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Introduction and summary

Ecuador is a lower-middle-income economy with about 45 percent of its export coming from primary and processed agricultural products. Until the 1970s agriculture was an even more important generator of foreign currency for the country, but the discovery of oil fields in 1967 transformed the country's export profile. Since 1973 oil exports have been the most important source of government revenue, and petroleum now accounts for about 45 percent of export earnings (Banco Central del Ecuador 2005).

Historically, agriculture in Ecuador had not only a major economic role but also a crucial socio-cultural one. One third of the country's population still lives in rural areas, and a quarter of the labor force is employed in agricultural activities (Table 1). No less than 60 percent of Ecuador's rural population is considered poor (Sanchez-Paramo 2005).

Protection of agricultural producers has always been a stated goal of governments, with the support of the general population. Interventions have been aimed at reducing the variability of domestic agricultural incomes, because the sector is subject to crop diseases, weather fluctuations and variable international prices.

Governments have adopted policies that affect agricultural price incentives both directly, and indirectly through industrial protection and macroeconomic policies. Direct government intervention in agriculture includes support for import-competing production through subsidies and border protectionist measures (tariffs and quotas on imports), as well as subsidization of farm credit and certain intermediate inputs to small farmers. On the export side, particularly when farm products were the main source of export revenues (before 1973), governments taxed export-oriented agricultural activities as a key source of their revenues. This amalgam of policies affected farmer incentives by making agricultural activities more or less profitable than other sectors of the economy, and it altered the competitiveness of different industries within the sector as well as the food prices paid by consumers.

A key purpose of this chapter is to construct estimates of indicators of direct and indirect assistance to (or taxation of) the agricultural sector in Ecuador. This is done for the whole sector, for aggregates of export-oriented and import-competing activities, and for

individual commodities. Following Anderson et al. (2008), the focus is on government policies that cause domestic prices to diverge from what they would be under free markets.

The conclusions about agricultural support in Ecuador should be interpreted with the usual caution for estimates of distortion indicators based on price comparisons. Caveats are necessary because assumptions and judgments are made when computing the various components of these measures. Moreover, the aggregate measures reported here ignore interventions in the services sector. Nonetheless, we believe that the measures of distortions to total agriculture and support and taxation of specific industries provide a reasonable basis for assessing the impact of agricultural and major economy-wide policies on Ecuadorian agriculture.

Our analysis, based on the period from 1966 to 2003, shows that agriculture as a whole was subject to declining net taxation and, in recent years, has shifted to slight net assistance. Taxation of export-oriented crops was in constant decline and reached a level of minimal intervention recently, while import-competing agriculture's heavy government intervention during the import-substitution period has given way to little or no protection in the 2000-03 period.

Despite considerable reforms to import restrictions implemented since the late 1980s, there is evidence that sectoral policies still impose varying distortions to agricultural incentives. The greater the variability of these government policy induced distortions, the greater the impact on the sectoral allocation of factors of production and the higher the national economic welfare costs (Lloyd 1974).

The remainder of this chapter is organized as follows. The next section presents a brief background of agricultural evolution prior to the 1960s. Economic growth, structural changes and political evolution from the 1960s to the present are then described. A narrative of the evolution of agricultural policies over the last 45 years follows. Methodological issues are then raised before summarizing and discussing the estimates of indicators of agricultural distortions. The final section draws implications of current policies and prospects for reform.

Agricultural evolution prior to the 1960s

During colonial times (1534-1822), the Spanish established an agricultural state system worked by native *indian* peons in the Sierra, the mountainous Andean area. The highlands' climate and peons system was considered appropriate for crop cultivation (maize, wheat, and corn) and livestock farming. On the Pacific coastal plain, the Costa, there were frequent

outbreaks of disease, and there were fewer natives composed of mixed ethnicities, which made it difficult for the Spanish to coerce labor. As a result, the Costa was neglected during the colonial period, developing a very different culture from that of the highlands, although there were some export oriented agricultural activities such as sugar cane, bananas, tobacco, cotton and cocoa. On the eastern slopes between the Andes and the headwaters of the Amazon, the Oriente, fierce natives and a difficult climate prevented settlement, so only religious missions attempted to reach these lands (Rudolph 1991).

After overcoming a period of regional political distress, Ecuador separated from the Gran Colombia in 1830 becoming a separate and independent republic.¹ The new republic consisted largely of a rural population, most of them under the peonage system, and its economy was based on cash crops and inexpensive raw materials which were vulnerable to international price and market demands fluctuations.

Until the beginning of the nineteenth century, the large land tenants “*terratenientes*” in the Sierra had almost absolute control over labor and resources (Baraona 1965). The peons were highly dependent economically and socially on the *terratenientes*. Between these two poles there were other subordinated social groups: merchants, small land owners and local authorities (Panchano 1984). The Oriente experienced different social and economic structures, with no dominant class at a regional level.

In the Costa at the beginning of the last century, the owners of large cocoa plantations were at the center of the social and political spectrum. They exercised considerable control over land and the economic landscape (Panchano 1984). From 1850 to 1910, cocoa exports were the mainstay of the economy, and to a lesser extent coffee and sugar products. The cocoa industry started to decline due to severe adjustments in the world market following World War I, and the growth of competition from Brazil and Africa, which contributed to over-supply. By the 1920s the cocoa industry was affected by the “Witch's Broom” fungus, which wiped out entire plantations, so that by the 1930s the sector was in serious decline. This had big repercussions for the entire economy (Luxner 1996). This transformation did not eliminate the privileged agro exporter class in the Costa, but it encouraged the evolution of medium-sized land owners.

During the 1950s, government-sponsored replanting efforts contributed to a partial resurgence of the cocoa industry, and coffee and bananas started to become important export products with export shares between 40 and 60 percent. In the 1960s, when cocoa and coffee

¹ The Galapagos Islands were annexed to Ecuador only in 1832.

started to lose their share in the international market, bananas became the most important export product. Since then Ecuador has been one of the world's largest exporters of bananas.

In the late 1950s, 90 percent of the country's exports came from primary agriculture (Banco Central del Ecuador 2005). But the Law of Industrial Incentives was decreed in 1957, which involved adopting a development strategy based on import-substituting industrialization. The industrial incentives included tariff and non-tariff measures to protect national manufacturing production, together with low tariffs or exemptions to imports of raw materials and some intermediate inputs used in manufacturing. The law also created provisions for subsidized credit and income tax exemptions for manufacturing industries.

Growth, structural changes and policy evolution since 1960

The discovery of oil fields in 1967 transformed Ecuador's agricultural-based economy, attracting large flows of foreign investment. On the political front, this coincided with a military regime (1963-66) which facilitated oil exploration-induced external indebtedness.

Between 1965 and 1975, the share of agriculture in GDP decreased from 27 to 18 percent, and non-agricultural activities experienced rapid development, especially the services sector to meet domestic demand growth (Figure 1). Industrial incentives were strengthened and broadened in 1962 and 1965 through the Industrial Promotion Law (which was modified again in 1971). However, the small size of the domestic market, a lack of a large pool of skilled people, and limited physical and financial infrastructure all constrained industrial expansion. Hence a large share of manufacturing was concentrated on what it could do best which was food processing.

During the second military interlude, from 1972 to 1979, Ecuador reaped the benefits of high-priced oil exports. Total GDP grew at an average 8 percent per year between 1971 and 1980, and exports earnings increased more than ten-fold (Banco Central del Ecuador 2005). The growth in revenue allowed governments to finance subsidies related to the import-substitution policy. At the same time it encouraged rapidly growing public and private expenditures. This fast economic expansion was accompanied by import growth and foreign debt buildup: imports increased by an average of 7 percent during the 1970s, spawning an inflationary pattern that eroded household purchasing power. From 1974 to 1979 the country's external debt, mainly due to oil sector expansion, grew from 324 to 44,500 million sucres (Flores and Merrill 1991).

With the economic growth of Ecuador highly dependent on oil, the sharp drop in oil prices in the early 1980s had large consequences. The public deficit reached 7 percent of GDP and the country endured a period of structural adjustment after foreign banks questioned the country's financial strength and resolved not to supply new loans (Whitaker and Greene 1990). With government revenues directly linked to oil exports, the downward price trend not only affected government resources dramatically, but it also led to recession in the economy with a further decrease of the other sources of revenues (de Janvry, Sadoulet and Fargeix 1991). The Government's deficit was alleviated through a devaluation of the currency and tight control of the foreign exchange rate market. Nonetheless, the secondary market foreign exchange rate premium averaged 58 percent during the 1980-84 period (Table 1).

For the period 1985-89 average GDP per capita was just over US\$1,000. Manufacturing's share of GDP was 17 percent, compared with an average for Latin America of 25 percent. The agricultural sector accounted for 15 percent of GDP but employed 35 percent of the economically active population (Table 1). Exports as a share of GDP reached 27 percent, with oil accounting for 48 percent of the total and agricultural products accounting for 29 percent (Table 2).

Three weather shocks contributed to a worsening economic crisis during the 1980s. The pluvial phenomenon "El Niño" in 1982-83 caused floods that severed public infrastructure and devastated to a great extent the Costa's agricultural production. In 1987, an earthquake damaged the oil pipeline which runs from the extraction point to distribution sites, interrupting oil exports for 6 months. In 1988, there was a drought in the Sierra, which had consequences for crop production and disrupted hydroelectric power generation.

By the late 1980s, it was perceived that the import substitution policy framework had not contributed to the creation of a solid and efficient manufacturing sector. The share of manufacturing in value added was about the same in both periods 1965-74 and 1975-84. By contrast, the share of the agricultural sector in GDP shrunk from one-quarter in 1965-74 to one-seventh in 1975-84 (Table 1).

A turnaround in trade policy from the import-substitution framework to an export oriented and less-protective trade policy started in the late 1980s. The trade policy changes included tariff cuts and other reductions to import restrictions, elimination of export taxes (although some permits and licenses still apply), export promotion laws, modernization of trade institutions and simplification of trade procedures. Trade reform brought import tariff rates gradually down from an average of 51 percent in 1985 to 29 percent in 1989 and to 11 percent in 1994 (World Bank 1988, Tamayo 1997).

During the 1990s, trade policy restructuring led to consolidation with trade partners from the Andean Community of Nations (Venezuela, Colombia, Peru and Bolivia), and to Ecuador's accession to the World Trade Organization (WTO) in 1995. According to the GTAP database for 2001 (Dimaranan 2006), the average applied rate of protection for all tradeables was 8 percent.² In addition to trade policies, there were important economic reforms focused on the labor market and exchange rate, both intended to favor export-oriented activities. The latter included exchange rate harmonization (to reduce the gap between the official and secondary rates), periodical mini-devaluations, and the floating of the currency within fixed bands.

Ecuador experienced a very tumultuous period from 1997 to 1999 with a marked economic crisis in 1999 (a GDP growth rate of -7 percent) and four presidents in four years. This resulted from the collapse of the banking system and simultaneous currency and public finance problems. The crisis was triggered by a combination of exogenous and domestic policy-induced shocks, leading to a loss of confidence in both the banking system and the domestic currency. Government liabilities increased dramatically, causing the country to default on its recently restructured 'Brady' foreign debt (Jacome 2004). On the brink of hyperinflation, the government in 2000 adopted the U.S. dollar as legal tender as a substitute to the sucre. The exchange rate, in sucres per U.S. dollar, changed from an annual average of 11,787 in 1999 to 25,000 in January 2000. The inflation rate moved from 52 percent in 1999 to a peak of 96 percent in 2000, before falling to single digit rates in 2003 and 2004.

The dollarization of the Ecuadorian economy was designed to increase macroeconomic stability by imposing tight fiscal discipline and eliminating governments (ab)use of exchange rate and monetary policies. Production of some non-traditional exports (e.g., flowers, seafood products and processed food) grew at an average rate of 10 percent per year for the period 2000-2005.³ However, an evaluation of the dollarization regime is compromised by the simultaneous occurrence of high oil demand and prices, and importantly the high volume of remittances sent by migrants who left the country during the economic crisis. In 2005, remittances amounted to 6 percent of GDP, and they were the second source of U.S. dollars for the economy, behind oil but ahead of banana export revenue.⁴

² Kee, Nicita and Olarreaga (2006), using empirical trade models, estimate for Ecuador an own-country trade restrictiveness index of 15 percent. Restrictions faced by Ecuadorian exporters abroad averaged 18 percent.

³ This performance is seen as the result of improved macroeconomic stability that over-compensated the initial real exchange rate appreciation resulting right after the implementation of dollarization (Abrego et al. 2006).

⁴ In 1998, remittances amounted to 3 percent of the GDP (IMF 2006).

López-Cálix (2003) notes that the stability and development of the country is promising, but tighter fiscal controls and a reduction of the external debt service are required to decrease the economy's susceptibility to external shocks in financial and oil markets. As a priority to improve competitiveness, he advocates for a major reform in trade policy to avoid the anti-export bias and to reduce the multiple and chronic distortions that still protect some sectors of the economy.

Agricultural policies since 1960

Export taxes on agriculture and import tariffs were the main sources of public revenue up to the mid-1960s (World Bank 1972). In the early 1960s, to anchor agricultural development, the government did three things: it created in 1963 the National Institute of Agricultural Research (INIAP) to accelerate technology adoption; it redefined some of the functions of the Ministry of Development by creating the Ministry of Agriculture in 1964; and it established a national system for agricultural credit (see Table 3 provides a chronological summary of the main agricultural policies in the last 45 years).

However, the most significant agricultural policy change occurred in 1964 when the military dictatorship implemented the Law of Agrarian Reform and Colonization. This policy was a response from the military regime, as the masses started to sympathize with socialist reform in the region, to gain acceptance from the people and to validate its government by conceding to the rural poor's demand for land ownership.⁵ The stated objectives of the land reform were to improve the conditions of small farmers and laborers, to eliminate absentee ownership and precarious land tenure systems by redistributing land-ownership, the provision of extension services, and the incorporation of agricultural workers into the social security system. The military government referred to the agrarian reform as “the cornerstone on which to build a new, harmonious, just, and dynamic Ecuador” (Blankstein and Zuvekas 1973).

