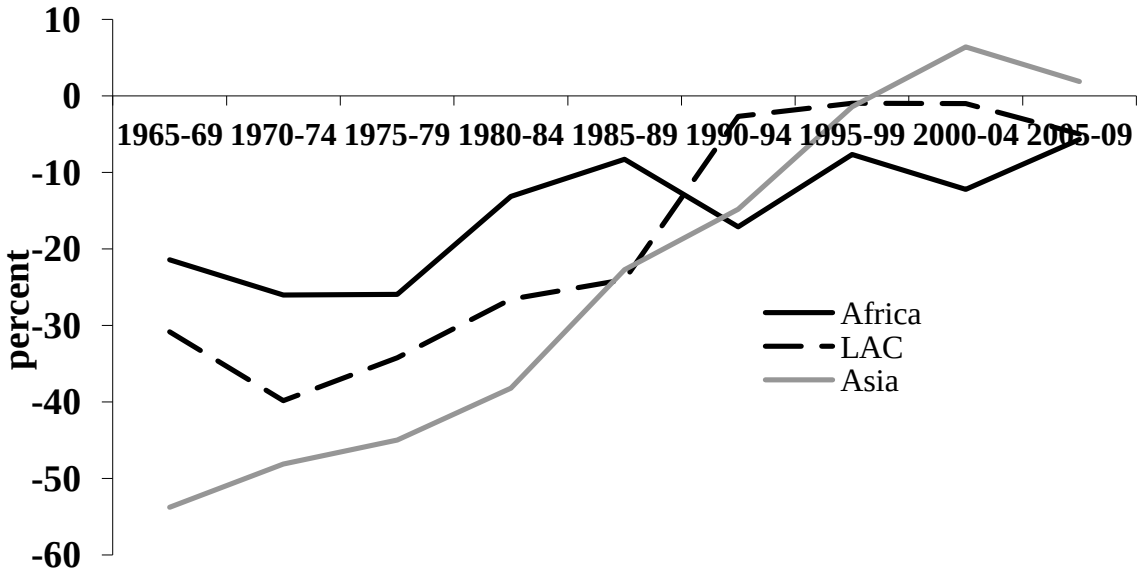


Figure 2. Developing and high-income countries' NRAs to agricultural and non-agricultural tradable sectors, and RRAs, 1955–2010 (%). Calculations use farm production–weighted averages across countries. RRA is defined as $100*[(100+NRAag^t)/(100+NRAnonag^t)-1]$, where $NRAag^t$ and $NRAnonag^t$, respectively, are the percentage NRAs for the tradable segments of the agricultural and non-agricultural sectors.

Source: Anderson 2009, Chap. 1, updated from estimates in Anderson and Nelgen 2012b.

