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Introduction and summary

Nicaragua is a small, open economy with a population of 5.5 million in 2004, low levels of income (GDP per capita of US\$850 in 2005), and high levels of poverty (48 percent of the population in 2003).¹ Since 1990 the country has undergone dramatic changes, including the end of a decade-long civil conflict, and the implementation of a series of economic reforms that liberalized prices and privatized most state-owned production.

Almost half of all Nicaraguans live in rural areas and work in agriculture activities for their livelihood. The rural sector has an especially high incidence of poverty: 2 of every 3 rural Nicaraguans are poor (World Bank 2003a). Thus, the agricultural sector plays a key role in the country's poverty reduction efforts.

Within Nicaragua's broader policies of structural reform and liberalization, policy makers have sought to liberalize trade by reducing tariffs and non-tariff barriers and by promoting exports through fiscal incentives within a strategy based on regional integration agreements. Since agriculture plays a key role in the country's economy and exports, an understanding of the degree of distortions to agricultural incentives is an important input to current and future policy decisions.

There are at least two previous studies that analyze distortions to agricultural incentives for Nicaragua. MAGFOR (2000) generated nominal and effective rates of protection (NRPs and ERPs) for five exportable products (coffee, sugar, meat, peanuts, and sesame seed) and six import-competing products (maize, rice, beans, sorghum, soy and milk) for the years 1996, 1997 and 1998. PROVIA-USAID (2002) generated NRPs and ERPs for four importable agricultural goods (maize, rice, sorghum and soy), five exportable

¹ Central Bank of Nicaragua (BCN) 2005 and World Bank (2003a).

agricultural goods (coffee, sugar cane, peanuts, beans, and sesame seed), and one good from the livestock sector (meat), for the period 1996 to 2000. The PROVIA (2002) study finds that importable products have high, positive nominal and effective rates of protection in Nicaragua while exports have negative rates of protection. This constitutes an anti-trade bias: the distortion to price signals encourages producing importable goods at the expense of exportable products.

This study generates measures of Nominal Rates of Assistance (NRAs), and Consumer Tax Equivalent rates (CTEs) for twelve agricultural products in Nicaragua, for the period 1991–2004, using the methodology laid out in Anderson et al. (2008) and summarized in the general results below. We analyze five import-competing goods (maize, rice, sorghum, soybeans and chicken meat) and six exportable goods (coffee, sugar, peanuts, beans, beef, and sesame seed) plus milk that together represent more than 80 percent of agricultural GDP and 20 percent of total GDP in 2001 (BCN 2005). From the results, average CTEs and NRAs are estimated for import-competing and exportable goods, and for the agricultural sector as a whole, and these are compared to protection rates in the non-agricultural sector during the same period.

Among the exportable crops, coffee, beans, and sugar are the main products. In the period 1991–2004 about 85 percent coffee production, 13 percent of bean production, and 39 percent of sugar production was exported. Rice and maize are the main products in the importables category. Rice imports account for around one-quarter of domestic consumption while maize imports add barely one percent. Table 1 shows the shares of key products in the value of agricultural production.

This study extends the time series of previous estimates of rates of protection in Nicaraguan agriculture, but unfortunately it is not possible to go back further than 1991 because of an absence of meaningful data: the decade of the 1980s was one of hyperinflation and a high degree of government intervention in most markets such that published prices are not representative.

The present study also differs from previous analyses in that it calculates NRAs using observed domestic prices for exportable products, rather than constructed prices. And it is the first study that estimates CTEs for Nicaraguan agricultural products.

We find that agriculture exhibited a negative NRA during the 1991–2004 period. The NRA was –7 percent in 1991–94, –16 percent in 1995–99 and –10 percent in 2000–04. At the same time non-agricultural products enjoyed a positive NRA of 13 percent on average for that 14-year period, revealing an anti-agricultural policy bias in Nicaragua. Furthermore,

during that period import-competing products enjoyed a positive average NRA of 19 percent, while exportable primary products faced a negative average NRA of -21 percent. Thus an anti-trade bias also prevails. However, there are some important differences between products within the two categories. The importables maize and rice had positive average rates of protection while sorghum and soybean had negative rates. And among exportables, one (sugar cane) had a positive NRA.

This chapter is organized as follows. The next section summarizes the evolution of the Nicaraguan economy since 1990 — a period in which the economy underwent a transition from high government intervention to one of market forces — and it summarizes the evolution of policies in the Nicaraguan agricultural sector. The following section describes the methodology used to estimate NRAs and CTEs. The estimates of the degrees of distortion in Nicaraguan agriculture are then discussed. The penultimate section summarizes the political economy of agricultural policies that have been implemented since 1991 that relate to these products, and the final section concludes with a discussion about prospects for future reform.

Nicaragua's economy: 1990 to 2005

After almost two decades of rapid, sustained growth between 1960 and 1977, Nicaragua experienced an economic collapse characterized by a fall in output in 1978 and 1979 as a result of a revolutionary war (Table 2). This was followed by negative growth rates during the 1980s, which resulted from inadequate economic policies, adverse external shocks, and a prolonged civil conflict.

By 1990, GDP per capita in Nicaragua had fallen to 43 percent of the level that it had been in 1977. In 1992, the worst year for Nicaragua's foreign trade, exports were just above the levels reached in 1971 and were 37 percent of average exports during the 1976-79 period. At the same time foreign debt had grown ten-fold, reaching US\$2,660 per capita. This was more than six times average income per capita at the time, and to service it required 4.7 times annual exports (IMF 1999).

By 1990, the economy was experiencing serious macroeconomic imbalances: the fiscal deficit was equal to almost 18 percent of GDP, the trade and balance of payments deficits were 32 and 42 percent of GDP respectively, and inflation was almost 7,500 percent

during that year. Production by state-owned enterprises accounted for almost 30 percent of GDP, and almost 20 percent of the labor force was employed by the public sector (IMF 1999).

In the political arena, Nicaragua returned to democracy in 1990, resolving the civil conflicts of the previous decade and re-establishing peace. Simultaneously, the new government began to implement economic policies that sought to stabilize prices, return macroeconomic stability, and move from a state-directed to a market economy.

Fiscal and monetary policies were strengthened, although the public sector deficit remained high. Most price controls were eliminated, and the foreign exchange and trade systems were liberalized. A structural reform program was initiated by the new government, which included privatization of state-owned firms and a reform of the banking system involving interest rate liberalization and the creation of an independent supervisor of banks.

One of the main features of the structural reform program was to downsize the role of the public sector. This included privatization of state-owned firms and a reduction in the size of the army, from 83,000 members in 1990 to just over 15,000 members by 1993 (IMF 1999). As a result of these policies, the rate of unemployment increased from 7.6 percent in 1990 to 17.8 percent in 1993; since then, it has gradually and continually decreased and was just 6.5 percent in 2004 (BCN 2006a).

To achieve the goal of macroeconomic stability and economic growth, one of the most important elements of economic policy was to maintain price stability. This was achieved through an expansion of foreign grants, aid and loans that have financed the country's fiscal and current account deficits. An important downside of this international financial cooperation, however, is that it contributed to significantly large trade and current account deficits, which averaged 24 and 21 percent of total GDP during the 1994-2005 period.

In March 1991, the government set in place a fixed exchange rate system at an exchange rate of 5 Córdobas per US dollar, which was maintained through 1991. In 1992 a crawling-peg system was introduced where the exchange rate was devalued daily at a pre-announced rate. Between 1992 and 1998, the official annual devaluation rate was 12 percent; it was reduced to 10 percent in 1999, to 6 percent between 2000 and 2003, and 5 percent during 2004-06.

As a result of these reforms, Nicaragua has been able to achieve positive growth rates as of the early 1990s, with an annual average growth rate of 3.5 percent during the 2000-04 period (BCN 2006a). Inflation has been dramatically reduced to single digits since 1999,

while unemployment declined from 14.9 percent in 1991 to 6.5 percent in 2004 (BCN 2006a).

The economy has also benefited from increasing workers' remittances and growing foreign direct investment flows, although a notable weakness in the external sector is the country's dependence on foreign aid, which contributes to large fiscal and current account deficits (IMF 2006).

In early 2002, the new government implemented tax reforms, strengthened bank regulations, and attempted to reduce corruption. The program had positive results, as GDP growth recovered in 2003 (after a decline in 2002), inflation remained subdued, and the level of international reserves increased, which all facilitated a stable macroeconomic framework (IMF 2006). The country's remaining economic challenges are the reduction of poverty (almost half of all Nicaraguans are poor), the reduction of fiscal deficit, the elimination of corruption, and the strengthening of exports.

Recent economic developments have been positive, as the fiscal deficit declined, GDP growth rates increased to 5.1 percent in 2004 due to an increase in exports, higher commodity prices, growing family remittances, and expanding credit by the financial sector. Furthermore, Nicaragua reached HIPC completion point in early 2004, which will provide external debt relief and release resources for human capital investments (IMF 2006).

Agriculture in Nicaragua

Between 1960 and 2000, Nicaragua's production composition remained virtually unchanged, and agriculture (including livestock) represented, on average, 16 percent of GDP. The share of other primary sectors averaged 9 percent of GDP during the same period. Agriculture's role in the economy is greater of course when one considers that a large share of secondary and service sectors include agriculture-related activities, such as agro-industrial production, food processing and distribution activities of agricultural products.