The Ecuadorian Institute of Agrarian Reform and Settlement (Instituto Ecuatoriano de Reforma Agraria y Colonización, IERAC) was set up to administer the law. The size of land holdings was limited to 800 hectares of arable land in the Sierra, 2,500 hectares of arable land

⁵ From some accounts, the law was enacted in response to pressure from abroad to reform *feudal* agricultural practices, from humanitarian and liberal elements within the country, and from large landowners in the Costa who needed additional cheap labor (Flores and Merrill 1991).

in the Costa, and 1,000 hectares of pastureland in either region.⁶ The law also set the minimum amount of land to be granted in the redistribution at 4.8 hectares (Flores and Merrill 1991).

From the beginning the program failed to be properly funded. The mechanism of payment for expropriations was flawed, and most of the land reassigned was from church and government ownership. Of the 517,049 hectares affected between 1964 and 1969, 70 percent were under the modality of colonization and the rest was under redistribution of land (Blankstein and Zubekas 1973). The slow process of legitimization of new land owners meant there was still a serious obstacle to access to credit and technical assistance for many farmers.

Following the departure of the military regime, revisions of the law were implemented in the early 1970s. The revisions required that all land with absentee landlords be sold to the tenants and that farm residents be permitted to acquire title to land they had worked for three years. Many landowners refused to rent their lands to former tenants and in some cases forced them off the land.

The role of the government in conferring colonization land rights, in questioning the property right of inefficient systems, and in reassigning land ownership from low productivity systems and abandoned lands was the center of the agrarian conflict, and it became a big political, social and economic problem (Chiriboga 1984).

In the Costa, land invasions were promoted by political leaders associated with leftist groups. Poor non-tenant farmers grouped in “cooperativas” were convinced they were entitled to land without having to pay for it, and their leaders were victims of harsh repression from landowners.⁷ The land conflict claimed the lives of hundreds of people in the Coast and some parts of the Sierra.⁸

⁶ The distribution of agricultural land in Ecuador up to 1954 was one of most unequal in Latin America. The First National Agricultural census in 1954 showed that 57 percent of agricultural land was concentrated in 3,704 units (around 1 percent of the total number of farms). At the other end of the scale, 73 percent of the landholdings were less than 5 hectares each and comprised only 7 percent of the land area (Blankstein and Zubekas 1973).

⁷ The groups of non-tenant rural people were known as the “precaristas”, referring to the precarious working and living conditions provided by large land owners.

⁸ In an interview by the authors about land reform accounts in El Salitre Urbina Jado, Ivan and Carolina Mendoza, children of the once *terratiente* Don Mendoza, said:

“Our farm ‘Rosa de Oro’ had been in our family’s possession for generations, it was located in Urbina Jado, province of Guayas. It had 1,200 hectares of livestock, sugar, cocoa and rice production. We lived a harmonious life with workers and their families. The greed of lawyers and political leaders from Guayaquil permeated our workers, and their hope for land-ownership was transformed into an aggressive invasion of our land. The chosen name of their cooperative ‘Tierra o muerte’ (land or death) reflected their actions.”

From 1964 to 1982 the agrarian reform affected 2 million hectares, 70 percent under the modality of colonization, largely in the Oriental region.⁹ The impact of the agrarian reform on agricultural productivity cannot be properly assessed, as data on land use varies widely and is often considered unreliable by analysts (Flores and Merrill 1991). Data for the mid-1980s, for example, has estimates of cropland and pastureland that vary around 20 to 50 percent, and estimates for the total land area suitable for agriculture show a variation of 50 percent around 27 million hectares.¹⁰

The government intended to complement the agrarian reform through its policy of agricultural growth including access to credit, subsidies to production, provision of roads infrastructure and guarantee minimum producer prices. However, many of the efforts were contradictory with taxation of export oriented activities, and numerous credit funds were disbursed without technical support and verification of land ownership. Owning land is not a sufficient condition for agricultural progress of small farmers. This is clear from the account of Martinez (1984): “Between 1954 and 1974 the real income for small farms (less than 5 hectares) decreased by 16 percent with respect to the general price index and 31 percent with respect to food prices. The agrarian reform left the small beneficiary without access to proper technical knowledge, credit, irrigation, infrastructure, and technology.”

In terms of achieving dynamism in the agricultural sector and encouraging economic growth, the agrarian reform produced mixed results. On the one hand, large land owners facing the risk of non-secure land rights were deprived the opportunity to expand their systems according to a pattern of development (Warman 1980). On the other hand, new lands were brought into production which were previously abandoned or not claimed — especially in the Oriental region (Chiriboga 1984).

From the 1960s to the 1980s, the agricultural sector evolved based on the adoption and expansion of labor-saving technologies and the introduction of entrepreneurship. The policy of import substitution provided protection to crops linked to industrial processes, and this led to the modernization of production systems that favored large land owners — many

After facing death threats, we were forced off our land. The once-respected farm was reduced to 70 hectares in our possession and a myriad redistribution among many people. Without proper access to technology, and agricultural assistance funds wasted in non-agricultural private activities, the reform was a catastrophe for this farm and this region — many wanting to imitate the lifestyle of ‘Don Mendoza’ saw the opportunity in loosely disbursed money from government’s agencies.”

⁹ The amount of land legally redistributed was 1.5 million hectares (IERAC 1982).

¹⁰ This situation is compounded by the lack of accurate information on agricultural employment. Blankstein and Zuvekas (1973) point out the faulty procedures of the 1968 census and the lack of comparability with the 1954 census.

of whom consolidated (and even expanded) their positions, by negotiating with small tenants the direct sale of the newly allocated lands. Modernization was more evident in the Sierra, given the presence of traditional production systems directed to livestock and dairy; while the Costa had already evolved to some extent to more rent-oriented systems — although many large rice and sugar farms were affected by the *precaristas* (Panchano 1984).

During the 1980s, numerous governments' efforts were directed to provide support to agriculture through the creation of a marketing board, implementation of minimum producer floor prices, the provision of credit, direct output subsidies and subsidies to fertilizers, the loaning of government agricultural machinery, irrigation projects and low fees for water usage, the construction of rural roads and crops-storage installations, and funds for agricultural research and extension programs.

Nonetheless, agriculture as a whole was negatively impacted by policy measures that created incentives for import-competing activities through import barriers to primary agriculture linked to industrial processes, over valued exchange rates, government marketing of agricultural products, and fixing of low consumer prices (Vos 1983, Chiriboga 1984, Whitaker and Greene 1990, Whitaker 1996). The focus on a more rent-oriented system led to an increase from 36 percent to 46 percent in the export share of agricultural production during this decade.

A new law of agricultural development was implemented in the mid-1990s with the objective of improving access to credit and providing technical assistance and extension programs to rural communities. However, governments later eliminated the programs for the commercialization of agricultural products (ENPROVIT) and grain storage (ENAC). The latter action was due to the opening of Ecuador to imports and a dismantling of stockpiling of grains on world markets. Both programs had a positive influence on food nutrition for the poorest segment of the population and improved harvest prices for small farmers.

Important trade reforms were implemented during the 1990s in Ecuador. Agricultural export-oriented activities benefited from the elimination of export taxes. Agricultural imports were facilitated by the elimination of most quotas and cuts in tariffs levels. Ecuador joined the Andean Community of Nations (CAN) trade partnership in 1994, adopting the Common External Tariff (CET) involving tariffs of 5, 10, 15 and 20 percent for all tariff lines. However, the classification of agriculture as a sensitive sector led to the adoption in 1995 of a mechanism for price stabilization known as the Andean Price Band System (SAFP). This system, currently still in place, is a mechanism of variable tariffs to maintain the import price between a floor and a ceiling price. In theory, domestic price stabilization is achieved by

applying an extra import tax (variable) when the import price (reference) plus the “regular” tariff does not reach the floor price, or reducing the tariff down to zero when the reference import price is higher than the ceiling price. The SAFF sets tariffs that fluctuate between 35 and 95 percent and it applies to 12 “marker” products, which amount to 138 related products and 148 tariffs sub-headings.¹¹

In 1995 when Ecuador was granted membership of the World Trade Organization (WTO), tariff ceilings were established at 10 percentage points higher than the CET except for automobiles, chemical products, and certain primary agriculture and lightly processed food products. The country successfully set its tariff schemes before 2001 and currently receives preferential treatment in the framework of the Global System of Preferences for developing countries and the U.S. General System of Preferences (GSP). Both mechanisms are oriented to favor industrialization and accelerated growth (Hachette 2003). In addition to these schemes, Ecuador receives preferential access to U.S. markets for certain products under the Andean Trade Promotion and Drug Eradication Act (ATPDEA).¹²

In 1993 the Most Favored Nation (MFN) tariff rate on primary agricultural products was 8 percent, and the rate for processed food was 15 percent (authors’ calculations using the WITS system).¹³ The bound rates in 1996, following WTO accession, were 20 percent for primary agriculture and 29 percent for processed food, respectively (World Trade Organization 2005). In 2001, the effectively applied tariff rate for primary agriculture was 8 percent, 11 percent for processed food, 4 percent for other primary, and 8 percent in other manufacturing (authors’ calculations using the GTAP database). Kee, Nicita and Olarreaga (2006) estimate an overall rate of protection (a trade restrictiveness index) including tariffs and non-tariffs barriers for the period 2001-04 of 36 percent for agriculture and food and 12 percent for non-food manufactures.

The trade policy reforms have resulted in a greater openness of the Ecuadorian economy to international markets. There was an increase in the share of total merchandise imports plus exports as a percentage of GDP from 37 percent in 1993 to 49 percent in 2004 (authors’ calculations using Banco Central del Ecuador data). In particular for the agricultural

¹¹ The SAFF marker products are palm oil, white rice, sugar, sugar cane, pork, barley, milk, yellow maize, white corn, soybeans, wheat, and chicken meat.

¹² The ATPDEA was implemented in 2002 adding product coverage to the Andean Trade Preferences Act (ATPA) enacted in 1991. The ATPDEA expired in December 2006. However, after two approved extensions by the U.S. Congress, it is set to expire in February 2008.

¹³ According to the tariff information reported for the first time to the United Nations Conference on Trade and Development (UNCTAD).

sector, the reforms have produced noticeable structural changes. From 1980 to 2003, the share of crops in the total value of farm production decreased from 70 to 57 percent, and the share of livestock rose from 30 to 43 percent (derived from data in FAO 2004). Despite this orientation to protected import-competing dairy and livestock activities, the export performance of agriculture saw an improvement with an increase in exports' share of the value of farm production from 36 percent in 1980 to 53 percent in 2003.

The adoption of the dollar as the local currency in 2000 had an initial negative impact on agricultural exports, reducing the total value by one quarter from the previous year. However, the stability brought by the new currency system has served as a productivity boost. Some non-traditional exports have evolved in an important manner in the last five years (e.g., flowers exports reached 11 percent of non-oil exports for the 2000-04 period). By 2003 the value of agricultural exports, in nominal terms, was at the same level as before the currency and debt crisis in 1999.

Estimating distortions to incentives

In their seminal volume, Krueger, Schiff and Valdes (1991) quantitatively assess Latin America policy intervention in agriculture from 1960 to 1985. The study differentiates the direct effects due to sectoral policies (price and border protection, and subsidies) from the indirect effects due to economy-wide policies. Ecuador was not included in that study, but it was one of the 8 countries included in the World Bank's subsequent surveillance of agricultural price and trade policies in Latin America, covering 1986 to 1993 for Ecuador (Valdes and Schaeffer 1996). There are several other studies quantifying the role of policies in the Ecuadorian agriculture, but they focus on a limited set of commodities and/or years (Vos 1983, Whitaker and Greene 1990, Whitaker 1996, Josling 1997, Quiroz and Chumacero 1998, Banco Central del Ecuador 2003, Fernandez 2003).

Defining and calculating various policy indicators

The present project's methodology (Anderson et al. 2008) defines indicators to study policy-induced agricultural price distortions (as distinct from market factors, infrastructural investments and services that change prices and incentives more generally). The focus is on government-imposed distortions that create a gap between domestic prices and what they would be under free markets. Since it is not possible to understand the characteristics of agricultural development with a sectoral view alone, the project's methodology not only

estimates the effects of direct agricultural policy measures (including distortions in the foreign exchange market), but it also generates estimates of distortions in non-agricultural sectors for comparative evaluation. It thereby considers the overall economic incentive environment.

Nominal rate of assistance to agriculture, and products selected

The nominal rate of assistance (NRA) to farmers involves a direct price comparison and is defined as the price of a product in the domestic market less its price at the border, expressed as a percentage of the border price. A crucial task in constructing this measure is to make transport costs and margins adjustments to derive an equivalent level of comparison in the marketing channel (see Anderson et al. 2008). In the absence of trade flows because of prohibitive tariffs, an international reference price is compared with the domestic price, taking into account international trading costs. The same applies for preferential fob prices on some quota-restricted exports — a comparison of that export price with the domestic price would be misleading. The Appendix contains the data sources for producer and border or reference prices, and information on the adjustments and assumptions made.

To account for governments' induced distortions in the market for foreign currency, an equilibrium exchange rate is estimated. The parallel market exchange rate is used as an indicator of the marginal price paid for foreign exchange by importers. The exporters' exchange rate is calculated as a weighted average of the official and the parallel market exchange rates with weights based on the exporter retention rate. The difference between the importer exchange rate and the equilibrium exchange rate is used as a measure of the exchange rate distortion component of protection to importables. Similarly, the difference between the exporter exchange rate and the equilibrium rate is used as a measure of the exchange rate distortion to exportable goods.

Indicators of distortions are estimated for the agricultural sector as a whole, for aggregates of export-oriented and import-competing activities, and for individual commodities. Based on data availability, from 1990 to 2000, the NRA also includes assistance to primary factors and purchased farm inputs and any other non-product-specific subsidies net of taxes.

This study includes the following production activities: banana, beef, cocoa, coffee, maize, milk, chicken meat, pig meat, rice, sugar, and soybeans. These 11 products cover between 60 and 84 percent of the total market value of production for the period under study

(1966 to 2003), as depicted in Figure 2. These commodities were subjected to heavy direct intervention in the form of export taxes, import quotas and tariff restrictions, and bans.

