

Short-term Macroeconomic and Poverty Impacts of the Global Economic Crisis on the Ecuadorian Economy

Complete Draft - Preliminary Results

Sara Wong*

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Abstract

This study quantifies the macroeconomic and poverty impacts of the 2008-2009 world economic crisis on Ecuador, including the effects of the main policy responses of the Ecuadorian Government to face the crisis. The main hypothesis highlights the magnitude of two transmission channels: trade and remittances.

The research also presents the impacts and a summary of key policies adopted by the Ecuadorian Government to try to avoid negative impacts in the BOP and growth in the country: import restrictions. The vulnerability of the Ecuadorian economy may be particularly high given that this is a dollarized economy. The US dollar has been the official currency of Ecuador since 2000; neither exchange rate (devaluation) nor monetary policies are policy options for Ecuador to fend off the world economic crisis.

The study applies a single-country static computable general equilibrium model for Ecuador combined with a microsimulation model. Preliminary results suggest that the import restriction policy adopted by the Government did not relieve the economy from the global economic crisis, but instead –depending on the labor market assumption– may have increased negative income impacts. From a distributional point of view, the impacts of the crisis were progressive, affecting more negatively households in the highest income quintile. A key channel of transmission is the fall in capital returns and wages of skilled labor. These factors are used intensively in the oil sector, a key sector of the Ecuadorian economy, and one of the hardest hit by the global crisis. There are differentiated poverty impacts: poverty may increase if labor is assumed sector specific, and it may be reduced if labor were mobile. These results are subject to some caveats.

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* Escuela Superior Politécnica del Litoral (ESPOL), sawong@espol.edu.ec, P.O. Box 09-01-11033. Guayaquil, Ecuador.

I. INTRODUCTION

The purpose of this study is to present the impacts of the global economic crisis on the Ecuadorian economy. This study is part of an IFPRI-PEP project that analyzes the impacts of the world economic crisis on developing countries. Key aims of this project are to highlight the main macroeconomic transmission channels of the world crisis in the developing countries under study and the policy responses of their governments.

The world financial and economic crisis started in the US, whose economy showed the first signs of trouble in the housing and financial markets in 2007, and developed into a fully-fledge crisis at the end of the third quarter of 2008 with the historic bankruptcy of Lehman Brothers. The US financial crisis quickly spread, first to the economies more exposed to the toxic financial instruments and troubled real estate markets, such as Europe, then to the rest of the world bringing with it the fall of financial institutions, a halt in credit and trade, layoffs, and slower, or even negative, growth.

Developing countries have been affected in several ways, including a decrease in exports, sudden stops in capital inflows, reduced remittances, etc. Developing countries exports decrease as their foreign demand coming from developed markets slows down or stops. Capital inflows stop as international investors become very risk averse and take money home, away from foreign markets, and banks reduce leverage. As reported by the IMF, net capital flows from most emerging markets turned negative (in the net) in the last quarter of 2008, which meant that countries found it more and more difficult to finance their balance of payment needs. To avoid a BOP crisis, developing countries resorted to devaluations, import restrictions, and/or higher indebtedness. Ecuador, a dollarized economy since 2000, could not adopt a policy of competitive devaluations and followed a policy that restricted imports.

Although the financial and economic world crisis led to many interesting developments and impacts on the financial side of the economy of several countries, this study focuses on the real side of the economy. In particular, the study focuses on modelling and capturing key expected channels of transmission in developing economies, such as trade, remittances, and capital flows (FDI and aid). It also focuses on modelling distributional transmission mechanisms that arise through production, the labor market, location and regional impacts, and government responses.

In the case of Ecuador, the main hypothesis highlights the magnitude of two key channels of transmissions: trade (through a percentage fall in the prices of oil exports, fuel imports, and exports of some manufacturing export products) and remittances.

The study also presents a summary of the import restrictions, the key policy, adopted by the Ecuadorian government to try to avoid negative impacts of the crisis in the country's balance of payment and growth.

The approach used in this analysis is to combine a single-country static computable general equilibrium model for Ecuador and a microeconomic model. The micromodel helps to study poverty impacts.

The main results suggest that a key channel of transmission of the global economic downturn is trade, through a fall in the world price of a key export product (oil), and the ensuing fall in capital return and wages of skilled workers. These factors are used intensively, and with low substitutability, in the oil sector. From a distributional point of view, the impacts of the crisis (and of the crisis plus the policy response) are progressive, affecting more negatively urban households in the highest income quintile. With the crisis, poverty increases if labor is assumed sector specific, but it may be reduced if labor were mobile. The import restriction policy adopted by the Government did not shield the households from the negative impacts on their income.

The next section discusses the transmission channels. Section III describes the modelling approach and data. Section IV summarizes the scenarios and closures. Section V and VI present results, and sensitivity analysis, respectively. The last section presents concluding remarks.

II. TRANSMISSION CHANNELS

Trade, remittances, foreign direct investment, and aid are the main transmission channels through which the global economic crisis may have an impact on developing countries (Decaluwé et al 2009). Of these channels, we believe that –in the case of Ecuador– the main transmission channels are: trade flows and remittances. The vulnerability of the Ecuadorian economy may be particularly high given that this is a dollarized economy. Ecuadorian exports are concentrated on a few commodities and a few markets. Exports of oil (53%), bananas (10%), shrimp and fish (5%), and flowers (4%) represented approximately three quarters of total exports according to the annual average shares for the period 2004-2008 (see Table 1). Over 50 percent of total exports go to developed markets such as the USA and the EU, and around 18 percent of total exports go to developing country markets such as those in the fellow Andean countries and the Caribbean. The developed export markets of Ecuadorian products were hit hard by the 2008 global economic crisis.

The demand for Ecuadorian exports grew in the years 2007 and 2008 for most commodities, although for some commodities at a slower pace than in previous years (Table 1). Total Ecuadorian exports grew at an annual rate of 13 and 29 percent in the years 2007 and 2008, respectively. In 2008, the growth in exports of primary goods (oil, bananas, flowers, shrimp and fish) may explain most of the growth in exports. However, in 2009, as the global economic crisis unfolded and spread throughout the Ecuadorian export markets, the value of total exports fell by 26 percent. The bulk of the fall comes from the fall in oil export prices that decreased by almost 40% from 2008 to 2009 (Table 2). Other export commodities such as bananas, and other primary products, actually experienced an (almost normal) increase in their f.o.b. value of total exports (22% and 20% increase, respectively. Table 1).

The presence of contractual arrangements may explain in certain cases why the exports did not fall for some products. Moreover, the export demand of certain agricultural products has been characterized by its resilience in previous world economic downturns. This is the case for bananas and other tropical fruits. According to a FAO report (FAO 2009), in the 1973-75 global economic crisis the demand for bananas in the USA did not experience a fall, although it did in the European markets (-9.7%). In those crisis years, world exports of tropical fruits expanded by 13%. Similarly, in the crisis of the early 1980s, except for the exports of pineapple, the exports of tropical fruits did not decrease; and for bananas, as happened in the crisis of the 1970s, demand fell in the European countries, but not in the USA. Bananas and other tropical fruits can be deemed as products that are a “necessity”, with a low income (and price) elasticity. In addition, the market share of tropical fruits has been in expansion since the 1970s (See FAO 2009, and reference therein cited).

The fall in oil prices had a negative impact on Government finances in 2009. Oil revenues represent around 30 percent of revenues for the Government (Table 3). Despite the fall in revenues, according to the Government, social programs (such as income transfers to the poorest) and infrastructure spending did not suffer cuts in 2009, nor did subsidies (such as the subsidies for the consumption of gas for domestic cooking and for diesel). Income transfers are an important income source for the poorest households in both urban and rural areas (Table 4).

At the same time the fall in oil prices meant a reduction in the world price of fuel. This is another trade channel that may have an impact on the Ecuadorian economy, as Ecuador imports fuels. A lower world import price of fuels means a reduction in the value of fuel imports for Ecuador (Table 5). As mentioned in the previous paragraph, there is a subsidy for the consumption of fuels in Ecuador that comes through a fixed domestic price for the consumption of certain fuels. When the world oil price is high the subsidy increases, and when the world oil price falls this subsidy decreases –alleviating the Government budget on the expenditure side (Tables 5 and 6).

On the trade side, a fall (-22%) is also noticeable in the f.o.b. value of manufacturing exports in 2009 (Table 1). It is the first time, since the US dollar was adopted as the Ecuadorian currency in 2000 that the value of total manufacturing exports has fallen. Apparently, in most cases a key component of this fall in value is a fall in price (unit value). Most of the manufactured export products represent a small share in total exports, ranging from a 0.01% share in total value of exports (meat products, dairy products, milling, and beverages) to a 2.2% share (transport equipment) in 2008. One exception is fish products

that made up almost 9% of the value of total exports in 2008. Its unit value fell by 11%, and its volume by 1%, for a total fall in value of fish product exports of 12% in 2009. See Table 8a.

Another transmission channel of the global crisis is remittances. According to data from the Central Bank of Ecuador, remittances fell by 9 percent in 2008 with respect to the previous year. In 2009, remittances fell during the first, second, and third quarter (-27, -14, and -7 percent, respectively with respect to similar periods in 2008), but recovered somewhat in the last quarter of 2009 when they grew by 5 percent, reaching a total annual fall of -12 percent (Table 7). Remittances represent around 6 percent of total GDP. The main sources of remittances for Ecuador are the USA, Spain, and Italy.

As shown in Table 4, remittances may be an important source of income for some low income households, representing 7% of total income for households in the lowest income quintile in urban areas, and they finance consumption (including housing). From the point of view of poverty, the fall in remittances may have a significant impact.

Ecuador has not been the recipient of great inflows of foreign direct investment. FDI reached 3% of GDP in 2004, approximately 1% of GDP in the years 2005-2006, 0.4% of GDP in 2007, and 2% of GDP in 2008. The usual recipients of FDI in Ecuador are the oil and mining sector, and telecommunications. In 2005, FDI represented 1.3 percent of GDP of which 40 percent went to the oil and mining sector (see Table 9, and see also the data section). Since 2004, the main countries of origin of FDI for Ecuador have been Mexico, European countries, and Asian countries (such as China). (See Table 10).

Aid is not an important source of income for Ecuador. Ecuador is not a recipient of important aid flows.

The fall in economic activity in some export sectors and some import sectors has brought about an increase in unemployment. According to data from the Central Bank of Ecuador (see Table 11), unemployment rates have increased since the year 2007 (6.34 percent), reaching 7.9 percent in 2009 (measured in December of each year). Fewer jobs, in a country where unemployment insurance is not a common practice, may increase poverty and/or lead to more informal jobs (underemployment).

Given the SAM and model available it is possible to capture the main transmission mechanisms identified in this section: (i) trade flows and commodity prices, namely a fall in world oil and fuel prices, as well as a fall in the export price of key manufactures (fish products), and (ii) a decrease in remittances. Key export sectors are separate in the SAM. Oil is a separate sector, although this sector includes both oil and fuels. The SAM also presents fish products as a separate sector. Remittances are included in the SAM.

III. MODEL AND DATA

This study implements a single-country Computable General Equilibrium model based on Lofgren et al (2002). This is a static model that assumes perfect competition, rational behaviour in households, and no money illusion (quantities are homogenous of degree zero with respect to prices). The main sections of the model include production and trade, income and institutions (agents), prices, and equilibrium. The model is programmed in GAMS.

The CGE model of Ecuador comprises 27 sectors: 8 primary (agriculture, fish, and forestry sectors), 16 extractive and manufacture sectors, and 3 service sectors.

At the top of the production module, technology is modeled by a Leontief function of value added and aggregate intermediate input. Value added is a CES function of primary factors (labor, capital, and land) and the aggregate intermediate input is a Leontieff function of disaggregated intermediate inputs. Substitution between main factors of production in the value added function differs among sectors. In particular, in the oil sector this elasticity is lower (0.2) than in other sectors (where it ranges between 0.60 to 0.95) reflecting the idea that, in the oil sector the factors are highly specialized. See Table A2-1, in Annex 2.

Domestic output may be sold in the market or consumed at home. Marketed outputs are imperfectly substitutable under a CES function. Activity-specific commodity prices clear the implicit market for each disaggregated commodity.

Aggregated domestic output is allocated between domestic consumption and exports through a CET function. The values of the CET elasticities used in the model are shown in Table A2-1 (Annex 2). The values of these CET elasticities are borrowed from other studies. Section VI summarizes results of a sensitivity analysis on the CET elasticities. Export demands are infinitely elastic at the world export price.