(a) Developing countries



(b) High-income countries

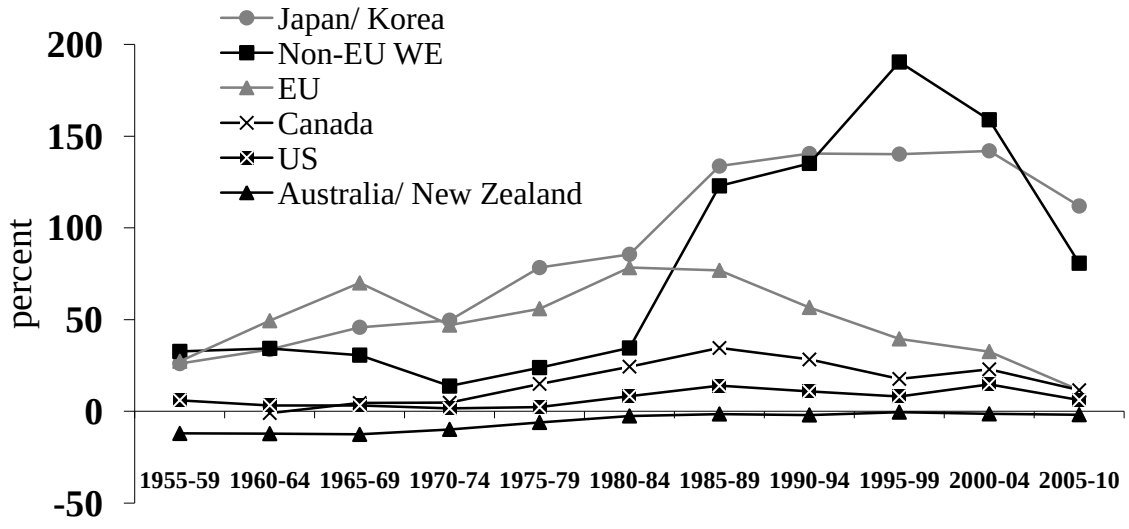
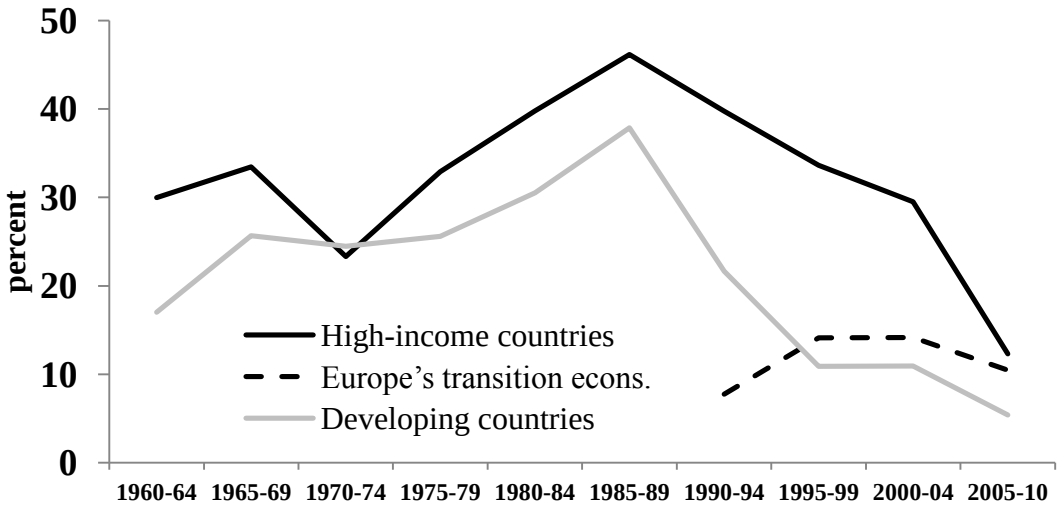


Figure 3. Developing and high-income countries' RRAs to agriculture by region, 1955–2010 (%). Calculations use farm production–weighted averages across countries.

Source: Anderson 2009, Chap. 1, updated from estimates in Anderson and Nelgen 2012b.

