Agricultural and trade policy reforms in Latin America:

impacts on markets and welfare

Kym Anderson and Ernesto Valenzuela

F
arm earnings in Latin America have been depressed by pro-urban

and anti–trade biases in national policies and by the agricultural support

policies of richer countries. These policies have reduced economic welfare

and hampered trade and growth, and may well have added to income

inequality. This paper synthesizes results from a World Bank project that

provides: measures of the extent to which national policies have changed

farmers' price incentives; partial equilibrium indices of the impact of farm

policies on trade and economic welfare; general equilibrium estimates of

trade, welfare and poverty effects of global reforms retrospectively and

prospectively; comparisons with similar estimates for Asia, Africa and

high-income countries; and a discussion of prospects for agricultural

policy reform.

Kym Anderson

Centre for International Economic

Studies (CIES)

School of Economics

University of Adelaide,

Australia

↝ kym.anderson@adelaide.edu.au

Ernesto Valenzuela

Centre for International Economic

Studies (CIES)

School of Economics

University of Adelaide,

Australia

↝ ernesto.valenzuela@adelaide.edu.au

I

Introduction

For decades, earnings from farming in Latin American countries have been depressed by a pro-urban bias, exchange-rate controls and export taxes, and by governments in richer countries favouring their farmers with import barriers and subsidies. Furthermore, a considerable degree of sector differentiation in import restrictions has yielded a high differentiation in sectoral protectionism. These past policies have reduced national and global economic welfare and hampered agricultural trade and economic growth, and may well have added to income inequality and poverty in the region.

From a distortionary agricultural incentive peak in the mid-1980s, however, the region has undergone reforms which have greatly reduced its sectoral and trade policy distortions, while some high-income countries have also begun reducing the protectionist aspects of their farm policies. Still, many trade-reducing price distortions remain between sectors, as well as within the agricultural sectors of most Latin American countries.

This paper summarizes results from a recent World Bank research project that provides, first, price comparison-based measures of the extent to which national policies have changed farmers' price incentives since the 1960s in eight Latin American countries; second, partial equilibrium indices of the impact of national farm policy reforms on the volume of agricultural trade and their economic welfare cost; and, third, general equilibrium estimates of national trade, welfare and poverty effects of global reforms from the early 1980s to 2004, which are compared with the projected effects of removing the remaining distortions in agriculture and other goods markets, and further reform in regional policies.

These results are part of a global research project seeking to improve our understanding of agricultural price and trade policy interventions and other reforms in Asia, Africa, the transition economies of Europe, and Latin America and the Caribbean.[1] The core of this project is a new set of annual time series estimates of assistance to and taxation of farmers over the past half-century for 75 countries that together account for more than 90% of the world's population and agricultural output (Anderson and Valenzuela, 2008).

The Latin American sample involves eight countries, comprising the big four economies of Argentina, Brazil, Chile, and Mexico; Colombia and Ecuador, two countries which rely heavily on agriculture; the Dominican Republic, the largest Caribbean economy; and Nicaragua, the poorest country in Central America. Together, in 2000-2004, these countries accounted for 78% of the region's population, 80% of its agricultural value added and 84% of its total gross domestic product (GDP).

The key characteristics of these economies – which account for 4.5% of world GDP but 7.7% of agricultural value added and more than 10% of agricultural and food exports —are shown in table 1. The table reveals the considerable diversity within the region in terms of stages of development, relative resource endowments, comparative advantages and hence trade specialization, and the incidence of poverty and income inequality. In particular, income inequality is high throughout the region compared with the rest of the world: the Gini coefficient is near or above 0.5 everywhere and averages 0.52. This is well above the Gini coefficient for Africa and Asia. Likewise, the Gini coefficient for land distribution inequality is high in Latin America: 0.55 for Chile, but above 0.7 for Argentina, Brazil, Ecuador and Nicaragua, compared with less than 0.5 in Asia (World Bank, 2007).

[1] The regional studies are Anderson and Martin (2009), Anderson and Masters (2009), Anderson and Swinnen (2008) and Anderson and Valdés (2008). Together with comparable studies of high-income countries, they form the basis for a global overview volume (Anderson 2009). The database for this project (Anderson and Valenzuela 2008) is available free of charge on the World Bank website at www.worldbank.org/agdistorsions.

TABLE 1

Latin America and other regions: key economic and trade indicators, 2000-2004

	Share (%) of world:			National relative to world (world = 100)			Ag. trade specialization index[b]	Poverty incidence[c]	Gini index for per capita income[d]
	Pop.	Total GDP	Ag. GDP	GDP per capita	Ag. land per capita	RCA[a] ag. & food			
LA focus countries	**6.49**	**4.49**	**7.73**	**69**	**178**	**219**	**0.42**	**7**	**52**
Argentina	0.61	0.54	1.04	89	426	541	0.85	5	51
Brazil	2.88	1.54	3.38	54	184	355	0.66	8	57
Chile	0.25	0.22	0.24	86	120	386	0.63	2	55
Colombia	0.70	0.24	0.77	35	132	264	0.25	7	59
Dominican Rep.	0.14	0.06	0.18	41	54	474	0.29	3	52
Ecuador	0.20	0.07	0.16	33	80	487	0.59	16	44
Mexico	1.62	1.82	1.89	112	133	64	-0.17	7	46
Nicaragua	0.08	0.01	0.06	14	169	952	0.26	44	43
Other LA countries	**1.84**	**0.84**	**2.05**	**46**	**148**	...	...	...	...
All Latin America	**8.33**	**5.33**	**9.78**	**64**	**171**	...	...	...	...
Africa	11.71	1.67	6.04	14	148	...	...	32	n.a.
Asia (excl. Japan)	50.76	10.37	36.65	20	34	80	-0.03	19	36
Western Europe	6.31	28.66	15.43	454	46	106	-0.03	...	
United States and Canada	5.14	32.67	10.82	636	186	119	0.08	...	40
Australia and New Zealand	0.38	1.54	1.57	405	2 454	354	0.62	...	35

Source: D. Sandri, E. Valenzuela and K. Anderson, "Economic and trade indicators for Latin America, 1960 to 2004," *Agricultural Distortions Working Paper*, N° 48434, Washington, D.C., World Bank, 2007, compiled mainly from World Bank *World Development Indicators*.

[a] Revealed comparative advantage index (RCA) is the share of agriculture and processed food in national exports as a ratio of that sector's share of global exports.

[b] Primary agricultural trade specialization index is net exports as a ratio of the sum of exports and imports of agricultural and processed food products (world average = 0.0).

[c] Percentage of the population living on less than US$ 1 per day.

[d] The poverty incidence and Gini indices are for the most recent year available between 2000 and 2004, except for Ecuador, where they refer to 1998. The weighted averages for the focus countries use population as the basis for weights.

Although it can call upon nearly twice as much agricultural land per capita as the rest of the world, Latin American agriculture is characterized by concentrated land ownership and a production structure whereby medium and large commercial farms, while few in number, contribute the bulk of agricultural output. It is also a region with a high degree of urbanization. These features are important for an understanding of the forces behind agricultural policies. So too is the fact that, until a few years ago, most countries in the region were experiencing a high degree of macroeconomic instability and high inflation. The manipulation of food prices for urban consumers in an attempt to reduce inflation was (and, in Argentina, still is) a dominant factor driving farm pricing policy.

Most Latin American countries have gone through a process of major economy-wide policy reforms, beginning approximately in the mid-1980s for some countries (or the mid-1970s for Chile) and in the mid-1990s for others. Reforms centred on macroeconomic stabilization, trade liberalization, deregulation and some privatization (or abolition) of State agencies. There was a considerable reassessment of the role of government in guiding economic development. Agricultural policies were an integral part of this reform process, although not the principle motivation of the reforms.

Following this introduction, section II of this paper briefly describes the evolution of agricultural and trade policies. Section III provides a short description of the methodology used by the authors

of the individual country case studies to estimate the nominal rate of assistance (NRA) to agricultural producers, the corresponding consumer tax equivalent (CTE) facing domestic buyers of agricultural products, the relative rate of assistance (RRA) between the farm and non-farm tradable sectors, partial equilibrium indices of trade and welfare, and general equilibrium estimates of the national trade, welfare and poverty effects of global reforms retrospectively since the early 1980s and prospectively as of 2004. A synopsis of the empirical results showing the changing extent of price distortions is then provided for each country, and the continental averages are compared with those of Asia and Africa. The paper concludes by drawing out some implications of the findings, including those for poverty and inequality and for possible future directions of policies affecting agricultural incentives in Latin America.

II

The evolution of agricultural and trade policies

From the late 1950s until approximately the mid-1980s, agricultural price interventions in the region were largely a by-product of a development strategy aimed at encouraging import substitution industrialization. This policy also raised budgetary resources in the form of import tax revenue, which was supplemented in some countries through agricultural export taxes. Both sets of approaches harmed the region's most competitive farmers and were offset only slightly by farm credit and fertilizer subsidies.

From the late 1950s until the early 1990s, there were concerns about high rates of inflation, especially where urban populations had strong political influence. Policymakers were under pressure to avoid large increases in food prices, which would potentially impact wage rates and thereby accelerate inflation.