Using a CES function, aggregate imported commodities and domestic output are imperfect substitutes in demand (Armington assumption). World import prices are taken as given. The Armington elasticities applied in the model are listed in Table A2-1 (Annex 2). Most of these elasticities are own estimates for Ecuador.

Export and import functions imply the assumption of a small open economy, that is, Ecuador is a price taker in the world markets.

In the income and institutions module, the main agents include households, enterprises, the Government, and the rest of the world.

Households get income from factors and transfers from other institutions. Consumption income is the residual after paying taxes, savings, and transfers to other institutions. Households' disposable income is spent according to a Linear Expenditure (LES) demand function derived from a Stone-Geary utility function. Commodities may be purchased from the market or consumed directly by the household-producer.

A representative producer in each industry (activity) maximizes profits, subject to technology and taking prices as given. They can also get transfers from other institutions. Their total income may be allocated between direct taxes, savings, and transfers to other institutions.

Total government revenue is the aggregate of tax income and transfers from the rest of the world. The Government spends this income on purchasing commodities, and transfers to other institutions. Government consumption is fixed in real terms while transfers to domestic institutions are CPI-indexed, and savings is a residual.

Foreign savings is the difference between foreign currency spending and receipts. Depending on the closure that is used, the trade balance may be fixed or flexible.

Household direct taxes are defined as fixed shares of household income. The rest of taxes are at fixed ad valorem rates. The treatment of taxes may vary according to the closure rule. Taxes may either be held at fixed rates or varied through two alternative mechanisms: uniformly increased by a certain, endogenous, amount of points for selected institutions or endogenously scaled for selected institutions.

Factor returns may vary across activities to accommodate potential influences arising from exogenous causes. There can be three alternative closure rules for factor markets: one in which supplies are inelastic and returns clear the market (full employment), one in which there is elastic supply and the employment level clears the market (unemployment), and one in which there are segmented markets and activities are forced to fully employ their specific factor.

In the set up of the Ecuador model there are three factors of production: land, capital, and labor. Labor is further classified in six different labor market segments: urban-skilled wage labor, urban-unskilled wage labor, rural-skilled wage labor, rural-unskilled wage labor, urban self-employed workers, and rural self-employed workers.¹

This study follows standard procedures for calibrating parameters and elasticities of a CGE model. To the extent that they are available, this study uses econometric estimates of

¹ Skilled wage labor is wage workers with more than primary education. Unskilled labor is wage workers that have primary, less than primary, or no education.

elasticities for Ecuador (See tables A2-1 and A2-2 in Annex). The calibration procedures include checks such as tests for data replication, tests for parameter weights, Walras' Law, etc.

The study combines this CGE model with a microsimulation model to address poverty effects of the crisis and the crisis plus policy responses. The microsimulation model includes three main equations: wage income, other household's earnings, and an occupational choice equation (See Bourguignon, Robilliard and Robinson (2003)). The coefficients of the regressions are significant and have the expected signs.

Data

The Social Accounting Matrix available and currently calibrated in the Ecuador model is for the year 2004. The original SAM is from the Central Bank of Ecuador, but it was modified to account for the European Union as a separate region for trade, to show land as a separate factor of production (See Wong and Kulmer 2009), and to separate out the subsidy on fuels. The sectors and the trade data in the SAM are disaggregated sufficiently enough to capture the proposed shocks and simulations in key activities and products for the Ecuadorian economy.

There may be concerns as to the use of the year 2004 as the base year, given that the shocks have indeed happened at the end of the year 2008. The Ecuadorian economy in 2007-2008 is certainly not identical to the one in 2004. One key feature may be the difference in oil prices –and oil revenues for that matter– as already shown in Tables 2 and 3. However, a comparison of the 2004 SAM data on exports, imports, remittances, and FDI against data for years 2005-2008 shows the following.

In 2004, for imports, and by sectors, most of the changes in imports stay below 20%, except for two sectors. These sectors are fuels (liquefied petroleum gas, gasoline, diesel; with an 11% share of total imports in 2004) and transport equipment (with a 9% share of total imports in 2004). Although Ecuador is an oil-exporting country, it imports almost all fuels consumed domestically. This sector shows an increase of over 64% in imports of fuel from 2004 to 2007. This increase may be explained by the increase in prices rather than by (or more than by) an increase in quantities imported. However, the increase in fuel prices is not passed down to Ecuadorian consumers as an increase in domestic fuel prices. This is because the Ecuadorian Government subsidizes the domestic fuel price (that is, Ecuadorians pay fixed prices for diesel, gas for cooking, and, with some variability, for gasoline). The other sector that shows a considerable increase in imports from 2004 to 2005 is transport equipment, with a 42% annual increase in imports in that period. This may be explained in part by new credit plans for car purchases. With a stable dollarized economy, car import companies and banks started plans to give incentives for car buyers.

On the export side, export shares by commodity have not varied drastically since 2004 (as seen in Table 1), although the oil sector –that is, exports of crude oil– shows an important increase in exports, with a 40% annual increase from 2004 to 2005. The share of oil exports in total exports in 2004 was 50% and in 2008 it reached 57%. Oil revenues, which all go to the Government, have accordingly increased. However, as a share of total government revenue, the oil revenue was 30% in 2004 and 34% in 2008. There are a few other sectors that show some important increases in exports (above 20%), but each of these sectors represents a small share in total exports. These other sectors are forestry (49% increase, and a 0.1% share), dairy products (57% increase, and a 0.004% share), milling (230% increase, and a 0.1% share), minerals (44% increase, and a 1.1% share), transport equipment (104% increase, and a 0.9% share), and machinery (50% increase, and a 1.4% share of total exports in 2004).

Regarding remittances, the SAM 2004 was actually constructed taking into account 2005 data for remittances. Totals for remittances are not far off from the real data reported for 2005. Remittances were 6% of total GDP in 2004 and reached 5% of total GDP in 2008. (See Table 7).

In summary, we expect the choice of the year 2004 as the base year not to create severe distortions in the results.

IV. SCENARIOS AND CLOSURES

There are two main types of simulations. Scenarios A include only the expected shocks of the crisis on the Ecuadorian economy –as identified in the previous section. Scenarios B include both the expected shocks and policy responses of the Government to avert the crisis. In each type of simulation there are three different combinations of values for the shocks (as summarized below). The simulations also perform a sensitivity analysis based on the CET parameter.

Scenarios A: Shock hypotheses

Both the fall in oil export prices (-39%, see Table 2) collected by the Government and the fall in the fuel import prices (-33%, see Table 6) purchased by the Government of Ecuador are definitely linked to the global financial and economic crisis. Given the trend in manufacturing exports and remittances, the fall in manufacturing exports and the fall in remittances could also be attributed to the crisis. From 2008 to 2009, manufacturing exports fell 22 percent (see Table 1), while in previous years these exports had an annual growth rate ranging from 15 to 30 percent. Within manufacturing sectors in particular, Table 8a shows an 11 percent fall in the unit value of exports of fish products from 2008 to 2009. Remittances fell 12 percent during the same period, and fell 9 percent from 2007 to 2008. It is the first time that remittances fall in Ecuador since dollarization started (Table 7).

According to the data presented and the trend observed –in growth and shares– in recent years, the hypotheses regarding the magnitude of the changes in those variables are:

- A fall of 30 percent in world (export) prices of crude oil
- A fall of 25 percent in world (import) prices of fuels
- A fall of 10 percent in remittances
- A fall of 10 percent in the world (export) price of fish products

Alternatively, this study sets up two other different scenarios with weaker values for the fall in those indicators. Table 12 summarizes the shock scenarios.

The fall in the price of crude oil, fuels, and fish products are modeled as reductions in the world price of those commodities. In the model, world prices are taken as given, as the economy is assumed to be small and open. In the case of crude oil and fish products, the price corresponds to the infinitely elastic world demand (world export price) for those products. Similarly, for the case of fuels, the price corresponds to the infinitely price-elastic world supply function of imports. Remittances are modeled as a reduction in the transfers from foreign accounts (the USA, the EU, Rest of the World, and the Andean Community) to the (urban and rural) households in Ecuador. Rural and urban households are classified by income quintile.

Scenarios B: Policy responses

As stressed in a previous section, the crisis has affected the Ecuadorian economy through trade channels –rather than through a reversal of capital flows. A balance of payment crisis would mean deep troubles in the real sector with unimaginable economic and social consequences for Ecuador, in particular given that this is a dollarized economy. In fact, trade flows were also a key channel of transmission in other Latin American economies. Although, in addition to that, in Brazil, Chile, and Peru, some financial turmoil was also felt (ECLAC 2009a).

To fend off the crisis, a series of policy measures were adopted by countries worldwide, including devaluation, reduction in taxes, increase in subsidies, increase in government spending, increase in tariffs, labor policies, social policies, higher indebtedness, etc (see ECLAC 2009b for a summary of the policies adopted by Latin American countries). Of these policies, competitive devaluations and higher tariffs raised fears of a turn back to a

protectionist era. Some Latin American economies resorted to devaluation (See Figure 1), but neither exchange rate policy nor monetary policy are policy options for Ecuador.

Countries where nominal devaluations clearly happened at the onset of the crisis (October 2008 until approximately March 2009) include Brazil, Chile, Colombia, Mexico and Uruguay (ECLAC 2009a). Some of the countries whose currencies devaluated, for example Colombia, are key trade partners of Ecuador.

Fiscal policy may be a policy option available for the Government of Ecuador. However, a study by the World Bank pointed out Ecuador as one of the countries with the highest index of constraints to implement counter-cyclical fiscal policies (Ecuador is just behind Venezuela in the ranking of this index that includes six other Latin American countries; see de la Torre 2009). This study also shows Ecuador as one of the countries with the highest aggregate index of lack of space for fiscal stimulus (again, Ecuador is just behind Venezuela in the ranking of this index that includes six other Latin American countries; see Calderón and Fajnzylber 2009).

The Government of Ecuador vowed not to reduce expenditure on social and investment programs, nor was the Government willing to lay off public servants (amongst the Latin American countries analyzed in the World Bank study, Ecuador and Bolivia show the largest contribution of public wages to mandatory spending; see Calderon and Fajnzylber 2009, p. 104). Government expenditures were not reduced, and government revenues fell abruptly at the end of 2008 which showed up as a deficit in the consolidated non-financial public sector, for the first time since dollarization was adopted in Ecuador (Table 13). A fiscal rule that kept government expenditures at bay was eliminated by the current Government. Similarly, as fate would have it, an oil fund that set aside the windfalls of the oil prices was closed and the funds used up. The last reserves of this oil fund are supposed to have helped the Government to navigate the economy through the crisis when it started.

On the tax side, the Government established a tax on outflows of capital (dollars that are paid or sent abroad had to pay a 2% tax of the total amount paid or wired), and was proactive in collecting VAT and income taxes. The Government did not raise any existing income or VAT tax rate. The income tax revenue, although it has been growing as a share in total revenues, is still not enough to make up for a fall in oil revenues of the magnitude felt in 2009.

Given these policy constraints, the main policy response adopted by the Government of Ecuador –to avoid the negative consequences of the world economic crisis– was to impose restrictions on imports of 627 tariff lines (in addition to any existing tariffs on these lines. See Table 14).

The goods with new ad-valorem tariffs comprise sugar products, beverages, other food products, wood and wooden products, chemicals, rubber and plastic, metallic and non-metallic products, and machinery and equipment and other manufactured goods. Specific tariffs were reserved only for textiles and apparel, leather products, and footwear, and some metallic and non-metallic products (ceramics). Quotas include a broader spectrum of products that range from agricultural food products to heavy manufactures (see Table 15).

The same day the Government published the list of products subject to higher ad-valorem tariffs, specific tariffs or quotas, the Government announced that the quotas were distributed to enterprises. The same publication with the tariffs and quotas included the distribution of the quota by HS line and firm, with a total value for each firm. In principle, each firm received a quarterly quota, but then the quota was made more flexible, although still subject to the annual maximum value established by the Government for each firm (see Table 16).

To ward against loss of competitiveness vis-à-vis Colombian products –given the nominal devaluation of the Colombian peso (as shown in Figure 1)– the Government announced in mid 2009 an additional list of tariff lines subject to import restrictions that applied to products coming from Colombia (1346 tariff lines). These trade restrictions were disputed by Colombia which sought to maintain its trade preferential partner status as an Andean Community member throughout the crisis. However, the WTO ruled in favour of Ecuador, allowing it to impose temporary import restrictions on Colombian products (an exchange rate

safeguard). See Table 17. The additional import restrictions on Colombian products were short lived.