(a) Trade-reduction index



(b) Welfare-reduction index

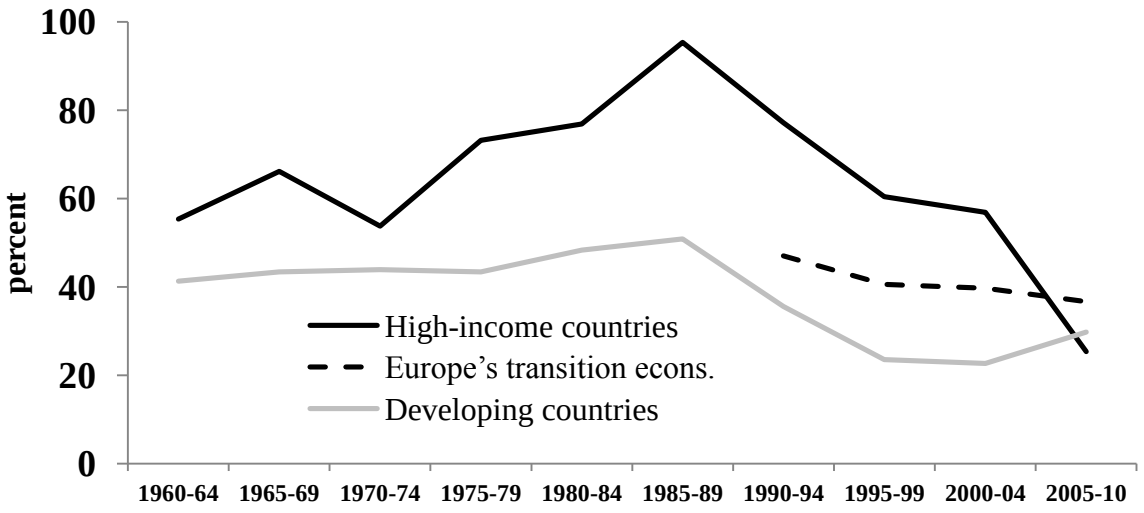


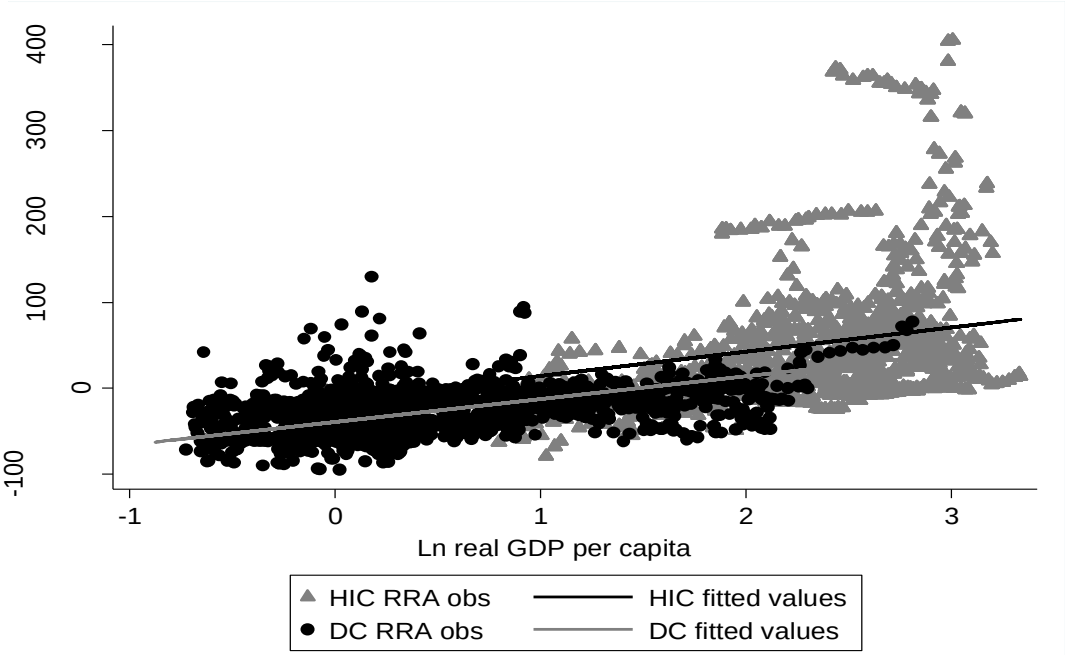
Figure 4. TRIs and WRIs among high-income, transition, and developing countries for tradable farm products, 1960–2010 (%).

Source: Lloyd, Croser, and Anderson 2010, based on time-series estimates in Anderson and Croser 2009, and updated using Anderson and Nelgen 2012b.

Figure 5. RRAs by country, 2005–10.

Source: Updated from Anderson 2009, Chap. 1, using Anderson and Nelgen 2012b.

