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Agricultural Price Distortions: Trends and Volatility, Past and Prospective

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Abstract: Historically, earnings from farming in many developing countries have been depressed by a pro-urban bias in own-country policies, as well as by governments of richer countries favouring their farmers with import barriers and subsidies. Both sets of policies reduced global economic welfare and agricultural trade, and added to global inequality and poverty. Over the past three decades, much progress has been made in reducing agricultural protection in high-income countries and agricultural disincentives in developing countries. However, plenty of price distortions remain. As well, the propensity of governments to insulate their domestic food market from fluctuations in international prices has not waned. Such insulation contributes to the amplification of international food price fluctuations, yet it does little to advance national food security when food-importing and food-exporting countries equally engage in insulating behaviour. Thus there is still much scope to improve global economic welfare via multilateral agreement not only to remove remaining trade distortions but also to desist from varying trade barriers when international food prices gyrate. This paper summarizes indicators of trends and fluctuations in farm trade barriers before examining unilateral or multilateral trade arrangements, together with complementary domestic measures, that could lead to better global food security outcomes.

JEL codes: F13, F14, Q17, Q18.

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Introduction

The responses of numerous governments to recent spikes in international food prices have brought agricultural price and trade policies back into the spotlight. Food-importing developing countries have accused agricultural-exporting countries of exacerbating food security concerns by restricting exports, while other exporters fear such restrictions will lead to a retreat from reliance on international markets as food-deficit countries seek greater self-sufficiency when prices return to trend. Meanwhile, food-importing countries have reduced their import restrictions and a few have even subsidized imports of their staple food, adding to the international food spike.

These recent short-run responses and their possible long-run protectionist consequences beg the question of how governments responded in the past to international food price trends and fluctuations. There was a long downward trend in those prices until the mid-1980s, apart from a spike around 1974, and then a flat period for nearly twenty years (Pfaffenzeller, Newbolt and Rayner 2007) – but then what appears to be an upward trend, with spikes in 2008, 2010/11 and late 2012. This paper reviews past policies by drawing on a global database on agricultural price distortions to see how governments dealt with those price trends and spikes.

Agricultural protection and subsidies in high-income (and some middle-income) countries have been depressing international prices of farm products for many decades, thereby lowering the earnings of farmers and associated rural businesses in developing countries (Johnson 1991; Tyers and Anderson 1992). Those policies almost certainly added

to global inequality and poverty, since historically at least three-quarters of the world's poorest people have depended directly or indirectly on agriculture for their main income (Ravallion, Chen and Sangraula 2007; World Bank 2007). As well as this external adverse influence on incomes of farmers in developing countries, their own governments taxed them during most of the past half-century. This involved both directly taxing farm exports and in some cases production (in-kind), as well as harming farmers indirectly by pursuing an import-substituting industrialization strategy, predominantly by restricting imports of manufactures and overvaluing their exchange rates (Krueger, Schiff, and Valdés 1988, 1991). Another consequence of those price-distorting policies was that they reduced the quantity of farm products traded internationally. Such 'thinning' of the international market meant that its prices have been more volatile than they otherwise would have been, adding to the influence of the 'insulating' feature of farm policies.

Since the mid-1980s, however, many developing country governments have been reforming their agricultural, trade and exchange rate policies, thereby reducing their anti-agricultural bias, and some high-income countries have reduced their farm price supports too, making it easier for developing countries to compete in the international market. Plenty of diversity in distortions remains across countries and across commodities within each country though, so a continuation of the reform process would still expand farm trade, 'thicken' international food markets, and thus not only raise the mean but also lower the volatility of prices in those markets. Moreover, the 'insulating' feature of farm policies has not diminished in either high-income or developing countries, so that continues to contribute non-trivially to the volatility to international food prices too.

This paper reviews evidence compiled and recently updated by the World Bank on those evolving patterns of distortions to agricultural incentives. The empirical indicators provided in that database are first outlined, before summarizing trends since the mid-1950s in

national distortions, followed by a review of government responses to fluctuations and their effects on international food prices. This is followed by a brief assessment of how the changing structure of the world economy and international trade will affect the likely patterns of national trade-related policies over the next decade or two. The paper concludes by arguing that new domestic social protection policy options are now available to reduce food insecurity in developing countries, making it more feasible for multilateral action to phase out remaining distortionary farm trade policies.

Indicators of National Distortions to Agricultural Prices

To gauge how farmer incentives in high-income and developing countries have evolved since the 1950s, we draw on time series evidence from a recent World Bank study compiled by Anderson and Valenzuela (2008), summarized in Anderson (2009), and updated to 2009/10 by Anderson and Nelgen (2012b). These estimates cover 82 countries which together account for more than 90 percent of global agriculture, population, employment, GDP and poverty. The key indicator is the nominal rate of assistance (NRA), defined as the percentage by which national government policies raise gross returns to farmers above what they would be without the government's intervention – or lowered them, if $NRA < 0$ (see Anderson et al. 2008 for methodological details).