Classifying the tradability of products

The classification of products according to their trade status is straightforward for traditional exported products such as banana, coffee, cocoa, and sugar before 1983, and rice before 1975. However, the classification of the remaining products according to their trade value data could be misleading in the presence of hindering trade barriers, or export subsidies designed to stabilize domestic prices. These remaining products are traded in very small amounts, or not traded at all, because governments have deliberately directed efforts to protect national industries. The approach adopted here is the “potential” net trade status in the absence of distortions and how domestic prices compare with international price equivalents — notwithstanding the absence of actual border prices. Thus, the remaining products are considered import-competing activities,¹⁴ with exceptions in sugar and rice for years in which weather-induced over-supply resulted in a clear net exporter trading position. This assumption accords with the policy debate between interest groups and the government regarding interventions for these activities: it has focused almost exclusively on tariffs, and occasionally safeguards.¹⁵ In Ecuador, with the exception of flowers and fruit exports starting in the late 1980s, the remaining agricultural products are considered non-traded internationally.

Nominal rates of assistance to non-agriculture and the relative rate of assistance

Non-agricultural industries are grouped into five aggregates: lightly processed food, highly processed food, non-agricultural primary resources, non-food manufacturing, and services. Within each of these sub-sectors, shares are defined according to their tradable status: importable, exportable and non-tradable. Tariff information is used to define the assistance estimate in non-agricultural import-competing industries, drawn from UNCTAD (WITS 2006), the World Bank (1976 and 1988) and the IMF (2005). Export taxes, including fees and permits for the later periods, are used to define the (negative) assistance to exportables, drawn from IMF (2005) and WTO (2005). It is assumed that there are no distortions in non-tradables. The classification and weights for aggregation are the authors’ best judgment based

¹⁴ However, the milk and beef sectors are marginally exporters of high-quality products.

¹⁵ Anecdotaly, in light of the presence of the avian flu virus (H9) in Colombian poultry farms Ecuador banned poultry imports from Colombia (reported in ‘El Universo’ newspaper 12 October 2005, Guayaquil, Ecuador).

on national Input-Output tables from Banco Central del Ecuador, and the GTAP 2001 database.¹⁶

Anderson et al. (2008) suggest that the relevant economy-wide indicator of policy intervention for comparison with assistance to agriculture is not necessarily the aggregate for all non-agricultural activities. They suggest a comparison of the NRAs of just the tradable component of the agricultural sectors and the NRAs of the tradable component of non-agricultural sectors. As such, a Relative Rate of Assistance (RRA) to agriculture is defined as follows:

$$RRA = 100 * \left[\frac{(100 + \text{NRA in Agric tradables})}{(100 + \text{NRA in Non Agric tradables})} - 1 \right]$$

where negative values indicate the policy regime has an anti-agricultural bias, and positive values indicate a pro-agricultural policy bias.

What do the estimates of distortions reveal?

This section summarizes the results for the agricultural sector and the results for the rest of the economy.

Indicators for primary agriculture

The nominal rates of assistance to agriculture for the period 1966 to 2003, by commodities and by aggregates of exportables and import-competing activities, are shown in Table 4 and summarized in Figure 3. Agriculture was negatively affected as an aggregate though almost all of that period, with agricultural policies depressing prices by as much as one-third in the early 1970s and averaging above zero only during the import substitution period of the early 1980s. However, this result masks the high dispersion of policy intervention, with export producers facing disprotection of up to 40+ percent and import-competing farmers benefiting during the latter 1970s and 1980s with NRAs averaging as high as 50+ percent. The variability of the nominal rate of assistance, as measured by the annual commodity standard deviation around the value of production-weighted mean, ranges from around 100 percent up

¹⁶ We exclude the treatment of value added tax (VAT) in our assistance calculations, as Anderson et al. (2006) consider this a tax on consumption. A VAT was first implemented in Ecuador in 1990 with a 10 percent rate, and later raised to 12 percent in 2000. The VAT includes provisions for exclusion of primary agriculture and lightly processed food.

to the mid-1980s but dropping to less than 30 percent during the past two decades. This reflects the very considerable progress made since the late 1980s in trade policies reform.¹⁷

Exportable NRAs show a downward trend, passing from a peak net taxation around 40 percent during the 1970s to minimal intervention in the 2000-03 period — the remaining intervention is mainly small fees for licenses, permits, and contributions to export promotion activities. Given the large weight of exportables in the production value, this sub-sector has dictated the aggregate NRA trend for total agriculture. The elimination of export taxes and the implementation of more dynamic and transparent trade procedures contributed in recent years to a significant reduction in distortions. The NRA trend for import-competing products shows that for the period covering the land reform years, there was a small degree of disprotection for this sub-sector, but subsequently there was a growing degree of support to import-competing agriculture through the combination of exchange rate policies, border policies and minimum floor producer prices. One consequence of this was the expansion of livestock activities after the land reform, as a way of diverting efforts from labor-intensive activities and taking advantage of the battery of support programs intended to complement the land reform.

Our calculations are consistent with the main findings of Valdes and Schaeffer (1996). They too find net taxation of the production of exportables and support to importables for the 1986-93 period.¹⁸ Although they report an increasing degree of taxation for exportables, in contrast to the decreasing disprotection found in this study, the discrepancy is likely due to their use of reference border prices which differs from the actual fob prices used in this study (which are from the Banco Central del Ecuador).¹⁹

The divergent policy treatment of export and import-competing sub-sectors in the past was based on the need to generate government revenues through trade taxes in the absence of a consolidated tax base and institutional capacity for low-cost collection of income taxes.

¹⁷ Non-product-specific assistance is incorporated in the calculations of agricultural support using information on public expenditure in agriculture and rural areas from FAO (2006). The FAO (2006) database contains estimates of public expenditures on: internal and external commercialization, education, forestry support, special rural production support programs, agricultural managerial expenses, irrigation infrastructure, agricultural research and extension, land buying programs, phyto-sanitary programs, integral rural development, promotion of association, and regularization of land ownership. It turns out that support conferred through non-product-specific subsidies adds less than 0.1 percent to the total agricultural NRA for the 1990s.

¹⁸ The two studies' NRA estimates for exportables, importables and total agriculture yield a correlation of 0.71.

¹⁹ Moreover, Valdes and Schaeffer classify beef as exportable. We find that unconvincing, given that the bulk of beef production is not in border provinces. "Although the data suggests that beef is an importable, it is an exportable because it does not capture all the *ad hoc* trading between the borders. For example, large quantities of beef *walk* into the country from Peru for summer grazing, and later either *walk* back or are sent after processing. A similar situation exists with Colombia." (Valdes and Schaeffer 1996).

Protectionism to import-competing production activities was always misguided as a source of revenues for the government. It has not been perceived by the general population as the implicit consumer food tax on the general population that it is.

Moreover, the greater gap between taxation of exportables and support to import-competing activities found in the 1980s was a direct consequence of the distortions in the exchange rate market. Figure 4 shows the percentage gap between exporters and importers' exchange rates from 1955 to 1998 (which became zero after dollarization). We do not incorporate real exchange rate misalignments into measures of agricultural distortions as is done in Krueger, Schiff and Valdes (1991). Rather, we treat distortions to exchange rates as equivalent to import and export taxes: distortions translate into implicit protection to import-competing activities (Anderson et al. 2008).²⁰

Figure 5 shows the evolution of agricultural policies effects at an individual commodity level for three periods: the first land-reform years; the period of higher protection conferred through the tariff and non-tariff structure and the exchange rate market; and the most recent period. Banana and coffee, the key sources of export revenue for the country for the period 1966-69, experienced a marked increase in taxation after the land reform years, in contrast to the minimal intervention in recent years. The government's attempts to return the cocoa sector to its main-exporting commodity role are reflected in the support shown in the reform years. This situation changed for the 1980s period through exchange rate distortions, and in the most-recent period through export licenses and contributions.

Rice is the main staple food in Ecuador, and as such its policies are particularly important to consumers. From 1951 to 1968, there were some specific exchange rate programs to support exports, amounting in nominal terms to an average NRA of 15 percent (IMF 2005). But the land reform process had a severe impact on many rice production zones, and domestic demand absorbed all production from 1968 to 1974. The annual production average over this period was only 10 percent greater than the 1961 figure. Since 1975, the country has assumed a fluctuating trade position, with the overriding goal of securing domestic floor producer prices. Our calculations show increasing protection of the sector

²⁰ Defining and estimating exchange rate misalignment is a complex problem. There is not a definite position in the economics profession about the long-run behavior of the real exchange rate. In a current period, it could be argued that a real appreciation of the foreign exchange rate lowers uniformly the price of all tradables relative to the price of nontradables, and conversely for a real devaluation, and thus it does not have any effect within the tradables grouping of industries. Moreover, fluctuations in market perception also could lead to foreign exchange rate misalignment relative to what fundamentals would suggest, and again this may be quite independent of distortionary government policy choices. Additionally, the definition of a year base is not without bias when exchange rates vary a lot within each year and products are sold unevenly through the year.

reaching as much as 37 percent for 1995-2003, comparable to the estimate by Fernandez (2003) of effective protection conferred by the SAFP system of 24 percent.²¹

Sugar evolved as a competitive export product up to 1983. Afterwards, the existence of preferential quota access to the U.S. market and simultaneous import barriers distorted the evolutionary trend of the industry. Both of these mechanisms raised the price received by producers, acting simultaneously as a foreign-conferred export subsidy to local producers and support through import restrictions. Our 22 percent estimate for the period 1995-2003 coincides with the estimate by Fernandez (2003) of effective protection of 21 percent for sugar producers for the same period.

The evolution of beef and milk production was a direct result of the land reform: agricultural production was directed to less labor-intensive activities to reduce the risk of land tenure loss through occupancy pressure. Following negative protection in this period, both sectors capitalized on the subsequent protection conferred through the import substitution framework and bans on imports. Our estimates show a peak protection of almost 60 percent for the early 1980s, which is consistent with the finding by Chiriboga (1984) of a four-fold increase in minimum domestic prices from 1978 to 1983. The results for the current period show assistance of 32 percent for beef and 9 percent for milk.²²

In the past, chicken meat was the most distorted sector, due to trade protective policies, subsidies to intermediate imports, and access to subsidized credit. Production benefited through domestic prices as much as three times higher than international prices. The opening of trade has put this sector on track to a normal process of industrial development, although our calculations still show some support (around 25 percent) for the most recent period. In Fernandez's numbers, the SAFP provided an effective protection of 9 percent for the period 1995-2003, and a CATO's note by Calderon (2005) reports an effective protection of 78 percent in 2004. However, poultry production costs are directly affected by tariff-supported domestic prices of maize and soybeans, which represent up to 65 percent of production costs.

Pig meat production has developed a pattern of industrialization and modernization with increasing protection conferred through border measures. However, like the poultry sector, this industry faces high production costs because of maize and soybeans supported prices. Our estimate of the NRA at the producer level is volatile because it requires an

²¹ Our 21 percent estimate for the period 1993-1995 is also comparable to Quiroz et al.'s (1998) of 32 percent.

²² For the period 1993-1995, our estimate of 26 percent is comparable with the Quiroz et al.'s (1998) effective tariff for milk of 40 percent.

international reference producer price and trade costs proxies (see Appendix for details). The calculations for the period 2000-03 suggest a domestic price 50 percent higher than border prices.

Yellow maize, a SAFF's marker product, is supported by the fluctuating tariff mechanism. Because local maize production is not sufficient to supply poultry and pork activities, which represent 90 percent of total domestic consumption, governments have sponsored programs of import quotas to producers who agree to buy local production. Our NRA estimate for maize of 40 percent for the period covered by Fernandez (1995-2003) compares with their estimate of effective protection of 18 percent. According to a Ministry of Agriculture's study of competitiveness (CORPEI and INCAE 2000), maize production exhibits low productivity and high production costs, and its profitability is due to the high border protection of 70 percent.

Soybean production is supported by the SAFF's tariff mechanism too. According to figures from the Ministry of Agriculture, domestic production only meets two months of domestic demand requirements from the poultry and feed industry. Thus, supply security is the policy argument to support this industry. Our estimate for the period 2000-03 shows protection of 12 percent.

Indicators for non-agriculture, and the RRA to agriculture

The details of the estimates of the nominal rate of assistance (NRA) in non-agricultural industries are presented in Appendix Table 5. The production weighted average for total non-agriculture shows a minimal intervention for the period under study, with a current protection estimate of 3 percent. Import-competing industries have consistently enjoyed protection, reaching a peak of 33 percent in the early 1980s, and the current average estimate for the latest years is 14 percent. Exportables have experienced taxation in the past, while current estimates show almost no intervention.

The sectoral view is useful to identify differences in the policy treatment of these industries.²³ Other primary sectors (mainly oil and gas production) have had minimal distortions in the past, and our measures do not capture any distortion since 1995. Non-food manufacturing has experienced a decreasing trend in protection, with an estimate around 5 percent in the most recent period. Based on our calculations, food production activities (lightly and processed) are the most distorted sectors. Protection has focused on these sectors

²³ In the absence of reliable estimates we assume zero NRA for services.

to enhance production stability and food supply insurance to consumers. Highly processed food industries show minimal intervention, with an average for the latest years of 4 percent. Lightly processed food production has experienced a trend from taxation to protection in recent years, with a peak of 20 percent (conferred through tariffs).

Once distortions to non-agricultural industries are considered, the relative rate of assistance to agriculture (RRA) shows that there was a decreasing trend in the taxation of agricultural tradables from a peak RRA level of -30 percent in the 1970-74 period, to a level of minimal intervention in the 2000-03 period. Importantly, during the early 1980s, the RRA shows an offsetting of policies (Table 5 and Figure 6).

Conclusions and prospects for Ecuadorian agricultural policy

Ecuadorian agriculture experienced a profound transformation as a result of policy intervention during the past 45 years. The agricultural land ownership reforms of the late 1960s and 1970s affected patterns of production and resulted in marked structural changes. Price controls and myriad subsidies to production altered the sector during the 1980s. To a greater degree, however, trade policies and interventions in the foreign exchange markets during the 1980s and 1990s created incentives to transfer resources to import-competing sectors and imposed a burden on export industries. Government protection was largely influenced by the lobbying of interest groups. Arguments advanced for agricultural protectionism included the importance of securing production activities as employment generators and the need to secure domestic food supplies. However, export-oriented agro-industries were successful at competing internationally in spite of policy-induced distortions to their incentives. From a rural income perspective, export-oriented agriculture has the best prospect for offering sustainable and stable employment.