(a) RRAs (%) and log of real GDP per capita



(b) RRAs (%) and agricultural comparative advantage

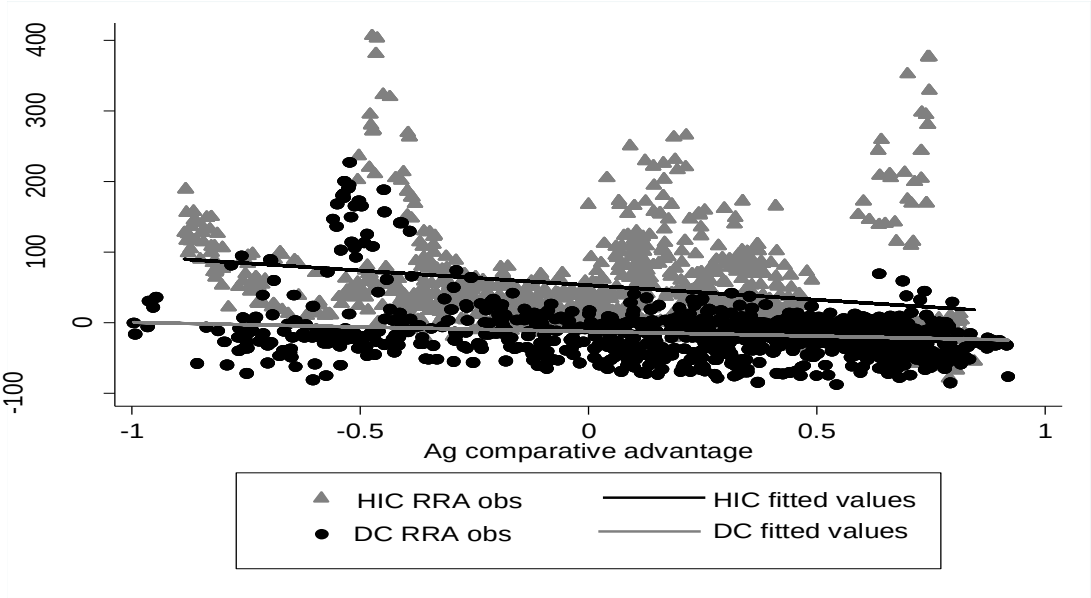


Figure 6. RRAs (%) mapped on real GDP per capita and agricultural comparative advantage, 1955–2007. Agricultural comparative advantage is defined as agricultural net exports divided by the sum of agricultural exports and imports.

Source: Anderson 2010, Figs. 2.2 and 2.3.

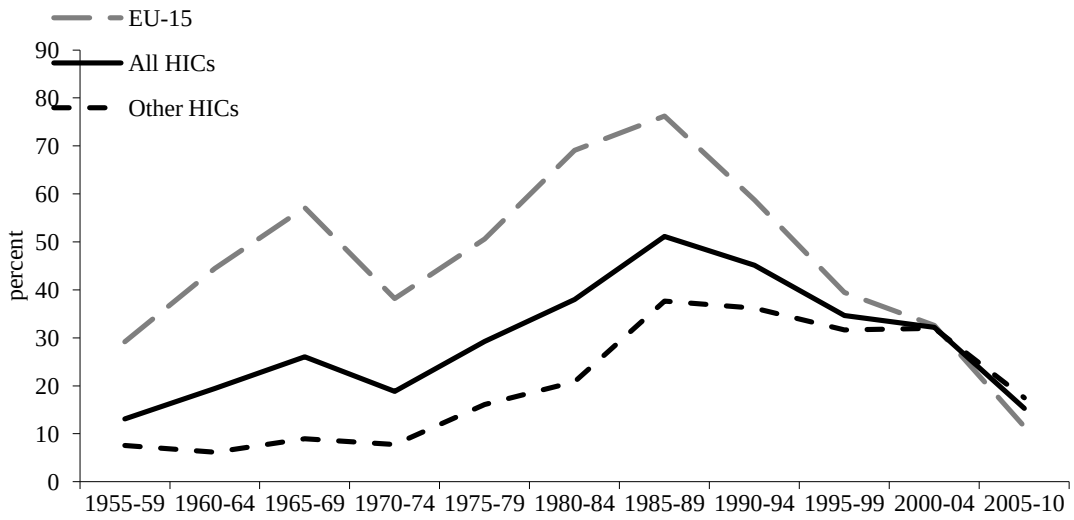


Figure 7. RRAs to agriculture, including decoupled supports, among EU-15, all high-income, and non–EU15 countries, 1955–2010 (%).

Source: Authors' compilation, from estimates in Anderson and Nelgen 2012b.