In addition to the fiscal and inflation objectives that made farm export taxes attractive, there was, in the 1950s and 1960s, a widespread belief among the region's economic policymakers and followers of the structuralist school associated with Prebisch (1950, 1959 and 1964) that the efficiency losses generated by the extraction of rents in agriculture were low and that the main impact would be to reduce land rents and land values. The prevailing view in Latin America at the time was that farmers were unresponsive to price incentives. While the belief in this unresponsiveness has now largely disappeared, a few countries —Argentina is one— still tax agricultural exports to generate fiscal revenues and lower consumer food prices.

By the 1980s, there was disillusionment with the results of the import substitution strategy and wider acceptance of theoretical developments regarding the causes of inflation and macroeconomic instability in general. During the 1980s and early 1990s, a macroeconomic framework designed for open economies gradually displaced the closed economy approach in most Latin American countries. Governments introduced economy-wide reforms with special emphasis on macroeconomic stabilization, deregulation, unilateral trade liberalization, and privatization.

The goal of the reformers was to create a better climate for productivity and private investment in all economic sectors, including agriculture. In most Latin American countries, the major change in trade policy was the partial or total removal of most quantitative restrictions on imports and exports, the elimination of export taxes and a programme of gradual reduction in the levels of import tariffs. This yielded incentives to move resources from import-competing to export-oriented sectors, including agricultural ones, which in turn enhanced competitiveness and led to greater integration with the world economy, particularly for larger farmers.

By the mid-1990s, intervention in the foreign-exchange markets was recognized as the most important "price distortion" affecting the agricultural economy. At the outset of the reforms, it was expected that trade liberalization and the reduction of fiscal deficits would lead to a depreciation in real exchange rates (Krueger, Schiff and Valdés, 1988 and 1991; Valdés 1996). Yet the reforms were followed by significant currency appreciation, associated with capital-account opening, greater inward foreign investment and major increases in domestic real interest rates. Reforms in the service sector also played a critical role. Deregulation and privatization had a major impact on the availability in the marketplace of more reliable and lower-cost services for agriculture such as ports, airlines and shipping transport.

The timing of reforms differed somewhat across countries. Colombia, for example, became a more open economy through export promotion beginning in 1967; it adopted a more ambitious liberalization of trade in 1990 and then went into a policy reform reversal beginning in 1992.

In Chile, the controlled markets of 1950 to 1974, accentuated during Allende's land reform years (1971-1973), were followed by radical economic reforms oriented towards trade liberalization, deregulation and privatization between 1978 and 1982, before a second phase of reforms beginning in 1984.

Mexico introduced strong policy changes starting in the mid-1980s, before the signing of the North American Free Trade Agreement (NAFTA). The changes involved more openness, deregulation and privatization, a reduction in credit subsidies, and major changes in the role of government in the marketing of farm products.

A wide variety of policy instruments have been applied to influence agricultural prices, even during the post-reform period. Colombia, for example, has had minimum support prices, in addition to import tariffs, price compensation schemes, procurement agreements, the monopolization of grain imports by a government agency, export licences and subsidies, and safeguards on imports; until 1990, moreover, all imports of inputs were subject to prior import licences. Then, in 1995, tariffs and tariff surcharges associated with price bands were introduced on more than 100 products.

Mexico has been another leader in interventions, even during the transition from highly government-controlled markets before the mid-1980s to more market-oriented policies. Its policies include price support programmes (before the mid-1980s and in conjunction with State trading), credit and input subsidies and direct income payments to farmers (PROCAMPO).

Interventions in Argentina have focused primarily on agricultural exportables, which have been subjected to export taxes, complemented by export bans in some years. The return to sizeable export taxes in 2001 and their subsequent increases have been controversial, leading to prolonged protests by farmers in urban areas in mid-2008.

III

The extent of distortions to agricultural incentives in Latin America

1. Methodology: quantifying the extent of distortions[2]

To quantify government-imposed distortions that create a gap between actual domestic prices and what they would be under free markets, Anderson and others (2008) suggest the first step is to compute the nominal rate of assistance (NRA) for each farm product. This is the percentage by which government policies have raised gross returns to farmers above what they would be without the government's intervention (or lowered them, if NRA < 0). A weighted average NRA for all covered products can then be derived using the value of production at undistorted prices as weights.[3] This NRA is similar to the producer and consumer support estimates (PSEs and CSEs) computed by the Organisation for Economic Co-operation and Development (OECD) for various years, except that the latter are expressed as a percentage of the distorted price. To that NRA for covered products is added a 'guesstimate' of the NRA for non-covered products (on average around 30% of the total) and an estimate of the NRA from non-product-specific forms of assistance or taxation.

---

[2] The methodology used here is similar but not identical to that used by Krueger, Schiff and Valdés (1991) and Valdés (1996). For a discussion of the differences in both the methodology and the estimates, see Anderson (2010).

[3] Our definition of a policy-induced price distortion follows Bhagwati (1971) and Corden (1997) and includes any policy measure at a country's border (such as a trade tax or subsidy, a quantitative restriction on trade or a dual or multiple foreign exchange-rate system, or any domestic producer or consumer tax/subsidy/restraint on output, intermediate inputs or primary factors of production (except where needed to directly overcome a diseconomy, or where it is set optimally across all products or factors, such as a value added tax to raise government revenue).

Each farm industry is classified either as import-competing, or as a producer of exportables, or as producing a non-tradable (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 covered tradable farm products. We also generate a production-weighted average NRA for non-agricultural tradables, for comparison with that for agricultural tradables via the calculation of a percentage relative rate of assistance (RRA), defined as:

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

where $NRAag^t$ and $NRAnonag^t$ are the percentage NRAs for the tradables parts of the agricultural (including non-covered) and non-agricultural sectors, respectively.[4] Since the NRA cannot be less than -100% if producers are to earn anything, neither can the RRA (since the weighted average $NRAnonag^t$ is non-negative in all our country case studies). And if both those sectors are equally assisted, the RRA is zero. This measure is useful in that if it is below (above) zero, it provides an internationally comparable indication of the extent to which a country's sectoral policy regime has an anti-(pro-)agricultural bias.

In addition to the NRA, we also consider the extent to which consumers are taxed or subsidized. For this purpose, a consumer tax equivalent (CTE) is computed as the percentage by which the price that consumers pay for their food exceeds the international price of each food product at the border. Differences between the NRA and the CTE can arise from distortions in the domestic economy resulting from transfer policies and taxes/subsidies that cause the prices paid by consumers (adjusted to the farm gate level) to differ from those received by producers; but in the absence of such differences, the CTE for each tradable farm product is assumed to be the same as the NRA from border distortions, and the CTE for non-tradable farm products is assumed to be zero.

2. Nominal rates of assistance to agriculture

On average, agricultural price and trade policies in Latin America reduced farmer earnings in the post-war period and through to the 1980s. The extent of this reduction (when expressed as a nominal tax equivalent) peaked at more than 20% in the 1970s, but still averaged close to 10% in the later 1980s (table 2). The only focus countries in our sample that received positive assistance from farm policies during that period were Chile and (at least from the late 1970s, but only to a minor extent) Mexico and Colombia. Argentina, Brazil, the Dominican Republic and Ecuador each had negative rates of assistance that averaged well over 20% for at least one five-year period and, apart from the Dominican Republic, each had a negative average NRA even in the 1990s, as did Nicaragua. By the mid-1990s, however, Brazil and the Dominican Republic had joined Chile and Colombia in having positive average NRAs. Meanwhile, Mexico had raised its assistance considerably before engaging in reform following negotiations to join the World Trade Organization (WTO) and NAFTA, while Argentina had all but eliminated discrimination against its exporters in the 1990s, only to reinstate explicit export taxes again in late 2001 when it abandoned its fixed exchange rate against the United States dollar and nominally devalued its currency by two thirds.

The average NRA for all agriculture across the region in the 1990s and the first half of the present decade was slightly positive, at around 5% (figure 1). The strong anti-trade bias of the past has diminished somewhat but is still evident in figure 1, which shows the average NRAs for agriculture's import-competing and export subsectors in the region.

According to the new study's estimates, there are relatively few significant domestic producer subsidies or taxes in the region. The main exceptions are positive domestic support measures in Mexico and slightly negative measures in Argentina (excluding export taxes). Non-product-specific assistance amounts to only one or two percentage points during the past four decades. Input price distortions have also contributed little, on average, to the overall regional NRA in agriculture, reducing the negative value slightly in the 1980s and adding modestly to the positive value during the past decade or so.

---

[4] Farmers are affected not just by the prices of their own products but also by the incentives non-agricultural producers face. That is, it is *relative* prices and hence *relative* rates of government assistance that affect producer incentives. More than seventy years ago, Lerner (1936) provided his Symmetry Theorem, which proved that in a two-sector economy, an import tax has the same effect as an export tax. This carries over to a model that also includes a third sector producing only non-tradables. For a clear non-technical exposition of this important insight from theory of relevance to Latin America, see Clements and Sjaastad (1984).