The policy environment of the last decade brought dynamic changes to the sector, significantly decreasing the anti-agricultural policy bias. Since the adoption of dollarization in 2000, the direct effect on agriculture from interventions in the foreign exchange market has been eliminated. However, the intra-sectoral bias is still present despite substantial reforms to trade policy, as border measures confer an important degree of protection to import-competing activities. The trade policy reforms included the abolition of export subsidies and export taxes (some contribution and permit fees still apply), and a considerable reduction in tariffs and quota implementations.

Economic welfare of the country (including producers and consumers) could still be enhanced by the elimination of remaining agricultural protectionist measures. The greatest role for agriculture in achieving poverty reduction may be through growth of internationally competitive activities, which generate rural employment and increase rural income. For instance, cocoa, banana, shrimps and more recently flowers have become lead export industries.

The near-term trade policy challenge for Ecuador is not to lose preferential market access to the U.S., in light of the expiration of benefits granted under the ATPDEA, which have been extended until February 2008. It seems unlikely that further preferential market access extensions could be granted in absence of a free trade agreement between Ecuador and U.S. The current suspension of the negotiations may put the country in a disadvantaged position with risks of trade diversion. Especially considering that Colombia and Peru, the country's most important trade partners in the Andean Community of Nations partnership, have already concluded their negotiations with U.S.²⁴ Prospects for further trade reform and integration arise in two other areas: negotiations of the Andean Community with the European Union; and indications of the government's desire to initiate negotiations with MERCOSUR.

²⁴ The CAN (Andean Community of Nations), at the time of this research has been completed is enduring heavy scrutiny, as Venezuela decided to withdraw from it as a consequence of the trade agreement of Colombia and Peru with the U.S.

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Table 1: Basic economic indicators, Ecuador, 1965 to 2004

	1965-69	1970-74	1975-79	1980-84	1985-89	1990-94	1995-99	2000-04
Population (in million)	5.5	6.3	7.3	8.4	9.6	10.7	11.8	12.7
Labor force (in million)	1.8	2.0	2.4	2.7	3.3	3.9	4.5	5.0
Agricultural workers (% of labor force)	54	49	43	38	35	32	28	25
Agricultural land (in million Ha)	4.7	5.0	5.8	6.9	7.6	8.0	8.0	8.1
GDP per capita (in current USD)	268	371	946	1466	1043	1255	1786	1875
Share of agriculture in GDP (%)	26	21	16	13	15	16	15	8
Foreign exchange secondary market premium (%)	17	7	7	58	32	14	4	

Source: Sandri, Valenzuela and Anderson (2006).

Table 2: Exports total value and product value composition, Ecuador, 1965 – 2004

	1965-69	1970-74	1975-79	1980-84	1985-89	1990-94	1995-99	2000-04
	(percent)							
Oil	1	27	57	69	48	42	31	45
Bananas	43	31	10	7	13	20	22	17
Coffee and products	22	15	13	7	10	5	3	1
Cocoa and products	16	9	3	5	6	3	2	2
Flowers, abaca and wood	0	0	0	0	0	0	4	6
Shrimp	1	2	2	5	14	15	16	5
Tuna and other fish	1	1	1	0	1	2	2	2
Other (incl. manufactures)	17	15	14	8	8	12	20	22
Total	100	100	100	100	100	100	100	100
	(current U.S. dollars)							
TOTAL (in million)	155	474	1425	2426	2313	3117	4634	5723

Source: Based on Banco Central del Ecuador data and Acosta (2006)

Table 3: Overview of major agricultural policy developments in Ecuador since 1957

Date	Measure	Description
1957 and 1962	Law of Industrial Incentives Import Substitution Policy	<ul style="list-style-type: none"> • Implementation of tariff and non-tariff barriers to protect manufacturing • Low tariffs or exemption to intermediate input imports • Subsidized credit and income tax exemption to manufacturing industries
1963	Creation of INIAP	<ul style="list-style-type: none"> • National Institute of agriculture research, main mechanism for technology adoption.
1964	Creation of Ministry of Agriculture (before functions of Ministerio de Fomento)	<ul style="list-style-type: none"> • To delineate the agricultural development, through technology transfers, services, and prices determination
1964	Reform Agrarian Law "La Ley de tierras baldías y colonización"	<p>Redistributing land-ownership with the objectives of:</p> <ul style="list-style-type: none"> • Eliminating precarious land tenure systems • Improving the conditions of the small farmer and agricultural workers • Providing agricultural extension services • Incorporating agricultural workers into the social security system • Main mechanism of credit to the agricultural sector
1964	Establishment of a national system for agricultural credit. Banco Nacional de Fomento	
1966	Creation of INERHI. National system of irrigation	<ul style="list-style-type: none"> • Development and assignment of irrigation areas
1970	Law of Abolition of precarious systems	<ul style="list-style-type: none"> • To eliminate precarious rental agreements and to make all farmers landowners
1973	Second Law of Agrarian reform	<ul style="list-style-type: none"> • To promote agriculture efficiency by redistributing land ownership of low productivity systems • Ownership reassignment of government and church lands • To provide credit and technical assistance • Implementation of subsidies and establishment of minimum prices
1979	Law of Agricultural Development. Law of Colonization of the Amazon region	<ul style="list-style-type: none"> • To provide support to agriculture through: subsidies to production, technical assistance, access to credits, and minimum floor prices • To control further land invasions through hard repression measures
1980-90	Implementation of Land purchases programs	<p>The most notable program was Protierras</p> <ul style="list-style-type: none"> • Negotiated external debt funds were destined to loans for land purchases
1986	Marketing Board	<ul style="list-style-type: none"> • To promote efficient agricultural trading
1992 and 1994	Exports Facilitation and Aquatic Transport	<ul style="list-style-type: none"> • To impulse and diversify the country's exports • To eliminate legal processes which restrict exports
1990	Implementation of VAT	<ul style="list-style-type: none"> • 10% tax on value added, with exceptions on agriculture
1992	Abolition of export taxes	<ul style="list-style-type: none"> • To promote agricultural exports
1993	Implementation of agricultural import tariffs band mechanism	<ul style="list-style-type: none"> • To reduce agricultural price volatility and provide an stable production environment
1994	New Law of Agricultural Development	<ul style="list-style-type: none"> • To improve access to credit for production • To provide technical assistance and extension programs
1995	WTO accession	
1997	Creation of CORPEI (Corporation for the Promotion of Exports and Investments)	<ul style="list-style-type: none"> • To promote the country's exports offer and attract foreign investment by offering technical assistance to exporters, promoting trade promotion events, facilitating the establishment of trade companies alliances, and operating a network of commercial offices
1997	Creation of COMEXI (Council of External Trade and Investments)	<ul style="list-style-type: none"> • To delineate external trade policies and direct investment • To define strategies for trade negotiations and economic integration • To delineate CORPEI's strategic plan for export promotion
1999	Debt, exchange, banking crisis	<ul style="list-style-type: none"> • Default of external debt
2000	Dollarization	<ul style="list-style-type: none"> • Adoption of U.S. dollar as legal tender
2000	Changes in VAT	<ul style="list-style-type: none"> • 12% tax on value added, with exemptions on agriculture
2003	Drawback Law	<ul style="list-style-type: none"> • To reimburse taxes paid on production inputs of exportable goods

Source: Authors' compilation.

Table 4: Nominal rates of assistance to covered agricultural products, Ecuador, 1966 to 2003

	(percent)							
	1966-69	1970-74	1975-79	1980-84	1985-89	1990-94	1995-99	2000-03
Exportables	-20.6	-40.0	-43.2	-31.1	-26.1	-11.1	-10.4	-2.9
Banana	-34.6	-48.5	-52.4	-39.1	-37.4	-8.6	-16.4	-7.3
Cocoa	5.6	-16.2	-13.3	-4.0	-13.5	-16.4	-11.7	-6.7
Coffee	-19.0	-41.8	-61.9	-39.4	-28.6	-15.6	-21.6	0.1
Import-competing products	-1.9	-14.5	26.4	53.8	26.7	-1.0	7.8	22.2
Maize	28.2	39.8	69.9	62.5	39.4	18.6	30.3	49.9
Soybean	50.7	-7.8	29.9	11.9	4.5	-1.8	-7.3	12.2
Milk	-14.2	-28.3	22.7	58.1	24.0	9.8	6.6	8.7
Beef	-11.7	-29.2	74.9	62.0	41.3	-6.2	5.3	31.8
Chicken meat	284.8	228.8	254.0	315.4	105.7	20.0	28.5	24.6
Pigmeat	6.4	-13.7	-9.1	33.2	4.9	-20.0	-10.9	50.5
Mixed trade status ^a								
Rice	-6.5	-8.0	-1.7	24.7	25.7	-6.2	35.2	39.8
Sugar	-9.6	-47.1	21.4	-15.3	-0.9	-15.2	28.5	13.0
Total of covered products ^b	-14.8	-31.5	-20.8	9.9	-0.8	-6.4	-2.0	12.2
Dispersion of covered products ^c	99.0	88.6	104.8	106.2	48.5	18.8	27.9	29.6
% coverage (at undistorted prices)	64.8	71.2	71.9	62.4	73.2	82.5	82.1	82.6

^a Mixed trade status products included in exportable or import-competing groups depending upon their trade status in the particular year.

^b Weighted average using value of output at unassisted farm-gate prices as weights.

^c The the simple 5-year average of the annual standard deviation around the weighted mean.

Source: Authors' calculations (see Appendix).

Table 5: Nominal rates of assistance to agricultural relative to non-agricultural industries, Ecuador, 1966 to 2003

(percent)

	1966-69	1970-74	1975-79	1980-84	1985-89	1990-94	1995-99	2000-03
Covered products	-14.8	-31.5	-20.8	9.9	-0.8	-6.4	-2.0	12.2
Non-covered	0.0	0.0	0.0	0.0	0.0	-0.2	-1.7	-3.4
All agric. products ^a	-9.6	-22.4	-15.0	5.9	-1.0	-5.3	-2.0	10.2
Trade bias index ^b	-0.19	-0.28	-0.54	-0.55	-0.38	-0.09	-0.15	-0.20
<i>Assistance to just tradables</i>								
All agricultural tradables ^a	-14.8	-31.5	-20.8	9.9	-0.8	-6.4	-2.6	11.2
All non-agricultural tradables	1.2	-3.2	4.8	9.4	8.6	2.5	5.8	8.5
Relative rate of Assistance, RRA^c	-15.8	-29.3	-24.5	0.3	-8.8	-8.8	-8.1	2.2

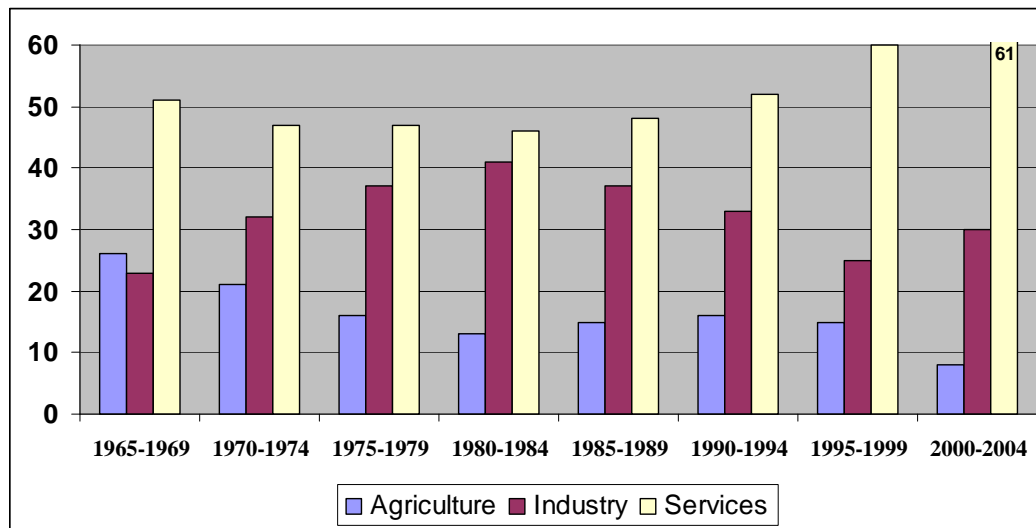
^a The inclusion of non-product-specific subsidies from 1990 to 2000 adds less than 0.1 percent to the NRA for total agriculture.

^b Trade Bias Index is $TBI = (1 + NRA_{ag_x}/100)/(1 + NRA_{ag_m}/100) - 1$, where NRA_{ag_m} and NRA_{ag_x} are the average percentage NRAs for the import-competing and exportable parts of the agricultural sector.

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

Source: Authors' calculations (see Appendix).

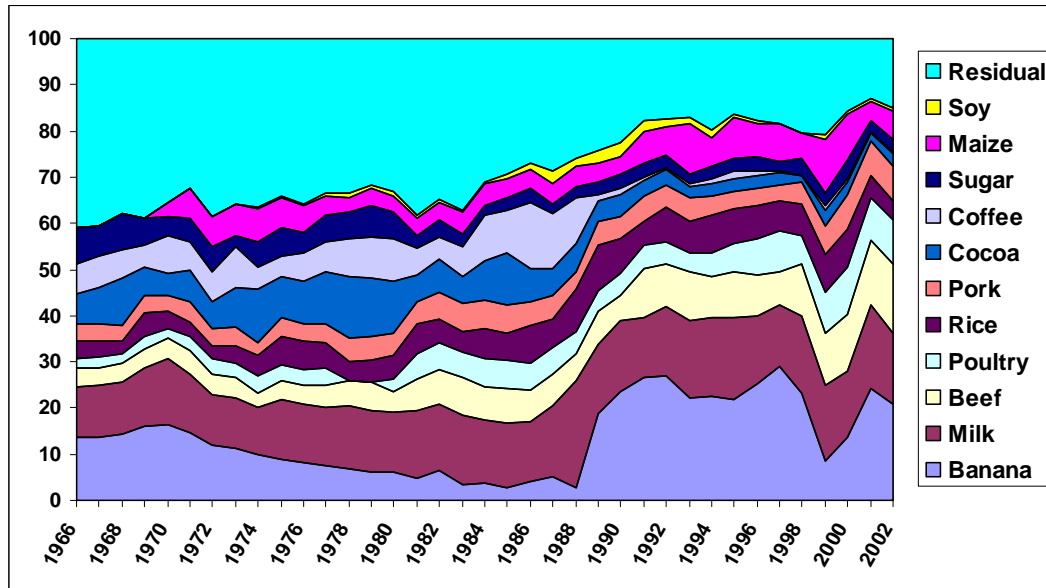
Figure 1: Agriculture, industry and services shares of GDP, Ecuador, 1965 to 2004
(percent)



Source: Authors' calculations using World Bank's World Development Indicators database.