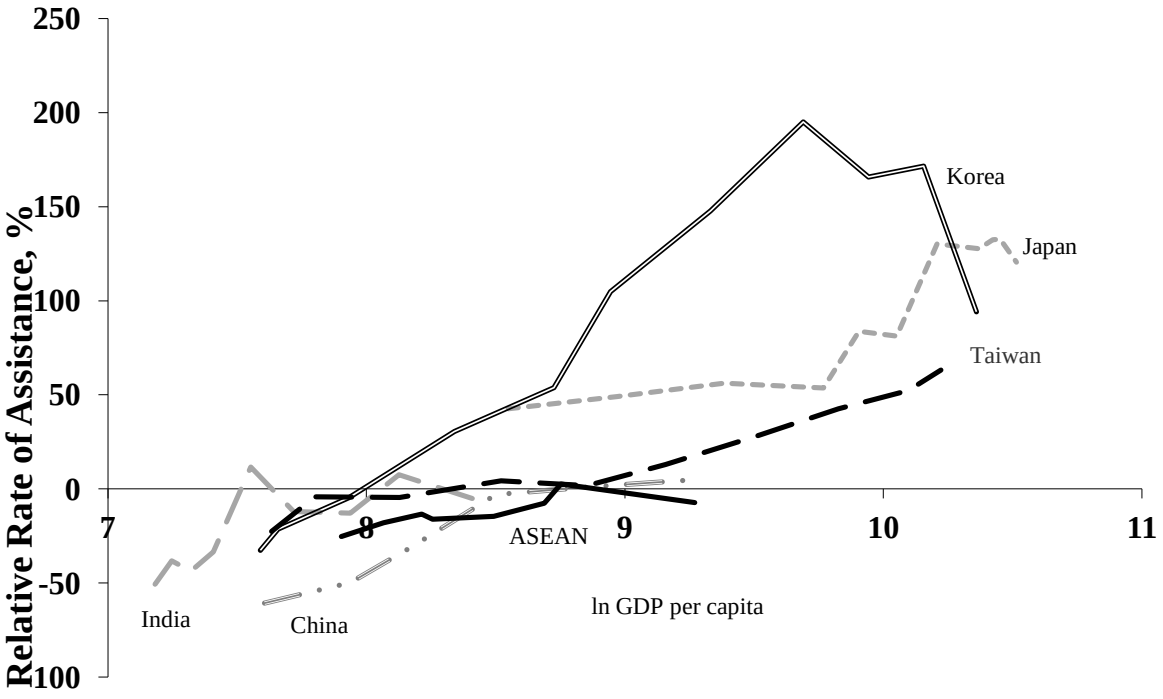
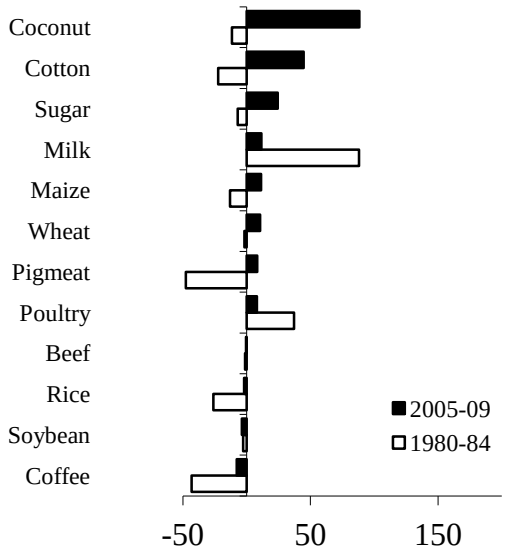


Figure 8. RRAs (%) to agriculture and log of real per capita GDP among large Asian economies, 1955[a]–2010. The GDP per capita data are in 1990 international Geary-Khamis dollars, updated from Maddison 2010.

[a] Because RRA estimates are lacking for earlier years, the starting dates for India are 1965, for ASEAN 1970, and for China 1981.

Source: Updated from Anderson and Martin 2009, Chap. 1, using Anderson and Nelgen 2012b.