If a trade measure is the sole source of government intervention for a particular product, then the measured NRA will also be the consumer tax equivalent (CTE) rate at that same point in the value chain for that product. But where there are also domestic producer or consumer taxes or subsidies, the NRA and CTE will no longer be equal and at least one of them will be different from the price distortion at the border due to trade measures. Both are expressed as a percentage of the undistorted price. Each industry is classified either as

import-competing, or a producer of exportables, or as producing a nontradable (with its status sometimes changing over the years), so as to generate for each year the weighted average NRAs for the two different groups of tradables.

In the Anderson and Valenzuela (2008) database, which covers up to 2004 for developing countries and to 2007 for high-income and transition economies, it turns out that the NRA and CTE are very highly correlated for most products in all countries. For that reason, only producer distortions were estimated in the update to 2009 for developing countries by Anderson and Nelgen (2012b). For high-income and transition economies and a few of the largest developing countries the update is to 2010 and, as with the earlier Anderson/Valenzuela database, is based on the producer and consumer support estimates of the OECD (2011).

The coverage of products for NRA estimates averages around 70 percent of the gross value of farm production in each country. Authors of the country case studies also provide ‘guesstimates’ of the NRAs for non-covered farm products. Weighted averages for all agricultural products are then generated, using the gross values of production at unassisted prices as weights. For countries that also provide non-product-specific agricultural subsidies or taxes (assumed to be shared on a pro-rata basis between tradables and nontradables), such net assistance is then added to product-specific assistance to get a NRA for total agriculture. Also provided, but as a separate add-on, are so-called decoupled measures such as whole-farm payments that in principle do not distort prices.

Farmers are affected not just by prices of their own outputs but also by the incentives nonagricultural producers face. That is, it is *relative* prices and hence *relative* rates of government assistance that affect producer incentives (Lerner 1936; Vousden 1990, pp. 46-47). If one assumes that there are no distortions in the markets for nontradables and that the value shares of agricultural and non-agricultural nontradable products remain constant, then

the economy-wide effect of distortions to agricultural incentives can be captured by the extent to which the tradable parts of agricultural production are assisted or taxed relative to producers of non-farm tradables. By generating estimates of the average NRA for non-agricultural tradables, it is then possible to calculate a Relative Rate of Assistance, RRA, defined in percentage terms as:

$$RRA = 100[(1+NRA_{ag}^t/100)/(1+NRA_{nonag}^t/100) - 1]$$

where NRA_{ag}^t and NRA_{nonag}^t are the weighted average percentage NRAs for the tradable parts of the agricultural and non-agricultural sectors, respectively. If both of those sectors are equally assisted, the RRA is zero; and if it is below (above) zero, it provides an internationally comparable indication of the extent to which a country's policy regime has an anti- (pro-) agricultural bias (Anderson et al. 2008).¹

In summarizing pertinent empirical findings from that World Bank study, it is helpful to begin with NRA estimates for the farm sector and then turn to RRA estimates.

National Distortions to Farmer Incentives: Trends Since the mid-1950s

Domestic prices exceeded international market prices for grains and livestock products in both Japan and the European Community in the 1950s, although by less than 40 percent. However, by the early 1980s the difference was more than 80 percent for Japan but was still around 40 percent for the EC—and was still close to zero for the agricultural-exporting rich countries of Australasia and North America (Anderson, Hayami and Others 1986, Table 2.5).

¹ In calculating the NRA for producers of agricultural and non-agricultural tradables, the methodology also includes the implicit trade tax distortions generated by dual or multiple exchange rates, drawing on Dervis, de Melo and Robinson (1981).

Virtually all of that assistance to Japanese and European farmers in that period was due to restrictions on imports of farm products.

Since 1986 the OECD has been computing annual producer and consumer support estimates (PSEs and CSEs) for its member countries (OECD 2011). For the group as a whole, producer support rose between 1986–88 and 2008–10 in US dollar terms (from \$239 to \$246 billion) but, when expressed as a share of support-inclusive returns to farmers, it has come down (from 37 to 20 percent). Because of some changes in support instruments, including switching to measures that are based on non-current production or on long-term resource retirement, the share of that assistance provided via market price support measures has fallen from three-quarters to one-half. When the PSE payment is expressed as a percentage of undistorted prices to make it like an NRA, the fall is from 59 to 25 percent between 1986–88 and 2008–10 (OECD 2011). This indicator suggests high-income country policies have become considerably less trade-distorting, at least in proportional terms, even though farmer support in high-income countries has continued to grow in dollar terms because of growth in the value of their farm output.

As for developing countries outside Northeast Asia, the main comprehensive set of pertinent estimates over time was, until recently, for the period just prior to when reforms became widespread. They were generated as part of a major study of 18 developing countries from the 1960s to the mid-1980s by Krueger, Schiff, and Valdés (1988, 1991). That study by the World Bank, whose estimates are summarized in Schiff and Valdés (1992), shows that the depression of incentives facing farmers has been due only partly to various forms of agricultural price and trade policies, including subsidies to food imports. Much more important in many cases have been those developing countries' non-agricultural policies that hurt their farmers indirectly. The two key ones have been manufacturing protectionism

(which attracts resources from agriculture to the industrial sector) and overvalued exchange rates (which attract resources to sectors producing non-tradables, such as services).