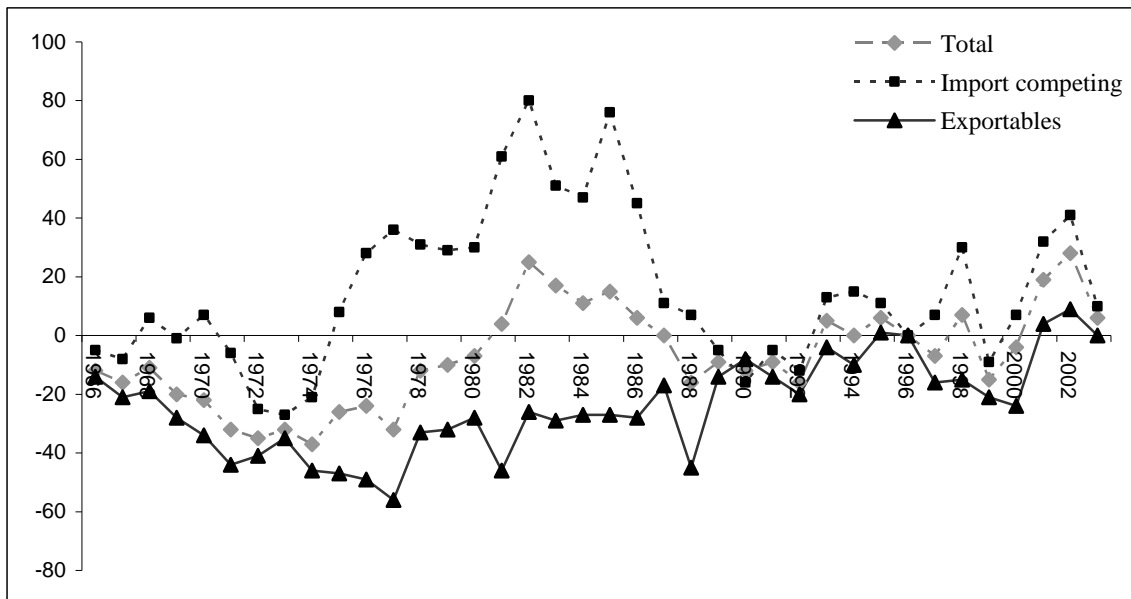
Figure 2: Agricultural production value shares, measured at market prices, by farm product, Ecuador, 1966 to 2003

(percent)



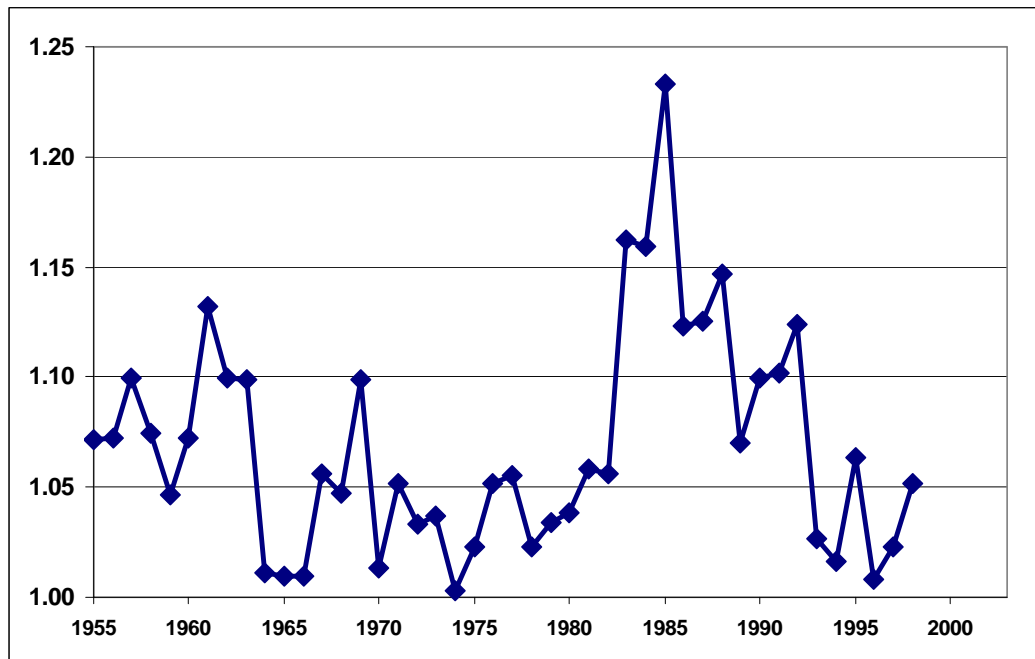
Source: Authors' calculations.

Figure 3: Nominal rates of assistance to exportable, importable and all covered agricultural products, Ecuador, 1966 to 2003
(percent)



Source: Authors' calculations (see Appendix).

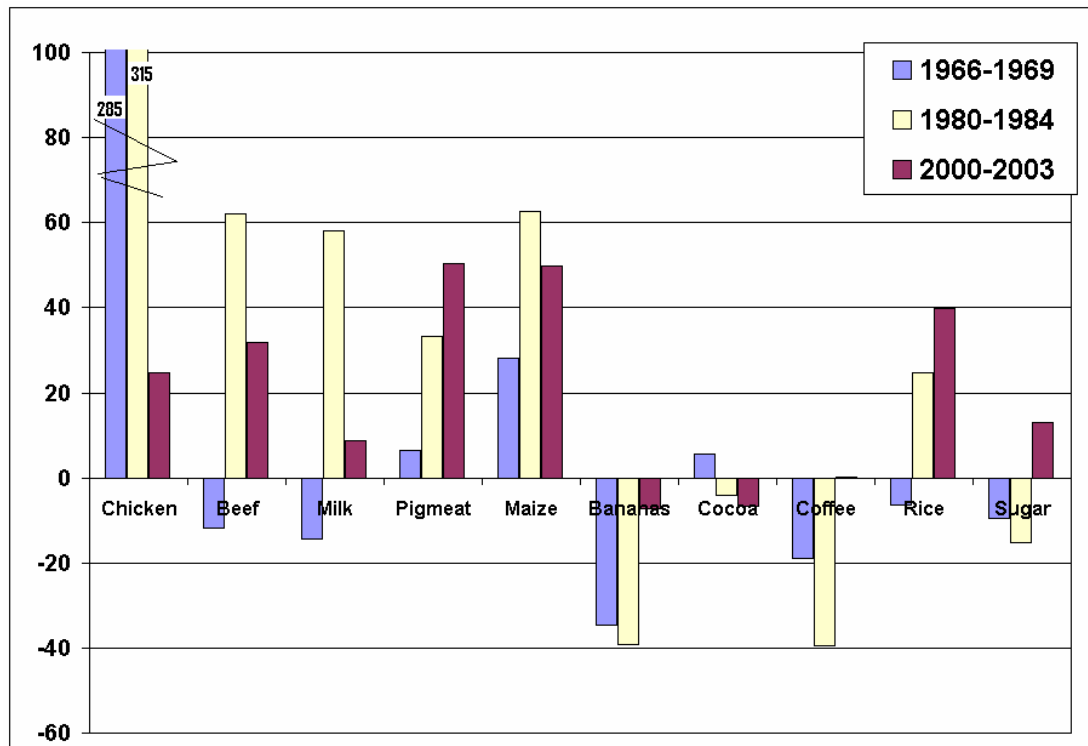
Figure 4: Proportion by which the exchange rate (LC per U.S. dollar) for importers exceeds that for exporters, Ecuador, 1955 to 1998



Source: Authors' calculations (see Appendix).

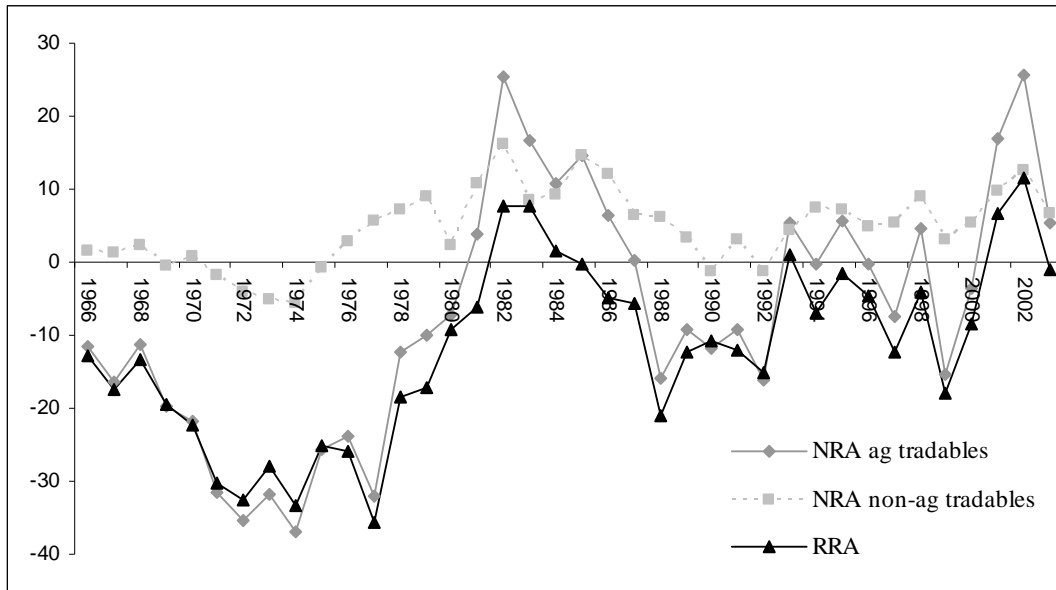
Figure 5: Nominal rates of assistance (NRA) by commodity, Ecuador, 1966 to 2003

(percent)



Source: Authors' calculations (see Appendix).

Figure 6: Nominal rates of assistance to all non-agricultural tradables, all agricultural tradable industries, and relative rates of assistance^a, Ecuador, 1966 to 2003
(percent)



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

Source: Authors' calculations (see Appendix).

Appendix: Key quantity and price data, assumptions and sources for Ecuador

QUANTITY DATA

Banana

Production: Almeida and Almeida (1950-1983), FAO (1984-89), SICA (1990-2004).

Import: Banco Central del Ecuador *Boletín Anuario*.

Export: Almeida and Almeida (1950-83), FAO (1984-89), Banco Central del Ecuador *Boletín Anuario* (1990-2004).

Cocoa

Production: Almeida and Almeida (1950-1983), FAO (1984-89), SICA (1990-2004).

Import: Banco Central del Ecuador *Boletín Anuario*.

Export: Almeida and Almeida (1950-81), FAO (1962,1963, 1982-89), Banco Central del Ecuador (1990-2004).

Coffee

Production: (Almeida and Almeida (1950-1983), FAO (1984-90), MAG (1991-2005).

Import: FAO (1961-2001), CORPEI (2002-04).

Export: FAO (1961-2001), CORPEI (2002-04).

Sugar, cane

Production: FAO.

Sugar, raw

Conversion factor: Colombian average conversion factor for the period 1960-2005 (Guterman, 2006).

Import: FAO (1961-2001), COMTRADE (2002-04).

Export: COMTRADE (1961-2003).

Rice, unmilled

Production: FAO (1961-89), SICA (1990-2004).

Import: FAO (1961-89), SICA (1990-2004).

Export: FAO (1961-89), SICA (1990-2004).

Rice, white

Conversion factor: MAG estimates for 2001.

Import: FAO (1961-89), Banco Central del Ecuador (1990-2004).

Export: FAO (1961-89), Banco Central del Ecuador (1990-2004).

Maize

Production: Authors' estimates using production indexes (1966-68, 1985-89), Almeida and Almeida (Maíz duro) (1969-84), SICA (1990-2004).

Import: COMTRADE (1969-94), Banco Central del Ecuador (1995-2004).

Export: COMTRADE (1971-96), Banco Central del Ecuador (1997-2004).

Soy

Production: FAO (1961-68, and 1985-89), Almeida and Almeida (1969-84), SICA (1990-2004).

Import: COMTRADE (1990-2004).

Export: COMTRADE (1990-2004).

Milk

Production: FAO (1961-2004).

Beef

Production: FAO (1961-2004).

Import: FAO (1961-98), Banco Central del Ecuador (1999-2003), COMTRADE (2004).

Export: FAO (1961-98), COMTRADE (1999-2001).

Chicken meat

Production: FAO (1961-2004).

Import: FAO (1961-91), COMTRADE (1992-2003).

Export: FAO, (1961-2001); COMTRADE (2002-03).

Pig meat

Production: FAO (1961-2004).

Import: FAO (1961-90), COMTRADE (1991-2005).

Export: FAO (1961-2001), COMTRADE (1992, 1993, 1998, 2000-02)

PRICE DATA

Banana:

Producer price: FAO (1966-89), SICA (1990-99), MAG (2000-04).

Domestic price (exporter's price before customs): Authors' calculations. Producer price is adjusted by using an ad valorem margin of 65% until 1981, and a specific margin of 80 USD afterwards. Based on CORPEI data for selected years and Rosero's (2001) estimate for 1997 of 61% increment on the producer price.

Border price: fob price, Almeida and Almeida (1950-81), FAO (1982-84), Banco Central del Ecuador *Boletín Anuario* (1985-2004).

Cocoa:

Producer price: FAO (1966-89), SICA (1990-99), MAG (2000-04).

Domestic price (exporter's price before customs): Authors' calculations. Producer price is adjusted by using an ad valorem margin of 14%. Based on farm and producer price data from SICA for selected years.