(a) Developing countries



(b) High-income countries

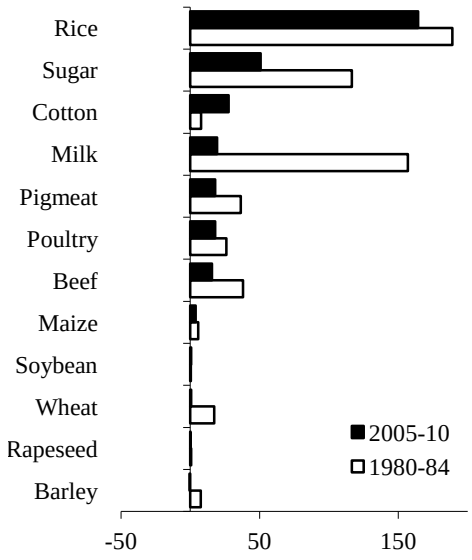
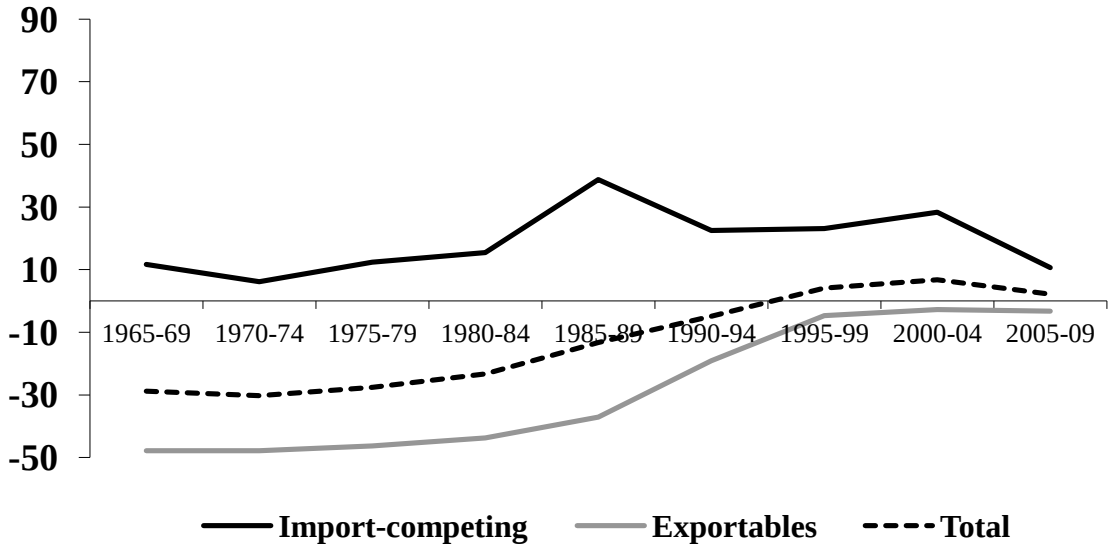


Figure 9. Comparison of earlier (1980–84) and more recent (2005–10) NRAs in developing and high-income countries, by product (%).
Source: Anderson, Cockburn, and Martin 2010, Fig. 2.6, updated using Anderson and Nelgen 2012b.

(a) Developing countries



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

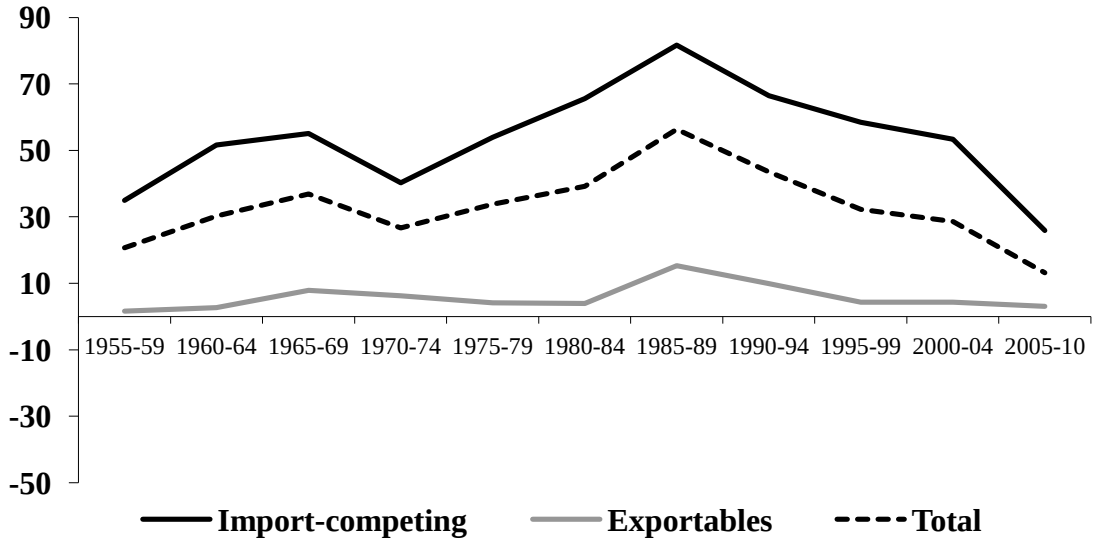


Figure 10. NRAs to exportable, import-competing, and all covered agricultural products in (a) developing and (b) high-income and European transition economies, 1955–2010 (%). Five-year weighted averages for covered products only. The total also includes nontradables. The straight line in the upper segment of each graph represents an ordinary-least-squares regression based on annual NRA estimates.
Source: Anderson 2009, Chap. 1, updated using Anderson and Nelgen 2012b.