Whether the import restrictions were indeed effective is an issue that deserves careful examination, but that is beyond the scope of the present study. Import data shows that the value of (c.i.f.) imports fell by 19 percent in 2009, with similar rates of decrease in the value of consumption (-21%), inputs (-22%), and oil (-22%) products. Imports of capital goods decreased 14 percent in value in that year. However, the total quantity imported fell only by 1% (See Table 18). To implement the scenarios with the policy response of import restrictions, nominal tariff equivalents of the specific tariffs and the quotas were estimated. Then, a simple average of the tariff lines, aggregated by the SAM product classification (so as to be able to apply the average in the CGE model simulations), was calculated. Alternatively, a trade weighted average was also calculated, yielding similar values for the nominal tariffs. Finally, applied tariffs were calculated for all SAM sectors, by regions, based on existing factors in the SAM. For the Andean Community, which before the crisis had zero-tariff trade with Ecuador, the study applies alternatively two sets of applied tariffs: one higher (those corresponding to the USA) and one lower (tariffs corresponding to the Rest of the World). Table 19 summarizes both the applied tariffs in the baseline and the new applied tariffs. Annex 1 explains further the calculation of the applied tariffs used in this study.

Closure rules

The following closures reflect both the relevant conditions in the Ecuadorian economy before the shocks and the expected mechanisms by which trade may have a short-term impact on the economy.

Concerning the external balance, as the Ecuadorian economy uses the US dollar as its official currency, the nominal exchange rate is fixed. This study does not adopt the usual closure in which the current account is assumed fixed, so as to avoid the “free lunch” effect that arises (in a static model) if the foreign savings were allowed to adjust to fill the current account gap. Instead, the study allows the current account to vary, as it is difficult to justify a fixed current account in an economic environment that implies adjustments in the main components of the current account (trade flows and remittances) –given the focus of the study on short-term impacts. According to the latest balance of payment data, the current account actually turned from positive (in 2008) to negative (in 2009) (Table 20). The consumer price index is the numeraire.

For the Government closure, all the tax rates (for households and enterprises) are fixed and government savings vary. Government consumption is fixed in real terms (or as a share of total absorption).

Regarding the savings-investment closure, this study assumes that it is a balanced investment one. In this closure, both nominal absorption shares of investment and government consumption are fixed at base levels (flexible quantities). The residual share for household consumption is also fixed at base levels (flexible quantities). There is a uniform marginal propensity to save (MPS) point change for selected institutions.

As per factors markets, this study assumes that land is not mobile to capture the notion that crops can only be cultivated in land with some agro-ecological requirements, unique for each type of crop (for instance, land that is used to cultivate rice cannot be used to cultivate bananas). Capital is assumed sector specific to reflect the short-term nature of the focus of this study.

The closure rules vary according to the three types of additional assumptions regarding factor markets: (i) full employment of all factors and factor returns adjust to clear the markets (the classical trade model closure), (ii) unemployment in the unskilled salaried labor market segment, both rural and urban –a feature expected to be common in most of the Latin American economies (the classical development theory closure, pointed out by Winters 2000) – while the rest of factor markets clear through changes in returns, and (iii) sector-specific skilled labor, to analyze the very short-run impacts of the crisis and policy responses, and to capture the notion that when a key economic sector with highly skilled factors that are not easily transferable is hit –such as oil- the economy may suffer stronger impacts (at least in the very short run).

V. RESULTS

As expected, given the fall in key export prices, in both set of scenarios (the scenarios with shocks, and the scenarios with shocks plus policy response), total demand for *exports* falls (between -0.84 to -2.36%, Table 21), although there are differences in performance by sectors: some key sectors still grow (bananas), while others fall for the first time in years (flowers, fish). Table 22.

Imports behave differently depending on the scenario. In contrast to the scenarios with only shocks, in the scenarios with shocks plus import restrictions as a policy response, both *imports* and *fixed investment* decrease. Total imports fall between -0.76 to -1.26%, depending on the depth of the shock and the set of new applied tariffs used by region. Similarly, total fixed investment falls between -0.13% to -0.35% (Table 21). As expected, the largest fall in imports happens in the most protected sectors (beverages -13% to -23%, textiles and apparel -10% to -13%, milling 0.84% to -7%) (Table 23). The scenarios with the set of higher tariffs used for the Andean Community show the larger effects on import reductions. The magnitude of the reductions in quantity of imports, in sectors with the highest new tariffs (beverages, textiles, and milling), are along the lines of what we observe in real data (compare Table 23 and Table 8b).²

Given that the model is static, with perfect competition, there are small changes in real GDP (in most of the scenarios it is slightly negative -0.01% to -0.13%, see Table 21). However, Table 24B and Table 24C with results from the scenarios with shocks plus import restrictions show that value added by sector increases more in manufacturing sectors that receive protection through higher tariffs (if the set of applied tariffs for the Andean Community corresponds to those of the USA: beverages 2% versus 0.6%, and textiles and apparel 2.14% versus 0.73%), but, at the same time, its growth turns negative in some other protected sectors: transportation equipment (-0.31%), and machinery equipment and other manufactured goods (-0.68%).

In the scenarios with labor mobility that include shocks plus policy response, factor income seems to decrease more or increase less than in the scenarios where only the shocks take place, in particular when the set of higher applied tariffs for the Andean Community is the higher set (that of the USA). The new tariffs imposed as a response to the world crisis did not shield skilled wage workers (and capital) from negative impacts on their wages (returns) (Table 25).³

Similarly, in the scenarios that include the shocks plus the policy response, households' income decrease more or increase less than in the scenarios where only the shocks take place. This is more so, the higher the new (non-zero) applied tariffs for the Andean Community region. In either case (scenarios with shock, and scenarios with shock plus policy response), households in the upper quintile of income (in both rural and urban areas) are hit more negatively: their income decreases more than the decrease in income obtained for the rest of households, as shown in Table 26.

An explanation with respect to why the crisis has affected more negatively the skilled wage labor, capital, and the income of households in the upper income quintile may lie in the economic activities that the crisis affected (export and import activities, and the oil sector), and in the policy response adopted by the government (import restrictions). Lower oil prices affect negatively the returns of factors used more intensively in this hard hit sector: capital and skilled labor. These factors are assumed to have low substitutability (lower than in any

² In a scenario that seems comparable, Duran et al (2010) also find small negative effects of the restrictive trade policy measures (although they only include data for trade partners other than Latin American countries) on GDP (-0.90%), imports (-1.50%), exports (-1.50%), and investment (-0.50%). The fall in consumption these authors find (-0.90%) is somewhat larger than the fall we find in our results (ranging from an increase of 0.48% to a fall of -0.17% in private consumption).

³ The direction and magnitude of the results is similar in both, the scenarios that assume full employment and the scenarios that assume unemployment amongst unskilled wage workers. If any difference, with unemployment, the fall in factor returns is slightly lower and the increase slightly higher. The results in labor income will later help to explain the poverty impacts of the crisis and of the crisis plus the policy response.

other sector. See Table A2-1) so that any negative shock in the world price of the output produced in the sector that employs them would lead to a downward adjustment in the price of these factors, particularly because the oil sector is a sector whose domestic output price is set by government regulation. The fact that households in the highest income quintile own these factors should explain the highest fall in the income of this type of households.

If instead we assume that skilled labor is sector specific, an assumption that is consistent with very short-term impact adjustments, there may be even more negative impacts in factor returns and households' income. Tables 27 and 28 confirm these results.

Other factors may also contribute to the observed fall in households' income, among these the notion that the economic activities of households that have a higher income level may concentrate on trade (exports and imports) and commerce (domestic trading). In rural areas, farmers with higher income are usually the ones whose production is oriented to export markets, in particular those in the coastal areas (although in the highlands, flowers is a key export activity). In urban areas, coastal cities such as Guayaquil depend heavily on commerce activities. Higher tariffs and quotas adopted by the Government as a response to the crisis led to a decline in commercial activities. Recent unemployment data shows that Guayaquil was one of the hardest hit cities in terms of the rise in unemployment rates in 2009.

Table 29 shows percentage changes in employment, for the scenarios that assume unemployment in the unskilled wage labor market (with perfect labor mobility). In urban areas, with the shock plus the policy response of import restrictions, there is a fall in employment (scenarios B2 and B3), or less growth (scenario B1), among the unskilled wage workers (when using the set of higher applied tariffs for the Andean Community). In contrast, the results with only the shocks show that employment increases (scenarios A1-A3).

As opposed to the scenarios with mobile labor, if skilled labor is assumed sector specific, the shocks lead to a fall in employment across all scenarios (A1-A3) ranging from -0.16% to -1.16%. The largest fall is observed in urban areas, in the scenarios with shocks plus policy response of import restrictions. If labor were sector-specific, there is a lower fall in employment for the skilled labor in both urban and rural areas, than that observed in the scenarios with only crisis. The magnitude of this fall in employment is along the line of the observed real data (compare Table 29 with Table 11).

It seems that, depending on the degree of labor mobility, the shocks may have a bigger or lesser effect increasing negative impacts on employment when labor is sector specific, but reducing negative effects on employment when labor is mobile.

In any case, the results show that the crisis was progressive, affecting more negatively households in the highest income quintile. The scenarios with shocks plus import restrictions show that the policy response did little to ameliorate those negative impacts.

It is worth mentioning that the simulations were also performed excluding the fall in remittances (these results are not shown in the tables, but are available upon request). Comparing these two sets of results there is no noticeable impact from the fall in remittances –at least on an aggregate level. According to a recent study on the impacts of the world economic crisis on remittances to Latin America and the Caribbean (Orozco 2009), the Ecuadorian immigrants who sent remittances seem to be comparatively less affected than others in terms of the amount of remittance sending –at least in the period 2008 and 2009. Over 70 percent of remitters maintained their sending levels in that period.

Poverty impacts

The results on factors' returns and employment and households' income (by income quintile) give us an indication of what the poverty impacts may be, and how the poverty impacts may vary depending on the labor market assumptions.⁴

⁴ The poverty analysis focuses on the scenarios with the largest shocks (A1) and its corresponding set of policy response (import restrictions) scenario (B1).

When *skilled labor is assumed sector specific*, the world crisis shows negative impacts on the poor: extreme poverty increases 0.14% under full employment and 0.36% under unemployment for unskilled wage workers, poverty increases 0.40% with full employment and 0.63% with unemployment (Table 30).⁵ Rigidities in the labor markets that show up as employment reductions amid the world economic crisis (Table 29) contribute to explain the increase in poverty incidence. Under the scenario of sector-specific labor there was also a larger reduction in income for households in the lowest income quintile (-1.68%, assuming full employment, and -2.12% assuming unemployment for unskilled wage workers) than when labor is mobile (-0.33% with full employment, and -0.21% with unemployment); compare Tables 26 and 27. The inefficient allocation of resources that the sector-specific assumption implies should explain the larger reductions in income.

On the contrary, when *labor is mobile*, employment does not fall with the crisis, instead it increases –albeit slightly (Table 29). Not surprisingly, when labor is mobile the world economic downturn does not bring significant poverty increases. Instead, extreme poverty falls (-0.10% if full employment is assumed, and -0.20% if unemployment) and poverty barely has any change (0.01% with full employment, and -0.03% with unemployment).

The policy response of import restrictions does help to slightly reduce (but does not eliminate) poverty increase when *labor is sector specific*: extreme poverty would increase 0.13% if full employment, or 0.33% under the unemployment assumption, and poverty would increase by 0.35% with full employment or 0.59% with unemployment. The import restriction policy, by holding on to domestic opportunities of employment in sectors directly hit by the world crisis (manufactures) –at least in the short-run- helps to slightly reduce the negative impacts of the crisis on poverty.⁶

However, when labor is *mobile*, the policy of imports restrictions may interfere with the slight reductions in poverty observed in a world economic crisis scenario. Imports restrictions impose a distortion in the allocation of resources that showed as a lower gains in employment or even reductions in employment, particularly in urban areas, which could help explain the results in poverty (extreme poverty fall only by -0.15%, and poverty increases by 0.01%, when assuming unemployment for unskilled wage workers). Even when the assumption is full employment –and adjustments cannot come through changes in employment- poverty falls less if the policy response to the crisis is imports restrictions (extreme poverty falls by -0.07% and poverty increases by 0.01%). See Table 30.