About 50 percent of Nicaraguans live in rural areas and depend on agricultural activities for their livelihood. Although the incidence of rural poverty has declined since 1993 (due greatly to agricultural sector growth), 2 of every 3 rural Nicaraguans continue to live in poverty (World Bank 2003a). The evolution of the agricultural sector is a key determinant to poverty reduction in Nicaragua: the majority of agricultural producers are small (usually poor) farmers, and the sector employs 40 percent of all workers in the country. The coffee sector alone employs 32 percent of all rural workers (World Bank 2003b).

Nicaragua is characterized by high inequality in the distribution of land: 72 percent of rural households are landless or own small plots (of 1.5 hectares), and they account for only 16 percent of land ownership. Medium and large farmers (owning farms that are 3.5 or more hectares) represent 28 percent of households, yet they own 84 percent of total land (Davis and Murgai 2000).

Nicaraguan agriculture is extensive rather than intensive. About 80 percent of agricultural land is devoted to the production of staple grains (corn, beans, rice, and sorghum), which contributes about 30 percent of agricultural GDP. Twenty percent of land is devoted to export crops (coffee, sesame, sugar, tobacco and peanuts), which contribute at least 50 percent of agricultural GDP (World Bank 2003a).

Agricultural products account for an important share of total exports in Nicaragua. During the 1994-2005 period, exports of Nicaragua's main agricultural products represented 50 percent of total goods exports (BCN 2006a). A main factor behind GDP growth in Nicaragua since 1991 was growth in exports, driven largely by growth of non-agricultural exports. Total exports (including exports produced in tax-free zones and purchases at ports) grew at an average annual rate of 14 percent between 1994 and 2005, when agricultural exports grew at an annual rate of 7.7 percent (BCN 2006a).

While the agricultural sector has displayed rapid growth rates in Nicaragua during the past 16 years, this is deemed to be temporary. The main reasons behind the growth are high export commodity prices, the takeup of unoccupied land, and the stability experienced after a decade of civil conflict which cannot be expected to foster indefinite growth in the sector (World Bank 2003a).

Agricultural trade policies

The prices of imported white and yellow corn, sorghum and rice were regulated through a price-band mechanism between 1992 and 1997. The band determined the level of tariffs that these products would receive, which ranged between 5 and 45 percent (OMC 1999). A committee was formed by representatives from different government agencies, including the Ministries of Economy, Agriculture, and Finance; the Central Bank; the National Basic Grain Commission; and the Nicaraguan Grains Buying Agency (ENABAS). With this mechanism, import tariffs were applied to international prices when they were below the lower-bound of the band to ensure that the domestic price was always above the minimum threshold.

The price band mechanism was abandoned in 1997, and replaced by an import quota-contingent tariff system. Imports of several agricultural products were subject to the scheme whereby imports within the quota pay reduced tariffs (often they are tariff-exempt), and imports that exceed the quota pay higher tariffs. The import quota is negotiated and defined for each agricultural cycle, and it is a function of the producers' capacity to supply the consuming industry's demand. Table 3 includes the list of agricultural products that are subject to the quota-contingent tariff structure, as well as information on the quota and tariffs that were negotiated between Nicaragua and the World Trade Organization in 2005 (MIFIC 2005).

In the case of grains, the import contingent tariff structure provides the consuming industry with partial or total tariff reductions during months of the year when domestic production is not harvested, and with a purchase price that is negotiated by the system's administrative commission during the harvest months. The members of the administrative commission include producers, industrial consumers, and representatives of the government.

Export promotion has been an objective sought by all governments since 1990. The policies to achieve this goal include a series of tax benefits and the signing of regional integration and trade agreements with several countries: the most important (in terms of market potential) is the recent CAFTA-DR with the United States.

Intermediate and capital goods used in agricultural production have been exempt from import tariffs since 1991. The products that enjoy these benefits are approved by the National Assembly based on a list proposed by the Ministry of Economy and the Ministry of Agriculture. The current list has not been updated since 1998 and it is considered to be incomplete as it excludes many agricultural inputs that are commonly used by agricultural producers.

In an effort to promote non-traditional exports, between 1992 and 1997 the Nicaraguan government issued tax credit certificates to exports of non-traditional goods (*Certificados de Beneficio Tributario* or CBTs). Between 1992 and 1994 the certificate value was equivalent to 15 percent of the value of exports. The rate was reduced to 10 percent in the 1995-96 period and to 5 percent in 1997. Since the CBTs were completely transferable to third parties, a secondary market rapidly developed where exporters sold their excess CBTs at a discounted value. The CBT program also exempted non-traditional exporters from part of

their corporate tax obligations.² The program was phased out in 1997 and was substituted in 1998 by a tax incentive scheme where all exports receive a drawback equivalent to 1.5 percent of the value of their exports. Nonetheless, it is yet to be determined whether this benefit is (at least partially) passed on to export-good producers.

Estimating NRAs and CTEs

The present study generates measures of Nominal Rates of Assistance and Consumer Tax Equivalent rates at the farm and wholesale level for key agricultural products. The construction of these measures follows the methodology developed in Anderson et al. (2008). To obtain NRAs on output we compare the wholesale domestic price in Managua with the border price or international reference price converted at the appropriate exchange rate and adjusted to include costs to get it to the wholesale market.

For importable goods, the international price we use to generate these measures is the reference price provided by World Bank Development Prospects Group, except in the case of rice where we use the CIF price.³ For exportable products, we use FOB prices for coffee, sugar, meat and peanuts (processed and unprocessed), and international reference prices provided by FAOSTAT for sugar cane, sesame seed, livestock, and by CORECA⁴ for red bean. To calculate the equivalent border price of the product in Managua, we add international transport costs, tariffs, port charges, and domestic transportation costs from port to Managua to the international reference price in the case of importables; and we subtract these costs in the case of exportables. This study also measures distortions to consumers' incentives, by estimating a consumer tax equivalent (CTE) of such things as import tariffs and consumption taxes or subsidies on final consumer prices.

Where there are distortions in the markets for farm inputs to a particular product, the NRA is adjusted to include the output price equivalent of the input subsidies (or taxes). This is done by subtracting the input's CTE times its input-output coefficient from the farm industry's output NRA, to get the total nominal rate of assistance to production of that good.

² The corporate tax exemption rates were gradually reduced from 80 percent in 1992 to 60 percent in 1997, the last year of the program (BCN 2004).

³ We used the international reference price when the ratio of imports to total domestic production was on average small (between 1-2 percent) or nonexistent, rendering the implicit paid price (total value of import / total volume of imports) unreliable to generate a series of relevant international prices.

⁴ Consejo Regional de Cooperacion Agricola (Centroamerica).

This was done for each product, but since it altered the NRA by less than 2 percentage points we report below only the total NRA.

Given the lack of data on margin structures for the period we are analyzing, we assume an equi-proportionate pass-through of distortions along the value chain for each product. This means that the NRAs on output at the farm-gate level are the same as estimated at the wholesale level.

The estimated NRAs for the 13 covered products are summarized in Table 4. Those covered products account for all but one-sixth of the country's gross value of production at undistorted prices (see final row of Table 4). For most products during most years producers faced negative rates of protection. The three major exceptions are sugar, white maize, and rice. For these three products, producers had positive rates of protection. In the case of sugar these rates can be explained by the concentrated market structure which gives producers a strong capacity to influence policies. For white maize and rice, protection is largely provided by import tariffs. The results show that import-competing agriculture experienced positive rates of protection, particularly during the second half of the period (1998-2004), while exportable agriculture experienced negative rates of protection. Overall Figure 3 shows Nicaragua experienced negative NRAs, since those for exportables more than outweighed the positive NRAs for the import-competing sub-sector. Over the whole period, the NRA averaged -11 percent for the 13 products in Table 4.

Non-covered farm products also have been affected by government policies. Quantifying that via price comparisons has not been possible. However, we divided that residual group into exportables, import-competing products and nontradables and assumed the NRAs for the first two of those components of non-covered products are the same as for covered products, and the NRA for nontradables was zero. A weighted average guesstimate was then generated for each year and is summarized on row 2 of Table 5. Non-product-specific assistance to the industry – amounting to 4 or 5 percent NRA equivalent, is then added in to obtain NRA estimates for all agriculture and for the tradables part of the farm sector, shown on rows 5 and 7 of Table 5, respectively. Throughout the period the NRA for import-competing farm products remained above that for exportables, but that anti-trade bias reduced somewhat in recent years (row 6 of Table 5).

The NRA for agriculture contrasts with the NRA for non-agricultural tradables. The latter has been estimated by again dividing up each of the non-farm sectors into exportable, nontradable and import-competing sub-sectors. Those sectors include non-agricultural primary products, highly processed food, non-food manufactures, and the service sector.

Their NRA is estimated directly from the information on import tariffs (including import surcharges) and export subsidies. Prices of nontradables are assumed to be undistorted, including for the whole of the service sector. Those NRAs are shown in detail in the Appendix, and are summarized in row 8 of Table 5. The rate of protection to non-agricultural tradables averaged around 12 percent in the 1990s and in the present decade to date. This is illustrated in Figure 3, together with the trend in the average NRA for agricultural tradables and the relative rate of assistance (RRA, derived from those two NRAs, as described in footnote d of Table 5). It shows that, relative to other sectors, the taxing of agriculture peaked at around 25 percent in the mid-1990s when international prices were high, but by 2004 the RRA somewhat less negative at just under -15 percent.

Estimates of CTEs are reported in Table 6. They show a somewhat similar pattern to NRAs on output. Sugar, white maize and rice had large and positive tax rates over the period. The same factors that explain NRAs on output explain the high CTEs. Meat also has had a positive CTE. For most years, the weighted average CTEs on both importables and exportables were positive, with the average CTE for importables five points above that for exportables (21 percent as compared with 26 percent). These large rates of taxation affect mainly low-income and poor families, as white maize, rice, and sugar constitute an important share of the basic consumption basket of these households.