The more-recent World Bank database, as updated by Anderson and Nelgen (2012b), covers 45 developing countries but also 13 European transition economies as well as 24 high-income countries. The results from that study² do indeed reveal that there have been substantial reductions in distortions to agricultural incentives in developing countries over the past two to three decades. They also reveal that progress has not been uniform across countries and regions, and that the reform process is far from complete. More specifically, many countries still have a wide dispersion in NRAs for different farm industries and in particular have a strong anti-trade bias in the structure of assistance within their agricultural sector; and some countries have “overshot” in the sense that they have moved from having an average relative rate of assistance to farmers that was negative to one that is positive, rather than stopping at the welfare-maximizing rate of zero. Moreover, the variance in rates of assistance across commodities within each country, and in aggregate rates across countries, remains substantial.

The global summary of those new results is provided in Figure 1. It reveals that the nominal rate of assistance (NRA) to farmers in high-income countries rose steadily over the post-World War II period through to the end of the 1980s, apart from a dip when international food prices spiked around 1973-74. After peaking at more than 50 percent in the

² A global overview of the results to 2007 is provided in Anderson (2009), and the detailed country case studies are reported in four regional volumes covering Africa (Anderson and Masters 2009), Asia (Anderson and Martin 2009), Latin American (Anderson and Valdés 2008), and Europe’s transition economies (Anderson and Swinnen 2008). Background papers and databases, including for the updated estimates by Anderson and Nelgen (2012b), are freely available at www.worldbank.org/agdistortions, as are e-book versions of the regional volumes. A comparison of these estimates with the earlier ones by Krueger, Schiff, and Valdés is available in Anderson (2010a).

mid-1980s, when international food prices were at a near-record low, the average NRA for high-income countries has fallen substantially. This is so even when the new farm programs that are somewhat ‘decoupled’, in the sense of no longer influencing production decisions, are included. For developing countries, too, the average NRA for agriculture has been moving towards zero, but from a level of around –25 percent between the mid-1950s and early 1980s. Indeed it ‘overshot’ in the 1990s although it is still less than half the average NRA for high-income countries.

The developing country average NRA conceals the fact that the exporting and import-competing subsectors of agriculture have very different NRAs. While the average NRA for exporters in developing countries has been negative throughout (coming back from –50 percent in the 1960s and 1970s to almost zero in 2000–09), the NRA for import-competing farmers in developing countries has fluctuated around a trend rise from 10 and 30 percent (and it even reached 40 percent in the years of low international prices in the mid-1980s). This suggests that export-focused farmers in developing countries are still discriminated against in two respects: by the anti-trade structure of assistance within their own agricultural sectors, and by the protection still afforded farmers in high-income countries. That anti-trade bias also reflects the more-general fact that NRAs are not uniform across commodities, which in turn indicates that resources within the farm sector of each country are not being put to their best use (Lloyd 1974). The extent of that extra inefficiency, over and above that due to too many or too few resources in aggregate in the sector, is indicated by the standard deviation of NRAs among covered products in each focus country. This dispersion index has fluctuated between 43 and 60 percent throughout the covered period, and has not diminished as NRAs have approached zero over the past 25 years (Anderson 2009, Table 1.6).

The improvement in farmers’ incentives in developing countries is understated by the above NRA estimates, because those countries have also reduced their assistance to

producers of non-agricultural tradable goods, most notably manufactures. The decline in the weighted average NRA for the latter, depicted in Figure 2, was clearly much greater than the increase in the average NRA for tradable agricultural sectors for the period to the mid-1980s, consistent with the finding of Krueger, Schiff, and Valdés (1988, 1991). For the period since the mid-1980s, changes in both sectors' NRAs have contributed almost equally to the improvement in farmer incentives. The Relative Rate of Assistance for developing countries as a group went from -46 percent in the second half of the 1970s to just above zero in the first decade of the present century. This increase (from a coefficient of 0.54 to 1.01) is equivalent to an almost doubling in the relative price of farm products, which is a huge change in the fortunes of developing country farmers in just a generation. It needs to be kept in mind, however, that within the developing country group the spectrum of national RRA estimates remains very wide (Figure 3), indicating great scope still for global economic welfare gains from further farm trade liberalization. Such reform not only would raise the mean level of real incomes, but also would reduce the variance of international food prices by 'thickening' international food markets: according to global economy-wide modelling results reported in Valenzuela, van der Mensbrugge and Anderson (2009), liberalization of remaining trade barriers as of 2004 would raise the share of farm production exported globally from 8 to 13 percent. Furthermore, such reform would reduce global income inequality and poverty, according to a follow-up study using numerous global and national economy-wide models all calibrated to 2004 and incorporating the same World Bank estimates of national price distortions as discussed above (Anderson, Cockburn and Martin (2010, 2011).