TABLE 2

**Latin America and other regions: nominal rates of assistance
to agriculture, 1965 to 2004[a]**

(Percentages)

	1965-1969	1970-1974	1975-1979	1980-1984	1985-1989	1990-1994	1995-99	2000-2004
Argentina	-22.7	-22.9	-20.4	-19.3	-15.8	-7.0	-4.0	-14.9
Brazil[b]	-6.1	-27.3	-23.3	-25.7	-21.1	-11.3	8.0	4.1
Chile	16.2	12.0	4.5	7.2	13.0	7.9	8.2	5.8
Colombia	-4.7	-14.8	-13.0	5.0	0.2	8.2	13.2	25.9
Dominican Republic	5.0	-17.5	-21.2	-30.7	-36.4	-1.0	9.2	2.5
Ecuador[b]	-9.6	-22.4	-15.0	5.9	-1.0	-5.3	-2.0	10.1
Mexico	...	...	...	2.9	3.0	30.8	4.2	11.6
Nicaragua[b]	...	...	...	...	...	-3.2	-11.3	-4.2
LA focus countries[a]	-7.2	-21.0	-18.0	-12.5	-10.9	4.2	5.5	4.8
Africa	-11.3	-14.7	-12.7	-7.9	-1.0	-8.9	-5.7	-7.3
Asia (excl. Japan)	-25	-25	-24	-21	-9	-2	8	12
Western Europe	68	46	56	74	82	64	44	37
United States and Canada	11	7	8	13	19	16	11	17
Australia and N. Zealand	10	8	8	11	9	4	3	1
Developing countries	-22	-24	-22	-18	-8	-2	6	9
High-income countries	35	25	32	41	53	46	35	32
All focus countries	6	0	2	5	17	18	17	18

Source: K. Anderson and E. Valenzuela, Estimates of Global Distortions to Agricultural Incentives, 1955 to 2007, Washington, D.C., World Bank, 2008 [on-line] www.worldbank.org/agdistortions, on the basis of estimates reported in K. Anderson and A. Valdés (comps.), Distortions to Agricultural Incentives in Latin America, Washington, D.C., World Bank, 2008.

[a] Weighted average for each country, including product-specific input distortions and non-product-specific assistance as well as authors' guesstimates for non-covered farm products, with weights based on gross value of agricultural production at undistorted prices.
[b] Ecuador and Brazil 1965-69 column refers to 1966-1969 data, and Nicaragua 1990-1994 column to 1991-1994 data.

FIGURE 1

**Latin America: nominal rates of assistance to exportable,
import-competing and all agricultural products, 1965 to 2004**

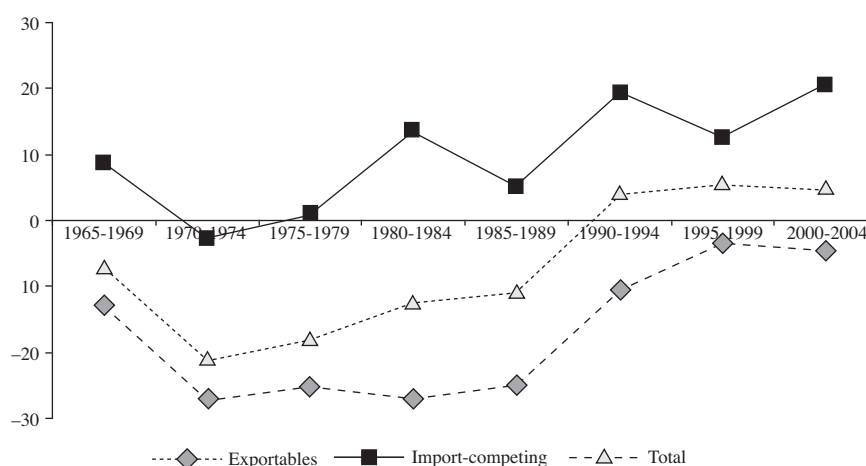*(Percentages, weighted average across countries)*

Source: K. Anderson and E. Valenzuela, *Estimates of Global Distortions to Agricultural Incentives, 1955 to 2007*, Washington, D.C., World Bank, 2008 [on-line] www.worldbank.org/agdistortions, on the basis of estimates reported in K. Anderson and A. Valdés (comps.), *Distortions to Agricultural Incentives in Latin America*, Washington, D.C., World Bank, 2008.

3. Assistance to non-farm sectors and the RRA

The anti-agricultural policy bias of the past was caused not only by agricultural policies but also by sectoral policies affecting industrial activities. The significant reduction in border protection for the manufacturing sector and the indirect impact of this in the form of lower prices for non-tradables after the initiation of the reforms, together with the deregulation and privatization of services, have also been important influences on incentives affecting intersectorally mobile resources. The reduction in assistance to non-farm tradable sectors may have been as responsible for the expansion in agricultural exports since the early 1990s as the reduction in direct taxation on these agricultural exports.

It has not been possible to quantify this distortion in non-farm tradable sectors as accurately as the distortion in agriculture. National case study authors have had to rely on applied trade taxes (for exports as well as imports) rather than undertaking price comparisons for all non-farm goods, and hence they have not captured the quantitative restrictions on trade that were important in earlier decades but that have been less important recently. Nor have they captured distortions in the services sectors; many of these sectors now produce tradables (or would do in the absence of interventions preventing the emergence of this production). As a result, the NRAs

for non-farm importables are underestimated, and the decline indicated is less rapid than the decline that actually occurred. The situation is similar for non-farm exportables, except that the actual NRAs would have been negative in most cases. Of these two elements of underestimation, the former bias probably dominated. Thus, the case study authors' estimates of the overall NRA for non-agricultural tradables should be considered as lower-bound estimates; this is especially true as we go back in time, so that the decline indicated by the NRA is less rapid than it actually was.[5]

Despite these methodological limitations, the estimated NRAs for non-farm tradables prior to the 1990s are sizeable. For Latin America as a whole, the average value of the NRAs for non-farm tradables has steadily declined throughout the past four decades as policy reforms have spread. This has therefore contributed to a decline in the estimated RRA among farmers. Thus, the RRA has fallen from more than -30% in the 1970s to an average of close to zero in 2000-2004 (see table 3), and this appears to have been caused as much by falling positive NRAs among non-

---

[5] This bias is accentuated in those cases where distortions to exchange rates are not included. Exchange-rate distortions have been included only in the studies on the Dominican Republic, Ecuador and Nicaragua, and these economies are too small for their inclusion to affect noticeably the weighted average NRAs and RRAs for the region as a whole.

TABLE 3

Latin America: nominal rates of assistance to agricultural and non-agricultural industries, 1965 to 2004

(Weighted averages for eight focus countries, percentages)

	1965-69	1970-74	1975-79	1980-84	1985-89	1990-94	1995-99	2000-04
NRA, covered products[a]	-13.0	-25.1	-19.6	-14.6	-14.3	0.9	0.8	2.7
NRA, non-covered products	-3.3	-15.5	-15.0	-10.9	-13.1	0.7	3.8	2.1
NRA, all agricultural products[a]	-8.6	-21.7	-18.1	-13.6	-14.0	0.8	1.7	2.5
Total agricultural NRA (incl. NPS)[b]	**-7.2**	**-21.0**	**-18.0**	**-12.5**	**-10.9**	**4.2**	**5.5**	**4.8**
NRA, tradables only:								
All agricultural tradablesb	-9.3	-23.0	-19.0	-12.9	-11.2	4.4	5.5	4.9
All non-agricultural tradables	15.9	27.8	23.3	18.5	16.8	7.3	6.6	5.5
Relative rate of assistance, RRA[c]	**-21.4**	**-39.8**	**-34.2**	**-26.6**	**-24.0**	**-2.7**	**-1.0**	**-0.6**

Source: K. Anderson and E. Valenzuela, *Estimates of Global Distortions to Agricultural Incentives, 1955 to 2007*, Washington, D.C., World Bank, 2008 [on-line] www.worldbank.org/agdistortions, on the basis of estimates reported in K. Anderson and A. Valdés (comps.), *Distortions to Agricultural Incentives in Latin America*, Washington, D.C., World Bank, 2008.

[a] NRAs including product-specific input subsidies.
[b] NRAs including non-product-specific (NPS) assistance, that is, the assistance given to all primary factors and intermediate inputs as a percentage of total primary agricultural production valued at undistorted prices.
[c] RRA is defined as $100*[(100 + NRAag^t)/(100 + NRAnonag^t) - 1]$, where $NRAag^t$ and $NRAnonag^t$ are the percentage NRAs for the tradables parts of the agricultural and non-agricultural sectors, respectively.

farm producers as by falling negative NRAs among farmers (figure 2). The extent of the change in RRAs in individual countries over the past two decades is striking, particularly in the case of Brazil and the Dominican Republic (the virtual disappearance of negative RRAs) and of Colombia (a switch from negative to positive RRAs).