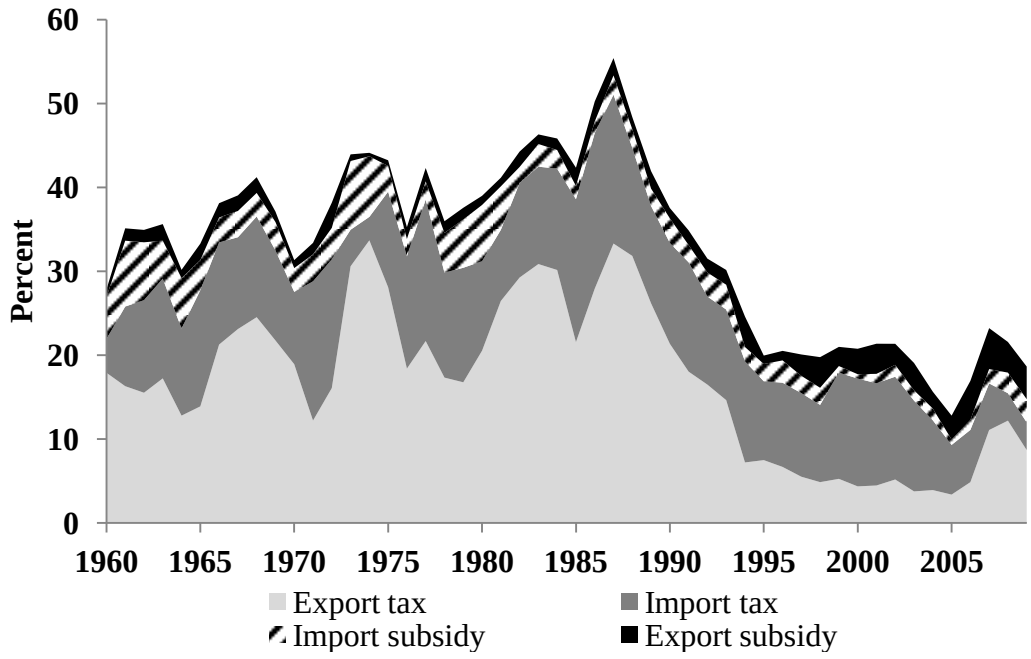


Figure 11. Contributions of various instruments to the border component of the welfare reduction index (WRI) for developing countries, 1960–2010 (%).

Source: Derived from estimates reported in Croser and Anderson 2011, updated using Anderson and Nelgen 2012b.