Border price: fob price, Almeida and Almeida (1950-81), Banco Central del Ecuador *Boletín Anuario* (1982-2004).

Coffee:

Producer price: FAO (1966-99), MAG (2000-04), version FAOSTAT (sept06). FAO series for 1989-1999 has been adjusted by a factor of 10.

Domestic price (exporter's price before customs): Authors' calculations. Producer price is adjusted by using an ad valorem margin of 22 %. Data inferred from production and transportation costs of Arabica and Robusta varieties (see pp. 17 and 23, Banco Central del Ecuador *Apuntes de Economía No. 40*).

Border price: Green New York/Hamburg Central America fob Reference Price, adjusted for estimated transportation costs (0.06 USD/lb).

Sugar, cane:

Producer price: FAO

Sugar, raw:

Domestic price: Authors' calculations based on producer price and processing costs. *Border price:* Unit export value from FAO (1966-82). From 1983 onwards, given the existence of a preferential exporters' price in some markets, a reference price is selected following the methodology of Anderson et al. (2008). For this latter period, a reference border price is computed by adding to the Colombia's fob price (as documented in Guterman, 2006) the average gap between Ecuadorian and Colombian fob prices for 1961-72.

Appendix figure 1 shows sugar fob prices in Brazil, Colombia, the Ecuadorian fob price (preferential US quota recipient in latter years), and the calculated border price.

Rice, unmilled:

Producer price: FAO (1966-90), SICA (1990-99), MAG (2000-04).

Domestic (milling buy) price: Authors' calculations. Producer price is adjusted for transportation by using an ad valorem margin of 5%.

Border price: Use of a reference price. Given the existence of preferential export prices, import tariffs and quota restrictions, a reference border (international) price is selected following the methodology of Anderson et al. (2008). In consideration to the actual trading position without policy intervention, unmilled rice is classified as an exportable until 1974 and as an importable afterwards. We make exceptions for years where weather-induced over supply define a clear net exporter trading position.

Authors' estimates of a reference price are based on the Colombian cif price, and calculated transport margins.

Using authors' estimates of transportation costs, the Ecuadorian fob price is calculated by reducing the Colombian cif price by 30%, and the Ecuadorian cif price is computed by increasing the Colombian cif price by 12%. (Colombian prices from Guterman, 2006).

Authors' estimate of transportation costs are based on grains freight rate US-Ecuador data from SICA (30% for the 1990-2000 period, 39% in 2004, 22% in 2005). Using data from COMTRADE, an 18% average grains freight rate US-Colombia is calculated for the period 1990-2005.

Appendix figure 2 shows the Colombian cif, the international reference Thailand, and the calculated border prices.

Rice, white:

Domestic price: Based on production prices and authors' calculations of milling and transportation margins. Based on own estimates using wholesale data from SICA and Viera and Nieto (2003)'s estimates for 2002.

Border price: Use of a reference price. Given the existence of preferential export prices, import tariffs and quota restrictions, a reference border (international) price is selected following the methodology of Anderson et al. (2008). In consideration to the actual trading position without policy intervention, rice is classified as an exportable until 1974 and as an importable afterwards. We make exceptions for years where weather-induced over supply define a clear net exporter trading position.

Authors' estimates of a reference price are based on the Colombian cif price, and calculated transport margins (as in the determination of unmilled rice border price).

Appendix figure 3 shows the cif price in Colombia and Brazil, and the calculated border prices.

Maize:

Producer price: FAO (1970-90), SICA (1990-2004). Previous years are computed by backward extrapolation using price indexes.

Domestic (wholesale) price: SICA (1990-04). Previous years are estimated using the calculated average ad valorem margin between wholesale and producer price for the period 1990-2004.

Border price: Reference price, US fob price (source: IMF 2006) adjusted by 30% transportation costs. Transportation costs calculations based on the cif/fob average ratio for the period 1990-2000 using trade data from SICA and COMTRADE.

Soy:

Producer price: FAO (1966-89), MAG (1990-2004).

Domestic (wholesale) price: MAG (1990-02). Previous years are estimated using the calculated average ad valorem margin between wholesale and farm price for the period 1990-2002.

Border price: Reference price, US fob price (source: IMF 2006) adjusted by 30% transportation costs. Transportation costs calculations based on COMTRADE data.

Milk:

Producer price: Milk, whole, Producer price from FAO (1966-97), MAG national average (1998-2005).

Border price: Use of a reference price. Milk whole, New Zealand's producer price, source: FAO and IMF average exchange rates.

This study follows the OECD's framework for milk Producer Support Estimates (PSE) by using a price comparison between the domestic and the New Zealand producer price after cost adjustments. Authors' assumptions are: 1) transportation costs to processing or final point of consumption are equal in both countries, 2) the calculated ratio cif/fob (equal to 1.25) of actual trade of powder milk from New Zealand to Ecuador is used as a proxy for international transportation costs of 'generic' milk products (source: COMTRADE and SICA).

Beef:

Producer price: FAO dressed carcass weight (excl. fats) producer price.

Border price: Use of a reference price, Australia. FAO dressed carcass weight (excl. fats) producer price.

Authors' assumptions are: 1) transportation costs to processing/final point of consumption are equal in both countries, 2) Australia's price is adjusted by applying the authors' calculated average ratio cif/fob (equal to 1.251) of Ecuadorian imports from Australia for the period 1999-2003 (source: COMTRADE and SICA).

Chicken meat:

Producer price: FAO chicken-ready-to-cook producer price.

Border price: Use of a reference price, US. FAO chicken-ready-to-cook producer price.

Authors' assumptions are: 1) transportation costs to processing/final point of consumption are equal in both countries, 2) US's price is adjusted by applying the authors' calculated average ratio cif/fob (equal to 1.125) of Ecuadorian imports from US for the period 1999-2003 (source: COMTRADE and SICA).

Pig meat:

Wholesale price: FAO dressed carcass producer price.

Cif price: Use of a reference price, US. FAO dressed carcass producer price.

Authors' assumptions are: 1) transportation costs to processing/final point of consumption are equal in both countries, 2) US's price is adjusted by applying the authors' calculated average ratio cif/fob (equal to 1.125).

TRADE TAXES AND SUBSIDIES

Export subsidies: Cocoa, Coffee and Sugar, from IMF (2005 and earlier years).

Export Taxes: From Banco Central del Ecuador (2005 and earlier years) and IMF (2005 and earlier years).

EXCHANGE RATES

Official exchange rates are annual averages from IMF (2006 and earlier years).

Secondary exchange rates are from IMF (2005 and earlier years) for 1955 to 1980.

Parallel exchange rates are calculated from 1981 to 1993 using the International Currency Analysis (1993 and earlier years) as reproduced as premia in Easterly (2006).

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Appendix Table 1: Prices and NRAs for primary products, Ecuador, 1966 to 2003
 (Trading status following the methodology of Anderson et al. (2008): X = exportable, M = importable,
 HX = non-tradable primary, exportable derived lightly product)

	Banana (X)			Cocoa (X)			Coffee (X)		
	Domestic price LCU/MT	Border price USD/MT	NRA = DP-BP BP	Domestic price LCU/MT	Border price USD/MT	NRA = DP-BP BP	Domestic price LCU/MT	Border price USD/MT	NRA = DP-BP BP
1966	752	59	-0.31	12312	535	0.25	11305	762	-0.20
1967	762	59	-0.35	12484	557	0.13	11463	698	-0.17
1968	741	58	-0.35	12134	579	0.07	11141	681	-0.16
1969	756	57	-0.38	12371	748	-0.23	11359	691	-0.23
1970	873	67	-0.38	9463	608	-0.26	12759	960	-0.37
1971	896	75	-0.56	11153	499	-0.18	12200	796	-0.43
1972	896	76	-0.56	11400	506	-0.15	13261	913	-0.45
1973	1076	78	-0.48	22403	794	0.07	20236	1176	-0.35
1974	1148	83	-0.45	26567	1480	-0.29	15912	1225	-0.48
1975	1254	105	-0.54	29798	1098	0.05	16067	1215	-0.49
1976	1370	110	-0.54	41040	1462	0.04	21960	2907	-0.72
1977	1485	113	-0.52	52212	3224	-0.41	28060	4914	-0.79
1978	1601	123	-0.50	63373	3078	-0.21	39931	3342	-0.54
1979	1683	134	-0.52	64535	2841	-0.14	41358	3535	-0.56
1980	1782	152	-0.56	58710	2235	-0.01	64195	3143	-0.23
1981	1782	172	-0.62	37118	1591	-0.15	39330	2535	-0.43
1982	4433	169	-0.20	46694	1437	-0.01	41480	2759	-0.54
1983	6326	168	-0.35	122105	1733	0.21	80230	2579	-0.47
1984	9456	148	-0.22	166246	2671	-0.24	163596	2846	-0.30
1985	11168	173	-0.40	184395	1965	-0.12	166269	2862	-0.46
1986	16246	201	-0.46	226267	1856	-0.07	360888	3947	-0.29
1987	23310	190	-0.42	344907	1825	-0.10	383894	2164	-0.01
1988	36788	193	-0.51	448670	1469	-0.21	477020	2682	-0.54
1989	112877	211	-0.09	577125	1190	-0.18	1037366	2028	-0.13
1990	179115	213	-0.07	790180	1090	-0.20	1519266	1605	0.05
1991	290445	264	-0.11	1080766	1066	-0.18	1478152	1541	-0.22
1992	393739	247	-0.15	1275683	1016	-0.33	1576826	1117	-0.25
1993	419197	216	-0.03	1856923	1005	-0.08	2610898	1288	0.01
1994	473035	226	-0.07	2570050	1183	-0.04	4346030	3052	-0.37
1995	567790	225	-0.11	3031841	1288	-0.17	10218720	3165	0.14
1996	741330	248	-0.07	3762946	1280	-0.09	7524960	2487	-0.06
1997	945332	291	-0.22	5635111	1400	-0.03	10043040	4014	-0.40
1998	1211036	268	-0.24	7916536	1537	-0.13	9945440	2810	-0.40
1999	2250944	235	-0.19	9811980	1005	-0.17	16728640	2216	-0.36
2000	130	200	-0.35	733	764	-0.04	1298	1847	-0.30
2001	226	232	-0.03	879	991	-0.11	1314	1161	0.13
2002	240	223	0.08	1561	1608	-0.03	1148	1017	0.13
2003	233	231	0.01	1590	1739	-0.09	1080	1039	0.04

Source: Authors' calculations using methodology from Anderson et al. (2008) and data sources reported in text.

Appendix Table 1: Prices and NRAs for primary products, Ecuador, 1966 to 2003 (cont.)
 (Trading status following the methodology of Anderson et al. (2008): X = exportable, M = importable,
 H = non-tradable primary)

	Sugar, cane (H)		Rice, unmilled				NRA = <u>DP-BP</u> BP
	Domestic price LCU/ MT	NRA = NRA raw sugar	Domestic price LCU/ MT	FOB USD/MT	CIF USD/MT	Trading status	
1966	73	0.01	1264	72	105	X	-0.05
1967	74	-0.05	1350	92	134	X	-0.26
1968	72	-0.07	1706	86	126	X	0.01
1969	73	-0.28	1754	79	115	X	0.04
1970	59	-0.45	1559	64	93	X	0.16
1971	87	-0.38	1695	59	86	X	0.06
1972	109	-0.34	1901	66	97	X	0.08
1973	65	-0.57	2208	121	177	X	-0.31
1974	152	-0.61	3310	212	309	X	-0.38
1975	176	-0.63	4109	148	215	M	-0.26
1976	200	-0.28	4557	108	157	M	0.07
1977	225	0.19	5009	115	167	M	0.10
1978	247	0.59	5460	151	220	M	-0.04
1979	352	1.20	5576	139	203	M	0.04
1980	358	-0.31	5912	170	248	M	-0.10
1981	202	-0.29	7130	188	273	M	-0.05
1982	391	0.40	8001	122	177	M	0.38
1983	388	-0.27	14501	117	170	M	0.46
1984	466	-0.30	20223	109	159	M	0.55
1985	993	0.70	28581	95	138	M	0.94
1986	1400	0.30	35721	90	131	M	0.81
1987	1167	-0.42	24927	99	144	M	-0.18
1988	2581	-0.28	55955	130	189	M	-0.23
1989	4640	-0.35	108119	134	195	M	-0.06
1990	7890	-0.32	134043	122	178	M	-0.16
1991	11220	-0.15	164735	131	190	M	-0.30
1992	14870	-0.35	275352	122	177	M	-0.17
1993	16600	-0.15	307787	109	158	M	-0.03
1994	28000	0.21	380594	125	182	X	0.35
1995	35000	0.00	518879	140	204	X	0.31
1996	51000	0.42	640500	145	211	X	0.37
1997	59000	0.33	951038	133	193	X	0.73
1998	89000	0.41	1203122	132	193	X	0.54
1999	114000	0.28	1502729	108	157	M	-0.19
2000	18	0.22	168	90	131	M	0.28
2001	15	-0.15	147	76	111	X	0.92
2002	20	0.38	137	83	121	M	0.12
2003	14	0.07	157	85	124	M	0.27

Source: Authors' calculations using methodology from Anderson et al. (2008) and data sources reported in text.