Similar estimates of distortion have been undertaken for Asia and Africa, making it possible to compare the extent of reforms in Latin America with those in other developing-country regions. Figure 3 summarizes those findings (see Anderson 2009, chapter 1 for details). It reveals that Latin American countries have reformed considerably more than countries in Africa, and like Asia they now have an average RRA of close to zero. However, their policy regimes were apparently not as negative towards farmers as those of Asia during the final third of the twentieth century.
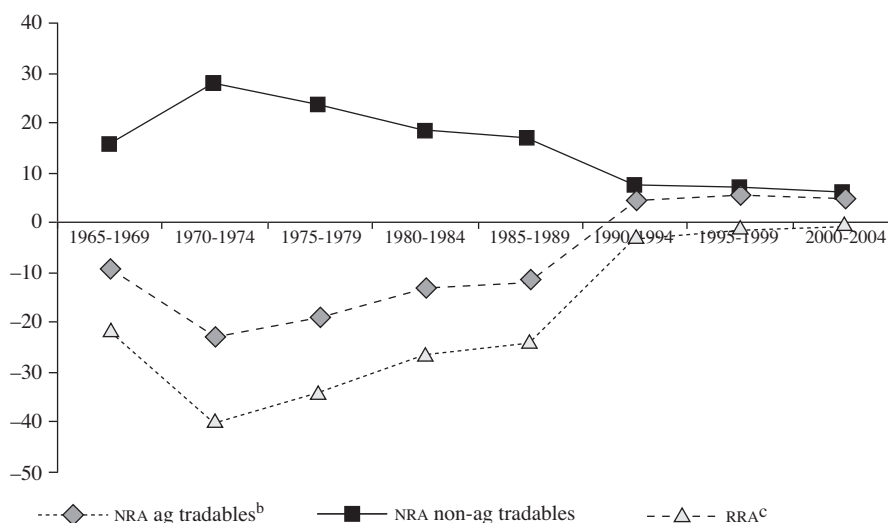
4. Consumer tax equivalents of agricultural policies

The extent to which farm policies impact on the retail consumer price of food and on the price of livestock feedstuffs depends on a wide range of factors, including the degree of processing undertaken and the extent of competition along the value chain. We therefore attempt only to examine the importance of the impact of policies on the buyer's price at the level where the farm product is first traded internationally and, hence, where price comparisons are made.[6]

---

[6] The consumer tax at the retail level is probably smaller in percentage terms but larger in value terms, because of the addition of marketing margins in the processing, distribution and retail parts of the value chain. To obtain weights that can make it possible to sum up across commodities and countries, we calculate the volume of apparent consumption simply as production plus net imports and then value the result at undistorted prices.

FIGURE 2

Latin America: nominal rates of assistance (NRA) to agricultural and non-agricultural tradable products and relative rate of assistance (RRA), 1965 to 2004[a]

(Percentages, weighted averages across eight countries)

· · ·◇· · · NRA ag tradables[b]   ■ NRA non-ag tradables   – –△– – RRA[c]

Source: K. Anderson y E. Valenzuela, *Estimates of Global Distortions to Agricultural Incentives, 1955 to 2007*, Washington, D.C., World Bank, 2008 [on-line] www.worldbank.org/agdistortions, on the basis of estimates reported in K. Anderson and A. Valdés (comps.), *Distortions to Agricultural Incentives in Latin America*, Washington, D.C., World Bank, 2008.

[a]   The RRA is defined as 100*[(100 + NRAag^t)/(100 + NRAnonag^t - 1], where NRAag^t and NRAnonag^t are the percentage NRAs for the tradables parts of the agricultural and non-agricultural sectors, respectively.
[b]   Nominal rate of assistance.
[c]   Relative rate of assistance.

FIGURE 3

Africa, Asia and Latin America: relative rates of assistance, 1965 to 2004[a]
(Percentages)

Asia ——— Africa ——— LAC - - - - -

Source: K. Anderson and E. Valenzuela, *Estimates of Global Distortions to Agricultural Incentives, 1955 to 2007*, Washington, D.C., World Bank, 2008 [on-line] www.worldbank.org/agdistortions, on the basis of estimates reported in K. Anderson and A. Valdés (comps.), *Distortions to Agricultural Incentives in Latin America*, Washington, D.C., World Bank, 2008.
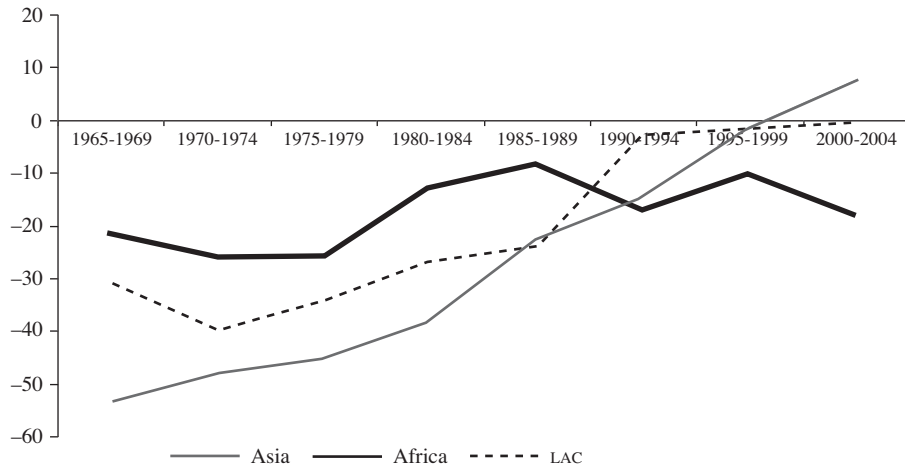
[a]   Five-year weighted averages with value of production at undistorted prices as weights. In Asia, estimates for China pre-1981 are based on the assumption that the nominal rate of assistance to agriculture in those earlier years was the same as the average NRA estimates for China in 1981-1989.

If there were no farm input distortions and no domestic output price distortions, so that the NRA was entirely the result of border measures such as an import or export tax, then the CTE would equal the NRA for each covered product. Because the behind-the-border distortions are relatively minor in Latin America, and because the NRA tended to be positive for import-competing products and negative for exportables until recently, the weighted average CTE for the region has been negative for most of the period. It averaged around -15% until the 1990s and was marginally above zero thereafter (table 4).

5.   Partial equilibrium indices of trade and the welfare effects of national farm policies

One way to indicate the impact that the market distortions have had over time on trade and welfare has been suggested by Anderson and Neary (2005), who developed a family of so-called trade restrictiveness indices. More recently Lloyd, Croser and Anderson (2009) have built on that family of indices for situations (as in agriculture) where there are differences between consumer and producer price distortions. Their trade (or welfare) reduction

index, TRI (or WRI), makes use of the above NRA and CTE estimates for each farm product to answer the question: what ad valorem trade tax, if applied uniformly to all farm products, would provide the same reduction in national agricultural trade (economic welfare) as the current structure of NRAs and CTEs? An important aspect of the WRI in particular is that it takes into account the fact that the welfare cost of a price-distorting policy measure is proportional to the square of the NRA for that measure.

Estimates of these TRIs and WRIs, which have the virtue of being comparable across countries and over time, are reported in table 5. Since the mid-1980s they have declined considerably for Brazil and Chile, and also for Argentina and Ecuador until recent reversals. For the region as a whole, the time path for these indicators has again followed that of Asia, and they have been more substantial than in Africa.

6.   Computable general equilibrium modelling of price and trade policy effects

While the above indices of trade and welfare reduction offer very useful indications over time of how much agricultural price and trade policies have been

TABLE 4

**Latin America, selected countries: percentage consumer tax equivalent
of policies affecting covered farm products, 1965 to 2003[a]**

(Percentages, at primary product level)

	1965-1969	1970-1974	1975-1979	1980-1984	1985-1989	1990-1994	1995-1999	2000-2003
Argentina	-27.6	-27.2	-25.2	-23.4	-16.6	-5.7	0.0	-9.1
Brazil	2.1	-25.4	-19.8	-25.8	-26.5	-23.1	-2.1	-1.3
Chile	7.1	1.5	2.8	9.0	23.8	18.1	14.2	10.7
Colombia	7.2	-13.4	-5.3	27.4	20.8	16.2	33.9	49.7
Dominican Rep.	12.9	-7.1	-7.7	-27.8	-31.4	7.8	16.6	3.5
Ecuador	-10.5	-25.7	3.9	35.0	17.4	-3.3	4.6	18.5
Mexico	...	...	...	-1.3	0.8	22.3	-1.9	9.9
Nicaragua	...	...	...	...	...	10.5	10.6	9.0
LA focus countries *(weighted average)*[b]	**-4.7**	**-22.1**	**-16.2**	**-13.4**	**-12.3**	**-2.7**	**1.4**	**5.1**

Source: K. Anderson and E. Valenzuela, *Estimates of Global Distortions to Agricultural Incentives, 1955 to 2007*, Washington, D.C., World Bank, 2008 [on-line] www.worldbank.org/agdistortions, on the basis of estimates reported in K. Anderson and A. Valdés (comps.), *Distortions to Agricultural Incentives in Latin America*, Washington, D.C., World Bank, 2008.

[a] Assumes the CTE is the same as the NRA derived from trade measures (i.e., not including any input taxes/subsidies or domestic producer price subsidies/taxes).
[b] Weights are consumption valued at undistorted prices, where consumption (from FAO) is estimated as production plus imports net of exports plus change in stocks of the covered products.

distorting national farm sectors, they are nonetheless only partial in the sense that reforms to policies in other sectors —which may have an indirect effect on farmer incentives— are not taken into account. Furthermore, there is an interest in numerous other regional and global economic consequences beyond national agricultural trade and economic welfare. And with reforms going on elsewhere in the world at the same time as Latin America has been reforming its policies, what are the net effects on Latin America of this global reform movement?

To respond to such additional interests and questions, the best available economic assessment tool is a global economy-wide model. For most of this decade, the World Bank has been using a global computable general equilibrium model known as LINKAGE (Van der Mensbrugghe, 2005) to form the basis for the World Bank's standard long-term projections of the world economy and for much of its trade policy analysis (see, for example, World Bank, 2002, 2004, 2005 and 2006). Valenzuela, van der Mensbrugghe and Anderson (2009) recently used that model first to quantify the net economic effects of trade-related policy changes globally from the early 1980s to 2004, and then to compare them with the prospective effects of removing the remaining policy distortions to global goods markets. While no-one anticipates a move to completely free markets

globally in the near future, the comparison with the 1980-1984 results provides a perspective on what is still in prospect relative to what the world has already been through in terms of policy changes over the past quarter-century. The prospective analysis also serves as a benchmark to suggest what is at stake in terms of further reforms via World Trade Organization (WTO) rounds of multilateral trade negotiations. At the same time, by showing how different the trade patterns of various countries would be without distortion, such results also provide a better indication of agricultural comparative advantages in different parts of the world than is available by looking at actual trade and self-sufficiency indicators in the current distortion-ridden situation.