Results by products

Before turning to the political economy behind these trends, it is helpful to review the distortions of the main covered products one by one.

White maize

White maize is an important agricultural product (8 percent of total agricultural GDP), with imports accounting for an average of 13 percent of total final domestic consumption. It represents around 10 percent of food expenditures by extremely poor households (World Bank 2003a, Table 1.3). Given that white maize is exempt from value added taxes, NRAs on output are equal to CTEs. In addition, because we are assuming an equi-proportionate pass-through of distortions along the value chain, the NRAs on output at the farm-gate level are equal to the NRAs on output at the wholesale level.

Producers of white maize enjoyed positive NRAs on output during all but one year in the 1991-2004 period (2003 was the exception with an NRA on output of -12 percent). This product is characterized by high and volatile NRAs and CTEs, which can be explained in part by the high volatility of the domestic price.

Kruger (2000) reveals that households are net consumers of this product, including poor and extremely poor households who purchase 62 and 66 percent of the white maize they consume, respectively. The high CTEs of white maize, therefore, imply high welfare costs to Nicaraguan households, especially those that are poor.

Rice

Imports of rice account for an average of 31 percent of total final domestic consumption. In the 1991-2004 period, rice represented an average of 7.2 percent of total agricultural GDP (Table 1), making it the second most important importable product in Nicaragua's agricultural sector after white maize.

As in the case of white maize, rice is exempt from value added taxes so that its NRAs on output are equal to CTEs, and the NRA on output at the farm-gate level is equal to the NRA on output at the wholesale level due to the equi-proportionate pass-through assumption discussed above.

Rice producers enjoyed positive and high NRAs on output, with an average NRA on output (and CTE) of 23 percent during the 1991-2004 period,⁵ and a peak level of protection in the year 2000 with an estimate equal to 71 percent. The high NRAs on output can be mostly explained by policy interventions. For most of the period, the NRA on output was correlated with the levels of tariff protection in place.

The rice industry is oligopsonic. It is controlled by a few large processors who purchase small farmers' production, and a handful of importers who have the ability to lobby government to implement policies that protect the sector. In addition to high import tariffs, rice processors and importers are able to influence the import quota quantity in the quota-contingent tariff mechanism. Between 1991 and 1998, they were able to influence policies that completely prohibited rice imports from Vietnam, claiming that it was necessary for sanitary reasons. As the international price began to decrease in 1996, domestic rice producers pressured government authorities, who responded by increasing the rice import tariff to a maximum of 90 percent in 2003. As the tariff increased, so did the NRA.

⁵ Simple average estimated from Table 6.

Towards the latter part of the year 2000, Nicaragua applied safeguard measures to protect domestic producers from sudden reductions in the international price of rice. The safeguard raised the applied tariff from 30 percent to 65 percent.⁶ In 2001, rice processors and importers negotiated an import quota with the government on the condition that they would pass part of the quota rent to higher domestic producer prices.

The negative welfare effects of the high level of CTEs on consumers is even stronger in the case of rice than white maize, because more than 90 percent of rice consumed by Nicaraguan families is purchased in the market (Kruger 2000) and only 2.4 percent is from own production.

Sorghum

Sorghum is the third most important importable product in Nicaragua's agricultural GDP. Its economic importance stems from the role that it plays in two important industrial sectors: the poultry and food processing sectors.

We have information on prices paid to sorghum producers at the processing plant. We add storage costs to construct the wholesale price, and subtract domestic transportation costs to obtain a farm-gate equivalent price.

The sorghum industry is highly concentrated on the demand side. There are only seven firms—four industrial poultry and three food processing plants—that purchase the entire production, compared with the almost 200,000 sorghum producers (IICA 2002a).

During the period that the price band was in place (1992 to 1997), the domestic price of sorghum was equal to the international price plus the necessary import tariff to ensure that the domestic price was at least equal to the price minimum. After the price band was abandoned in 1997, the associations of sorghum and poultry producers negotiated with the Ministry of Industry and Trade to design of a new trade policy for sorghum whereby: (i) producers first purchase all domestic production, using high tariffs if necessary; (ii) once domestic production is purchased, imports beyond that production level pay zero tariffs, (iii) part of the benefit of the reduced tariff is transferred to producers in a higher producer price, and (iv) producers and industrial consumers negotiate price, volume, and quality in their trade

⁶ Here it is important to comment on the great difficulty of obtaining consistent tariff rates in Nicaragua. In general there are several different sources for import tariffs such as the Central Bank, the Ministry of Agriculture, the Customs Service, and the Ministry of Economy among others; in all products, the tariffs reported by each source are different. In many cases the differences are extremely large, making the series completely incomparable. When in doubt we used measures reported by the Customs Service.

contracts. The Ministry of Industry and Trade acts as a mediator in their negotiations and enforces any agreement (IICA 2002a).

Although in principle domestic prices are not shielded from evolutions in international markets of sorghum and yellow corn, they are mostly a reflection of the bargaining process described above. In 1996, due to pressure from interest groups, the government increased the tariff on sorghum imports to a maximum of 30 percent in 2000–01. In 2000, safeguard measures were implemented to protect domestic sorghum producers from reductions in the international price of sorghum and yellow corn.⁷ The safeguard increased the tariff applied to sorghum from 15 percent to 30 percent. In spite of these policies, the NRAs for sorghum were negative during most of the 1991-2004 period.

From these largely negative rates of assistance a natural question arises: why don't sorghum producers export their product instead of negotiating with large industrial buyers, often under unfavorable negotiating conditions? Part of the answer lies in the fact that most sorghum producers are small (80 percent of sorghum farms are 35 hectares or less in size) and they have little knowledge on how to export. Indeed, three characteristics of sorghum producers were identified by a World Bank (2003b) study as key constraints to the export competitiveness of Nicaragua: low levels of organization, inadequate access to marketing resources, and (possibly) limited implementation of quality/sanitary management systems.

Soybean

Imports of soybean represent almost 13 times the level of domestic production and over 2 times the level of domestic use in the oil processing industry. The NRA of soybean shows a general declining trend. Overall, it decreased between 1991 and 1996, a period of rising international prices, and also a period when the price-band mechanism was in place. Between 1997 and 1999, the NRA increased to 0 percent in 1999, only to decline again to a minimum of -53 percent in 2004.

The soybean industry at the wholesale level (plant) is duopsonistic: producers sell their output to the oil-producing industry which is comprised of two plants in the whole country. Soybean producers are small, unorganized, and thus have limited capacity to export their product (see World Bank 2003b). If soybean prices are higher than that which oil producers are willing to pay, the substitute product is imported unprocessed oil (from soybean and other types of oilseeds). Indeed, in the most recent period (2000-05) the

⁷ Sorghum and yellow corn are treated as perfect substitutes as inputs (feed) in the poultry industry.

government has reduced tariffs on imports of unprocessed cooking oils (MIFIC 2005), and soybean production in Nicaragua has decreased from 20,000 tons in 1999 to 8,000 tons in 2004.

Coffee

Coffee is the main agricultural product in Nicaragua. In 2004 it accounted for 15 percent of the country's agricultural production and 17 percent of total exports. As much as 85 percent of production was exported in the 1991-2004 period. However, the importance of coffee has declined in recent years: the share of coffee in merchandise exports peaked in 1998 at 31 percent, but has since declined to the present level of around 15 percent.

In the construction of NRAs on output we use fob prices, while the wholesale domestic price comes from the price that coffee producers receive at the coffee processing plant. The NRA on output of coffee exhibits large swings, with periods of positive and negative values, particularly in the 1990s. During the whole period the (unweighted) average NRA on output was -13 percent.

There are thousands of small coffee growers in Nicaragua, and a relatively small number of processing and exporting firms that (often) provide financing to growers, purchase the coffee, process and package it, and then finally export it. Thus, the large differences between the export price and the domestic price received by producers are due to the industry's structure, where processors and exporters are able to charge a high profit margin for the services they offer. The negative protection rates are not influenced by government interventions, as this industry has almost no government regulation or export taxes, so that the evolution of the NRA on output is due mainly to movements in the border price.

Sugar cane and processed sugar

We estimate NRAs and CTEs for both sugar cane (primary good) and sugar (processed good). As in the case of coffee, the international price used in our estimates is the fob price.

During the 1991-2004 period the importance of sugar to agricultural production remained relatively stable with a share of 8 percent of agricultural GDP (Table 1). At the same time the share of sugar in merchandise exports fluctuated between 4 and 9 percent with an average of 6 percent of total exports. Between 30 and 50 percent of all sugar production was exported, and a small share of production was imported (about 2 percent). All sugar cane production is used in the sugar production process.

As in many other countries, sugar is one of the most heavily regulated and protected products in Nicaragua, exhibiting extremely high, positive and increasing rates of protection during the period analyzed. The sugar industry is an oligopoly made up of four sugar mills that have the ability to lobby for protectionist policies.

We find that protection is more than twice as high for the processed good (sugar) than the primary good (sugar cane), which reflects the political economy of the sector. This implies that Nicaraguan consumers pay a consumer equivalent tax rate of more than 100 percent for the sugar they purchase.

During the early 1990s, the domestic price of sugar was regulated in Nicaragua through a price floor to benefit producers. In addition, between 1991 and 1996 sugar imports were effectively prohibited by administrative decisions, as sugar importers were required to obtain a direct import license from the Ministry of Economy (and only a handful were granted). As of 1997 the import license requirement was eliminated, and the tariff on sugar imports between 1997 and 2004 was set at 55 percent. Sugar producers sell part of their production to the United States under an accorded quota price, and to the international market. The remaining production is sold domestically. Typically prices under the quota in the U.S. market are much higher than prices in the international market.