Government Responses to Fluctuations and Spikes in International Food Prices

National governments evidently dislike domestic food price volatility, since they tend to transmit less than fully any fluctuations around trend levels of international food prices. This tendency means the estimated NRA for each product – the percentage by which the domestic price exceeds the border price – also fluctuates from year to year around its long-run trend, and in the opposite direction to the international price. This propensity has not diminished in either developing or high-income countries as part of the trade-related policy reforms that began in the mid-1980s (Anderson and Nelgen 2012a). To estimate the proportion of any international price fluctuation that is transmitted to domestic markets within twelve months, Anderson and Nelgen (2012c) follow Nerlove (1972) and Tyers and Anderson (1992, pp. 65-75) in using a partial-adjustment geometric distributed lag formulation to estimate short-run transmission elasticities for each of nine key traded food products for all focus countries for the period 1985 to 2010. Those elasticity estimates range from 0.73 for soybean down to just 0.43 for sugar. The unweighted average across those nine products is 0.56, suggesting that, within one year, barely half the movement in international prices of primary food products is transmitted to domestic markets on average.

When some governments alter the restrictiveness of their food trade measures to insulate their domestic markets somewhat from international price fluctuations, the volatility faced by other countries is amplified. That reaction therefore prompts more countries to follow suit. The irony is, however, that when both food-exporting and food-importing countries so respond, each country group undermines the other's attempts to stabilize its domestic markets. That is to say, what seems like a solution to each importing (or exporting) country's concern *if it were acting alone* turns out to be less effective, the more exporting (or importing) countries respond – presumably for the same political economy reasons – in a similar way.

To see this more clearly, Martin and Anderson (2012) consider the situation in which a severe weather shock at a time of low global stocks causes the international food price to suddenly rise. If national governments wish to avert losses for domestic food consumers, and they do so by altering their food trade restrictions (raising export taxes or lowering import tariffs), then only a fraction of that price rise is transmitted to their domestic market. That response raises the consumer subsidy equivalent/lowers the consumer tax equivalent of any such trade measure, and does the opposite to producer incentives. However, if such domestic market insulation using trade measures is practiced by similar proportions of the world's food-exporting and -importing countries, it turns out to be not very effective in keeping domestic price volatility below what it would be in the international marketplace if no governments so responded. Rather, it is like everyone in a crowded stadium standing up to see better: on average no party is better off.

Martin and Anderson (2012) also point out that, with the help of some simplifying assumptions, it is possible to get at least a back-of-the-envelope estimate of the proportional contribution of government trade policy reactions to an international price spike such as in 2006-08. Updated estimates for the key grains are 0.40 for rice, 0.19 for wheat, and 0.10 for maize (Anderson and Nelgen 2012c). It is possible to apportion those policy contributions between country groups. Table 1 reports the contributions of high-income versus developing countries, and also of exporting versus importing countries. During 2006-08, developing countries were responsible for the majority of the policy contribution to all three grains' price spikes, whereas in 1972-74 the opposite was the case except for rice. As for exporters versus importers, it appears exporters' policies had the majority of the influence, other than for wheat in the 1970s, but importers made a very sizeable contribution as well. It is also possible, in the light of these estimates, to get a sense of how effective were changes in trade restrictions in limiting the rise in domestic prices. The proportional rise in the international

price *net of* the contribution of changed trade restrictions, when multiplied by the international price rise, is reported in the second column of Table 2, where it is compared with the proportional rises in the domestic price in the sample countries. The numbers for 2006-08 suggest that, on average for all countries in the sample, domestic prices rose slightly more than the adjusted international price change for wheat, and only slightly less for maize and just one-sixth less for rice. These results suggest that the combined responses by governments of all countries have been sufficiently offsetting as to do very little to insulate domestic markets from this recent international food price spike.

How Might Trade Policies Develop Over the Next Decade or Two?

With the above insights it is now possible to turn to the question of how the changing structure of the world economy and international trade will affect the patterns of national trade-related policies in the coming years. The global financial crisis and the on-going economic recession in Europe seem set to ensure that emerging economies will continue to grow faster than high-income countries. The rapid growth (doubling) of the developing economies' share of global exports since the mid-1990s, led by China and India, also looks like continuing, as does the growth in relative importance of South-South trade (ADB 2011, Anderson and Strutt 2012a,b; Hanson 2012). Industrialization in those emerging economies is deepening global production networks and contributing to greater trade in intermediate inputs, but it is also continuing to drive the strong demand for farm products and industrial raw materials, including for energy production. If this, together with only slow increases in the taxing of carbon emissions globally, holds fossil fuel prices at current high levels as expected, the United States and the European Union are likely to retain their biofuel subsidies and mandates for energy self-sufficiency reasons. This would mean prices for food and fuel

will remain closely linked – in both height and volatility (Hertel and Beckman 2011). Food production variability is expected to increase too, thanks to climate change.