The World Bank's LINKAGE model is a relatively straightforward CGE model in which factor stocks are fixed, producers minimize costs subject to constant returns to scale of production technology, consumers maximize utility, and all markets are cleared with flexible prices. There are three types of production structures. Crop sectors reflect the substitution possibilities between extensive and intensive farming; livestock sectors reflect the substitution possibilities between pasture and intensive feeding; and all other sectors reflect standard capital/labour substitution. There are two types of labour, skilled and unskilled. There is a single representative household per

TABLE 5

**Selected countries and regions:[a] trade and welfare reduction
indices for all covered tradable farm products, 1960 to 2004**
(Percentages)

a) Trade reduction indices

	1960-64	1965-69	1970-74	1975-79	1980-84	1985-89	1990-94	1995-99	2000-04
Argentina	30	27	28	25	23	18	7	3	13
Brazil	n.a.	12	28	19	20	13	11	0	0
Chile	9	-7	-15	4	8	24	17	14	8
Colombia	14	5	8	8	18	11	5	12	-13
Dominican Rep.	60	25	21	27	37	34	57	30	37
Ecuador	...	12	15	34	45	26	3	7	16
Mexico	...	...	...	12	16	13	26	8	17
Nicaragua	...	...	...	...	...	...	11	22	18
Latin America	**22**	**8**	**19**	**17**	**19**	**13**	**23**	**7**	**8**
Africa	**32**	**33**	**33**	**34**	**18**	**54**	**17**	**16**	**22**
Asia	**15**	**28**	**23**	**28**	**34**	**28**	**18**	**8**	**6**
Developing countries	**26**	**27**	**27**	**28**	**28**	**29**	**21**	**9**	**10**
European transition economies	**...**	**...**	**...**	**...**	**...**	**...**	**-4**	**13**	**14**
High-income countries	**19**	**9**	**16**	**21**	**27**	**28**	**28**	**18**	**18**

b) Welfare reduction indices

	1960-64	1965-69	1970-74	1975-79	1980-84	1985-89	1990-94	1995-99	2000-04
Argentina	32	30	28	27	24	19	10	8	17
Brazil	n.a.	16	43	36	42	39	34	8	7
Chile	53	27	28	28	16	34	23	18	13
Colombia	28	23	22	26	40	25	25	35	58
Dominican Rep.	78	42	44	46	50	55	89	48	59
Ecuador	...	37	48	59	71	44	20	24	32
Mexico	...	...	...	43	48	42	54	30	33
Nicaragua	...	...	...	...	...	...	29	31	26
Latin America	**42**	**25**	**38**	**36**	**44**	**39**	**42**	**20**	**23**
Africa	**52**	**52**	**52**	**49**	**51**	**81**	**52**	**37**	**36**
Asia	**27**	**44**	**39**	**42**	**48**	**46**	**28**	**19**	**16**
Developing countries	**44**	**44**	**42**	**42**	**48**	**48**	**32**	**19**	**18**
High-income countries	**49**	**48**	**46**	**64**	**69**	**71**	**52**	**38**	**38**

Source: K. Anderson and J. Croser, "National and global agricultural trade and welfare reduction indexes, 1955 to 2007," Washington, D.C., World Bank, 2009 [on-line] www.worldbank.org/agdistortions, on the basis of product NRAs and CTEs in K. Anderson and E. Valenzuela, *Estimates of Global Distortions to Agricultural Incentives, 1955 to 2007*, Washington, D.C., World Bank, 2008 [on-line] www.worldbank.org/agdistortions..

[a]　Regional aggregates are weighted using the average of the value of production and the value of consumption at undistorted prices.

modelled region, allocating income to consumption using the extended linear expenditure system. Trade is modelled using a nested Armington structure in which aggregate import demand is the outcome of allocating domestic absorption between domestic goods and aggregate imports, and then aggregate import demand is allocated across source countries to determine bilateral trade flows.[7]

---

[7] In terms of model closure, government fiscal balances are fixed, with the fiscal objective being met by changing the level of lump-sum taxes on households. This implies that losses of tariff revenues are replaced by higher direct taxes on households. The current-account balance is also fixed. Given that other external financial flows are fixed, this implies that ex ante changes to the trade balance are reflected in ex post changes to the real exchange rate. For example, if import tariffs are reduced, the propensity to import increases, and additional imports are financed by increasing export revenues. The latter typically is achieved by a depreciation of the real exchange rate. Finally, investment is driven by savings. With fixed public and foreign saving, investment comes from changes in the saving behaviour of households and from changes in the unit cost of investment. The model only solves for relative prices, with the numeraire, or price anchor, being the export price index of manufactured exports from high-income countries. This price is fixed at unity in the base year.

The model is calibrated to 2004 using Version 7 of the GTAP global protection database (see www.gtap.org). This is amended by replacing its estimated agricultural distortions for developing countries (which are mostly based on applied tariff rates only) with NRAs and CTEs that reproduce those estimated by authors of the developing-country case studies in the World Bank project, as compiled by Valenzuela and Anderson (2008). Valenzuela and Anderson also provide a set of distortions for the period 1980-1984, again aiming to reproduce trend distortion rates in the country case studies. Both periods' distortions are summarized for Latin American countries and other regions in table 6.

Several key findings from the global economy-wide modelling study by Valenzuela, van der Mensbrugghe and Anderson (2009) are worth emphasizing. First, the model estimates that policy reforms from the early 1980s to 2004 improved developing-country economic welfare by US$ 73 billion per year, and that removing the distortions remaining as of 2004 would add another US$ 65 billion per year. This suggests that, in a developing-country welfare sense, the world had

TABLE 6

Selected countries and regions: structure of price distortions in global goods markets, 1980-1984 and 2004[a]

(Percentages)

	1980-1984				2004			
	Primary agriculture	Agriculture and lightly processed food		Other goods	Primary agriculture	Agriculture and lightly processed food		Other goods
	Domestic support	Export subsidy	Tariff	Tariff	Domestic support	Export subsidy	Tariff	Tariff
Argentina	0.0	-20.9	0.0	15.8	0.0	-14.8	0.0	5.8
Brazil	5.0	-17.1	3.2	33.4	0.0	0.0	4.8	8.9
Chile	-3.0	0.0	4.8	6.2	0.0	0.0	2.4	1.8
Colombia	-0.6	1.0	21.7	22.8	0.0	0.0	21.6	9.8
Ecuador	0.0	-13.7	28.6	10.3	0.0	0.0	13.4	10.4
Mexico	14.3	-9.6	19.1	6.8	1.2	0.0	6.2	3.4
Nicaragua	0.0	-2.8	10.9	3.9	0.0	-2.8	9.6	3.9
Other Latin America	-1.7	0.3	9.9	9.9	-1.7	0.3	9.9	9.9
All developing countries	**-0.6**	**-11.0**	**16.4**	**25.6**	**1.4**	**0.0**	**21.8**	**7.5**
Africa	-0.3	-2.5	17.0	12.6	-0.8	0.1	20.4	11.2
East Asia	-5.6	-21.5	24.3	29.6	-0.3	0.0	41.6	6.7
South Asia	3.5	-7.1	10.7	72.6	7.2	1.7	6.9	20.2
Latin America	3.8	-9.6	9.8	15.7	-0.2	-1.4	7.2	6.7
Middle East	-12.4	0.0	7.5	5.7	-12.4	0.0	7.5	5.7
E. Europe and C. Asia	0.8	-2.6	13.8	9.6	0.8	-0.3	15.9	4.8
High-income countries	**6.6**	**20.9**	**24.0**	**2.4**	**2.6**	**7.2**	**22.3**	**1.2**
World total	**2.3**	**4.7**	**20.1**	**10.1**	**1.9**	**3.5**	**22.1**	**3.3**

Source: Authors' calculations based on K. Anderson and E. Valenzuela, *Estimates of Global Distortions to Agricultural Incentives, 1955 to 2007*, Washington, D.C., World Bank, 2008 [on-line] www.worldbank.org/agdistortions.

[a] Using value of production at undistorted prices as weights.

moved nearly half of the way towards freeing up goods trade over that quarter-century. For Latin America, the corresponding welfare gains are US$ 7.1 billion and US$ 15.8 billion per year (table 7). Since the Latin American region represents barely one tenth of the population of developing countries, its per capita gains were similar to those for other developing-country regions during the past quarter-century, and would be (one tenth of 15.8/65 =) 2.4 times greater if the policies in place as of 2004 were to be removed. This is largely because 70% of those prospective welfare gains from global liberalization would come from agricultural and food policy reforms.

Second, the share of global farm production exported in 2004, including intra-European Union (EU) trade, was slightly smaller as a result of those reforms in 1980-2004 (11.4% instead of 13.1%) because

of the reduction in farm export subsidies (table 8). Agriculture's 11% share in 2004 contrasts with three times that for other primary products and more than twice that for all other goods —a 'thinness' that is an important contributor to the volatility of international prices for weather-dependent farm products. If the policies distorting goods trade in 2004 were removed, the share of global farm product and food production exported would rise from 11.4% to 15.4%, thereby reducing instability in the prices and quantities of those products traded. This would benefit Latin America especially, given that agriculture and food products are 2.2 times more important to its exports than to the rest of the world's exports.