Appendix Table 1: Prices and NRAs for primary products, Ecuador, 1966 to 2003 (cont.)
 (Trading status following the methodology of Anderson et al. (2008): X = exportable, M = importable,
 HX = non-tradable primary, exportable derived lightly product)

	Maize (M)			Soy (M)		
	Domestic price LCU/MT	Border price USD/MT	NRA = $\frac{DP-BP}{BP}$	Domestic price LCU/MT	Border price USD/MT	NRA = $\frac{DP-BP}{BP}$
1966	1769	75	0.26	3957	151	0.42
1967	1769	70	0.26	4012	134	0.51
1968	1726	62	0.42	3900	126	0.58
1969	1726	68	0.19	3976	123	0.52
1970	1360	76	-0.15	3522	140	0.20
1971	3139	76	0.53	2302	150	-0.43
1972	3515	72	0.83	4588	167	0.03
1973	4671	127	0.39	5217	346	-0.43
1974	6003	172	0.39	10341	330	0.25
1975	6111	155	0.52	9578	261	0.41
1976	6215	146	0.57	10252	281	0.34
1977	6319	124	0.87	10622	340	0.15
1978	6423	131	0.89	11004	315	0.35
1979	6493	150	0.64	11217	344	0.24
1980	7070	163	0.63	11577	345	0.27
1981	6966	170	0.50	11419	340	0.23
1982	7463	141	0.62	11599	288	0.23
1983	19686	177	0.91	22625	337	0.15
1984	21291	177	0.47	19908	335	-0.28
1985	24168	146	0.55	32731	264	0.16
1986	23914	114	0.39	51752	246	0.40
1987	35536	98	0.72	61914	254	0.16
1988	68160	139	0.27	85235	364	-0.39
1989	88343	145	0.04	169954	321	-0.10
1990	137589	142	0.07	275575	285	0.07
1991	189331	140	0.10	339464	271	0.01
1992	278551	135	0.09	485938	273	-0.05
1993	340677	133	0.28	569514	299	-0.05
1994	435827	140	0.38	622800	298	-0.07
1995	561379	160	0.23	807435	291	-0.02
1996	727518	214	0.05	976461	361	-0.16
1997	815702	152	0.29	1499128	365	-0.01
1998	1180586	132	0.51	1511981	290	-0.12
1999	1965547	117	0.42	2531388	227	-0.06
2000	170	115	0.48	223	238	-0.06
2001	180	116	0.55	296	219	0.35
2002	201	129	0.56	310	245	0.26
2003	193	137	0.41	284	303	-0.06

Source: Authors' calculations using methodology from Anderson et al. (2008) and data sources reported in text.

Appendix Table 1: Prices and NRAs for primary products, Ecuador, 1966 to 2003 (cont.)
 (Trading status following the methodology of Anderson et al. (2008): X = exportable, M = importable,
 HX = non-tradable primary, exportable derived lightly product)

	Milk (M)			Beef (M)		
	Domestic price LCU/MT	Border price USD/MT	NRA = $\frac{DP-BP}{BP}$	Domestic price LCU/MT	Border price USD/MT	NRA = $\frac{DP-BP}{BP}$
1966	1513	106	-0.22	7100	387	0.00
1967	1534	103	-0.25	7200	418	-0.13
1968	1491	80	-0.04	7000	412	-0.13
1969	1521	75	-0.05	7140	419	-0.20
1970	1900	77	0.17	7165	436	-0.22
1971	1800	90	-0.26	9334	435	-0.21
1972	1800	128	-0.47	9272	458	-0.24
1973	2030	143	-0.46	11602	631	-0.31
1974	2420	158	-0.39	9435	733	-0.49
1975	3662	140	0.01	14280	282	0.96
1976	4000	125	0.19	16000	297	0.99
1977	4330	131	0.21	18500	347	0.96
1978	4670	162	0.11	19783	381	1.01
1979	5110	120	0.61	23076	1049	-0.16
1980	5760	129	0.68	24240	1080	-0.15
1981	7230	147	0.80	42880	992	0.58
1982	8380	157	0.63	55310	749	1.25
1983	12200	150	0.39	80610	755	0.83
1984	15210	132	0.41	113200	865	0.59
1985	19800	120	0.54	157000	746	0.97
1986	25720	132	0.29	190050	717	0.76
1987	32690	131	0.19	216420	762	0.35
1988	90940	168	0.40	307660	929	-0.14
1989	95610	209	-0.22	655290	989	0.13
1990	141600	208	-0.25	751730	1025	-0.19
1991	205590	142	0.17	2364460	2143	-0.11
1992	329390	182	-0.04	2915040	1950	-0.21
1993	497300	200	0.24	4323980	1752	0.23
1994	608650	200	0.35	4635700	2151	-0.04
1995	760830	226	0.19	5675860	2049	-0.02
1996	831950	278	-0.07	6190340	1792	0.07
1997	1038370	245	0.02	7023160	1613	0.05
1998	1449000	186	0.32	12168900	1523	0.35
1999	1969020	192	-0.13	15894300	1655	-0.19
2000	170	177	-0.04	1700	1681	0.01
2001	250	216	0.16	2696	1808	0.49
2002	270	252	0.07	3360	2203	0.53
2003	250	216	0.16	2842	2286	0.24

Source: Authors' calculations using methodology from Anderson et al. (2008) and data sources reported in text.

Appendix Table 1: Prices and NRAs for primary products, Ecuador, 1966 to 2003 (cont.)
 (Trading status following the methodology of Anderson et al. (2008): X = exportable, M = importable,
 HX = non-tradable primary, exportable derived lightly product)

	Chicken meat (M)			Pig meat (M)		
	Domestic price LCU/MT	Border price USD/MT	NRA = $\frac{DP-BP}{BP}$	Domestic price LCU/MT	Border price USD/MT	NRA = $\frac{DP-BP}{BP}$
1966	27190	379	2.89	10670	566	0.02
1967	27570	330	3.22	10820	474	0.15
1968	26800	352	2.89	10510	459	0.17
1969	27320	377	2.40	10720	550	-0.09
1970	20562	338	1.89	11031	563	-0.07
1971	31250	340	2.39	14000	434	0.19
1972	34032	350	2.66	13910	622	-0.16
1973	40972	595	1.60	17400	953	-0.31
1974	52083	533	2.89	14150	848	-0.34
1975	54580	653	2.23	21420	1143	-0.28
1976	57100	583	2.62	23420	1089	-0.21
1977	59670	581	2.77	25330	983	-0.05
1978	59670	646	2.57	30475	1155	0.02
1979	59670	645	2.51	29292	1046	0.06
1980	58100	684	2.20	29680	950	0.18
1981	103760	702	4.40	43690	1087	0.47
1982	119000	665	4.46	58290	1268	0.40
1983	143370	704	2.49	81970	1091	0.29
1984	220550	834	2.22	127530	1171	0.32
1985	254000	747	2.18	170000	1096	0.45
1986	255670	853	0.99	186000	1232	0.00
1987	320730	694	1.20	218600	1281	-0.19
1988	501540	821	0.58	331860	1050	-0.18
1989	711680	908	0.33	719460	1054	0.16
1990	916890	809	0.26	936050	1332	-0.22
1991	1715140	1070	0.30	1766130	1947	-0.27
1992	2203250	1104	0.06	2172800	1671	-0.31
1993	2719440	1181	0.15	3210290	1812	-0.11
1994	3381150	1215	0.24	3275870	1599	-0.09
1995	4752680	1169	0.43	3691190	1415	-0.08
1996	5892000	1295	0.41	4047880	1814	-0.31
1997	7337610	1281	0.38	5051790	1848	-0.34
1998	9762820	1335	0.24	8064240	1202	0.14
1999	14225990	1260	-0.04	13055100	1059	0.05
2000	1250	1142	0.09	1653	1477	0.12
2001	1724	1335	0.29	2157	1548	0.39
2002	1970	1036	0.90	2253	1167	0.93
2003	1884	2708	-0.30	2047	1299	0.58

Source: Authors' calculations using methodology from Anderson et al. (2008) and data sources reported in text.

Appendix Table 2: Prices and NRAs for lightly processed foods, Ecuador, 1966 to 2003
(Trading status following the methodology of Anderson et al. (2008): X = exportable, M = importable)

	Sugar, raw (X)			Rice, white				
	Domestic price LCU/MT	Border price USD/MT	NRA = $\frac{DP-BP}{BP}$	Domestic price LCU/MT	FOB USD/MT	CIF USD/MT	Trading status	NRA = $\frac{DP-BP}{BP}$
1966	2077	112	0.01	2981	152	221	X	0.07
1967	2105	112	-0.05	3184	194	283	X	-0.17
1968	2048	112	-0.07	4023	182	265	X	0.13
1969	2077	135	-0.28	4134	167	244	X	0.16
1970	1679	145	-0.45	3676	135	197	X	0.29
1971	2475	148	-0.38	3996	126	183	X	0.17
1972	3101	178	-0.34	4481	141	205	X	0.20
1973	1849	163	-0.57	5206	255	372	X	-0.23
1974	4325	436	-0.61	7803	446	650	X	-0.30
1975	5007	527	-0.63	9687	311	453	M	-0.17
1976	5690	291	-0.28	10745	228	332	M	0.19
1977	6401	198	0.19	11809	243	354	M	0.23
1978	7027	170	0.59	12874	318	463	M	0.07
1979	10015	172	1.20	13146	295	429	M	0.16
1980	10185	555	-0.31	13938	360	524	M	0.00
1981	5747	294	-0.29	16810	396	577	M	0.06
1982	11124	243	0.40	18865	260	379	M	0.52
1983	11039	258	-0.27*	34189	251	365	M	0.61
1984	13258	231	-0.30*	47682	235	342	M	0.70
1985	28252	156	0.70	67389	206	299	M	1.11
1986	39831	203	0.30*	84223	195	284	M	0.97
1987	33202	271	-0.42*	58773	214	311	M	-0.10
1988	73431	265	-0.28	131930	277	404	M	-0.15
1989	132011	345	-0.35	254923	287	417	M	0.04
1990	224476	364	-0.32	354521	262	381	M	0.03
1991	319217	304	-0.15	439462	280	407	M	-0.13
1992	423062	348	-0.35	558361	261	380	M	-0.22
1993	472281	277	-0.15	686829	232	338	M	0.02
1994	796619	293	0.21	964960	265	386	X	0.62
1995	995774	352	0.00*	1330334	297	433	X	0.58
1996	1450985	317	0.42	1393798	307	447	X	0.41
1997	1678591	305	0.33*	2179057	280	408	X	0.88
1998	2532112	305	0.41*	3022846	280	408	X	0.83
1999	3243379	215	0.28*	3712842	228	332	M	-0.05
2000	249	203	0.22	360	191	279	M	0.29
2001	223	263	-0.15	325	163	237	X	1.00
2002	267	194	0.38	313	177	258	M	0.22
2003	214	199	0.07	360	180	263	M	0.37

* Defined as importable, as indicated by the high volume of imports.

Source: Authors' calculations using methodology from Anderson et al. (2008) and data sources reported in text.

Appendix Table 3: Exchange rate, Ecuador, 1955 to 2004

	Official rate (LC/USD)	Commodity specific rate (LC/USD)	Parallel market rate	Estimated equilibrium exchange rate ^a
		Banana, all exports		
1960	15.15	15.6, 16.9	17.60	16.99
1961	16.33	15.7, 17.4	21.70	20.36
1962	18.00	20	22.20	21.15
1963	18.18		22.40	21.35
1964	18.18		18.60	18.50
1965	18.18		18.52	18.44
1966	18.18		18.52	18.44
1967	18.18		20.39	19.84
1968	18.18		20.02	19.56
1969	18.18		22.40	21.35
1970	20.64		21.21	21.07
1971	25.00		27.80	27.10
1972	25.25		27.00	26.56
1973	25.00		26.96	26.47
1974	25.00		25.15	25.11
1975	25.00		26.20	25.90
1976	25.00		27.80	27.10
1977	25.00		28.00	27.25
1978	25.00		26.20	25.90
1979	25.00		26.80	26.35
1980	25.00		27.03	26.52
1981	25.00		28.17	27.38
1982	30.03		33.70	32.78
1983	44.12		63.06	58.32
1984	62.54		88.75	82.20
1985	69.56		119.28	106.85
1986	122.78		160.00	150.69
1987	170.46		223.19	210.00
1988	301.61		414.93	386.60
1989	526.35		608.83	588.21
1990	767.75		947.33	902.44
1991	1046.25		1297.00	1234.31
1992	1533.96		2000.00	1883.49
1993	1919.11		2026.09	1999.34
1994	2196.73		2270.00	2251.68
1995	2564.49		2925.00	2834.87
1996	3189.47		3242.34	3229.12
1997	3998.27		4189.58	4141.75
1998	5446.57		6051.75	5900.45
1999	11786.80		11786.80	11786.80
2000	1.00		n.a.	1.00
2001	1.00		n.a.	1.00
2002	1.00		n.a.	1.00
2003	1.00		n.a.	1.00
2004	1.00		n.a.	1.00

^a See Anderson et al. (2008) on the exchange rate methodology used in this study

Appendix Table 4: Nominal rate of assistance (NRA) to agriculture, Ecuador, 1966 to 2003
(percent)

	NRAs covered products			NRA Remaining Agriculture	NRAs Total Agriculture			Total NRA (including non-product specific subsidies)
	Import competing	Exports	Sub-Total		Import competing	Exports	Total NRA	
1966	-5	-14	-12	0	-5	-14	-7.3	n.a.
1967	-8	-21	-16	0	-8	-21	-10.5	n.a.
1968	6	-19	-11	0	6	-19	-7.2	n.a.
1969	-1	-28	-20	0	-1	-28	-13.4	n.a.
1970	7	-34	-22	0	7	-34	-15.1	n.a.
1971	-6	-44	-32	0	-6	-44	-23.4	n.a.
1972	-25	-41	-35	0	-25	-41	-24.7	n.a.
1973	-27	-35	-32	0	-27	-35	-22.6	n.a.
1974	-21	-46	-37	0	-21	-46	-26.4	n.a.
1975	8	-47	-26	0	8	-47	-18.5	n.a.
1976	28	-49	-24	0	28	-49	-16.8	n.a.
1977	36	-56	-32	0	36	-56	-23.9	n.a.
1978	31	-33	-12	0	31	-33	-8.9	n.a.
1979	29	-32	-10	0	29	-32	-7.1	n.a.
1980	30	-28	-7	0	30	-28	-4.8	n.a.
1981	61	-46	4	0	61	-46	2.2	n.a.
1982	80	-26	25	0	80	-26	14.8	n.a.
1983	50	-29	17	0	50	-29	9.8	n.a.
1984	47	-27	11	0	47	-27	7.2	n.a.
1985	75	-27	15	0	75	-27	9.8	n.a.
1986	45	-28	6	0	45	-28	4.6	n.a.
1987	11	-17	0	0	11	-17	0.2	n.a.
1988	7	-45	-16	0	7	-45	-12.3	n.a.
1989	-5	-14	-9	0	-5	-14	-7.4	n.a.
1990	-16	-8	-12	0	-16	-8	-9.6	-9.5
1991	-5	-14	-9	0	-5	-14	-7.9	-7.8
1992	-12	-20	-16	0	-12	-20	-13.8	-13.7
1993	13	-4	5	0	13	-3	4.4	4.4
1994	15	-10	0	0	15	-10	-0.1	-0.1
1995	11	1	6	0	11	1	4.6	4.7
1996	0	0	0	0	0	0	-0.2	-0.1
1997	7	-16	-7	-2	7	-15	-6.1	-6.1
1998	30	-15	7	-3	30	-14	4.5	4.5
1999	-9	-21	-15	-3	-9	-18	-13.0	-13.0
2000	7	-24	-4	-4	7	-19	-3.8	-1.0
2001	32	4	19	-3	32	2	15.2	n.a.
2002	41	9	28	-3	41	5	21.9	n.a.
2003	10	0	6	-3	10	-1	4.6	n.a.