What should one expect in terms of trend and volatility of rates of assistance to agriculture under that scenario of a continuation of historically high and variable food prices in international food markets? In terms of the long-run trend in NRAs, if international food prices stay high then high-income countries are unlikely to return to their former agricultural protection growth path. However, people and governments in emerging/industrializing economies – especially large ones such as China, India and Indonesia – may well feel more food-insecure as their farm sectors become less competitive as their food and feed demands grow. Continuing growth in their agricultural protection cannot be ruled out therefore, even if international food prices remain high (Anderson and Nelgen 2011). That will raise their domestic prices of foods increasingly above those at their borders,³ thereby undermining food security for all their households except those that are net sellers of food. The latter group will become an ever-smaller share of the population and workforce in the course of economic growth, but whether they become a smaller share of the poor in those countries is difficult to anticipate. Hence it is unclear what impact agricultural protection growth would have on the national poverty rate in these and other countries. Certainly their per capita food consumption would grow less rapidly, and their farm protection growth would dampen international food prices somewhat.

As for fluctuations in NRAs around trend, past behavior leads one to expect both high-income and developing country governments to continue to alter their food trade

³ Such a trend is already evident for China: its agricultural NRA rose from -3 to 21 percent between 1999 and 2010 (Anderson and Nelgen 2012b, based on PSE estimates by OECD 2011). This has been sufficient to maintain self sufficiency in all key farm products except soybean (whose tariff is bound in the WTO at 3 percent and which mostly goes into livestock feed and so helps maintain apparent self sufficiency in meat and milk).

restrictions so as to insulate their domestic markets somewhat from international food price volatility. For the reasons laid out in the previous section, this behavior will continue to amplify price fluctuations in the international market and, if both exporting and importing countries continue to respond similarly, such interventions will keep being rather ineffective in preventing fluctuations in domestic food prices. How severe such volatility might be will depend on the size of any unanticipated exogenous shocks to world food markets and the global stocks-to-use ratios of the affected products at the time of any such exogenous shocks. If stocks were to be very low when harvests failed in significant regions, food price spikes of the magnitude experienced in mid-2008, early 2011 and mid-2012 could well be repeated if countries do not agree multilaterally in the meantime to desist from altering their trade restrictions at such times.

Policy Implications

The above empirical evidence supports the view that national trade restrictions add non-trivially to international food price volatility in at least two ways: through ‘thinning’ international food markets, and through ‘insulating’ domestic food markets from international price fluctuations. Together those policy attributes magnify the effect on international prices of any shock to global food supply or demand.

The solution to the first (‘thinning’) problem is simple economically if not politically: it is for countries to open further their markets to food trade. The political difficulty and the adjustment costs associated with doing that are minimized if countries can agree to liberalize their food and agricultural markets multilaterally, and to do so at the same time as non-agricultural markets are liberalized. That was what happened in the Uruguay Round, and it is what has been aspired to by members of the World Trade Organization (WTO) via their Doha

Development Agenda (DDA). After more than a decade of negotiating, the DDA has come to a standstill. While prospects look dim (see Bureau and Jean 2012), there is still some hope that the talks will be revived. Meanwhile, various plurilateral negotiations on options for regional integration and free-trade areas are under discussion, but the benefits from them are always far smaller than those from a multilateral agreement – and often agriculture is the sector liberalized least.

The optimal solution to the second (‘insulating’) problem also involves the WTO. In a many-country world, it is clear from the above analysis that the trade policy actions of individual countries can be offset by those of other countries to the point that the interventions become ineffective in achieving their stated aim of reducing domestic food price volatility. This is a classic international public good problem that could be solved by a multilateral agreement to restrain the variability of trade restrictions.

In the current Doha round of WTO negotiations there are proposals to phase out agricultural export subsidies as well as to bring down import tariff bindings, both of which would contribute to more-stable international food prices. However, proposals to broaden the Doha agenda to also introduce disciplines on export restraints have struggled to date to gain traction.

Regardless of whether WTO member countries liberalize their food trade and bind their trade taxes on exports as well as imports at low or zero levels, there would still be occasions when international food prices spike, which raises the question as to what alternative instruments governments could use to avert losses for significant groups in their societies. A standard answer from economists is that food security for consumers, most notably food affordability for the poor, is best dealt with using generic social safety net measures that offset the adverse impacts of a wide range of different shocks on poor people – net sellers as well as net buyers of food – without imposing the costly by-product distortions

that necessarily accompany the use of n^{th} -best trade policy instruments for social protection. That might take the form of targeted income supplements to only the most vulnerable households, and only while the price spike lasts.

This standard answer has far greater power now than just a few years ago, thanks to the digital information and communication technology (ICT) revolution. In the past it has often been claimed that such payments are unaffordable in poor countries because of the fiscal outlay involved and the high cost of administering such handouts. However, recall that in half the cases considered above, governments *reduce* their trade tax rates, so even that intervention may require a drain on the budget of many finance ministries. In any case, the option of using value-added taxes in place of trade taxes to raise government revenue has become common practice in even low-income countries over the past decade or two. Moreover, the ICT revolution has made it possible for conditional cash transfers to be provided electronically as direct assistance to even remote and small households, and even to the most vulnerable members of those households (typically women and their young children – see, e.g., Fiszbein and Schady (2009), Adato and Hoddinott (2010) and Skoufias, Tiwari and Zaman (2010)).