Two non-tariff barriers remained in place after 1997: (i) between 1997 and 1999, sugar imports were prohibited under reciprocity rules, and they were applied to countries where the imports originated, and (ii) in 1999 it was determined that the price to which the sugar tariff would be applied would be the quota price paid by the US, not the competitive market price, thus prohibiting sugar imports in practice as the base to apply the tariff was increased (MIFIC 2005).

Sesame

Sesame is an export good: all production that meets the required quality standards by importing countries is sold abroad. This covers more than 90 percent of total production. The remaining production is consumed domestically by small and medium-sized enterprises, such as bakeries and small-scale candy producers.

Sesame exhibited negative NRAs for all but two years (1993 and 1994). The average NRA was –30 percent during the period. The negative rates were due to large increases in the border price that were not reflected in the domestic price. This can be explained there are only five sesame processing plants and thousands of producers.

Groundnuts

The peanut industry has grown rapidly during the past 15 years; its share in agricultural GDP increased from less than 1 percent in 1991 to 4 percent in 2004. At the same time the share of exports increased from 2.9 percent in 1991 to 5.1 percent in 2004, becoming one of the main agricultural exports of the country. The sector benefited between 1992 and 1997 from a tax-incentive program—the *Certificados de Beneficio Tributario*, or CBTs—aimed at promoting non-traditional exports. The program consisted of a draw-back of 15 percent of export value that was phased down to 1.5 percent in 1997. During the 1991-2004 period, the peanut industry exported on average 56 percent of total production, with no significant imports (BCN 2006A).

The two products we analyze in this study are unprocessed peanut (in its shell), which is the primary product sold to processing plants, and peanut after processing, which is the exported product. In our analysis of the primary good (unprocessed peanut), the domestic price is the wholesale price paid to producers at the plant and the international price is estimated based on the fob price. For the exported good, the domestic price is the producer price (at the processing plant) plus processing costs and the international price is the fob price.

The NRA on output and CTE for peanuts differ due to the value added tax of 15 percent that consumers pay. The farm-level NRA of unprocessed peanut production was zero in 1991 but rapidly declined and remained negative for the 1992–2004 period as domestic prices grew at lower rates than international prices obtained by Nicaraguan exports. Since the tax-incentive program was phased out in 1997, the peanut sector has not experienced government regulations other than stable and decreasing import tariffs—from 10 percent in 1998 to 5 percent onwards—and the tax draw-back of 1.5 percent enjoyed by all exporters since 1997. Thus, the declining NRAs on output were due mainly to movements in the international (border) price received by exporters relative to domestic prices.

Red bean

The share of beans in agricultural GDP has increased from about 5 percent at the beginning of the 1990s to 8.2 percent in 2004, becoming the third most important product in agriculture. During the 1994-2004 period, exports represented almost 15 percent of total production (while imports represented 3 percent of production), thereby accounting for 2.1 percent of total exports.

A turning point in the sector occurred in the 1994-96 period when bean exports increased dramatically as the international price began a steep and sustained increase, and bean exports soared from 5 percent of production in 1993 to 26 percent in 1995. Official Central Bank data reports exports of red beans as representing 18 percent of total production during the 2001–2004 period; however, local authorities and producers contend that the role of bean exports is even greater, as a substantial amount of production is exported through the black market to other Central American countries. In spite of the increase in exports, the domestic market remains the main market for domestic producers.

Accordingly, in the 1991 and 1993 period when there were low levels of exports (5 percent), the NRA was greater than zero; whereas in the post-1994 period, the NRA was negative (except for 1998) and averaging –14 percent (Table 1). The sustained negative rates of protection after 1999 and the flow of imports from neighboring countries (Costa Rica, Honduras, and El Salvador) motivated the government to increase import tariffs to 30 percent in 2003. This could explain the increase in the rates of protection during 2004, which reached –4 percent, as domestic prices increased more than international prices.

Livestock and meat

We analyze livestock as a primary good and bovine meat as a processed and exportable product. Domestic prices are from Saavedra and Vallecillo (2005), and international prices are based on the fob price received for exports. Nicaragua exports 47 percent of its total meat production with virtually no imports. As Nicaragua exports different cuts of meat, we chose the most representative one and then selected a domestic cut of equivalent quality. Domestic prices (in dollar terms) of the equivalent domestic cut remained stable over the period of analysis, rendering the international price as the main factor in generating changes in the NRA.

The political economy of agricultural-sector policies

In seeking to understand the trend in policy interventions, it is helpful to first consider the Sandinista period before the reforms began in 1991.

The Sandinista Regime: 1979 – 1990

During the decade prior to our period of analysis, the Sandinista party governed Nicaragua under the leadership of President Daniel Ortega. The Sandinista Revolution, which took place between 1978 and 1979, overthrew the Somoza dictatorship that had lasted more than 50 years.

The Sandinista period can be characterized as authoritarian in matters of politics and economics. Among the goals of the Administration were to reduce the high poverty and inequalities inherited from previous governments, through direct intervention of the state in the economy.

As a result, Nicaragua's economy during the 1980s was one in which the state played an active role both as a regulator and through direct ownership of the means of production. The financial sector was nationalized, as were key industries in almost all other economic sectors.

In agriculture, the government implemented an overwhelming land reform program, confiscating land from large land-owners (usually political adversaries or absent owners who had migrated out of Nicaragua). Furthermore, the state-owned *Banco de Desarrollo* subsidized loans to small farmers and cooperatives in order to stimulate agricultural production. The government also participated in the distribution of agricultural goods. The sale of non-traded goods was regulated through price controls, and a government agency (ENABAS) was created to distribute and coordinate the sale of basic staple goods. The commercialization of the country's main exportable agricultural products was centralized in government-owned and managed firms.

One of the most important aspects of Nicaragua's international commerce activities during the 1980s was the total trade embargo by the United States and isolation by the international financial community following Nicaragua's foreign debt default. Trade policy was characterized by active government controls such as the mandatory sale of foreign reserves to the Central Bank, multiple exchange rates, high and discretionary import tariffs, export taxes, and the limited issue of export licenses to firms or individuals affiliated with or "friendly" towards the government.

Domestic economic policy towards the end of the 1980s resorted to inorganic monetary emission and large fiscal deficits (in part as a result of the U.S. trade embargo and isolation by the international financial community). This led to hyperinflation and economic recession that lasted from the mid-1980s until 1991.

The reform period since 1990

Nicaragua's trade policy since 1990 focused on trade liberalization and the promotion of exports. The policies implemented include tariff reductions, free-trade and regional integration agreements, and fiscal incentives to benefit the export sector. The policies have been effective: the average tariff applied by Nicaragua was reduced from 43 percent in 1990 to 5 percent in 2000 (OMC 1999).

Nicaragua is a member of the Central American Common Market (CACM), thus, its present import tariff is the common external tariff of the CACM. Under its agreements with the WTO, the country consolidated its general trade tariffs to a maximum of 40 percent, with the exception of sensitive agricultural and industrial products that still have high tariff levels. Among these are the importable goods analyzed in this study, and two of the exportable good analyzed in this study: sugar and meat. Thus, whilst overall tariff reduction has been successful, the country's tariff policies contain many exceptions to the general tariff rule and have been volatile during the last 15 years (OMC 1999).

The broad tax reform law of 1997 was intended to eliminate biases against the agricultural sector by simplifying the tariff structure for agricultural goods. The number of tariffs was reduced by more than 50 percent and the tariff dispersion was reduced to between 0 and 15 percent. There were fewer exceptions for sensitive goods that had high tariffs before the reform, including basic grains (corn, beans, rice and sorghum), milk, poultry, and sugar. The argument used to defend high tariffs was that they protected domestic producers from unfair international competition, given that international producers usually receive some kind of subsidy (OMC 1999).

Nicaragua's three government administrations since 1990 have continued to implement market reforms that have deepened economic liberalization. Many of these reforms have been the result of conditionality clauses from international financial institutions or from foreign governments. Examples include the privatization of the telecommunications and energy sectors; a major reform of the public pension system, and the privatization of state-owned banks.

In the case of agricultural protection, the abandonment of the price band mechanism is an example of a policy brought about by foreign pressure: donations were conditioned on the abolition of the band and the government proceeded to eliminate it. In its place, however, another (more arbitrary) mechanism was set in place: the import quota-contingent tariff structure whereby quotas and tariffs are decided by government-producer committees.

Most of the policies in the agricultural sector are the result of successful lobbying by interest groups (producers or industrial users). As discussed above, several of the industries we analyzed are uncompetitive, with market power concentrated in a few key players, who sometimes have sufficient economic and political power to influence key policy decisions. The rice and sugar industries are clear examples and have been discussed above.

When protectionist interventions are implemented, large producers, industrial consumers and agro-industrial food processors have been the beneficiaries of that protection. For instance, the government regulation that set up the price band mechanism had an explicit objective to ensure sufficient food for the population and to protect the interests of domestic basic grains producers (La Gaceta 1992). Despite the intentions to benefit consumers and isolate them from volatile price fluctuations, tariffs and import restrictions protect domestic producers and hurt consumers and small producers by raising the domestic price (Kruger 2000).

Prospects for reform

The World Bank (2003b) summarizes the key issues, problems and bottlenecks in Nicaraguan agriculture, some of which are important in explaining and understanding the high rates of protection in the products that we analyze. That report also proposes some avenues for reform to increase the competitiveness of the agricultural sector.