VI. SENSITIVITY ANALYSIS

This section includes simulations with upward (20% and 25% higher) and downward (20% and 25% lower) values for the CET elasticity parameter, which is the elasticity that shows the export responsiveness to changes in the relative price of exports and domestic production. The value of this elasticity at the base is shown in Table A2-1 in Annex 2. The applied closure is the same as that in the main model explained in Section IV.

The main results of the CET sensitivity analysis highlight an asymmetric response of exports to changes in the sensitivity of export demand. When the scenarios run with a more inelastic CET elasticity (20 or 25 percent cut), exports that increased in the scenarios with the original CET parameters now increase even more, and exports that fell in the original scenarios now fall less. This effect on exports is largest the larger the cut in the value of the CET elasticity. On the other hand, when there is a more elastic CET elasticity (20 or 25 percent increase), exports that originally increased now increase less, and exports that originally fell, now fall by more. This would imply that during the current economic crisis, which has led to fall in world export prices, we would expect a larger fall in exports in those sectors with more elastic CET elasticity, such as in the oil sector (See Table A2.1, in Annex 2). The results confirm this implication.

On the import side, there are no noticeable changes in imports due to changes in the CET elasticity. Similarly for other variables in the aggregate, there are no noticeable changes in

⁵ Extreme poverty uses the one-dollar-a-day poverty line, poverty the two-dollar-a-day poverty line.

⁶ Recall that with an import restriction policy, when labor was assumed sector specific, employment for unskilled wage workers fell less in both urban and rural areas.

consumption, fixed investment or GDP with a more inelastic or more elastic set of CET elasticities.

As per factor returns, with lower CET elasticities, there are no differences with respect to the percentage changes in factor returns in the original set of simulations, except for those returns corresponding to both self-employed labor, which now increases by less, and capital, which now falls by less. This is compatible with the lesser impact on exports in the oil sector observed with a lower CET elasticity when oil prices fall. The opposite happens when there is an increase in the CET elasticities. Returns to self-employed increase by more and returns to capital fall more than in the original scenarios (with the original set of CET elasticities). This is in line with the developments in the oil sector. With higher CET elasticities, and oil prices falling, there is a larger fall in export in this sector, which would lead to a higher fall in the return to capital (with respect to changes in the scenarios with the original set of CET elasticity values).

More on the distributional side, with a lower CET elasticity there is a lower fall in the fall of households' income in the highest income quintile. The larger the cut in the CET elasticity, the smaller the fall in the household income. If there is an increase in the CET elasticity, the fall in the household income in the highest income quintile is larger. These results again are consistent with the larger fall in the returns to capital observed with a set of larger CET elasticities.

VII. CONCLUSIONS

This study tries to measure differences in economic impact stemming from different scenarios, as a result of the world economic crisis. The study analyzes two key transmission channels of the crisis: trade and remittances. The scenarios with shocks include these transmission channels: a fall in the world prices of oil and fish products –both are key export products of Ecuador–, a fall in the world import price of fuels, and a fall in remittances. The scenarios with shocks plus policy response add to the shock scenarios higher tariffs in selected products by regions (USA, the EU, the Andean Community, and the Rest of the World).

These different scenarios suggest that, in general, the *crisis* had some negative impacts on the economy: in real terms total exports and value added fell, household incomes fell, and also return to capital and wages for the skilled wage workers fell. The fall in the world export price of the most important export product of Ecuador, oil, brings about a fall in the return of the factors most intensively used in the sector: capital and skilled wage labor. The fall in returns of these factors is larger when skilled labor is assumed sector specific (as it would be expected in a very short-run analysis).

When the effect of *import restrictions* is added to the shock scenarios, not only do exports and value added fall, but also imports and fixed investment, more so the higher the increase in the tariffs.

On the distributional side, both in the scenarios with crisis and with crisis plus policy response, the fall in the incomes of households in the highest income quintile and skilled wage labor is larger. The results suggest that income impacts of shocks depend on the nature of the policy adopted in response, and that the crisis and the imports restrictions were progressive.

The results analyze differences depending on labor market assumptions (unemployment or not), and differentiate between urban and rural impacts, and among different segmented labor markets. When unemployment in the unskilled wage labor market segment is assumed, the results in aggregate variables are not much different, but they highlight the fall in employment of labor amongst the *urban* unskilled wage workers.

A fall in employment happens when the shocks are combined with a policy response of increase in tariffs. It also happens when skilled labor is assumed sector specific in both the scenarios with shocks and with shocks plus import restrictions. However, in contrast with the scenarios that assume labor mobility, when skilled labor is assumed sector specific, scenarios with shocks *and* increases in tariffs show less fall in employment than the scenarios with just shocks: higher tariffs may serve as a cushion that prevents some unskilled wage workers

from losing their jobs, at least, in the very short term. Nonetheless, the scenarios with labor mobility show employment gains, despite the crisis, and despite the crisis plus import restrictions. The assumption on labor markets helps explain the poverty impacts in both scenarios, of the crisis and of the crisis plus import restrictions. With the crisis, poverty increases if labor is assumed sector specific but it may be reduced if labor were mobile.

A CET sensitivity analysis highlights an asymmetric reaction of exports. Exports are more responsive (fall more) to fall in world export prices when CET elasticity is larger. On the contrary, when the CET elasticity is lower, exports fall less when prices fall.

These results play out factors that the Government should take into consideration when devising a policy response to shocks:

- (i) The nature of the shock: which sector is being hit the hardest and how (exporter or importer, through prices or quantities, etc.),
- (ii) The type of adjustment expected in the labor market: is it short-term, medium-term, are there rigidities? In a dollarized economy it is important to try to make labor markets more flexible, by eliminating rigidities that may make any adjustment period more painful in terms of losses in employment,⁷
- (iii) Distributional impacts: are the shock and policy responses regressive or progressive?, and
- (iv) Responsiveness to changes in prices (elasticity in factors of production, exports, etc.).

It is important to notice that the results of this study are subject to some caveats: a) the results depend on the closure adopted, b) it is hard to calculate a "right" applied tariff (when simulating the policy response of import restrictions), and c) the results come from a static CGE model.

Further interesting research would be to simulate the impacts of the world economic crisis on poverty in Ecuador. According to Acevedo et al (2009), Ecuador (along with Mexico) are the countries with the largest projected losses in per capita GDP for 2009 with the potentially negative impact that that may have on poverty indicators for this country.

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⁷ Recently, the Government enacted a law that eliminated labor contracts by hour in most of the economic activities, making the labor market less flexible.

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Table 1.- Ecuador: Exports by type of product

Year	Total exports	Total primary	Commodities					Total manufactures
			Oil	Banana	Shrimp & fish	Flowers	Other primary	
Thousand of FOB US\$								
2004	7,752,892	6,024,637	3,898,508	1,023,610	363,994	354,817	383,707	1,728,254
2005	10,100,031	7,852,539	5,396,840	1,084,394	506,914	397,907	466,484	2,247,492
2006	12,728,243	9,829,484	6,934,010	1,213,489	649,889	435,842	596,254	2,898,759
2007	14,321,316	10,637,660	7,428,356	1,302,549	708,876	469,424	728,455	3,683,656
2008	18,510,598	14,262,180	10,568,327	1,639,400	787,553	565,662	701,239	4,248,418
2009	13,762,276	10,459,281	6,284,100	1,994,915	794,156	545,801	840,310	3,302,995
% share								
2004	100%	78%	50%	13%	5%	5%	5%	22%
2005	100%	78%	53%	11%	5%	4%	5%	22%
2006	100%	77%	54%	10%	5%	3%	5%	23%
2007	100%	74%	52%	9%	5%	3%	5%	26%
2008	100%	77%	57%	9%	4%	3%	4%	23%
2009	100%	76%	46%	14%	6%	4%	6%	24%
2004-08	100%	77%	53%	10%	5%	4%	5%	23%
Growth rate								
2004	-	-	-	-	-	-	-	-
2005	30%	30%	38%	6%	39%	12%	22%	30%
2006	26%	25%	28%	12%	28%	10%	28%	29%
2007	13%	8%	7%	7%	9%	8%	22%	27%
2008	29%	34%	42%	26%	11%	21%	-4%	15%
2009	-26%	-27%	-41%	22%	1%	-4%	20%	-22%

Source: Central Bank of Ecuador and own calculations.

Table 2.- Ecuador: Oil export prices and quantities

Year	Export Price		Volume Exported	
	US\$	% change	Number of barrels	% change
2004	30.13	-	192,315	-
2005	41.01	36%	194,172	1%
2006	50.75	24%	195,523	1%
2007	59.86	18%	186,547	-5%
2008	82.95	39%	184,727	-1%
2009	50.94	-39%	177,408	-4%

Source: Central Bank of Ecuador and own calculations.

Table 3.- Oil revenues

Year	Million of US\$		
	Total revenues	Oil revenues	% share
2004	5,179	1,558	30%
2005	6,052	1,567	26%
2006	6,895	1,719	25%
2007	8,490	1,764	21%
2008	13,799	4,642	34%
2004-08			27%
2008 (Jan - Mar)	2,867	976	34%
2008 (Apr - Jun)	3,607	1,593	44%
2009 (Jan - Mar)	2,107	281	13%
2009 (Apr - Jun)	2,847	443	16%

Source: Central Bank of Ecuador and own calculations.

Table 4.- Income shares by area and income quintile^{1,2}

Total						
Quintiles	Remittances	Transfers	Self-employment	Wages	Agricultural	Total
1	5%	11%	32%	30%	22%	100%
2	5%	6%	29%	45%	15%	100%
3	4%	4%	28%	52%	11%	100%
4	4%	3%	30%	56%	7%	100%
5	3%	2%	35%	53%	6%	100%
Urban						
Quintiles	Remittances	Transfers	Self-employment	Wages	Agricultural	Total
1	7%	15%	34%	42%	2%	100%
2	6%	7%	32%	54%	2%	100%
3	5%	4%	31%	58%	1%	100%
4	4%	4%	31%	60%	1%	100%
5	3%	2%	37%	55%	4%	100%
Rural						
Quintiles	Remittances	Transfers	Self-employment	Wages	Agricultural	Total
1	3%	10%	32%	22%	33%	100%
2	4%	4%	27%	37%	28%	100%
3	4%	3%	24%	46%	23%	100%
4	3%	3%	26%	48%	20%	100%
5	3%	1%	31%	41%	23%	100%

Source: Own construction using data from Ecuador's Household Survey 2005-2006.

Notes: 1.- Some households also obtain income from small businesses, but this income is not included due to measurement issues. 2.- Quintile 5 is the highest income quintile.

Table 5.- Domestic Oil Fuel: Revenues (Subsidy), Prices and Import Volume¹

Total Oil Fuels						
Year	Volume of Imports (Thousands of US\$)	Average Import Price ² (US\$/barrel)	Import Cost (Thousands of US\$)	Average Domestic Sales Price (US\$/barrel)	Revenue for Domestic Oil Fuel Sales (Thousands of US\$)	Difference (Subsidy): Domestic Revenues Sales - Import Cost (Thousands of US\$)
2004	17,348	47.77	828,727	31.92	553,715	-275,012
2005	22,173	66.50	1,474,438	33.59	744,747	-729,691
2006	25,933	75.26	1,951,688	33.84	877,685	-1,074,003
2007	29,329	83.02	2,434,862	34.38	1,008,472	-1,426,390
2008	27,859	103.30	2,877,952	35.43	987,011	-1,890,941
2009	32,179	69.58	2,239,053	35.85	1,153,694	-1,085,359

Source: Central Bank of Ecuador and own calculations.

Notes: 1.- Volumes of imported goods are registered when they arrive in the country. It considers only Gasoline, Diesel and Liquefied Gas Petroleum.

2.- Excluding VAT value, operational costs, tax Customs payments for product nationalization, CORPEI payment, and insurance costs totaling approximately 14.5% of C&F.

Table 6.- Oil Fuel Prices and Import Shares, by type ¹

Year	Total Oil Fuels	Gasoline	Diesel	LGP
Percentage change in Average Import Price				
2005	39%	36%	50%	21%
2006	13%	14%	5%	21%
2007	10%	9%	9%	15%
2008	24%	18%	38%	10%
2009	-33%	-26%	-38%	-37%
Percentage change in Average Domestic Sales Price				
2005	5%	0%	1%	-1%
2006	1%	0%	-2%	1%
2007	2%	0%	1%	4%
2008	3%	0%	5%	11%
2009	1%	0%	-7%	-6%
Share in Import Volume				
2004	100%	27%	32%	41%
2005	100%	27%	37%	36%
2006	100%	24%	44%	33%
2007	100%	27%	40%	33%
2008	100%	27%	40%	33%
2009	100%	29%	42%	28%

Source: Central Bank of Ecuador and own calculations.