What if countries are still unsatisfied with the contribution of their farmers to national food security, as reflected in food self-sufficiency ratios, or feel their farmers are missing out on the benefits of rapid economic growth and industrialization? Again agricultural import protection measures are far from first-best ways of dealing with these socio-political concerns. Alternative measures include subsidizing investments in agricultural R&D, in rural education and health, and in roads and other rural infrastructure improvements. If the social rates of return from those investments are currently high and above the private rates of returns, as is typically the case in developing countries, expanding such investments will be economically beneficial. So too could be improvements in land and water institutions that

determine property rights and prices for those key farm inputs. Such investments almost certainly would reduce poverty and boost food security, including through raising net farm incomes while lowering the consumer price of food in towns and cities.

The challenge of encouraging countries to switch from trade to domestic policy instruments for addressing non-trade domestic concerns is evidently non-trivial. Yet the evidence summarized above shows some reform has been possible during the past three decades. With luck, the emergence of new, lower-cost social protection mechanisms involving conditional cash e-transfers might edge governments one more step away from the use of beggar-thy-neighbor trade measures.

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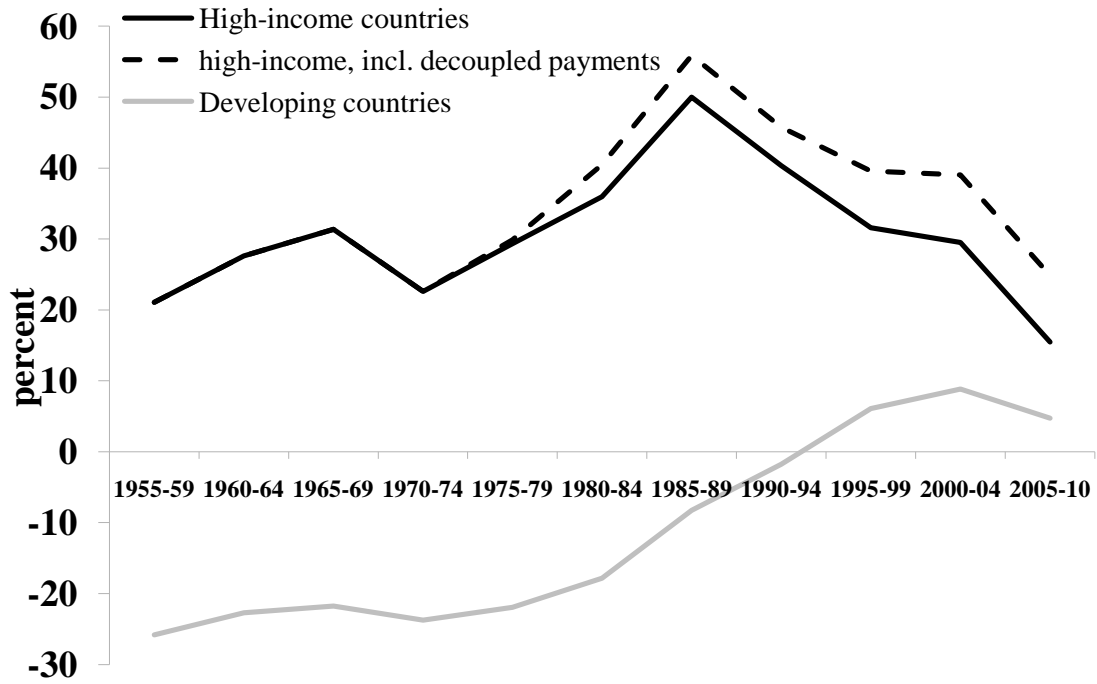
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Figure 1: NRAs to agriculture in high-income and developing countries,^a 1955 to 2010
(percent)