Third, the developing countries' share of the world's primary agricultural exports rose from 43% to 55%, and its farm output share from 58% to

TABLE 7

Selected countries and regions: welfare impact of a return to 1980-1984 policies and of full liberalization of global merchandise trade, 2004
(Relative to the 2004 benchmark data, in 2004 dollars and percentages)

	Return to 1980-1984 price distortions in 2004			Full liberalization of remaining price distortions as of 2004		
	Total real income change p.a. *(billions of dollars)*	Change in income due to change in terms of trade only *(billions of dollars)*	Total real income change as percentage of 2004 benchmark[a]		Total real income change p.a. *(billions of dollars)*	Change in income due to change in terms of trade only *(billions of dollars)*	Total real income change as percentage of 2004 benchmark[a]
Argentina	-1.7	0.1	-1.4	(0.1)	3.2	-0.7	2.6	(-0.6)
Brazil	-5.3	6.8	-1.2	(1.6)	6.8	5.6	1.6	(1.3)
Chile	0.1	0.7	0.1	(1.0)	0.3	0.2	0.4	(0.3)
Colombia	2.5	2.5	3.5	(3.5)	2.2	0.7	3.1	(1.0)
Ecuador	-0.6	0.3	-2.5	(1.2)	2.0	1.1	8.2	(4.4)
Mexico	-2.6	3.6	-0.5	(0.7)	-0.7	-3.4	-0.1	(-0.6)
Nicaragua	0.0	0.0	0.6	(0.0)	0.0	0.0	1.3	(0.4)
Other Latin America	0.5	-0.2	0.1	(-0.1)	2.0	-1.0	0.5	(-0.3)
All developing countries	**-73.1**	**49.3**	**-1.0**	**(0.7)**	**64.9**	**-12.2**	**0.9**	**(-0.2)**
North Africa	0.6	0.1	0.3	(0.0)	0.9	-2.8	0.5	(-1.5)
Sub-Saharan Africa	-3.4	1.7	-1.0	(0.5)	0.0	-3.2	0.0	(-0.9)
East Asia	-61.5	19.9	-2.2	(0.7)	30.1	-1.0	1.1	(0.0)
South Asia	-10.8	6.5	-1.7	(1.0)	-0.4	-3.9	-0.1	(-0.6)
Latin America	-7.1	13.7	-0.4	(0.8)	15.8	2.5	1.0	(0.2)
Middle East	2.6	0.4	0.5	(0.1)	4.2	-0.2	0.8	(0.0)
E. Europe and C. Asia	6.5	7.1	0.5	(0.6)	14.2	-3.6	1.2	(-0.3)
High-income countries	**-159.9**	**-50.8**	**-0.7**	**(-0.2)**	**102.8**	**11.3**	**0.5**	**(0.1)**
World total	**-233.0**	**-1.5**	**-0.8**	**(0.0)**	**167.7**	**-1.0**	**0.6**	**(0.0)**

Source: World Bank LINKAGE model simulations from E. Valenzuela, D. van der Mensbrugghe and K. Anderson, "General equilibrium effects of distortions on global markets, farm incomes and welfare," *Distortions to Agricultural Incentives: A Global Perspective, 1955-2007*, K. Anderson (comp.), London, Palgrave Macmillan, 2009.a Numbers in parentheses refer to change due to terms of trade effects.

[a]   Numbers in parentheses refer to change due to terms of trade effects.

TABLE 8

**Selected countries and regions: impact on shares of agricultural
and food production exported of a return to 1980-1984 policies
and of full liberalization of global merchandise trade**
(Percentages)

	2004 benchmark	Return to 1980-1984 policies	Full global liberalization
Argentina	42.3	31.6	47.0
Brazil	20.7	13.3	32.5
Chile	37.6	34.7	40.0
Colombia	13.6	32.0	29.0
Ecuador	28.2	21.2	47.5
Mexico	7.7	6.8	9.2
Nicaragua	27.6	31.4	31.9
Other Latin America	14.6	15.0	26.8
All developing countries	**9.5**	**9.5**	**16.9**
North Africa	6.3	7.9	20.6
Sub-Saharan Africa	13.8	13.5	19.3
East Asia	8.4	7.7	15.1
South Asia	3.7	2.4	7.5
Latin America	18.1	16.3	28.2
Middle East	7.4	14.2	17.2
E. Europe and C. Asia	6.8	9.1	11.1
High-income countries	**13.0**	**15.9**	**14.1**
World total[a]	**11.4**	**13.1**	**15.4**

Source: World Bank LINKAGE model simulations from E. Valenzuela, D. van der Mensbrugghe and K. Anderson, , "General equilibrium effects of distortions on global markets, farm incomes and welfare," *Distortions to Agricultural Incentives: A Global Perspective, 1955-2007*, K. Anderson (comp.), London, Palgrave Macmillan, 2009.

[a]   Including intra-EU trade.

62%, because of those reforms, with rises in nearly all agricultural industries except rice and sugar. Removing remaining goods market distortions would boost their export and output shares to 64% and 65%, respectively. Because of the importance of farm products in the exports of Latin America, it enjoys exceptionally large proportions of those developing-country share gains.

Fourth, the average real price in international markets for agricultural and food products would have been 13% lower had policies not changed over the quarter-century to 2004. Evidently the impact of reforms in high-income countries (including the cuts in farm export subsidies) in raising international food prices more than offset the opposite impact of reforms (including the cuts in agricultural export taxes) in developing countries over that period. By contrast, removing the distortions remaining as of 2004 is projected to raise the international price of agricultural and food products by less than 1% on average (table 9). This is contrary to earlier modelling results based on the GTAP protections database, such as

those in Anderson, Martin and van der Mensbrugghe (2006), which suggested they would rise by 3.1% or, for primary agriculture alone, by 5.5%. The lesser impact in these new results is because export taxes in developing countries based on the above NRA estimates are included in the new database (most notably for Argentina), and their removal would offset the international price-raising effect of eliminating import protection and farm subsidies elsewhere.

Fifth, accompanying the price changes are changes in output, exports and imports of farm products. For Latin America, output would have been about 7% lower and exports 21% lower in 2004 had the reforms after the early 1980s not taken place, compared with just 3% lower and 5% *higher* for other developing countries, respectively. However, while farm output would increase even more in Latin America if the distortions remaining as of 2004 were removed (by 27%), they would increase by only 7% in other developing countries on average. For the world as a whole, these results suggest farm trade would have been two thirds bigger in real value terms had the past two

TABLE 9

Impact on real international product prices of a return to 1980-1984 policies and of full liberalization of global merchandise trade
(Percentages relative to 2004 baseline)

	Return to 1980-1984 policies	Full global liberalization
Paddy rice	-11.6	6.6
Wheat	-15.4	1.4
Other grains	-27.5	2.7
Oil seeds	-8.6	-2.4
Sugar cane and beet	-0.5	-2.0
Plant-based fibres	0.8	2.9
Vegetables and fruits	2.8	1.8
Other crops	2.6	1.0
Cattle, sheep	0.5	-1.1
Other livestock	-2.0	-2.1
Raw milk	0.4	-0.2
Wool	-1.9	3.3
Beef and sheep meat	-15.0	4.6
Other meat products	-45.5	0.6
Vegetable oils and fats	-1.4	-1.9
Dairy products	-8.5	3.8
Processed rice	0.6	2.9
Refined sugar	-2.5	1.3
Other food, beverages and tobacco	0.1	-1.3
Textile and wearing apparel	1.4	-1.2
Other manufacturing	0.3	-0.2
Merchandise trade	-1.2	-0.2
Agriculture and food	-12.6	0.3
Primary agriculture	-5.9	0.9
Agriculture and lightly processed food	-17.6	1.3

Source: World Bank LINKAGE model simulations from E. Valenzuela, D. van der Mensbrugghe and K. Anderson, "General equilibrium effects of distortions on global markets, farm incomes and welfare," *Distortions to Agricultural Incentives: A Global Perspective, 1955-2007*, K. Anderson (comp.), London, Palgrave Macmillan, 2009

N.B.: Model numeraire is the export price index of high-income countries' manufactured exports.

decades of reform not occurred. On the export side, that is almost entirely due to high-income countries, whose exports would have been more than twice as large had they not lowered their export subsidies and developing countries not lowered their export taxes. If the distortions as of 2004 were removed, global trade would be boosted by two fifths (table 10).

Sixth, for developing countries as a group, net farm income (value added in agriculture) would have been 5% lower without the reforms of the quarter-century to 2004, and 10% lower in Latin America, which is many times more than the proportional gains for non-agriculture. If the policies remaining in 2004 were removed, net farm incomes would rise a further 37% for Latin America and 6% for all

developing countries, compared with just 2% for non-agricultural value added (table 11). Furthermore, returns to unskilled workers in developing countries – the majority of whom work on farms – would rise by more than returns to other production factors from that liberalization. In Latin America that is also true, except that land rents are affected even more positively than unskilled labour. Together, these findings suggest that both inequality and poverty globally could be alleviated by such reform, given that in developing countries three quarters of the poor are in farming households (Chen and Ravallion 2008); in Latin America, however, reforms may have increased inequality inasmuch as agricultural land is still owned by the wealthy.