Note: 1.- Volumes of imported goods are registered when they arrive in the country. It considers only Gasoline, Diesel and Liquified Gas Petroleum.

Table 7.- Remittances

Year	Millions of US\$	% growth	First quarter		Second quarter		Third quarter		Fourth quarter		% GDP	
			Year	Millions of US\$	%	Year	Millions of US\$	%	Year	Millions of US\$		%
2000	1,317	-	2000	290	-	316	-	342	-	369	-	8%
2001	1,415	7%	2001	360	24%	377	19%	350	2%	328	-11%	7%
2002	1,432	1%	2002	321	-11%	338	-10%	365	4%	408	24%	6%
2003	1,627	14%	2003	379	18%	385	14%	407	11%	458	12%	6%
2004	1,832	13%	2004	423	12%	440	14%	456	12%	513	12%	6%
2005	2,422	32%	2005	590	39%	599	36%	610	34%	624	22%	7%
2006	2,928	21%	2006	654	11%	711	19%	762	25%	801	28%	7%
2007	3,088	5%	2007	676	3%	771	9%	815	7%	826	3%	7%
2008	2,822	-9%	2008	760	12%	712	-8%	707	-13%	644	-22%	5%
2009	2,495	-12%	2009	555	-27%	610	-14%	656	-7%	675	5%	5%

Source: Central Bank of Ecuador and own calculations.

Table 8.- Trade in Manufactures, 2008-2009

Table 8a.- Manufacturing Exports: growth in value and volume, and export shares

SAM Sector	Description	Growth Rates 2008-2009			2008	2009
		Volume	Total FOB Value	Unit Value	Share in Total Export Value	Share in Total Export Value
10	Meat, meat products and sub products	9%	-14%	-21%	0.01%	0.01%
11	Canned fish and other manufactured aquatic products	-1%	-12%	-11%	8%	10%
12	Oils and fats	12%	-15%	-24%	1%	2%
13	Dairy products	-55%	-55%	1%	0.01%	0.004%
14	Milling and bakery products	-1%	11%	12%	0.1%	0.1%
15	Sugar products	-67%	-40%	80%	0.4%	0.3%
16	Alcoholic and non-alcoholic beverages	-4%	1%	5%	0.1%	0.2%
17	Other miscellaneous food products, chocolate, and tobacco	4%	9%	5%	2%	2%
18	Textiles and apparel, leather, leather products, and footwear	-11%	17%	31%	1%	2%
19	Wood and wooden products	-48%	-59%	-22%	0.2%	0.1%
20	Paper and paper products	8%	-24%	-30%	0.3%	0.3%
21	Chemicals, rubber, and plastic	13%	-9%	-19%	1%	1%
22	Metallic and non-metallic mineral products	93%	-25%	-61%	2%	2%
23	Transportation equipment	-8%	-37%	-32%	2%	2%
24	Machinery and equipment, other non-food manufactured goods	-33%	-20%	20%	1%	1%

Table 8b.- Imports of manufactured products

SAM Sector	Description	Growth rates (percentage)		
		Quantity (Kgs)	Value (CIF)	Unit Value
14	Milling and bakery products	-10.15	-20.17	-11.16
16	Alcoholic and non-alcoholic beverages	-25.36	-35.83	-14.03
17	Other miscellaneous food products, chocolate, and tobacco	-1.32	-5.81	-4.56
18	Textiles and apparel, leather, leather products, and footwear	-27.90	-32.98	-7.05
19	Wood and wooden products	-23.38	-24.31	-1.22
20	Paper and paper products	-5.57	-16.62	-11.70
	Total	-0.98	-19.25	-11.51

Source: Corporación de Promoción de las Exportaciones e Inversiones (CORPEI) and own calculations based on data from Central Bank.

Table 9.- Foreign Direct Investment by recipient activity

Recipient activity	2002	2003	2004	2005	2006	2007	2008	2009¹
Thousands of US\$								
Mining and quarrying	487,458	148,549	385,374	198,345	-116,618	-124,266	243,164	168,070
Trade	70,441	78,144	103,151	72,464	32,303	92,185	116,445	61,169
Transport, storage and communications	23,091	439,097	73,696	17,503	83,324	-52,460	217,169	104,159
Business services, community, social and personal	112,790	72,616	42,055	91,804	118,855	101,259	152,306	7,631
Others	89,481	133,107	232,663	113,297	152,856	177,441	267,229	128,039
Total	783,261	871,513	836,940	493,414	270,720	194,159	996,313	469,069
GDP	24,899,481	28,635,909	32,642,225	37,186,942	41,763,230	45,789,374	54,685,881	
% share								
Mining and quarrying	62%	17%	46%	40%	-43%	-64%	24%	36%
Trade	9%	9%	12%	15%	12%	47%	12%	13%
Transport, storage and communications	3%	50%	9%	4%	31%	-27%	22%	22%
Business services, community, social and personal	14%	8%	5%	19%	44%	52%	15%	2%
Others	11%	15%	28%	23%	56%	91%	27%	27%
Total	100%	100%	100%	100%	100%	100%	100%	100%
% GDP	3%	3%	3%	1%	1%	0%	2%	
growth rate								
Mining and quarrying	-	-70%	159%	-49%	-159%	7%	-296%	6%
Trade	-	11%	32%	-30%	-55%	185%	26%	-40%
Transport, storage and communications	-	1802%	-83%	-76%	376%	-163%	-514%	-55%
Business services, community, social and personal	-	-36%	-42%	118%	29%	-15%	50%	-94%
Others	-	49%	75%	-51%	35%	16%	51%	-40%
Total	-	11%	-4%	-41%	-45%	-28%	413%	-44%
% GDP	-	15%	14%	14%	12%	10%	19%	

Source: Central Bank of Ecuador and own calculations.

Note: 1.- From first to third quarter.

Table 10.- Foreign Direct Investment by country of origin
% share

Origin	2002	2003	2004	2005	2006	2007	2008	2009 ¹
United States	56%	-5%	9%	-16%	-62%	26%	-2%	-7%
Andean Community ²	3%	-1%	2%	3%	5%	20%	9%	3%
Rest of America ³	21%	86%	73%	117%	113%	-113%	49%	75%
Europe ⁴	16%	18%	13%	0%	33%	119%	40%	17%
Asia ⁵	3%	3%	0%	-4%	11%	47%	5%	12%
Oceania ⁶	0%	0%	2%	0%	0%	0%	0%	0%
Other countries	0%	0%	0%	0%	0%	1%	0%	0%
Total	100%	100%	100%	100%	100%	100%	100%	100%

Source: Central Bank of Ecuador and own calculations.

Notes: 1.- From first to third quarter.

2.- Includes Colombia, Bolivia, Peru and Venezuela.

3.- Includes Dutch Antilles, Argentina, Bahamas, Bermudas, Brazil, Canada, Chile, Cayman Islands, Virgin Islands, Mexico, Panama, Uruguay and other countries.

4.- Includes Germany, Belgium and Luxembourg, Denmark, Spain, France, Netherlands, England, Italy, Romania, Sweden, Switzerland and other countries.

5.- Includes China, South Korea, Japan, Taiwan, Israel and other countries.

6.- Includes Australia and other countries.

Table 11.- Unemployment
Percentage change

Year	Annual average	December
2004	10.97	9.88
2005	10.71	9.30
2006	10.13	9.03
2007 ¹	8.78	6.34
2008	6.90	7.50
2009	8.48	7.90

Source: Central Bank of Ecuador and National Institute of Statistics and Census.

Note: 1.- Since September 2007 includes the cities of Machala and Ambato. There is a change in methodology in this year.

Table 12.- Scenarios A: Shock simulations

Simulation	A1	A2	A3
Oil world export price	fall 30%	fall 20%	fall 10%
Fuels world import price	fall 25%	fall 15%	fall 5%
Fish products world export price	fall 10%	fall 10%	fall 10%
Remittances	fall 10%	fall 5%	fall 5%

Source: The author.

Table 13.- Central Government and Non-financial Public Sector, Finance Position
Millions of US\$

Year	Central Government	Non-fin Public Sector
	Surplus/Deficit	Surplus/Deficit
2004	-319.21	683.38
2005	-180.44	266.19
2006	-87.69	1,363.35
2007	-63.77	970.13
2008	-614.91	-466.72
2009	-2,634.98	-2,345.98
2008 - I	232.90	1,243.15
2008 - II	387.15	895.69
2008 - III	463.36	-49.17
2008 - IV	-1,698.31	-2,556.38
2009 - I	-596.11	-813.65
2009 - II	-538.34	101.17
2009 - III	-516.07	88.41
2009 - IV	-984.38	-1,721.91

Source: Central Bank of Ecuador and own calculations.

Table 14.- Ecuador: Import Restrictions 2009

Category	Number of HS ¹ lines	Value
Ad Valorem	73	30%, 35%
Specific	283	US\$ 10 - US\$ 12 per pair US\$ 0.10 per kilo US\$ 12 per kilo
Quota	271	Depending on the HS line. Total Value permitted: US\$ 2,125,439,679
Total	627	

Source: Official register from Government No. 512 (January 22, 2009), Resolution 466, and own calculations.

Note 1.- A variation of the Harmonized System of tariff lines is applied in Ecuador, and it is called "NANDINA". Import restrictions are in addition to any existing tariffs.

Table 15.- Mapping between the SAM classification and the number of HS lines subject to import restrictions

Product Number	SAM Description	Number of HS lines subject to Import Restrictions			
		Ad-Valorem	Specific	Quota	Total
1	Banana, coffee, and cocoa	-	-	-	-
2	Cereals	-	-	-	-
3	Flowers	-	-	-	-
4	Other agricultural products	-	-	8	8
5	Livestock	-	-	3	3
6	Forestry products	-	-	-	-
7	Shrimps	-	-	-	-
8	Raw fish	-	-	1	1
9	Crude oil, mineral products and fuel oils and other oil products	-	-	-	-
10	Meat, meat products and sub products	-	-	3	3
11	Canned fish and other manufactured aquatic products	-	-	-	-
12	Oils and fats	-	-	-	-
13	Dairy products	-	-	-	-
14	Milling and bakery	-	-	15	15
15	Sugar products	4	-	-	4
16	Alcoholic and non-alcoholic beverages	21	-	4	25
17	Other miscellaneous food products, chocolate, and tobacco	5	-	14	19
18	Textiles and apparel, leather, leather products, and footwear	-	281	27	308
19	Wood and wooden products	14	-	4	18
20	Paper and paper products	-	-	17	17
21	Chemicals, rubber, and plastic	7	-	32	39
22	Metallic and non-metallic mineral products	5	2	31	38
23	Transportation equipment	-	-	43	43
24	Machinery and equipment, other non-food manufactured goods	17	-	69	86
25	Transportation services and storage	-	-	-	-
26	Telecommunication and mail services	-	-	-	-
27	Other services	-	-	-	-

Source: Official register from Government No. 512 (January 22, 2009), Resolution 466, and own calculations.

Table 16.- Distribution of Quota

Product Number	SAM Description	Number of HS lines subject to Quota	Number of firms with Quota permit	Value of
				Quota (US\$)
4	Other agricultural products	8	202	43,844,186
5	Livestock	3	162	423,551
8	Raw fish	1	4	1,219
10	Meat, meat products and sub products	3	66	7,768,674
14	Milling and bakery	15	365	48,046,626
16	Alcoholic and non-alcoholic beverages	4	114	21,586,908
17	Other miscellaneous food products, chocolate, and tobacco	14	480	53,774,622
18	Textiles and apparel, leather, leather products, and footwear	27	9,583	30,826,704
19	Wood and wooden products	6	2,962	12,419,111
20	Paper and paper products	17	7,628	81,560,513
21	Chemicals, rubber, and plastic	32	11,605	267,336,572
22	Metallic and non-metallic mineral products	31	5,426	46,059,206
23	Transportation equipment	43	6,155	1,178,013,539
24	Machinery and equipment, other non-food manufactured goods	67	27,196	230,356,317

Source: Consejo de Comercio Exterior e Inversiones (COMEXI), Resolution 467.