First and foremost, the report recommends that all discretionary policies that are currently in place to protect some sectors of agricultural production should be eradicated, and substituted by transparent and consistent rules that do not discriminate in favor of a handful of products. This would eliminate the possibility for interest groups to lobby officials and be able to influence measures that benefit their sector. A second and related recommendation is the elimination of all forms of price regulation through import tariffs (or any other measures), to allow markets to provide the signals to domestic producers and allow them to respond to these signals.

Policies that promote competition, or those that improve the efficiency of marketing channels, would help reduce—if not eliminate—the market power that is enjoyed by many of the oligopsonistic firms that exist in several of the country's key products, at the expense of small producers. This could include promoting public-private partnerships that reduce the

dependence of small producers on domestic purchasers by improving their export capacity to market and sell their production internationally.

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Table 1: Product shares in the value of agricultural production, Nicaragua, 1991 to 2004

(percent, at distorted prices)														
Item	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004
EXPORTABLE CROPS:	48.0	46.3	44.2	32.3	34.3	36.8	36.2	34.4	38.0	39.3	40.0	36.9	33.6	37.0
Sesame (Natural)	2.1	1.5	1.2	1.2	2.0	1.5	1.9	0.7	0.5	0.5	0.5	0.1	0.4	0.6
Coffee (Green)	19.9	17.3	21.9	11.3	11.3	12.1	12.3	15.2	15.8	18.4	18.2	14.1	12.8	14.9
Sugar Cane	7.6	8.3	7.0	6.3	6.9	7.1	8.4	8.6	8.4	7.9	7.2	6.7	6.6	7.9
Beans	5.3	5.3	5.1	8.8	8.2	9.7	7.0	4.3	9.0	7.4	8.4	10.4	8.2	8.2
Groundnuts	0.6	0.6	0.5	2.1	2.7	2.3	2.6	2.8	2.7	4.0	4.1	4.0	3.9	3.8
Others	12.4	13.4	8.5	2.7	3.3	4.0	4.0	2.7	1.7	1.2	1.6	1.6	1.6	1.7
IMPORTABLE CROPS:	14.8	15.8	15.9	23.1	22.7	22.0	19.7	18.3	15.0	15.7	14.4	15.5	17.6	13.7
Rice	5.3	5.7	5.6	8.6	9.6	7.8	8.1	6.7	6.9	7.2	6.8	7.7	8.2	6.9
Maize	7.6	7.7	7.8	10.9	10.0	10.3	8.8	9.2	6.5	7.4	6.7	6.8	8.3	5.8
Sorghum	0.0	0.4	0.3	2.7	2.3	3.1	1.8	1.4	1.0	0.8	0.9	0.9	0.9	0.8
Soybeans	1.9	2.0	2.1	0.7	0.8	0.8	1.0	1.0	0.6	0.2	0.1	0.1	0.2	0.2
Others	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
LIVESTOCK	37.2	37.9	39.9	44.6	42.9	41.3	44.2	47.3	46.9	45.0	45.6	47.6	48.8	49.3
Beef	20.0	18.2	18.5	17.6	16.8	15.9	16.4	17.4	17.4	15.8	15.8	17.0	17.6	19.0
Milk, chicken and other	17.2	19.7	21.5	27.0	26.2	25.4	27.7	29.8	29.5	29.2	29.7	30.6	31.2	30.2
TOTAL	100	100	100	100	100	100	100	100	100	100	100	100	100	100

Source: Central Bank of Nicaragua, BCN

Table 2: Growth in gross domestic product, Nicaragua, 1960 to 2004

(average annual growth rate, percent)

	1960-69	1970-77	1978-79	1980-89	1990-99	2000-04
Primary Sector	7.9	4.6	-15.4	-0.8	4.7	2.4
Crops	8.3	4.9	-13.4	0.1	5.0	n.a.
Livestock	7.0	3.4	-16.6	-1.8	2.4	n.a.
Fishery	23.8	9.3	-24.3	-10.3	26.2	n.a.
Forestry	-1.1	8.5	-40.1	0.7	2.2	n.a.
Secondary Sector	9.7	7.0	-35.3	-2.6	4.2	4.0
Manufacturing	11.3	6.2	-27.4	-2.9	1.8	4.7
Construction	13.0	11.9	-74.2	-0.3	12.8	1.3
Mining	2.8	5.7	-58.0	-1.4	16.6	3.9
Tertiary Sector	6.3	5.1	-27.2	-1.2	1.7	4.5
Commerce	7.4	5.6	-37.8	-2.6	3.5	3.2
Central Government	4.3	6.6	-6.3	2.4	-3.7	1.6
Communic./Transport	7.4	5.6	-21.7	-3.4	3.0	4.5
Financial	13.1	7.3	-12.7	-1.5	2.0	8.1
Energy and Water	13.5	4.4	-10.9	1.4	3.3	4.6
Property	2.2	0.0	-26.6	-0.1	2.2	3.7
Other Services	4.4	4.6	-31.9	-3.4	3.3	4.1
TOTAL GDP	7.5	5.6	-26.5	-1.5	3.2	3.5

Note: n.a. = not available. Growth rates = geometric average

Source: Author's calculations based on Central Bank of Nicaragua statistics (www.bcn.gob.ni)

Table 3: Import quota-contingent tariff structure, Nicaragua, 2004

Product	Quota (tons)	Tariff - Within Quota (%)	Tariff - Outside Quota (%)
Maize	8,742	40	60
Bovine Meat	1,575	40	60
Beans	2,403	40	60
Rice	4,959	40	60
Sorghum	6,244	40	60
Vegetable oil ¹	2	40	60
Sugar ²	48	60	100
Poultry	851	60	200
Milk	6,068	40	75

¹ Millions of liters.

² Cubic meters

Source: MIFIC (2005).

Table 4: Nominal rates of assistance to covered agricultural products, Nicaragua, 1991 to 2004
(percent)

	1991	1992	1993	1994	1991 -94	1995	1996	1997	1998	1999	1995 -99	2000	2001	2002	2003	2004	2000 -04
Exportables^a	-15	-14	-8	-24	-14.9	-29	-28	-33	-31	-24	-29.1	-19	-20	-18	-19	-14	-18.1
Coffee	-44	-26	-20	-42	-33.1	-62	-37	-53	-59	-43	-50.5	-31	-14	-7	-44	-19	-22.8
Sugar	2	44	43	55	36.0	50	74	62	60	60	61.2	52	35	43	35	35	40.1
Sesame	-39	-42	12	27	-10.6	-38	-31	-15	-45	-42	-34.2	-47	-30	-39	-43	-43	-40.5
Groundnuts	0	-1	-15	-21	-9.1	-30	-18	-35	-37	-15	-27.0	-18	-45	-30	-42	-37	-34.5
Red beans	10	-11	86	-23	15.6	-10	-17	-12	13	-7	-6.7	-16	-31	-17	-34	-4	-20.3
Beef	-10	-15	-19	-27	-17.6	-38	-35	-35	-26	-28	-32.4	-28	-27	-24	-17	-16	-22.4
Milk												17	8	-15	7	n.a.	n.a.
Import-competing^a	12	13	19	6	12.5	22	4	15	30	17	17.5	52	24	31	0	16	24.9
Maize	2	17	30	30	19.9	0	15	26	31	20	18.4	57	12	13	-12	9	15.6
Rice	-10	-6	3	-25	-9.5	16	-5	23	32	28	19.0	71	49	61	21	34	47.0
Sorghum	-33	-13	-14	-19	-19.6	-24	-25	-5	0	-4	-11.5	8	0	-23	-15	-20	-10.0
Soybeans	31	52	8	10	25.1	15	-38	-37	-21	0	-16.2	-5	-2	-21	-30	-53	-22.0
Milk	65	18	12	19	28.6	26	6	-12	39	8	13.5					n.a.	n.a.
Chicken	94	97	82	70	85.8	86	33	33	30	22	40.6	32	14	33	n.a.	n.a.	26.2
Total of covered products^a	-8	-6	1	-15	-7.1	-14	-18	-20	-16	-13	-16.4	-6	-11	-8	-16	-9	-9.9
Dispersion of covered products ^b	42	40	39	40	40.1	42	34	36	41	32	35.7	39	28	31	25	26	29.8
% coverage at undistorted prices	80	82	87	87	83.9	85	86	87	87	90	86.9	92	89	90	84	76	86.2

^a NRAs including product-specific input subsidies.

^b 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, Nicaragua, 1991 to 2004

	(percent)																
	1991	1992	1993	1994	1991 -94	1995	1996	1997	1998	1999	1995 -99	2000	2001	2002	2003	2004	2000 -04
Covered products ^a	-8	-6	1	-15	-7.1	-14	-18	-20	-16	-13	16.4	-6	-11	-8	-16	-9	-9.9
Non-covered products	-8	-7	-1	-17	-8.2	-19	-21	-23	-20	-15	19.7	-6	-10	-8	-14	-7	-9.0
All agricultural products ^a	-8	-6	1	-16	-7.2	-15	-18	-21	-16	-13	16.8	-6	-11	-8	-16	-9	-9.8
Non-product-specific (NPS)	3	4	5	5	4.1	6	3	6	5	7	5.5	5	6	4	5	7	5.5
Total agricultural NRA (incl. NPS assistance)^a	-5	-2	5	-10	-3.2	-9	-15	-15	-12	-6	11.3	-1	-4	-3	-10	-2	-4.2
Trade bias index ^c	-24	-24	-22	-28	-24	-41	-31	-41	-47	-35	-39	-47	-36	-38	-19	-26	-33
<i>Assistance to just tradables</i>																	
All agricultural tradables ^b	-5	-2	5	-10	-3.2	-9	-15	-15	-12	-6	11.3	-1	-4	-3	-10	-2	-4.2
All non-agric tradables	9	11	12	14	11.6	11	12	15	14	15	13.3	13	14	12	14	14	13.4
Relative rate of assistance, RRA^d	-13	-12	-6	-21	13.2	-18	-24	-26	-22	-18	21.7	-12	-16	-14	-21	-14	15.5

^a NRAs including product-specific input subsidies.