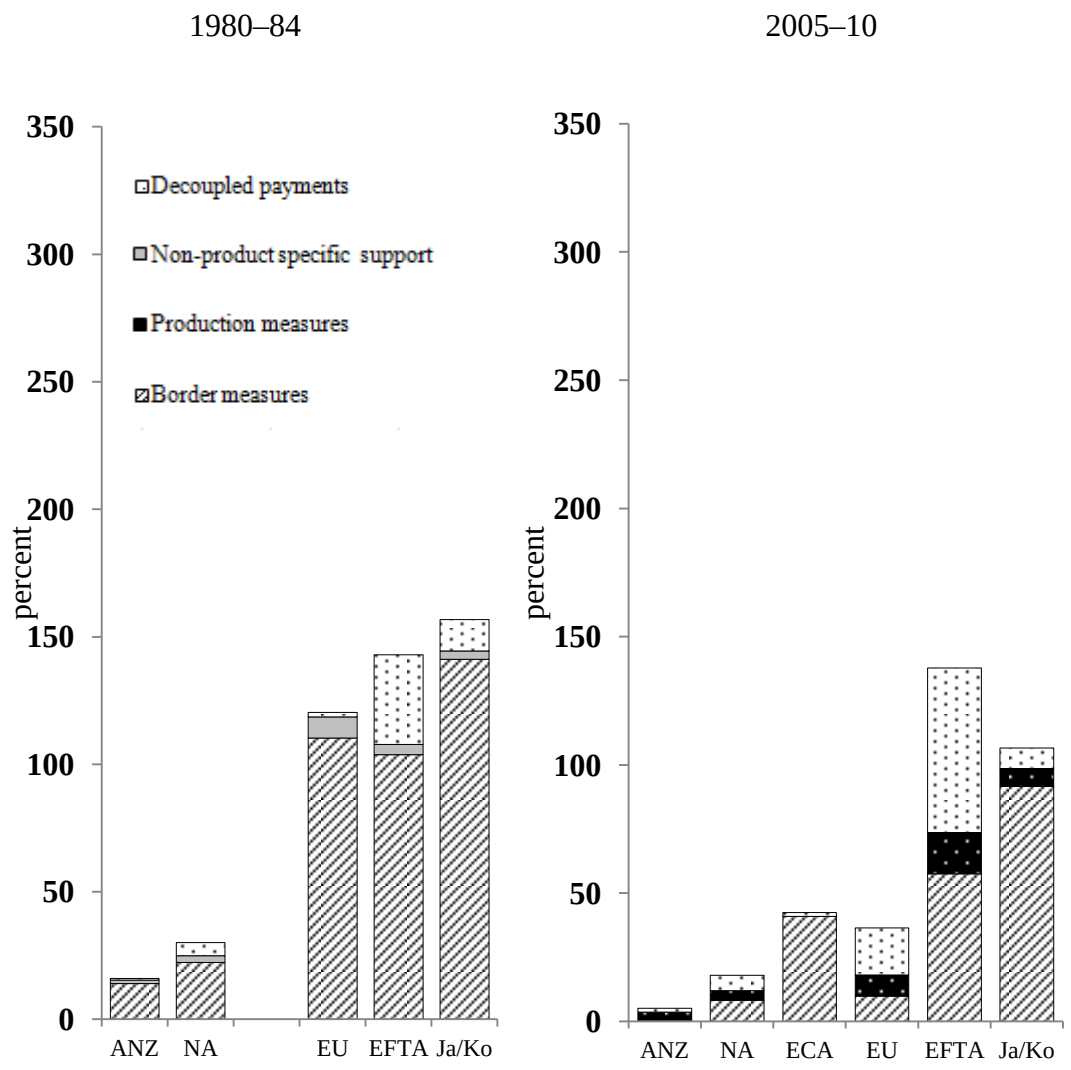


Figure 12: Comparison of earlier (1980–84) and more recent (2005–10) contributions of various policy instruments to the producer component of the welfare reduction index (WRI) for selected high-income and transition countries (%).

Source: Croser and Anderson 2011, updated using Anderson and Nelgen 2012b.

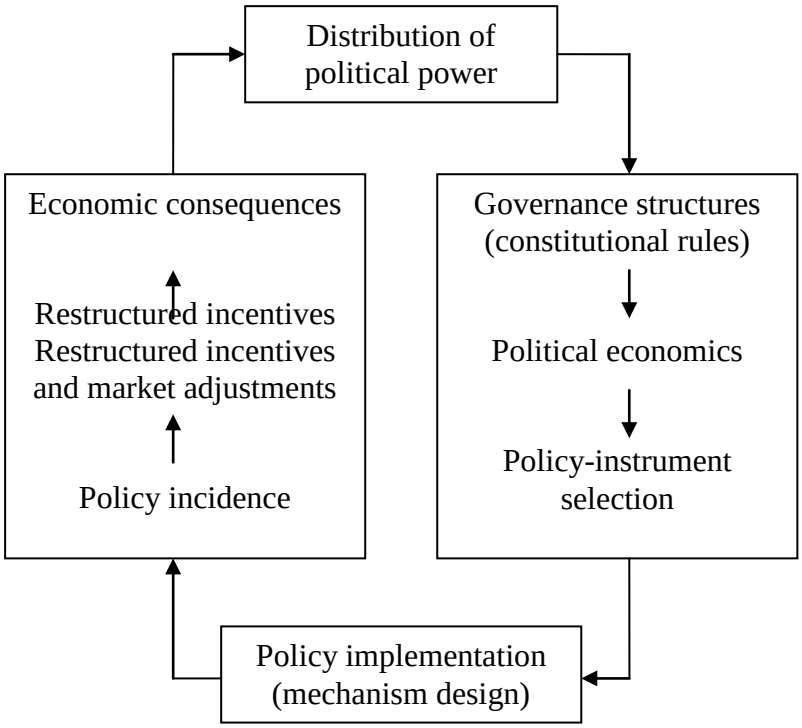


Figure 13. The policy-making process and its economic consequences.

Source: Rausser, Swinnen, and Zusman 2011, p. 4.