Table 17.- Ecuador: Import Restrictions for Colombia

Category	Number of HS ¹ lines	Value
Ad Valorem	60	30%, 35%
Specific	283	US\$ 10 - US\$ 12 per pair US\$ 0.10 per kilo US\$ 12 per kilo
Quota	181	Depending on the HS line. Total Value permitted: US\$ 2,125,439,679
<i>Ad Valorem (MFN)</i>	822	5% - 20%
Total	1346	

Source: Official register from Government No. 512 (January 22, 2009). Resolution 466 and Supplement of official register from Government No. 631 (July 10, 2009). Resolution 494.

Table 18.- Ecuador: Total imports

Growth rate in Total value of Imports					
2004	2005	2006	2007	2008	2009
-	25%	18%	15%	34%	-19%
Growth rate in Volume					
2004	2005	2006	2007	2008	2009
-	21%	19%	8%	5%	-1%

Source: Central Bank of Ecuador and own calculations.

Table 19.- Applied Tariffs

SAM Sector	Product	Applied Tariffs (base)				New Applied Tariffs rate				
		USA Tariffs (%)	EU Tariffs (%)	ROW Tariffs (%)	Andean Community Tariffs (%)	USA Tariffs (%)	EU Tariffs (%)	ROW Tariffs (%)	Andean Community Tariffs (%)	
									Alternative 1 USA Tariffs	Alternative 2 ROW Tariffs
1	Banana, coffee, and cocoa				0					
2	Cereals	5.0	15.0	6.0	0					
3	Flowers	0.8	0.4	2.4	0					
4	Other agricultural products	5.7	10.4	2.7	0	5.9	13.3	2.8	5.9	2.8
5	Livestock	2.2	8.7	0.3	0	2.2	9.7	0.3	2.2	0.3
6	Forestry products	7.6	14.0	1.4	0					
7	Shrimps				0					
8	Raw fish	1.9		6.5	0	2.6		6.5	2.6	6.5
9	Crude oil, mineral products and fuel oils and other oil products	0.8	0.8	0.3	0					
10	Meat, meat products and sub products	9.6	17.1	8.2	0	9.9	19.0	8.4	9.9	8.4
11	Canned fish and other manufactured aquatic prod.	2.3	19.0	2.5	0					
12	Oil and fats	2.2	16.9	1.8	0					
13	Dairy products	31.9	17.9	4.1	0					
14	Milling and bakery products	19.5	11.1	0.4	0	21.5	12.1	0.4	21.5	0.4
15	Sugar products	1.0	0.5		0	1.4	0.7		1.4	
16	Alcoholic and non-alcoholic beverages	27.2	19.8	8.6	0	42.8	42.9	19.3	43.0	19.3
17	Other miscellaneous food products, tobacco	20.1	15.0	4.9	0	21.9	18.6	5.6	21.9	5.6
18	Textiles and apparel, leather, and footwear	21.3	1.8	18.7	0	34.9	34.8	34.9	35.0	34.9
19	Wood and wooden prod.	17.0	5.7	9.6	0	20.8	7.2	14.0	21.0	14.0
20	Paper and paper products	6.5	12.5	0.1	0	6.8	13.1	0.1	6.7	0.1
21	Chemicals, rubber and plastic	6.6	8.6	5.1	0			5.6		5.6
22	Metallic mineral products and non-metallic	9.1	11.5	4.0	0			4.2		4.2
23	Transportation equipment	17.5	13.1	15.0	0					
24	Machinery and equip., other non-food manufactured	5.9	9.5	9.4	0	6.2	10.1	10.0	6.2	10.0
25	Transportation services and storage				0					
26	Telecommunication and mail services				0					
27	Other services				0					

Source: For the baseline: Social Accounting Matrix 2004. For the policy response: Own estimations.

Note 1.- USA is the United States of America, EU is the European Union, and ROW is the Rest of the World.

Table 20.- Ecuador: Current Account Balance

Year	Million of US\$
2000	920.50
2001	-549.80
2002	-1,177.80
2003	-424.34
2004	-564.47
2005	275.00
2006	1,617.50
2007	1,588.19
2008	1,085.73
2009	-243.95
2008 I	1,247.80
2008 II	1,322.33
2008 III	62.66
2008 IV	-1,546.14
2009 I	-853.00
2009 II	90.24
2009 III	472.18
2009 IV	22.81

Source: Central Bank of Ecuador and own calculations.

**Table 21.- Real GDP
Percentage Change**

Part A.- Simulation A: Shocks due to the crisis ^{1,2}						
Variable	Scenario A1		Scenario A2		Scenario A3	
	Full employment	Unemployment	Full employment	Unemployment	Full employment	Unemployment
Absorption	0.56	0.59	0.38	0.40	0.26	0.27
Private consumption	0.76	0.82	0.52	0.55	0.36	0.38
Fixed investment	0.25	0.27	0.17	0.18	0.10	0.11
Exports	-2.36	-2.32	-1.56	-1.53	-1.06	-1.03
Imports	0.06	0.11	-0.02	0.01	-0.07	-0.05
GDP (value added)	-0.10	-0.06	-0.03	-0.01	-0.01	0.01
GDP (factor cost)	-0.10	-0.06	-0.03	-0.01	-0.01	0.01

Part B.- Simulation B: Shocks + policy response due to the crisis, using US tariffs for the AC ^{1,3,4}						
Variable	Scenario B1		Scenario B2		Scenario B3	
	Full employment	Unemployment	Full employment	Unemployment	Full employment	Unemployment
Absorption	0.09	0.10	-0.07	-0.08	-0.19	-0.15
Private consumption	0.21	0.22	-0.02	-0.03	-0.17	-0.13
Fixed investment	-0.21	-0.20	-0.29	-0.29	-0.35	-0.32
Exports	-2.05	-2.02	-1.30	-1.28	-0.84	-0.84
Imports	-1.14	-1.13	-1.22	-1.22	-1.26	-1.16
GDP (value added)	-0.13	-0.12	-0.07	-0.07	-0.05	-0.04
GDP (factor cost)	-0.08	-0.07	-0.03	-0.02	-0.01	0.00

Part C.- Simulation B: Shocks + policy response due to the crisis, using ROW tariffs for the AC ^{1,3,4}						
Variable	Scenario B1		Scenario B2		Scenario B3	
	Full employment	Unemployment	Full employment	Unemployment	Full employment	Unemployment
Absorption	0.26	0.29	0.09	0.11	-0.02	-0.01
Private consumption	0.44	0.48	0.21	0.23	0.06	0.07
Fixed investment	-0.14	-0.13	-0.22	-0.22	-0.29	-0.28
Exports	-2.22	-2.19	-1.48	-1.46	-1.01	-0.99
Imports	-0.79	-0.76	-0.87	-0.86	-0.92	-0.91
GDP (value added)	-0.11	-0.09	-0.05	-0.04	-0.03	-0.02
GDP (factor cost)	-0.08	-0.06	-0.03	-0.01	-0.01	0.01

Source: Own calculations.

Notes: 1.- For all scenarios the closures include: (i) External Account: Flexible current account. Fixed real exchange rate. (ii) Government: Flexible savings, flexible income, fixed expenditure. (iii) Savings Investment Balance: balanced investment point share adjustment. (iv) Factor markets: land and capital sector specific. Mobile labor and two alternative scenarios: Full employment and unemployment in the unskilled wage worker labor market segment.

2.- Scenario A1: 30% fall in oil world price; 25% fall in fuels world import price; 10% fall in fish products world export price; and 10% fall in remittances. *Scenario A2:* 20% fall in oil world price; 15% fall in fuels world import price; 10% fall in fish products world export price; and 5% fall in remittances. *Scenario A3:* 10% fall in oil world price; 5% fall in fuels world import price; 10% fall in fish products world export price; and 5% fall in remittances.

3.- Scenario B1: Scenario A1 plus higher tariffs for selected commodities. *Scenario B2:* Scenario A2 plus higher tariffs for selected commodities. *Scenario B3:* Scenario A3 plus higher tariffs for selected commodities. Higher tariffs for selected commodities, by regions, are shown in Table 19.

4.- US is the United States, AC is the Andean Community, and ROW is the Rest of the World.

Table 22.- Quantity of Exports / Selected Sectors
Percentage Change

Description	Base (Millions of US\$)	Part A.- Simulation A: Shocks due to the crisis ^{1,2}					
		Scenario A1		Scenario A2		Scenario A3	
		Full employment	Unemployment	Full employment	Unemployment	Full employment	Unemployment
Banana, coffee, and cocoa	1,144.73	0.41	0.58	0.29	0.42	0.10	0.25
Cereals	6.14	0.62	0.66	0.37	0.41	0.12	0.16
Flowers	356.41	-1.42	-1.20	-0.96	-0.82	-0.68	-0.55
Crude oil, mineral products and fuel oils and other oil products	4,406.41	-4.41	-4.42	-2.64	-2.66	-1.49	-1.50
Canned fish and other manufactured aquatic products	462.92	-7.19	-7.15	-7.39	-7.37	-7.57	-7.56
Milling and bakery products	5.38	0.18	0.22	0.00	0.02	-0.17	-0.15
Alcoholic and non-alcoholic beverages	11.95	-0.10	-0.11	-0.07	-0.08	-0.07	-0.08
Other miscellaneous food products, chocolate, and tobacco	300.69	0.51	0.57	0.33	0.37	0.14	0.18
Textiles and apparel, leather, leather products, and footwear	107.13	0.38	0.40	0.27	0.28	0.14	0.15
Wood and wooden products	81.74	0.44	0.44	0.37	0.36	0.38	0.35

Description	Base (Millions of US\$)	Part B.- Simulation B: Shocks + policy response due to the crisis, using US tariffs for the AC ^{1,3,4}					
		Scenario B1		Scenario B2		Scenario B3	
		Full employment	Unemployment	Full employment	Unemployment	Full employment	Unemployment
Banana, coffee, and cocoa	1,144.73	1.47	1.66	1.34	1.49	1.15	1.19
Cereals	6.14	0.62	0.67	0.37	0.42	0.12	0.19
Flowers	356.41	-1.33	-1.19	-0.91	-0.84	-0.66	-0.60
Crude oil, mineral products and fuel oils and other oil products	4,406.41	-4.32	-4.32	-2.66	-2.65	-1.57	-1.55
Canned fish and other manufactured aquatic products	462.92	-6.93	-6.92	-7.13	-7.14	-7.31	-7.35
Milling and bakery products	5.38	0.47	0.51	0.31	0.32	0.14	0.15
Alcoholic and non-alcoholic beverages	11.95	-0.47	-0.47	-0.45	-0.44	-0.45	-0.22
Other miscellaneous food products, chocolate, and tobacco	300.69	0.76	0.80	0.57	0.61	0.38	0.34
Textiles and apparel, leather, leather products, and footwear	107.13	0.56	0.57	0.44	0.45	0.32	0.31
Wood and wooden products	81.74	0.39	0.38	0.33	0.32	0.35	0.32

Description	Base (Millions of US\$)	Part C.- Simulation B: Shocks + policy response due to the crisis, using ROW tariffs for the AC ^{1,3,4}					
		Scenario B1		Scenario B2		Scenario B3	
		Full employment	Unemployment	Full employment	Unemployment	Full employment	Unemployment
Banana, coffee, and cocoa	1,144.73	0.44	0.58	0.31	0.41	0.12	0.24
Cereals	6.14	0.36	0.39	0.11	0.14	-0.14	-0.10
Flowers	356.41	-1.30	-1.14	-0.88	-0.78	-0.63	-0.53
Crude oil, mineral products and fuel oils and other oil products	4,406.41	-4.35	-4.36	-2.69	-2.70	-1.60	-1.60
Canned fish and other manufactured aquatic products	462.92	-6.93	-6.90	-7.13	-7.12	-7.31	-7.30
Milling and bakery products	5.38	0.23	0.27	0.07	0.08	-0.10	-0.08
Alcoholic and non-alcoholic beverages	11.95	-0.37	-0.37	-0.34	-0.34	-0.35	-0.35
Other miscellaneous food products, chocolate, and tobacco	300.69	0.54	0.57	0.35	0.38	0.15	0.19
Textiles and apparel, leather, leather products, and footwear	107.13	0.45	0.47	0.34	0.35	0.22	0.22
Wood and wooden products	81.74	0.45	0.45	0.39	0.39	0.41	0.38

Source: Own calculations. **Notes:** 1.- For all scenarios the closures include: (i) External Account: Flexible current account. Fixed real exchange rate. (ii) Government: Flexible savings, flexible income, fixed expenditure. (iii) Savings Investment Balance: balanced investment point share adjustment. (iv) Factor markets: land and capital sector specific. Mobile labor and two alternative scenarios: Full employment and unemployment in the unskilled wage worker labor market segment. 2.- *Scenario A1*: 30% fall in oil world price; 25% fall in fuels world import price; 10% fall in fish products world export price; and 10% fall in remittances. *Scenario A2*: 20% fall in oil world price; 15% fall in fuels world import price; 10% fall in fish products world export price; and 5% fall in remittances. *Scenario A3*: 10% fall in oil world price; 5% fall in fuels world import price; 10% fall in fish products world export price; and 5% fall in remittances. 3.- *Scenario B1*: Scenario A1 plus higher tariffs for selected commodities. *Scenario B2*: Scenario A2 plus higher tariffs for selected commodities. *Scenario B3*: Scenario A3 plus higher tariffs for selected commodities. Higher tariffs for selected commodities, by regions, are shown in Table 19. 4.- US is the United States, AC is the Andean Community, and ROW is the Rest of the World.