^b Total of assistance to primary factors and intermediate inputs divided to total value of primary agriculture production at undistorted prices (%).

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

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

Source: Authors' calculations (see Appendix).

Table 6: Consumer tax equivalents of policies affecting consumer prices of food, Nicaragua, 1991 to 2004

(percent)

Table 9. Nicaragua: Consumer Tax Equivalent of Agriculture (Primary and Processed)*, 1991-2004

Product	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004
Importable														
White Maize	3.6	18.7	32.0	31.1	1.7	16.5	26.9	33.1	21.7	58.0	13.9	14.3	-11.0	10.4
Rice	-8.0	-4.4	5.5	-23.4	18.8	-2.9	25.2	34.5	30.4	73.5	51.4	64.6	23.5	36.9
Sorghum	-29.3	-9.4	-10.6	-16.1	-21.8	-23.9	-5.3	0.1	-5.7	6.0	-0.9	-25.2	-17.5	-20.3
Soybean	52.8	76.4	25.3	26.6	32.4	-28.7	-28.6	-11.1	12.6	6.8	9.7	-11.6	-21.9	-47.3
Exportable														
Coffee	-34.8	-13.5	-6.9	-32.4	-55.3	-26.6	-45.2	-52.0	-33.1	-19.2	-0.1	8.9	-34.1	-5.0
Sugar	90.7	154.3	82.9	89.0	57.1	50.6	99.8	68.9	114.1	152.3	182.5	120.5	179.1	191.3
Sesame	-38.5	-40.9	13.3	28.9	-37.3	-30.0	-14.5	-43.7	-41.2	-46.4	-29.5	-38.2	-42.1	-41.9
Peanut	28.4	31.4	13.4	3.4	-3.3	7.5	-14.2	-15.1	12.6	8.0	-21.4	-3.7	-19.4	-14.5
Red Beans	13.0	-6.9	88.1	-19.4	-6.2	-15.3	-10.0	15.2	-4.8	-12.4	-27.4	-12.8	-29.0	-1.0
Meat	-11.3	12.6	12.9	11.7	26.0	45.3	41.5	35.3	28.9	19.9	12.3	10.8	14.7	4.9
CTE Importables	-4.6	2.0	12.6	-11.8	14.6	2.1	25.5	34.2	28.2	68.3	39.9	47.3	11.6	27.2
CTE Exportables	12.8	31.7	50.6	23.1	25.0	21.8	21.9	20.9	30.7	22.3	18.8	24.6	31.3	32.9
Total CTE Agriculture	4.2	15.6	31.3	3.6	19.3	11.0	23.8	26.3	29.8	38.1	26.6	33.7	24.2	31.1

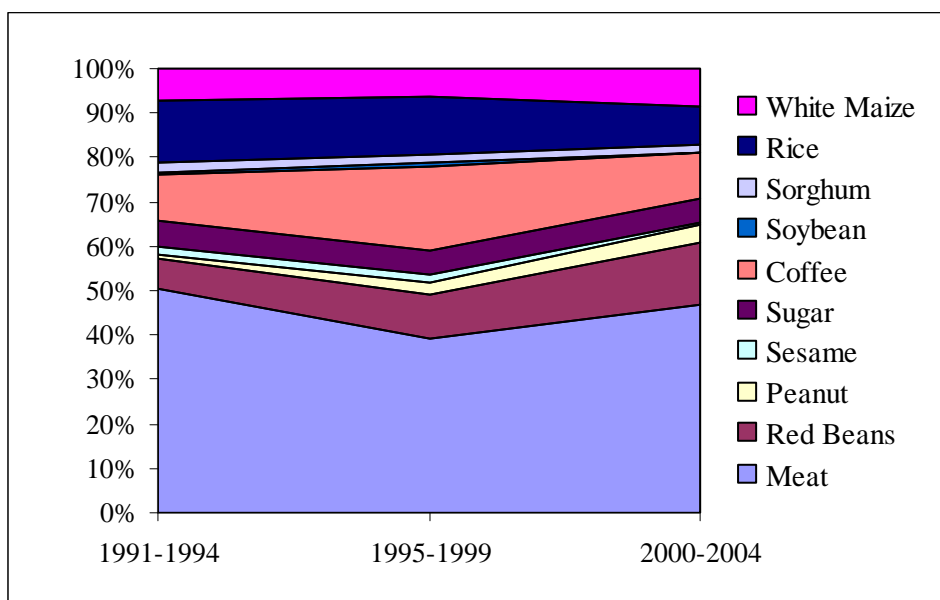
*: weighted average of CTEc and CTEcp. Weights are value of consumption of primary and processed agricultural production valued at undistorted prices.

Source: Authors' estimates following Anderson *et al* (2006) methodology.

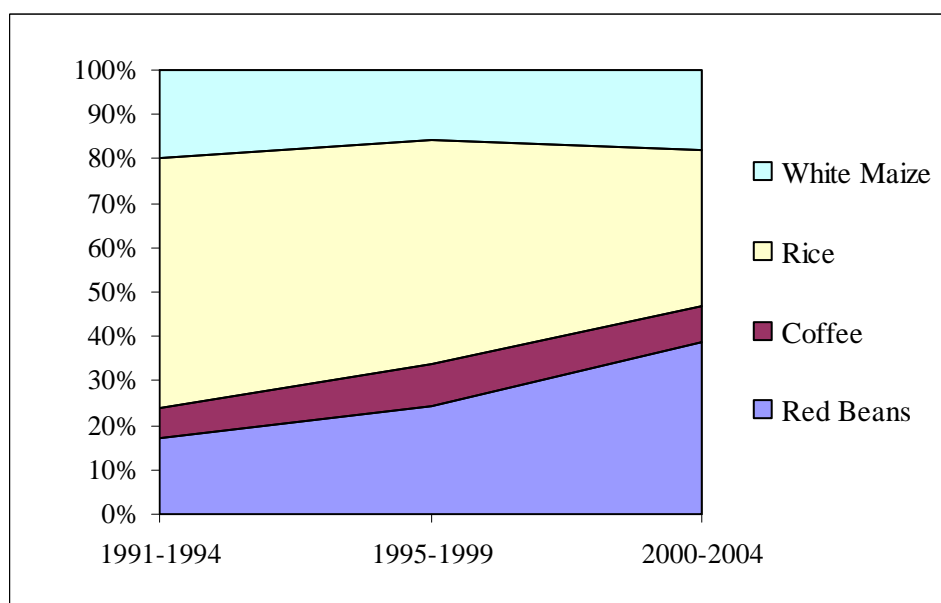
Figure 1: Agricultural production and consumption shares by farm product, Nicaragua, 1991 to 2004

(percent, at undistorted prices)

(a) Primary agricultural production shares

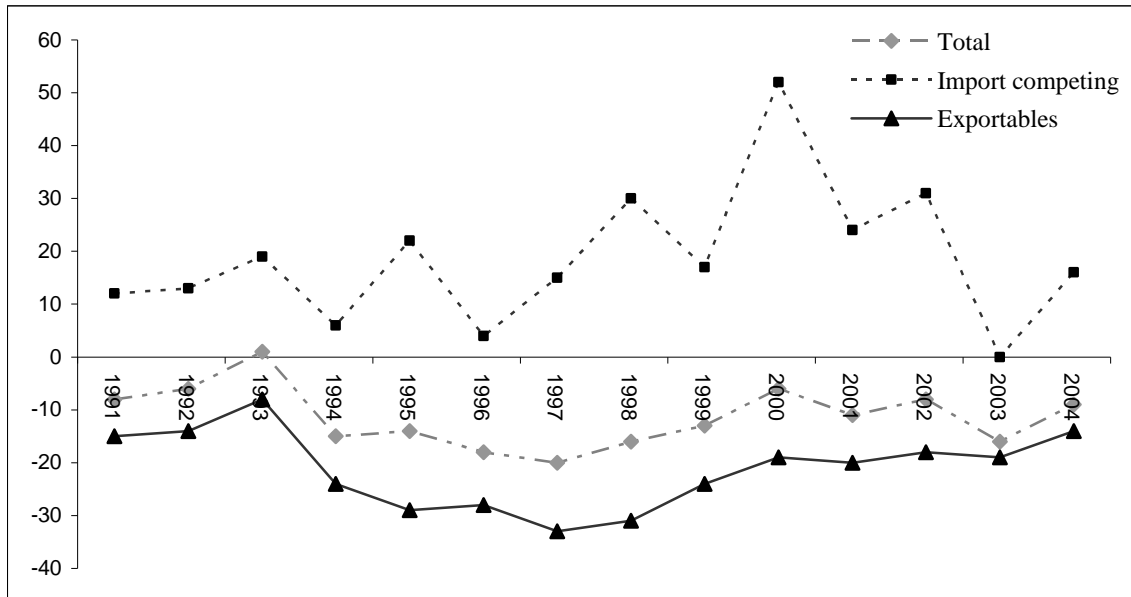


(b) Final household food consumption shares



Sources: Authors' estimates.