TABLE 10

Selected countries and regions: impact on agricultural and food output and trade of a return to 1980-1984 policies and of full liberalization of global merchandise trade
(Relative to benchmark data, percentages)

	Return to 1980-1984 policies			Full liberalization		
	Output	Exports	Imports	Output	Exports	Imports
Argentina	-19.9	-36.7	27.8	37.8	95.6	81.8
Brazil	-18.2	-48.5	30.7	45.3	100.7	94.8
Chile	-11.0	-7.8	12.7	4.7	11.3	15.8
Colombia	48.6	292.6	110.4	14.6	161.4	81.7
Ecuador	-15.6	-69.6	-12.7	46.1	198.7	71.8
Mexico	-2.3	-54.0	12.6	-0.4	5.8	4.3
Nicaragua	2.8	26.1	16.8	2.9	21.6	19.4
Other Latin America	-4.6	-0.2	32.2	25.7	175.9	30.4
All developing countries	**-3.2**	**4.9**	**50.3**	**7.1**	**100.0**	**40.4**
North Africa	-0.7	35.2	21.4	17.3	377.2	62.5
Sub-Saharan Africa	4.3	15.5	50.0	1.9	41.9	32.3
East Asia	-5.4	-0.2	51.2	4.0	77.4	37.4
South Asia	-2.8	-41.2	12.3	0.0	108.3	33.2
Latin America	-6.9	-20.6	26.8	26.8	106.4	29.8
Middle East	7.1	154.2	58.6	21.5	222.7	12.1
E. Europe and C. Asia	-2.6	53.4	91.6	-2.6	79.7	77.6
High-income countries	**11.0**	**110.8**	**78.3**	**-13.1**	**-4.0**	**38.3**
World total[a]	**3.6**	**66.9**	**66.9**	**-2.6**	**39.1**	**39.1**

Source: World Bank LINKAGE model simulations from E. Valenzuela, D. van der Mensbrugghe and K. Anderson, "General equilibrium effects of distortions on global markets, farm incomes and welfare," *Distortions to Agricultural Incentives: A Global Perspective, 1955-2007*, K. Anderson (comp.), London, Palgrave Macmillan, 2009

[a] Excluding intra-EU trade.

TABLE 11

Impact on agricultural and non-agricultural value added of retrospective analysis (going back to 1980-1984 policies) and full liberalization of global merchandise trade
(relative to 2004 benchmark data, percentages)

	Return to 1980-1984 policies		Full liberalization	
	Agric.	Non-agric.	Agric.	Non-agric.
Argentina	-25.5	13.1	103.5	13.8
Brazil	-24.9	1.6	42.6	4.2
Chile	-1.8	1.3	5.5	0.9
Colombia	13.6	15.3	53.5	1.5
Ecuador	-35.4	-1.9	126.0	6.7
Mexico	-4.0	1.8	0.3	-1.0
Nicaragua	5.1	-0.4	2.4	2.3
Other Latin America	0.0	-0.2	28.7	-0.6
Developing countries	**-4.9**	**-0.4**	**5.6**	**1.9**
North Africa	-0.3	0.3	-1.1	0.8
Sub-Saharan Africa	-3.1	-0.3	-0.8	-0.5
East Asia	-8.9	-2.8	4.7	3.5
South Asia	-2.2	2.7	-6.7	-0.3
Latin America	-9.8	2.7	37.0	2.3
Middle East	-1.1	-0.8	25.4	0.9
E. Europe and C. Asia	1.5	-0.1	-5.2	0.3
High-income countries	**36.2**	**-0.5**	**-14.7**	**0.1**
World total	**8.8**	**-0.5**	**-1.2**	**0.5**

Source: World Bank LINKAGE model simulations from E. Valenzuela, D. van der Mensbrugghe and K. Anderson, "General equilibrium effects of distortions on global markets, farm incomes and welfare," *Distortions to Agricultural Incentives: A Global Perspective, 1955-2007*, K. Anderson (comp.), London, Palgrave Macmillan, 2009.

IV

Poverty, inequality and policy implications

The most salient feature of price and trade policies in the Latin America region since the 1960s are the major economic reforms, including significant trade liberalization, seen in most countries during the later 1980s and early 1990s (table 12). Overall levels of non-agricultural protection have declined considerably, most significantly in the industrial sector, and there have been reforms in the service sector (deregulation and privatization). Both changes have improved the competitiveness of the agricultural sector. By way of summarizing the key findings, the following features of the Latin American experience of the past 40 or more years are worth highlighting.

(i) The region has seen a gradual movement away from the taxation of farmers relative to non-agricultural producers since the 1970s, and the emergence of positive assistance for agriculture since the early 1990s. The gradual fall in the estimated (negative) RRA for the region, from as high as -40% in the early 1970s to less than -2% in the past decade, has not been dissimilar to trends in Africa and Asia, but is nonetheless dramatic. Instead of being effectively taxed nearly US$ 17 billion per year, as occurred in the 1980s (or US$ 400 per person working in agriculture), farmers in the region now enjoy support worth more than US$ 5 billion per year, or nearly US$ 125 per person employed on farms. An exception is Argentina, where there was a reversal of policy reform that involved a move back to direct export taxation in late 2001, although this has to be seen in the context of the massive devaluation in Argentina at that time when the country abandoned the fixed parity with the United States dollar. Thanks to the devaluation, Argentina continued to contribute to the rapid growth of Latin America's share in the global exports of farm products that was stimulated by the gradual elimination of anti-agricultural policies.

(ii) The dispersion across Latin America in average NRAs and RRAs for farmers has not diminished much despite the reforms in all countries, nor has the dispersion in NRAs among farmers within each Latin American country, including a strong anti-trade bias in assistance rates. This means there is still a lot of scope for reducing distortions in the region's use of resources in agriculture. This finding also indicates that political economy forces are at work in each country

and that these are not changing greatly relative to the situation in other countries over time.

(iii) Because agricultural taxation or assistance mostly takes place via trade measures, movements in the CTE closely replicate changes in farm support or taxation, which means that food prices were kept artificially low before the reforms but have been above international levels on average in recent years. It also means there is considerable variation in CTEs across products and across countries in the region. The CTEs (like the NRAs) are highest for milk, rice and sugar, but are negative on average for maize, beef, and soybeans.

(iv) The decline in negative RRAs has been caused as much by cuts in protection in non-agricultural sectors as by reforms in agricultural policies. This underscores the fact that the removal of distortions in agricultural incentives in the region has been part of a series of economy-wide reform programmes and has not been caused merely by farm policy reforms.

(v) The recent and prospective reforms have benefited unskilled workers in the region but have benefited landholders even more. That suggests domestic income and wealth redistribution policies may need to be adjusted in Latin America if reforms are not to exacerbate inequality in the region.[8]

The assistance trends are encouraging insofar as they signal that the long period of encouraging import substitution in the industrial sector and of taxing primary exports, which so heavily discriminated against the agricultural sector in Latin America, has been largely relegated to history. However, as the above summary makes clear, this does not mean that policies are no longer distorting agricultural incentives. And if Latin America were to follow the policy path chosen by more advanced economies, which involves increasing agricultural assistance as per capita incomes rise, there may be even more distortion in the future. This suggests that vigilance

---

[8] A recent study by Valdés and others (2008, table 2, p. 86) suggests that since 1990 the earnings of landholders have gone down in Brazil, Chile and Mexico. That is not inconsistent with the above modelling result, which is from a 'what if…' simulation that shows how factor prices would have been changed by policy reforms since the early 1980s if nothing else changed over that period.

TABLE 12

**Selected countries and regions: impact on real factor prices of a return to
1980-1984 policies and of full global merchandise trade liberalization[a]**

(Relative to the benchmark data, percentages)

a) Return to 1980-1984

	Unskilled wages	Skilled wages	Capital user cost[b]	Landb user cost	Aggregate CPI	Food CPI
Developing countries	**-2.1**	**-1.7**	**-1.5**	**-4.1**	**1.0**	**0.4**
North Africa	0.3	0.1	-0.2	-1.1	0.3	-0.7
Sub-Saharan Africa	0.1	0.6	1.2	-1.5	-1.4	-3.1
East Asia	-4.5	-3.7	-3.4	-6.2	0.7	1.9
South Asia	-4.1	-4.7	-1.7	-6.6	5.4	4.7
Latin America	0.0	-0.1	-0.2	-8.1	2.2	0.2
Middle East	0.6	0.7	0.2	-4.3	-1.2	-3.9
E. Europe and C. Asia	0.2	-0.1	0.2	4.1	-0.2	-1.6
High-income countries	**0.4**	**-0.7**	**-0.4**	**102.1**	**-0.1**	**-1.2**
World total	**-0.1**	**-0.9**	**-0.7**	**21.1**	**0.2**	**-0.5**

b) Full global merchandise trade liberalization as of 2004

	Unskilled wages	Skilled wages	Capital user cost[b]	Landb user cost	Aggregate CPI	Food CPI
Developing countries	**3.5**	**3.0**	**2.9**	**1.6**	**-0.9**	**-2.8**
North Africa	7.0	7.7	5.3	-0.5	-5.2	-7.2
Sub-Saharan Africa	3.2	3.2	3.8	0.2	-3.8	-4.9
East Asia	4.0	3.4	3.3	1.9	0.1	-2.7
South Asia	-0.6	2.3	1.2	-6.2	-1.6	0.3
Latin America	4.5	1.4	1.9	21.1	1.2	3.2
Middle East	8.3	2.9	4.7	43.8	-3.3	-10.5
E. Europe and C. Asia	1.7	3.2	2.6	-4.5	-2.3	-4.5
High-income countries	**0.2**	**1.0**	**0.5**	**-17.9**	**-0.6**	**-3.6**
World total	**0.9**	**1.3**	**1.2**	**-3.1**	**-0.7**	**-3.2**

Source: World Bank LINKAGE model simulations from E. Valenzuela, D. van der Mensbrugghe and K. Anderson, "General equilibrium effects of distortions on global markets, farm incomes and welfare," Distortions to Agricultural Incentives: A Global Perspective, 1955-2007, K. Anderson (comp.), London, Palgrave Macmillan, 2009

[a]   Nominal factor prices deflated by national aggregate consumer price index (CPI), column 5.
[b]   The user cost of capital and land represents the subsidy-inclusive rental cost.

will be needed among economic policy advisors in the years to come. Meanwhile, the opposite policy problem remains in Argentina, where explicit export taxation was reintroduced in late 2001 and has been increased a number of times since then.