Table 23.- Quantity of Imports / Selected Sectors
Percentage Change

		Part A.- Simulation A: Shocks due to the crisis ^{1,2}					
Description	Base (Millions of US\$)	Scenario A1		Scenario A2		Scenario A3	
		Full employment	Unemployment	Full employment	Unemployment	Full employment	Unemployment
Other agricultural products	89.00	1.04	1.09	0.70	0.72	0.39	0.42
Livestock	11.60	1.88	1.98	1.26	1.31	0.75	0.80
Crude oil, mineral products and fuel oils and other oil products	1,055.34	-2.44	-2.31	-2.32	-2.26	-2.16	-2.13
Milling and bakery products	36.74	1.65	1.70	1.15	1.17	0.71	0.73
Alcoholic and non-alcoholic beverages	60.55	1.34	1.42	0.91	0.96	0.57	0.62
Other miscellaneous food products, chocolate, and tobacco	188.42	0.81	0.84	0.53	0.54	0.29	0.30
Textiles and apparel, leather, leather products, and footwear	433.62	0.92	0.99	0.62	0.66	0.43	0.45
Wood and wooden products	16.23	-0.22	-0.10	-0.40	-0.33	-0.75	-0.61
Paper and paper products	331.57	0.30	0.36	0.10	0.13	-0.01	0.00
		Part B.- Simulation B: Shocks + policy response due to the crisis, using US tariffs for the AC ^{1,3,4}					
Description	Base (Millions of US\$)	Scenario B1		Scenario B2		Scenario B3	
		Full employment	Unemployment	Full employment	Unemployment	Full employment	Unemployment
Other agricultural products	89.00	0.54	0.55	0.20	0.20	-0.10	0.02
Livestock	11.60	1.06	1.09	0.49	0.46	0.01	0.13
Crude oil, mineral products and fuel oils and other oil products	1,055.34	-1.99	-1.96	-1.87	-1.89	-1.71	-1.77
Milling and bakery products	36.74	-6.66	-6.67	-7.12	-7.13	-7.51	-7.32
Alcoholic and non-alcoholic beverages	60.55	-22.53	-22.52	-22.83	-22.85	-23.09	-16.02
Other miscellaneous food products, chocolate, and tobacco	188.42	-3.85	-4.01	-4.26	-4.27	-4.48	-4.31
Textiles and apparel, leather, leather products, and footwear	433.62	-12.91	-12.89	-13.15	-13.16	-13.29	-12.80
Wood and wooden products	16.23	-7.33	-7.28	-7.51	-7.49	-7.85	-6.69
Paper and paper products	331.57	-1.30	-1.28	-1.48	-1.49	-1.59	-1.54
		Part C.- Simulation B: Shocks + policy response due to the crisis, using ROW tariffs for the AC ^{1,3,4}					
Description	Base (Millions of US\$)	Scenario B1		Scenario B2		Scenario B3	
		Full employment	Unemployment	Full employment	Unemployment	Full employment	Unemployment
Other agricultural products	89.00	0.71	0.74	0.37	0.39	0.07	0.10
Livestock	11.60	1.56	1.64	0.98	1.01	0.50	0.53
Crude oil, mineral products and fuel oils and other oil products	1,055.34	-1.90	-1.81	-1.78	-1.74	-1.63	-1.61
Milling and bakery products	36.74	0.81	0.84	0.32	0.34	-0.10	-0.08
Alcoholic and non-alcoholic beverages	60.55	-12.65	-12.61	-13.00	-12.98	-13.28	-13.25
Other miscellaneous food products, chocolate, and tobacco	188.42	-0.80	-0.95	-1.23	-1.22	-1.46	-1.44
Textiles and apparel, leather, leather products, and footwear	433.62	-9.69	-9.64	-9.94	-9.92	-10.09	-10.09
Wood and wooden products	16.23	-6.24	-6.16	-6.42	-6.37	-6.76	-6.64
Paper and paper products	331.57	0.02	0.06	-0.17	-0.15	-0.27	-0.27

Source: Own calculations. **Notes:** 1.- For all scenarios the closures include: (i) External Account: Flexible current account. Fixed real exchange rate. (ii) Government: Flexible savings, flexible income, fixed expenditure. (iii) Savings Investment Balance: balanced investment point share adjustment. (iv) Factor markets: land and capital sector specific. Mobile labor and two alternative scenarios: Full employment and unemployment in the unskilled wage worker labor market segment. 2.- *Scenario A1:* 30% fall in oil world price; 25% fall in fuels world import price; 10% fall in fish products world export price; and 10% fall in remittances. *Scenario A2:* 20% fall in oil world price; 15% fall in fuels world import price; 10% fall in fish products world export price; and 5% fall in remittances. *Scenario A3:* 10% fall in oil world price; 5% fall in fuels world import price; 10% fall in fish products world export price; and 5% fall in remittances. 3.- *Scenario B1:* Scenario A1 plus higher tariffs for selected commodities. *Scenario B2:* Scenario A2 plus higher tariffs for selected commodities. *Scenario B3:* Scenario A3 plus higher tariffs for selected commodities. Higher tariffs for selected commodities, by regions, are shown in Table 19. 4.- US is the United States, AC is the Andean Community, and ROW is the Rest of the World.

Table 24A.- Quantity of Aggregate Value Added
Percentage Change

Description	Base (Millions of US\$)	Simulation A: Shocks due to the crisis ^{1,2}					
		Scenario A1		Scenario A2		Scenario A3	
		Full employment	Unemployment	Full employment	Unemployment	Full employment	Unemployment
Banana, coffee, and cocoa production	523.77	0.57	0.77	0.39	0.55	0.14	0.32
Cereals crop	158.29	1.51	1.57	0.93	0.97	0.38	0.44
Flowers production	346.00	-1.25	-1.05	-0.84	-0.72	-0.58	-0.46
Other agricultural production	292.74	1.46	1.49	0.97	1.00	0.51	0.55
Livestock production	512.67	0.97	0.99	0.65	0.67	0.34	0.37
Forestry production	229.00	0.52	0.54	0.38	0.39	0.27	0.27
Shrimps farming	283.56	-0.09	-0.09	-0.04	-0.04	-0.02	-0.03
Raw fish farming	207.28	-1.48	-1.37	-2.19	-2.14	-2.78	-2.74
Crude oil, mineral products and fuel oils and other oil production	4,326.28	-2.34	-2.31	-1.19	-1.18	-0.44	-0.44
Meat, meat products and sub products	213.75	0.90	0.92	0.61	0.62	0.34	0.35
Canned fish and other manufactured aquatic products	265.13	-6.54	-6.49	-6.77	-6.75	-6.98	-6.96
Oils and fats	86.25	1.18	1.21	0.75	0.77	0.38	0.40
Dairy products	150.25	0.59	0.62	0.40	0.42	0.22	0.24
Milling and bakery	149.83	1.11	1.16	0.68	0.71	0.30	0.33
Sugar products	107.84	0.97	1.03	0.65	0.69	0.35	0.40
Alcoholic and non-alcoholic beverages	177.95	0.60	0.62	0.40	0.42	0.23	0.25
Other miscellaneous food products, chocolate, and tobacco	171.97	0.53	0.59	0.36	0.41	0.18	0.23
Textiles and apparel, leather, leather products, and footwear	532.98	0.72	0.77	0.49	0.52	0.31	0.32
Wood and wooden production	340.63	0.40	0.42	0.30	0.31	0.25	0.24
Paper and paper production	194.77	0.60	0.64	0.30	0.32	0.07	0.07
Chemicals, rubber and plastic production	286.71	0.78	0.83	0.54	0.57	0.30	0.33
Metallic and non-metallic mineral production	246.13	1.59	1.74	1.13	1.21	0.86	0.91
Transportation equipment	100.30	0.06	0.09	0.05	0.07	0.08	0.07
Machinery and equipment, other non-food manufactured goods	85.42	0.10	0.23	0.09	0.16	0.10	0.14
Transportation services and storage	2,672.29	1.06	1.15	0.76	0.80	0.56	0.59
Telecommunication and mail services	1,073.51	0.11	0.11	0.07	0.07	0.05	0.05
Other services	17,271.40	0.17	0.19	0.12	0.13	0.08	0.09

Source: Own calculations.

Notes: 1.- For all scenarios the closures include: (i) External Account: Flexible current account. Fixed real exchange rate. (ii) Government: Flexible savings, flexible income, fixed expenditure. (iii) Savings Investment Balance: balanced investment point share adjustment. (iv) Factor markets: land and capital sector specific. Mobile labor and two alternative scenarios: Full employment and unemployment in the unskilled wage worker labor market segment.

2.- Scenario A1: 30% fall in oil world price; 25% fall in fuels world import price; 10% fall in fish products world export price; and 10% fall in remittances. **Scenario A2:** 20% fall in oil world price; 15% fall in fuels world import price; 10% fall in fish products world export price; and 5% fall in remittances. **Scenario A3:** 10% fall in oil world price; 5% fall in fuels world import price; 10% fall in fish products world export price; and 5% fall in remittances.

Table 24B.- Quantity of Aggregate Value Added
Percentage Change. US tariffs for AC

Description	Base (Millions of US\$)	Simulation B: Shocks + policy response due to the crisis ^{1,2,3}					
		Scenario B1		Scenario B2		Scenario B3	
		Full employment	Unemployment	Full employment	Unemployment	Full employment	Unemployment
Banana, coffee, and cocoa production	523.77	1.84	2.06	1.65	1.83	1.39	1.44
Cereals crop	158.29	1.54	1.59	0.97	1.00	0.43	0.52
Flowers production	346.00	-1.24	-1.13	-0.87	-0.81	-0.64	-0.58
Other agricultural production	292.74	1.18	1.21	0.71	0.73	0.25	0.33
Livestock production	512.67	0.50	0.50	0.18	0.18	-0.13	-0.07
Forestry production	229.00	0.78	0.78	0.64	0.64	0.54	0.49
Shrimps farming	283.56	0.18	0.19	0.22	0.23	0.23	0.19
Raw fish farming	207.28	-1.29	-1.27	-1.99	-2.01	-2.56	-2.59
Crude oil, mineral products and fuel oils and other oil production	4,326.28	-2.11	-2.11	-1.04	-1.05	-0.34	-0.35
Meat, meat products and sub products	213.75	0.47	0.48	0.18	0.18	-0.09	-0.04
Canned fish and other manufactured aquatic products	265.13	-6.31	-6.30	-6.53	-6.55	-6.74	-6.78
Oils and fats	86.25	1.30	1.31	0.88	0.88	0.52	0.52
Dairy products	150.25	0.21	0.22	0.02	0.02	-0.16	-0.11
Milling and bakery	149.83	1.11	1.13	0.70	0.70	0.32	0.37
Sugar products	107.84	1.06	1.08	0.75	0.75	0.46	0.45
Alcoholic and non-alcoholic beverages	177.95	2.00	2.00	1.81	1.81	1.64	1.16
Other miscellaneous food products, chocolate, and tobacco	171.97	1.60	1.68	1.45	1.49	1.27	1.20
Textiles and apparel, leather, leather products, and footwear	532.98	2.14	2.15	1.91	1.91	1.73	1.69
Wood and wooden production	340.63	0.64	0.64	0.54	0.53	0.50	0.44
Paper and paper production	194.77	0.88	0.88	0.58	0.57	0.36	0.33
Chemicals, rubber and plastic production	286.71	0.88	0.91	0.63	0.64	0.40	0.40
Metallic and non-metallic mineral production	246.13	2.19	2.22	1.76	1.73	1.51	1.42
Transportation equipment	100.30	-0.31	-0.29	-0.32	-0.32	-0.29	-0.29
Machinery and equipment, other non-food manufactured goods	85.42	-0.68	-0.64	-0.69	-0.71	-0.69	-0.64
Transportation services and storage	2,672.29	1.30	1.33	1.01	1.00	0.83	0.80
Telecommunication and mail services	1,073.51	0.05	0.06	0.02	0.02	0.00	0.00
Other services	17,271.40	0.01	0.01	-0.04	-0.04	-0.08	-0.06

Source: Own calculations.