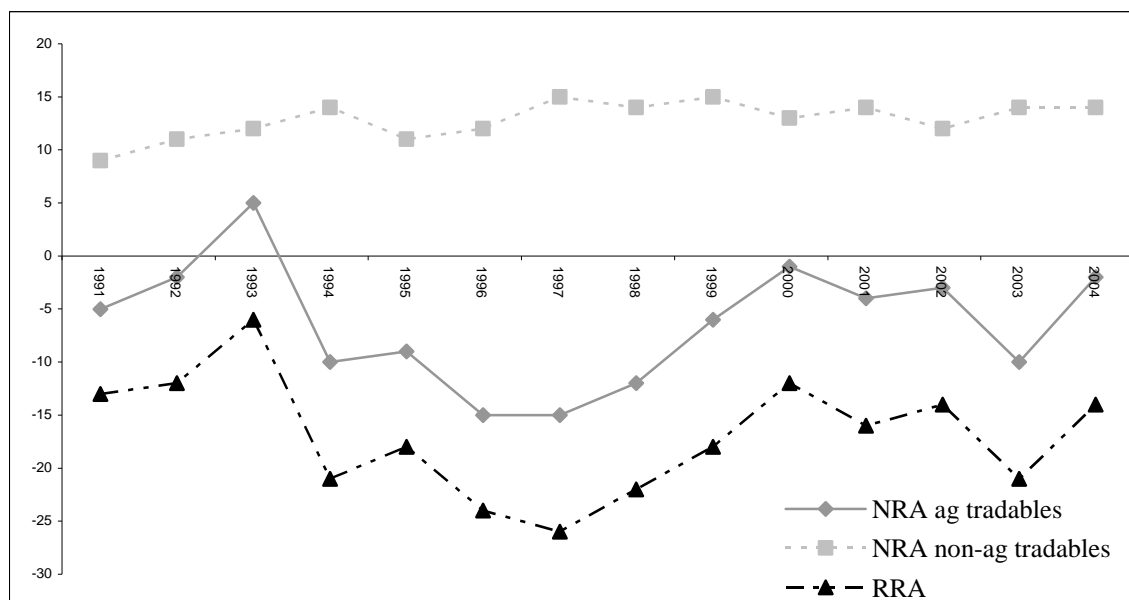
Figure 2: Nominal rates of assistance to exportable, importable and all covered agricultural products, Nicaragua, 1991 to 2004
(percent)



Source: Authors' calculations (see Appendix).

Figure 3: Nominal rates of assistance to all non-agricultural tradables, all agricultural tradable industries, and relative rates of assistance^a, Nicaragua, 1991 to 2004

(percent)



^a The RRA is defined as $100 * [(100 + NRA_{ag}^t) / (100 + NRA_{non-ag}^t) - 1]$, where NRA_{ag}^t and NRA_{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: data, assumptions and sources

Production and Consumption

Crop areas are from Central Bank statistics, 1991 – 2004.

Production, export and import volume data are from FAOSTAT (2006).

Apparent consumption data for sorghum, soy, sugar, peanut and meat: based on technical information provided at the seminar titled “Fortalecimiento del Sector Privado para la Formulación de Políticas Agrícolas.” Instituto Interamericano de Cooperación Para la Agricultura (2002).

Apparent consumption data for maize, rice, coffee, sesame and bean from FAOSTAT (2006).

Farm-gate product prices

Farm-gate product prices for maize, rice, sorghum, soy, sesame, peanut and meat are from Ministry of Agriculture, based on monthly price surveys from 1991 – 2004.

Farm-gate product prices for coffee are from FAOSTAT (2006).

Farm-gate product prices for sugar and red bean are from the Central American Council for Regional Agricultural Cooperation (CORECA).

Farm-gate product prices for milk and chicken are from FAO producer price series (whole milk, and ready-to-cook chicken).

Wholesale product prices

Primary products: maize, rice, sorghum, soy, sesame, peanut and meat are from Ministry of Agriculture monthly price surveys from 1991 – 2004; coffee prices from FAOSTAT (2006), and sugar and red bean are from CORECA.

Lightly processed products are from Central Bank statistics.

Margins are based on technical analyses in Instituto Interamericano de Cooperación Para la Agricultura (2002) and Ministry of Agriculture (2000).

Border prices

Maize, rice, soybean, and sorghum border prices are from the Development Prospects Group database, The World Bank.

Coffee, sugar, peanut, red bean, and meat border prices are FOB prices calculated from the value of the country’s exports or imports divided by the volume of that trade, estimated with data from Central Bank statistics.

Sesame border prices are reference prices from the U.S. market.

Milk whole, New Zealand's producer price, source: FAO. 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: transportation costs to processing or final point of consumption are equal in both countries, and 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 (from Valenzuela, Wong and Sandri 2007).

Chicken border price is a reference price, (US chicken ready-to-cook, from FAO). Authors' assumptions are: transportation costs to processing/final point of consumption are equal in both countries, and 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 (from Valenzuela, Wong and Sandri 2007).

Exchange rates

Official and parallel exchange rates are from statistics of the Central Bank of Nicaragua.

Input-output coefficients (conversion factors)

All conversion factors are based on technical studies in "Fortalecimiento del Sector Privado para la Formulación de Políticas Agrícolas." Instituto Interamericano de Cooperación Para la Agricultura (2002) and Ministry of Agriculture (2002).

Conversion factors for processed peanut include information obtained from interviews with industry experts.

Production, consumption, input and trade taxes and subsidies are from Ministry of Finance statistics.

List of data sources

Anderson, K., W. Martin, D. Sandri and E. Valenzuela (2006), "Methodology for Measuring Distortions to Agricultural Incentives", Agricultural Distortions Working Paper 02, World Bank, Washington DC, August. Posted at www.worldbank.org/agdistortions

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Easterly, W. (2006), *Global Development Network Growth Database*, accessed 23 June <http://www.nyu.edu/fas/institute/dri/global%20development%20network%20growth%20database.htm>

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Ministry of Finance (MIHCP). Tariffs Statistics compiled in *Sistema Arancelario Centroamericano* database. Available online for years 1999 – 2004 at: <http://www.mific.gob.ni:81/docushare/dsweb/View/Collection-397> and earlier years available upon request from the Ministry of Industry, Commerce and Trade (MIFIC) (www.mific.gob.ni) or the Customs Department of the Ministry of Finance (www.dga.gob.ni). Other years available physically at the MIFIC library.

The World Bank (2006), *Development Prospects Group Database*.

Valenzuela, E., S. Wong and D. Sandri (2007), “Distortions to Agricultural Incentives in Ecuador.” Agricultural Distortions Working Paper 16, World Bank, Washington DC, December.

Appendix Table 1: Prices and NRAs for primary products, Nicaragua, 1991 to 2004

Year	Maize			Rice			Sorghum			Soybean			Coffee		
	Domestic price per MT	Border price per MT	NRA = $\frac{DP-BP}{BP}$	Domestic price per MT	Border price per MT	NRA = $\frac{DP-BP}{BP}$	Domestic price per MT	Border price per MT	NRA = $\frac{DP-BP}{BP}$	Domestic price per MT	Border price per MT	NRA = $\frac{DP-BP}{BP}$	Domestic price per MT	Border price per MT	NRA = $\frac{DP-BP}{BP}$
1991	1031	996	0.036	2780	3021	-0.080	664	939	-0.293	2338	1760	0.328	4872	8597	-0.433
1992	1171	987	0.187	2853	2984	-0.044	846	934	-0.094	2691	1754	0.534	4818	6403	-0.248
1993	1499	1136	0.320	3319	3146	0.055	950	1063	-0.106	2392	2195	0.090	5892	7279	-0.191
1994	1703	1299	0.311	3238	4226	-0.234	1004	1197	-0.161	2657	2413	0.101	7984	13587	-0.412
1995	1576	1550	0.017	4621	3889	0.188	1169	1494	-0.218	3156	2740	0.152	9596	24675	-0.611
1996	2568	2204	0.165	4664	4803	-0.029	1518	1996	-0.239	2312	3728	-0.380	12748	19985	-0.362
1997	2419	1906	0.269	6420	5128	0.252	1692	1786	-0.053	2488	4005	-0.379	13741	28837	-0.523
1998	2563	1925	0.331	7657	5694	0.345	1866	1863	0.001	2897	3748	-0.227	14057	33679	-0.583
1999	2405	1977	0.217	7347	5636	0.304	1776	1883	-0.057	3487	3563	-0.021	16050	27607	-0.419
2000	3469	2195	0.580	7040	4058	0.735	2194	2069	0.060	3706	3990	-0.071	18057	25714	-0.298
2001	2654	2331	0.139	7352	4857	0.514	2277	2299	-0.009	3364	3527	-0.046	14126	16254	-0.131
2002	2891	2531	0.143	6956	4227	0.646	1859	2483	-0.252	3207	4173	-0.232	16124	17021	-0.053
2003	2663	2992	-0.110	6180	5002	0.235	2231	2706	-0.175	3767	5549	-0.321	12013	20970	-0.427
2004	3647	3302	0.104	8148	5954	0.369	2354	2952	-0.203	3087	6737	-0.542	20380	24661	-0.174