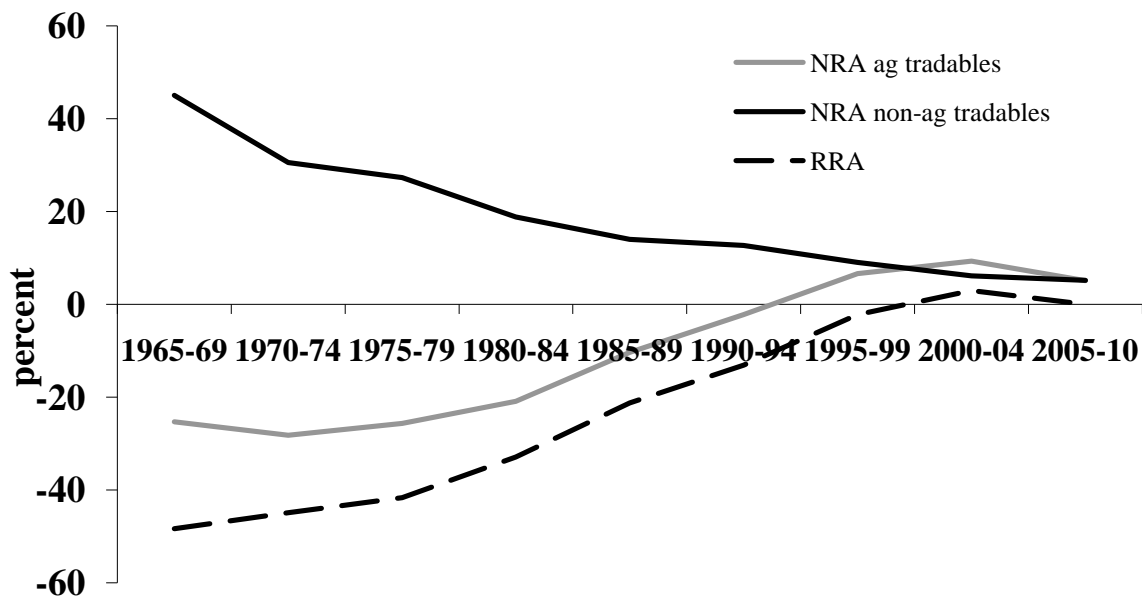


^a Five-year weighted averages, with decoupled payments included in the dashed line. The non-EU transitional economies of Central and Eastern Europe and Central Asia (ECA) are included in the high-income country group.

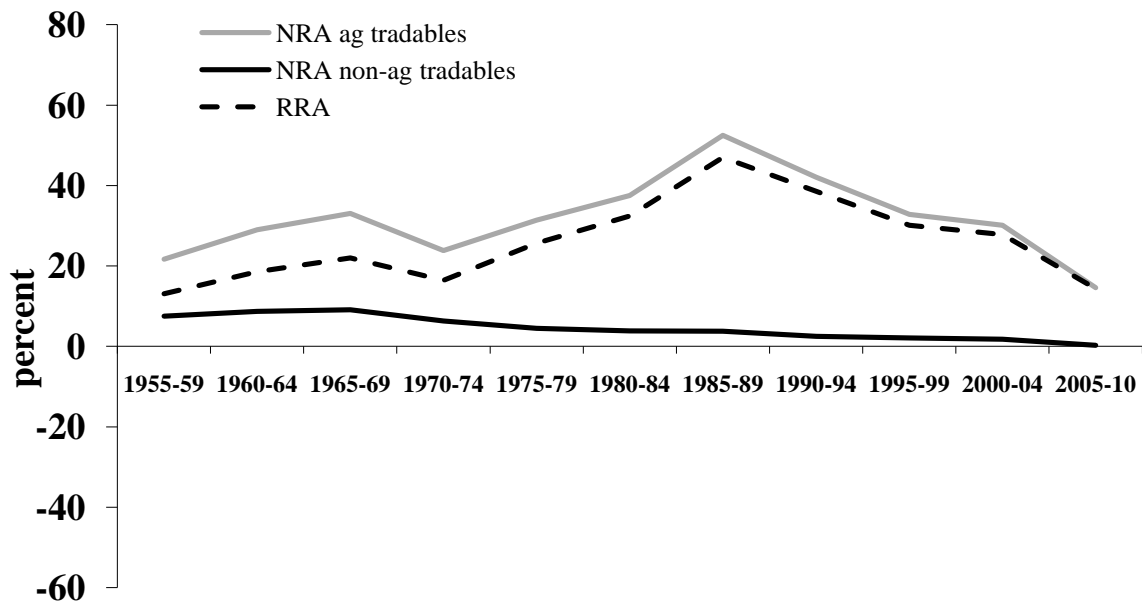
Source: Anderson (2009, Ch. 1), updated from estimates in Anderson and Nelgen (2012b).

Figure 2: Developing and high-income countries' NRAs to agricultural and non-agricultural tradable sectors, and RRAs,^a 1955 to 2010 (percent)