Source: Authors' calculations using methodology from Anderson et al. (2008) and data sources reported in appendix.

Appendix Table 5: Value shares^a of primary production of covered^b and non-covered products, Ecuador, 1966 to 2003

(percent)

	Banana	Beef	Cocoa	Coffee	Maize	Milk	Pigmeat	Poultry	Rice	Soybean	Sugar	Non-covered
1966	18	4	5	10	1	12	3	0	4	0	7	36
1967	19	4	5	9	1	13	3	0	4	0	6	36
1968	20	4	6	8	1	11	3	1	3	0	8	36
1969	22	5	7	7	1	11	3	1	4	0	7	33
1970	23	5	7	9	1	11	3	1	3	0	6	31
1971	27	5	6	8	2	14	3	1	2	0	7	26
1972	21	4	7	8	1	16	3	1	2	0	6	30
1973	18	5	8	7	3	16	5	1	4	0	5	29
1974	14	5	8	8	3	13	3	1	6	0	11	29
1975	16	2	7	7	3	11	4	1	7	0	14	28
1976	15	2	8	19	2	9	4	1	5	0	5	30
1977	12	2	16	24	1	8	3	1	4	0	4	25
1978	12	2	18	15	1	10	4	1	3	1	3	29
1979	11	6	14	18	2	8	4	1	4	1	3	28
1980	13	5	12	11	2	7	4	1	6	1	8	32
1981	13	5	4	11	2	9	4	1	7	1	4	40
1982	10	4	4	13	2	11	5	1	4	1	3	42
1983	6	5	5	14	2	12	5	2	4	0	4	41
1984	5	5	12	15	3	11	5	2	4	1	3	33
1985	5	4	15	18	2	10	5	2	3	1	2	33
1986	8	4	8	21	2	11	5	3	5	1	3	29
1987	9	5	7	12	2	13	6	3	8	2	4	29
1988	5	6	7	20	2	15	4	3	11	3	3	23
1989	17	5	5	12	2	17	4	3	9	2	4	21
1990	21	6	5	10	2	17	5	3	7	2	4	19
1991	27	11	4	8	2	10	7	4	7	2	3	16
1992	27	10	4	6	2	14	6	4	8	2	4	15
1993	25	9	3	6	2	14	6	4	8	2	3	18
1994	23	9	3	15	1	12	4	4	6	1	2	19
1995	24	10	3	13	2	14	4	4	6	1	3	16
1996	26	8	3	11	2	15	5	5	5	1	2	17
1997	35	7	3	7	2	12	5	6	4	0	1	18
1998	28	9	2	4	0	14	5	5	5	0	3	23
1999	32	10	3	5	1	14	4	7	7	0	2	16
2000	18	12	3	5	2	15	7	10	7	1	3	17
2001	29	11	2	2	2	17	6	8	3	1	3	16
2002	25	13	4	1	1	18	5	6	4	1	2	20
2003	23	13	4	1	1	14	5	15	4	1	2	18

Source: Authors' spreadsheet

^a Each row sums to 100.^b At farmgate undistorted prices, US\$.

Appendix Table 6: Nominal rate of assistance in non-agricultural tradable industries, Ecuador, 1966 to 2003.

(percent)

	1966-69	1970-74	1975-79	1980-84	1985-89	1990-94	1995-99	2000-03
Lightly processed food production								
Importable	-3	-19	27	55	28	2	8	20
Exportable	-8	-26	-5	-23	-17	-8	-9	21
Nontradable	0	0	0	0	0	0	0	0
<i>Weighted average</i>	-6	-23	12	32	20	0	6	20
Highly processed food production								
Importable	18	16	12	15	30	20	20	18
Exportable	-3	-1	-2	-5	-7	-4	-1	0
Nontradable	0	0	0	0	0	0	0	0
<i>Weighted average</i>	2	2	2	1	3	2	3	4
Non-ag primary production								
Importable	18	16	12	15	30	17	13	11
Exportable	-3	-1	-2	-5	-7	-4	-1	0
Nontradable	0	0	0	0	0	0	0	0
<i>Weighted average</i>	-1	0	-1	-2	-3	-1	0	0
Non-food manufactures								
Importable	18	16	12	15	30	17	12	10
Exportable	-3	-1	-2	-5	-7	-4	-1	0
Nontradable	0	0	0	0	0	0	0	0
<i>Weighted average</i>	9	8	6	7	14	8	6	5
Total NRA (weighted average of above sectors) to Non-Agriculture								
Importable	11	3	18	33	29	10	11	14
Exportable	-4	-7	-3	-7	-8	-4	-2	1
<i>Tradables</i>	1	-3	5	9	9	2	6	9
Nontradable	0	0	0	0	0	0	0	0
TOTAL non-Agric	0	-1	1	2	2	1	2	3

* Value added used as weights when available otherwise value of production.

Source: Authors' calculations

Appendix Table 7: Nominal rates of assistance to covered, uncovered and all agricultural products, to exportable and import-competing agricultural industries, and relative to non-agricultural industries, Ecuador, 1966 to 2003

(percent)

	Covered products	Non-covered products	Total ag NRA (incl NPS) ^a	Exportable NRA ^b	Import-competing NRA ^b	All ag tradables	All non-ag tradeables	RRA ^c
1966	-12	0	-7	-14	-5	-12	2	-13
1967	-16	0	-10	-21	-8	-16	1	-18
1968	-11	0	-7	-19	6	-11	2	-13
1969	-20	0	-13	-28	-1	-20	-1	-19
1970	-22	0	-15	-34	7	-22	1	-22
1971	-32	0	-23	-44	-6	-32	-2	-30
1972	-35	0	-25	-41	-25	-35	-4	-32
1973	-32	0	-23	-35	-27	-32	-5	-28
1974	-37	0	-26	-46	-21	-37	-6	-33
1975	-26	0	-18	-47	8	-26	-1	-25
1976	-24	0	-17	-49	28	-24	3	-26
1977	-32	0	-24	-56	36	-32	6	-36
1978	-12	0	-9	-33	31	-12	7	-18
1979	-10	0	-7	-32	29	-10	9	-17
1980	-7	0	-5	-28	30	-7	2	-9
1981	4	0	2	-46	61	4	11	-6
1982	25	0	15	-26	80	25	16	8
1983	17	0	10	-29	51	17	8	8
1984	11	0	7	-27	47	11	9	2
1985	15	0	10	-27	76	15	15	0
1986	6	0	5	-28	45	6	12	-5
1987	0	0	0	-17	11	0	6	-6
1988	-16	0	-12	-45	7	-16	6	-21
1989	-9	0	-7	-14	-5	-9	3	-12
1990	-12	0	-10	-8	-16	-12	-1	-11
1991	-9	0	-8	-14	-5	-9	3	-12
1992	-16	0	-14	-20	-12	-16	-1	-15
1993	5	0	4	-3	13	5	4	1
1994	0	0	0	-10	15	0	7	-7
1995	6	0	5	1	11	6	7	-1
1996	0	0	0	0	0	0	5	-5
1997	-7	-2	-6	-15	7	-8	5	-12
1998	7	-3	4	-14	30	4	9	-4
1999	-15	-3	-13	-18	-9	-15	3	-18
2000	-4	-4	-1	-19	7	-3	5	-8
2001	19	-3	15	2	32	17	10	7
2002	28	-3	22	5	41	26	13	12
2003	6	-3	5	-1	10	5	7	-1

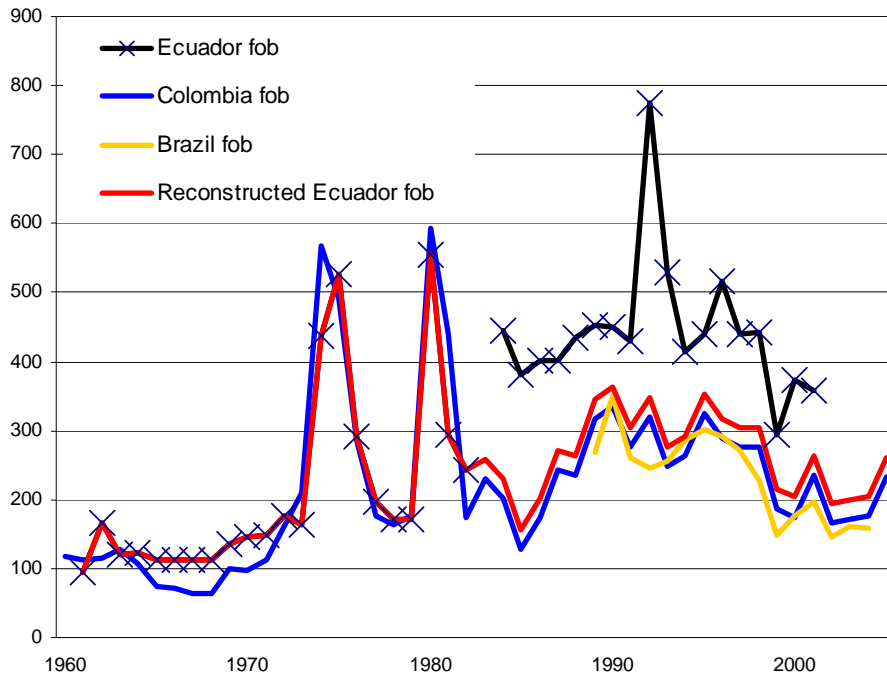
^a NRAs including assistance to nontradables and non-product-specific assistance.

^b NRAs including product-specific input subsidies and non-covered products.

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

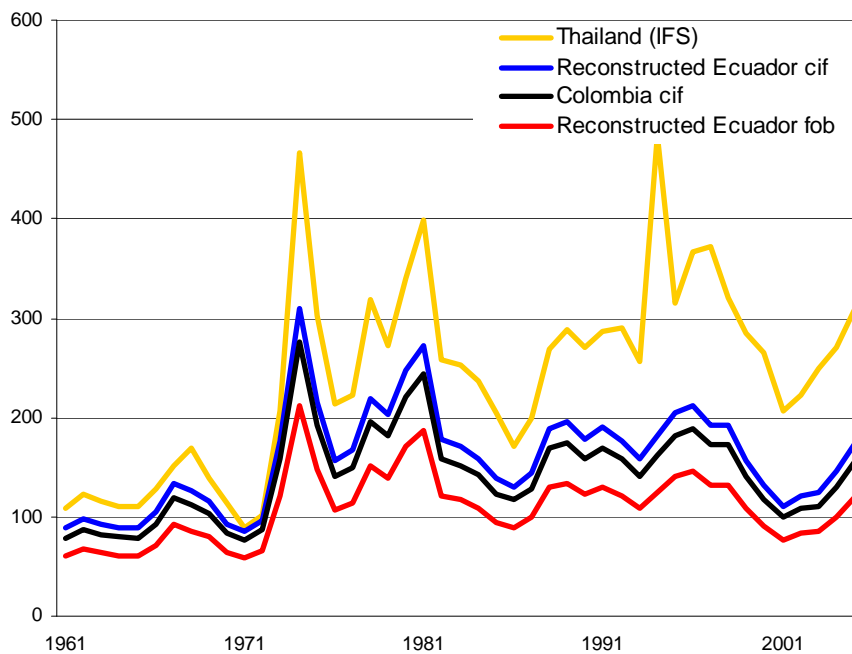
Source: Authors' spreadsheet

Appendix Figure 1: Raw sugar fob prices (U.S. \$/tonne), Ecuador and other countries, 1961 to 2003



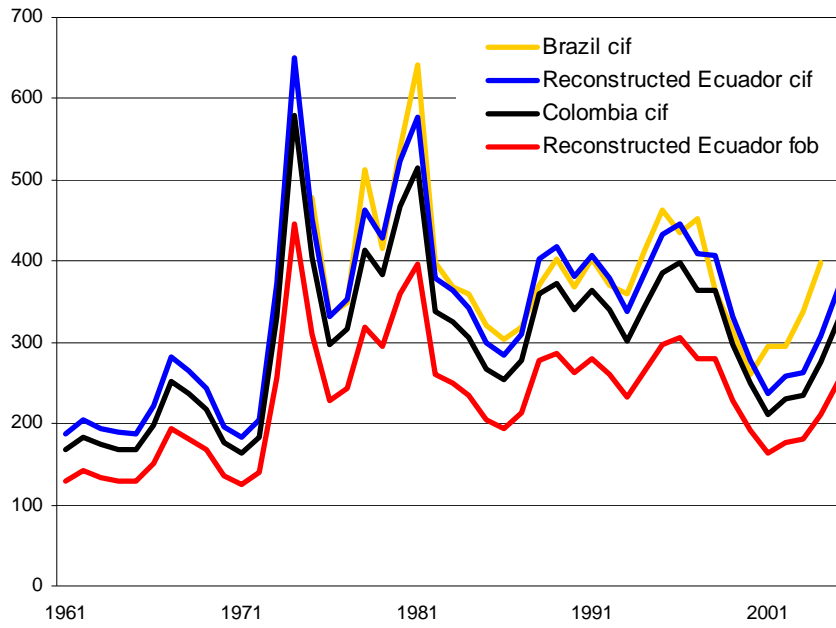
Source: Authors' calculations

Appendix Figure 2: Unmilled rice cif and fob prices (U.S. \$/tonne), Ecuador and other countries, 1961 to 2003



Source: Authors' calculations

Appendix Figure A3: Polished (white) rice cif and fob prices (U.S. \$/tonne), Ecuador and other countries, 1961 to 2003



Source: Authors' calculations