Year	Sugar cane			Sesame			Peanut (unprocessed)			Red Bean			Cattle		
	Domestic price per MT	Border price per MT	NRA = $\frac{DP-BP}{BP}$	Domestic price per MT	Border price per MT	NRA = $\frac{DP-BP}{BP}$	Domestic price per MT	Border price per MT	NRA = $\frac{DP-BP}{BP}$	Domestic price per MT	Border price per MT	NRA = $\frac{DP-BP}{BP}$	Domestic price per MT	Border price per MT	NRA = $\frac{DP-BP}{BP}$
1991	83	81	0.021	3422	5566	-0.385	1988	1915	0.038	3101	2743	0.130	4387	4629	-0.052
1992	116	80	0.445	3996	6759	-0.409	1860	1792	0.038	2584	2774	-0.069	4436	4908	-0.096
1993	138	96	0.437	5253	4636	0.133	2254	2507	-0.101	6456	3433	0.881	5179	6001	-0.137
1994	167	108	0.549	5968	4628	0.289	2802	3367	-0.168	4687	5817	-0.194	5735	7384	-0.223
1995	186	124	0.501	6906	11006	-0.373	2327	3098	-0.249	4083	4354	-0.062	6273	7457	-0.159
1996	215	123	0.746	10471	14957	-0.300	3343	3891	-0.141	8820	10416	-0.153	6098	9150	-0.333
1997	230	142	0.624	10614	12412	-0.145	3602	5260	-0.315	9892	10991	-0.100	7761	11266	-0.311
1998	235	146	0.604	8770	15569	-0.437	3688	5506	-0.330	10866	9435	0.152	9244	13447	-0.313
1999	253	158	0.597	11179	19017	-0.412	4306	4842	-0.111	10879	11422	-0.048	10916	13880	-0.214
2000	265	174	0.522	11109	20724	-0.464	4742	5542	-0.144	9534	10880	-0.124	11522	15132	-0.239
2001	290	215	0.352	13123	18625	-0.295	3723	6192	-0.399	8644	11914	-0.274	12500	16109	-0.224
2002	310	216	0.433	10550	17072	-0.382	4216	5687	-0.259	8324	9549	-0.128	13900	17322	-0.198
2003	328	242	0.355	12960	22394	-0.421	4486	7192	-0.376	7562	10648	-0.290	16024	18492	-0.133
2004	346	256	0.352	18145	31252	-0.419	5223	7797	-0.330	12079	12204	-0.010	18364	20900	-0.121

Source: Authors' spreadsheet using methodology from Anderson et al. (2008)

Appendix Table 2: Prices and NRAs for lightly processed foods, Nicaragua, 1991 to 2004

Year	Sugar			Peanut (husked)			Meat		
	Domestic price per MT	Border price per MT	NRA = $\frac{DP-BP}{BP}$	Domestic price per MT	Border price per MT	NRA = $\frac{DP-BP}{BP}$	Domestic price per MT	Border price per MT	NRA = $\frac{DP-BP}{BP}$
1991	2622	1374	0.908	2969	2641	0.124	11332	12799	-0.115
1992	2703	1062	1.545	2844	2468	0.152	13236	11695	0.132
1993	2983	1631	0.829	3451	3469	-0.005	16202	14240	0.138
1994	3442	1821	0.890	4231	4677	-0.095	17797	15724	0.132
1995	3437	2188	0.571	3642	4288	-0.151	19932	15604	0.277
1996	3772	2506	0.505	5076	5392	-0.059	22330	15048	0.484
1997	4214	2109	0.998	5493	7309	-0.248	25011	17250	0.450
1998	5039	2983	0.689	5684	7638	-0.256	28012	20249	0.383
1999	5603	2616	1.142	6600	6686	-0.013	31261	23882	0.309
2000	5839	2314	1.524	7252	7659	-0.053	33799	27800	0.216
2001	7009	2479	1.827	5920	8569	-0.309	35591	31331	0.136
2002	5746	2605	1.205	6639	7847	-0.154	37726	33510	0.126
2003	7293	2612	1.792	7062	9967	-0.291	39990	34494	0.159
2004	7694	2640	1.915	8112	10810	-0.250	42189	40123	0.051

Source: Authors' spreadsheet using methodology from Anderson et al. (2008)

Appendix Table 3: Exchange rate, Nicaragua, 1960 to 2005

Year	Official rate	Secondary/ parallel market rate	Retention rate ^a	Discount to secondary market rate (%)	Estimated equilibrium exchange rate using this study's methodology ^b
1960	7	n.a.	n.a.	n.a.	n.a.
1961	7	n.a.	n.a.	n.a.	n.a.
1962	7	n.a.	n.a.	n.a.	n.a.
1963	7	n.a.	n.a.	n.a.	n.a.
1964	7	n.a.	n.a.	n.a.	n.a.
1965	7	n.a.	n.a.	n.a.	n.a.
1966	7	n.a.	n.a.	n.a.	n.a.
1967	7	n.a.	n.a.	n.a.	n.a.
1968	7	n.a.	n.a.	n.a.	n.a.
1969	7	n.a.	n.a.	n.a.	n.a.
1970	7	n.a.	n.a.	n.a.	n.a.
1971	7	n.a.	n.a.	n.a.	n.a.
1972	7	n.a.	n.a.	n.a.	n.a.
1973	7	n.a.	n.a.	n.a.	n.a.
1974	7	n.a.	n.a.	n.a.	n.a.
1975	7	n.a.	n.a.	n.a.	n.a.
1976	7	n.a.	n.a.	n.a.	n.a.
1977	7	n.a.	n.a.	n.a.	n.a.
1978	7	n.a.	n.a.	n.a.	n.a.
1979	8.7	n.a.	n.a.	n.a.	n.a.
1980	10	17.3	n.a.	73.3	7.68
1981	10	24.4	n.a.	144.3	7.69
1982	10	28	n.a.	180.0	7.70
1983	10	28	n.a.	180.0	7.70
1984	10	n.a.	n.a.	n.a.	7.67
1985	26.1	666.8	1.00	2451.7	7.62
1986	66.4	1,214	1.00	1726.7	7.53
1987	70.0	6,294	1.00	8890.8	7.40
1988	190.9	673.2	1.00	252.6	7.25
1989	15,655	19,077	1.00	21.9	7.09
1990	689,958	701,710	1.00	1.7	6.94
1991	4.3	5.3	1.00	22.1	6.80
1992	5.0	5.3	1.00	6.9	6.69
1993	6.1	6.2	1.00	2.0	6.61
1994	6.7	6.9	1.00	2.8	6.55
1995	7.5	7.7	1.00	1.6	6.51
1996	8.4	8.5	0.94	0.4	6.48
1997	9.5	9.5	0.94	0.2	6.46
1998	10.6	10.6	0.95	0.4	6.45
1999	11.8	11.9	0.96	0.5	6.45
2000	12.8	12.8	0.88	0.3	6.44
2001	13.4	13.5	0.92	0.3	6.43
2002	14.3	14.3	0.96	0.1	6.42
2003	15.1	15.1	0.94	0.2	6.41
2004	15.9	16.0	0.92	0.2	n.a.

Source: Central Bank of Nicaragua. "n.a." = not available.

^a The proportion of foreign currency actually sold by all exporters at the parallel market rate.

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

Appendix Table 4: Value shares^a of primary production of covered^b and non-covered products, Nicaragua, 1991 to 2004

(percent)

	Bean	Cof- fee	Groun dnut	Maize	Meat	Milk	Poul- try	Rice	Ses- ame	Sor- ghum	Soy- bean	Sugar	Non- cover ed
1991	4	11	0	4	40	3	2	8	2	2	0	3	20
1992	4	7	0	5	42	4	2	10	2	2	0	3	18
1993	4	6	1	6	44	5	3	12	1	2	0	3	13
1994	6	9	1	4	43	4	3	11	1	2	1	3	13
1995	4	17	2	5	33	4	3	10	3	1	1	3	15
1996	8	11	2	7	33	5	3	9	2	2	1	3	14
1997	6	16	2	4	36	4	3	10	1	1	1	3	13
1998	9	17	2	4	34	3	3	10	1	1	1	2	13
1999	9	18	3	4	33	8	4	7	0	1	0	2	10
2000	11	14	3	5	36	8	4	6	1	1	0	2	8
2001	11	7	3	5	37	10	6	6	0	1	0	2	11
2002	9	6	3	6	40	11	5	7	0	2	0	2	10
2003	10	8	3	6	38	9	na	5	1	1	0	3	16
2004	8	6	4	5	41	na	na	5	1	1	0	3	24

^a Each row sums to 100.

^b At farmgate undistorted prices, US\$.

Source: Authors' spreadsheet

Appendix Table 5: Nominal rates of assistance to covered, uncovered and all^a agricultural products, to exportable^b and import-competing^b agricultural industries, and to agricultural tradables relative^c to non-agricultural tradables, Nicaragua, 1991 to 2004
(percent)

	Covered products	Non-covered products	Total ag NRA (incl NPS)	Exportables NRA	Import-competing NRA	All ag tradables	All non-ag tradeables	RRA ^c
1991	-8	-8	-5	-15	12	-5	7	-12
1992	-6	-7	-2	-14	13	-2	7	-9
1993	1	-1	5	-8	19	5	7	-2
1994	-15	-17	-10	-24	6	-10	7	-16
1995	-14	-19	-9	-29	22	-9	6	-14
1996	-18	-21	-15	-28	4	-15	5	-19
1997	-20	-23	-15	-33	15	-15	6	-20
1998	-16	-20	-12	-31	30	-12	6	-17
1999	-13	-15	-6	-24	17	-6	8	-13
2000	-6	-6	-1	-19	52	-1	6	-6
2001	-11	-10	-4	-20	24	-4	6	-10
2002	-8	-8	-3	-18	31	-3	5	-8
2003	-16	-14	-10	-19	0	-10	6	-15
2004	-9	-7	-2	-14	16	-2	6	-8

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

^b NRAs including products specific input subsidies.

^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