(a) Developing countries

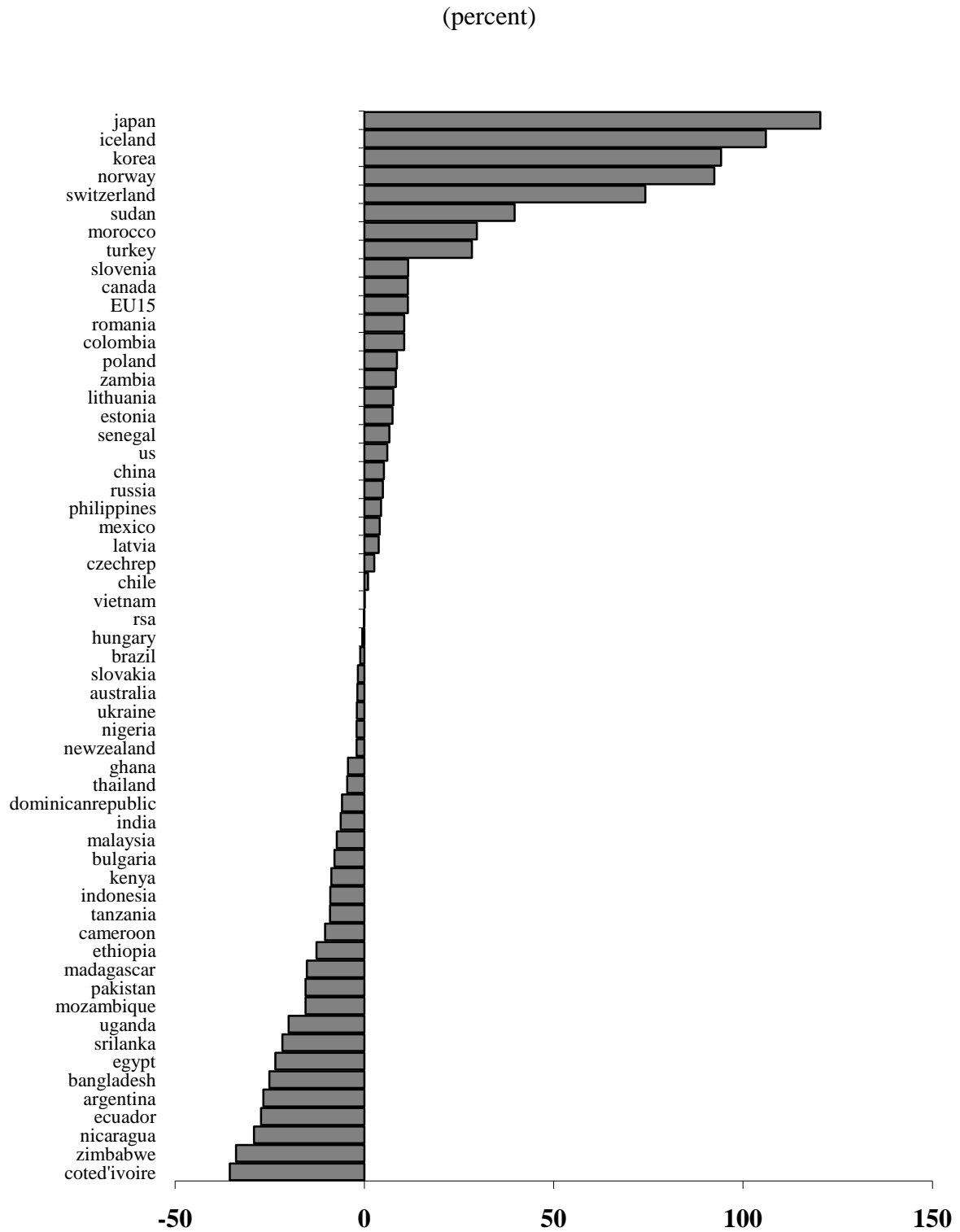


(b) High-income countries



^a Calculations use farm production-weighted averages across countries. RRA is defined as $100 \cdot [(100 + \text{NRA}_{\text{ag}}^t) / (100 + \text{NRA}_{\text{non-ag}}^t) - 1]$, where NRA_{ag}^t and $\text{NRA}_{\text{non-ag}}^t$, respectively, are the NRAs for the tradable segments of the agricultural and non-agricultural sectors.

Source: Anderson (2009, Ch. 1), updated from estimates in Anderson and Nelgen (2012b).

Figure 3: Relative rate of assistance to farmers (RRA),^a by country, 2000-04

^a See text and Figure 2 for the formal definition of the relative rate of assistance.

Source: Based on the RRA estimates in Anderson and Valenzuela (2008)

Table 1: Contributions^a of high-income and developing countries, and of importing and exporting countries, to the proportion of the international price change that is due to policy-induced trade barrier changes, 1972-74 and 2006-08

	TOTAL PROPORTIONAL CONTRIBUTION	High- income countries' contribution	Developing countries' contribution	Importing countries' contribution	Exporting countries' contribution
<u>1972-74</u>					
Rice	0.27	0.04	0.23	0.10	0.17
Wheat	0.23	0.15	0.08	0.18	0.05
Maize	0.18	0.14	0.04	0.06	0.12
<u>2006-08</u>					
Rice	0.40	0.02	0.38	0.18	0.22
Wheat	0.19	0.09	0.10	0.07	0.12
Maize	0.10	0.05	0.05	0.03	0.07

^a Expressed such that the two numbers in each subsequent pair of columns add to the total proportion shown in column 1 of each row.

Source: Anderson and Nelgen (2012c).

Table 2: Comparison of the domestic price rise with the rise in international grain prices net of the contribution of changed trade restrictions, rice, wheat and maize, 2006-08

(percent, unweighted averages)

	International price rise		Domestic price rise		
	Including contribution of changed trade restrictions	Net of contribution of changed trade restrictions	All countries	Developing countries	High-income countries
Rice	113	68	56	48	74
Wheat	70	56	77	65	81
Maize	83	75	73	62	82

Source: Anderson and Nelgen (2012c)

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