Trade taxes, whether on agricultural imports to reduce import competition for the benefit of poor farmers, or on agricultural exports to lower the cost of food for the urban poor, are not the most efficient way to reduce poverty (Winters, McCulloch and McKay, 2004). Trade policy instruments are almost never the first-best way to reduce poverty. On the contrary, food trade taxes may even worsen

poverty, depending on the earning and spending patterns of poor households and on the alternative tax-raising instruments available. Far better would be microeconomic reforms to mitigate the deep-seated structural problems affecting the competitiveness of factor and goods markets. This is because the reforms have accentuated the differences between commercially oriented farmers and farmers who are less prepared to take advantage of economic reform. Although countries have adopted various policies to mitigate the human costs of economic adjustment (especially since the mid-1990s), there were adverse effects on rural poverty in some cases, and traditional agriculture

was often left behind (Spoor, 2000; Valdés and Foster, 2007). Many countries in the region have implemented safety net programmes to aid all the poor, including direct income transfers and conditional cash transfers to families in agriculture. The challenge for the years ahead is to improve the coverage and effectiveness of

poverty alleviation programmes. Such programmes are not only good at fighting poverty, but can contribute to investments in human capital and, by acting as a form of guaranteed compensation, can reduce political obstacles to further economic reforms.

(Original: English)

Bibliography

Anderson, K. (2010), "Krueger/Schiff/Valdés revisited: agricultural price and trade policy reform in developing countries since the 1980s", *Applied Economic Perspectives and Policy*, vol. l, No. 1, Oxford, Oxford University Press, forthcoming.

———— (ed.) (2009), *Distortions to Agricultural Incentives: A Global Perspective, 1955-2007*, London, Palgrave Macmillan.

Anderson, J.E. and J.P. Neary (2005), *Measuring the Restrictiveness of International Trade Policy*, Cambridge, Massachusetts, The MIT Press.

Anderson, K. and J. Croser (2009), "National and global agricultural trade and welfare reduction indexes, 1955 to 2007", Washington, D.C., World Bank [online] www.worldbank.org/agdistortions.

Anderson, K. and W. Martin (eds.) (2009), *Distortions to Agricultural Incentives in Asia*, Washington, D.C., World Bank.

Anderson, K., W. Martin and D. van der Mensbrugghe (2006), "Distortions to world trade: impacts on agricultural markets and incomes", *Review of Agricultural Economies*, vol. 28, No. 2, Oxford, Blackwell Publishing.

Anderson, K. and W. Masters (eds.) (2009), *Distortions to Agricultural Incentives in Africa*, Washington, D.C., World Bank.

Anderson, K. and others (2008), "Measuring distortions to agricultural incentives, revisited", *World Trade Review*, vol. 7, No. 4, Cambridge, Cambridge University Press.

Anderson, K. and J. Swinnen (eds.) (2008), *Distortions to Agricultural Incentives in Europe's Transition Economies*, Washington, D.C., World Bank.

Anderson, K. and A. Valdés (eds.) (2008), *Distortions to Agricultural Incentives in Latin America*, Washington, D.C., World Bank.

Anderson, K. and E. Valenzuela (2008), *Estimates of Global Distortions to Agricultural Incentives, 1955 to 2007*, Washington, D.C., World Bank [online] www.worldbank.org/agdistortions.

Bhagwati, J. (1978), *Foreign Trade Regimes and Economic Development: Anatomy and Consequences of Exchange Control Regimes*, Cambridge, Massachusetts, Ballinger.

———— (1971), "The generalized theory of distortions and welfare", *Trade, Balance of Payments and Growth*, J. Bhagwati and others (eds.), Amsterdam, North-Holland.

Chen, S. and M. Ravallion (2008), "The developing world is poorer than we thought, but no less successful in the fight against poverty", *Policy Research Working Paper*, No. 4703, Washington, D.C., World Bank, August.

Clements, K.W. and L.A. Sjaastad (1984), "How protection taxes exporters", *Thames Essay*, No. 39, London, Trade Policy Research Centre.

Corden, W. (1997), *Trade Policy and Economic Welfare*, Oxford, Clarendon Press.

Krueger, A.O., M. Schiff and A. Valdés (1991), *The Political Economy of Agricultural Pricing Policy: Latin America*, Baltimore, Johns Hopkins University Press.

———— (1988), "Agricultural incentives in developing countries: measuring the effect of sectoral and economywide policies", *World Bank Economic Review*, vol. 2, No. 3, Oxford, Oxford University Press.

Lerner, A. (1936), "The symmetry between import and export taxes", *Economica*, vol. 3, No. 11, Oxford, Blackwell Publishing, August.

Lloyd, P.J., J.L. Croser and K. Anderson (2009), "Global distortions to agricultural markets: new indicators of trade and welfare impacts, 1955 to 2007", *Policy Research Working Paper*, No. 4865, Washington, D.C., World Bank, March.

Prebisch, R. (1964), *Towards a New Trade Policy for Development: Report by the Secretary-General of the United Nations Conference on Trade and Development* (E/Conf.46/3), New York, United Nations. United Nations publication, Sales No. 64.II.B.4.

———— (1959), "Commercial policy in underdeveloped countries", *American Economic Review*, vol. 49, No. 2, Nashville, Tennessee, American Economic Association.

———— (1950), *The Economic Development of Latin America and its Principal Problems* (E/CN.12/89/Rev.1), New York, United Nations.

Sandri, D., E. Valenzuela and K. Anderson (2007), "Economic and trade indicators for Latin America, 1960 to 2004", *Agricultural Distortions Working Paper*, No. 48434, Washington, D.C., World Bank.

Spoor, M. (2000), "Two decades of adjustment and agricultural development in Latin America and the Caribbean", *Reformas económicas series*, No. 56 (LC/L.1352), Santiago, Chile, Economic Commission for Latin America and the Caribbean (ECLAC).

Valdés, A. (1996), "Surveillance of agricultural price and trade policy in Latin America during major policy reforms", *World Bank Discussion Paper*, No. 349, Washington, D.C., November.

Valdés, A. and W. Foster (2007), "The breadth of policy reforms and the potential gains from agricultural trade

liberalization: an ex post look at three Latin American countries", *Reforming Agricultural Trade for Developing Countries: Key Issues for a Pro-Development Outcome of the Doha Round*, Alex F. McCalla and John Nash (eds.), Washington, D.C., World Bank.

Valdés, A. and others (2008), "Evolución del ingreso agrícola real en América Latina, 1990-2005", *Revista española de estudios agrosociales y pesqueros*, No. 218, Madrid, Ministerio de Medio Ambiente y Medio Rural y Marino.

Valenzuela, E. and K. Anderson (2008), "Alternative agricultural price distortions for CGE analysis of developing countries, 2004 and 1980-84", *GTAP Research Memoranda*, No. 2925, West Lafayette, Purdue University, December [online] www.gtap.agecon.purdue.edu/resources.

Valenzuela, E., D. van der Mensbrugghe and K. Anderson (2009), "General equilibrium effects of distortions on global markets, farm incomes and welfare", *Distortions to Agricultural Incentives: A Global Perspective, 1955-2007*, K. Anderson (ed.), London, Palgrave Macmillan.

Van der Mensbrugghe, D. (2005), "Linkage technical reference document: version 6.0", Washington, D.C., World Bank, unpublished [online] worldbank.org/prospects/linkagemodel.

Winters, L.A., N. McCulloch and A. McKay (2004), "Trade liberalization and poverty: the evidence so far", *Journal of Economic Literature*, vol. 42, No. 1, Nashville, Tennessee, American Economic Association.

World Bank (2007), *World Development Report 2008: Agriculture for Development*, Washington, D.C.

———— (2006), *Global Economic Prospects: Economic Implications of Remittances and Migration*, Washington, D.C.

———— (2005), *Global Economic Prospects: Trade, Regionalism, and Development*, Washington, D.C.

———— (2004), *Global Economic Prospects: Realizing the Development Promise of the Doha Agenda*, Washington, D.C.

———— (2002), *Global Economic Prospects and the Developing Countries, 2002: Making Trade Work for the Poor*, Washington, D.C.

————, World Development Indicators Database [online] http://go.worldbank.org/B53SONGPA0.