Notes: 1.- For all scenarios the closures include: (i) External Account: Flexible current account. Fixed real exchange rate. (ii) Government: Flexible savings, flexible income, fixed expenditure. (iii) Savings Investment Balance: balanced investment point share adjustment. (iv) Factor markets: land and capital sector specific. Mobile labor and two alternative scenarios: Full employment and unemployment in the unskilled wage worker labor market segment.

2.- Scenario B1: 30% fall in oil world price; 25% fall in fuels world import price; 10% fall in fish products world export price; and 10% fall in remittances. **Scenario B2:** 20% fall in oil world price; 15% fall in fuels world import price; 10% fall in fish products world export price; and 5% fall in remittances. **Scenario B3:** 10% fall in oil world price; 5% fall in fuels world import price; 10% fall in fish products world export price; and 5% fall in remittances. Each of these scenarios also includes higher tariffs for selected commodities, as shown in Table 19.

3.- US is the United States and AC is the Andean Community.

Table 24C.- Quantity of Aggregate Value Added
Percentage Change. ROW tariffs for AC

Description	Base (Millions of US\$)	Simulation B: Shocks + policy response due to the crisis ^{1,2,3}					
		Scenario B1		Scenario B2		Scenario B3	
		Full employment	Unemployment	Full employment	Unemployment	Full employment	Unemployment
Banana, coffee, and cocoa production	523.77	0.63	0.79	0.45	0.56	0.18	0.33
Cereals crop	158.29	1.26	1.31	0.70	0.73	0.16	0.21
Flowers production	346.00	-1.19	-1.06	-0.83	-0.74	-0.59	-0.50
Other agricultural production	292.74	1.23	1.25	0.75	0.77	0.30	0.34
Livestock production	512.67	0.73	0.74	0.41	0.42	0.10	0.12
Forestry production	229.00	0.78	0.79	0.65	0.65	0.54	0.54
Shrimps farming	283.56	0.11	0.11	0.15	0.15	0.16	0.16
Raw fish farming	207.28	-1.15	-1.07	-1.84	-1.81	-2.41	-2.38
Crude oil, mineral products and fuel oils and other oil production	4,326.28	-2.11	-2.09	-1.04	-1.04	-0.34	-0.34
Meat, meat products and sub products	213.75	0.68	0.69	0.39	0.40	0.12	0.13
Canned fish and other manufactured aquatic products	265.13	-6.30	-6.26	-6.52	-6.51	-6.73	-6.72
Oils and fats	86.25	1.24	1.27	0.83	0.84	0.46	0.48
Dairy products	150.25	0.41	0.42	0.21	0.23	0.04	0.06
Milling and bakery	149.83	0.97	1.01	0.56	0.58	0.18	0.21
Sugar products	107.84	1.04	1.09	0.74	0.76	0.45	0.48
Alcoholic and non-alcoholic beverages	177.95	1.38	1.40	1.20	1.20	1.03	1.04
Other miscellaneous food products, chocolate, and tobacco	171.97	0.85	0.93	0.71	0.74	0.52	0.57
Textiles and apparel, leather, leather products, and footwear	532.98	1.82	1.85	1.60	1.61	1.42	1.42
Wood and wooden production	340.63	0.66	0.68	0.57	0.57	0.53	0.51
Paper and paper production	194.77	0.62	0.65	0.33	0.34	0.10	0.10
Chemicals, rubber and plastic production	286.71	0.70	0.74	0.46	0.48	0.22	0.25
Metallic and non-metallic mineral production	246.13	2.27	2.39	1.84	1.89	1.59	1.61
Transportation equipment	100.30	-0.26	-0.24	-0.27	-0.26	-0.25	-0.26
Machinery and equipment, other non-food manufactured goods	85.42	-0.48	-0.39	-0.50	-0.46	-0.49	-0.46
Transportation services and storage	2,672.29	1.35	1.42	1.06	1.09	0.88	0.90
Telecommunication and mail services	1,073.51	0.08	0.08	0.04	0.04	0.02	0.01
Other services	17,271.40	0.05	0.06	0.00	0.01	-0.04	-0.03

Source: Own calculations.

Notes: 1.- For all scenarios the closures include: (i) External Account: Flexible current account. Fixed real exchange rate. (ii) Government: Flexible savings, flexible income, fixed expenditure. (iii) Savings Investment Balance: balanced investment point share adjustment. (iv) Factor markets: land and capital sector specific. Mobile labor and two alternative scenarios: Full employment and unemployment in the unskilled wage worker labor market segment.

2.- Scenario B1: 30% fall in oil world price; 25% fall in fuels world import price; 10% fall in fish products world export price; and 10% fall in remittances. **Scenario B2:** 20% fall in oil world price; 15% fall in fuels world import price; 10% fall in fish products world export price; and 5% fall in remittances. **Scenario B3:** 10% fall in oil world price; 5% fall in fuels world import price; 10% fall in fish products world export price; and 5% fall in remittances. Each of these scenarios also includes higher tariffs for selected commodities, as shown in Table 19.

3.- AC is the Andean Community and ROW is the Rest of the World.

Table 25.- Factor Income
Percentage Change

		Part A.- Simulation A: Shocks due to the crisis ^{1,2}					
		Scenario A1		Scenario A2		Scenario A3	
Factor	Labor market	Full employment	Unemployment	Full employment	Unemployment	Full employment	Unemployment
LABOR							
	Urban						
	Unskilled wage labor	0.31	0.38	0.15	0.19	0.12	0.14
	Skilled wage labor	-0.56	-0.44	-0.29	-0.22	0.05	0.09
	Self-employment	0.70	0.82	0.47	0.53	0.40	0.44
	Rural						
	Unskilled wage labor	0.21	0.29	0.19	0.22	0.22	0.24
	Skilled wage labor	-0.40	-0.27	-0.15	-0.08	0.15	0.20
	Self-employment	1.01	1.14	0.63	0.70	0.41	0.46
CAPITAL		-20.85	-20.61	-13.84	-13.71	-6.31	-6.25
LAND		1.62	1.79	1.08	1.19	0.60	0.71
		Part B.- Simulation B: Shocks + policy response due to the crisis, using US tariffs for the AC ^{1,3,4}					
		Scenario B1		Scenario B2		Scenario B3	
Factor	Labor market	Full employment	Unemployment	Full employment	Unemployment	Full employment	Unemployment
LABOR							
	Urban						
	Unskilled wage labor	0.04	0.07	-0.09	-0.09	-0.11	-0.08
	Skilled wage labor	-0.93	-0.90	-0.64	-0.66	-0.29	-0.27
	Self-employment	0.30	0.33	0.11	0.08	0.06	0.08
	Rural						
	Unskilled wage labor	0.29	0.28	0.28	0.23	0.33	0.27
	Skilled wage labor	-0.69	-0.66	-0.43	-0.45	-0.12	-0.10
	Self-employment	0.68	0.71	0.34	0.32	0.14	0.17
CAPITAL		-20.01	-19.96	-12.89	-12.95	-5.28	-5.45
LAND		1.77	1.87	1.25	1.29	0.78	0.81
		Part C.- Simulation B: Shocks + policy response due to the crisis, using ROW tariffs for the AC ^{1,3,4}					
		Scenario B1		Scenario B2		Scenario B3	
Factor	Labor market	Full employment	Unemployment	Full employment	Unemployment	Full employment	Unemployment
LABOR							
	Urban						
	Unskilled wage labor	0.22	0.27	0.09	0.11	0.07	0.09
	Skilled wage labor	-0.67	-0.59	-0.39	-0.35	-0.04	-0.02
	Self-employment	0.59	0.67	0.39	0.43	0.34	0.36
	Rural						
	Unskilled wage labor	0.15	0.21	0.15	0.17	0.19	0.19
	Skilled wage labor	-0.50	-0.41	-0.24	-0.20	0.08	0.10
	Self-employment	0.91	1.00	0.57	0.61	0.37	0.40
CAPITAL		-19.81	-19.62	-12.68	-12.60	-5.07	-5.05
LAND		1.43	1.56	0.91	0.98	0.44	0.52

Source: Own calculations.

Notes: 1.- For all scenarios the closures include: (i) External Account: Flexible current account. Fixed real exchange rate. (ii) Government: Flexible savings, flexible income, fixed expenditure. (iii) Savings Investment Balance: balanced investment point share adjustment. (iv) Factor markets: land and capital sector specific. Mobile labor and two alternative scenarios: Full employment and unemployment in the unskilled wage worker labor market segment. 2.- *Scenario A1*: 30% fall in oil world price; 25% fall in fuels world import price; 10% fall in fish products world export price; and 10% fall in remittances. *Scenario A2*: 20% fall in oil world price; 15% fall in fuels world import price; 10% fall in fish products world export price; and 5% fall in remittances. *Scenario A3*: 10% fall in oil world price; 5% fall in fuels world import price; 10% fall in fish products world export price; and 5% fall in remittances. 3.- *Scenario B1*: Scenario A1 plus higher tariffs for selected commodities. *Scenario B2*: Scenario A2 plus higher tariffs for selected commodities. *Scenario B3*: Scenario A3 plus higher tariffs for selected commodities. Higher tariffs for selected commodities, by regions, are shown in Table 19. 4.- US is the United States, AC is the Andean Community, and ROW is the Rest of the World.

Table 26.- Household Income
Percentage Change

Part A.- Simulation A: Shocks due to the crisis ^{1,2}						
Household type	Scenario A1		Scenario A2		Scenario A3	
	Full employment	Unemployment	Full employment	Unemployment	Full employment	Unemployment
Urban						
Quintile 1	-0.33	-0.21	-0.20	-0.14	-0.03	0.07
Quintile 2	-1.04	-0.93	-0.64	-0.58	-0.35	-0.18
Quintile 3	-2.34	-2.22	-1.45	-1.39	-0.91	-0.63
Quintile 4	-3.64	-3.52	-2.28	-2.21	-1.38	-1.04
Quintile 5	-6.85	-6.72	-4.43	-4.35	-2.18	-1.97
Rural						
Quintile 1	0.25	0.36	0.17	0.23	0.10	0.20
Quintile 2	-0.74	-0.63	-0.43	-0.37	-0.35	-0.13
Quintile 3	-0.73	-0.62	-0.38	-0.33	-0.50	-0.17
Quintile 4	-1.19	-1.09	-0.59	-0.54	-1.04	-0.43
Quintile 5	-4.90	-4.77	-3.04	-2.98	-2.04	-1.51
Part B.- Simulation B: Shocks + policy response due to the crisis, using US tariffs for the AC ^{1,3,4}						
Household type	Scenario B1		Scenario B2		Scenario B3	
	Full employment	Unemployment	Full employment	Unemployment	Full employment	Unemployment
Urban						
Quintile 1	-0.64	-0.61	-0.48	-0.50	-0.29	-0.22
Quintile 2	-1.32	-1.29	-0.89	-0.91	-0.58	-0.44
Quintile 3	-2.55	-2.53	-1.63	-1.65	-1.08	-0.82
Quintile 4	-3.79	-3.77	-2.40	-2.42	-1.48	-1.18
Quintile 5	-6.86	-6.83	-4.40	-4.42	-2.13	-1.98
Rural						
Quintile 1	0.03	0.06	-0.02	-0.04	-0.07	0.00
Quintile 2	-0.88	-0.85	-0.54	-0.57	-0.44	-0.27
Quintile 3	-0.86	-0.84	-0.49	-0.52	-0.59	-0.31
Quintile 4	-1.32	-1.31	-0.71	-0.73	-1.14	-0.57
Quintile 5	-4.89	-4.86	-3.00	-3.03	-1.99	-1.52
Part C.- Simulation B: Shocks + policy response due to the crisis, using ROW tariffs for the AC ^{1,3,4}						
Household type	Scenario B1		Scenario B2		Scenario B3	
	Full employment	Unemployment	Full employment	Unemployment	Full employment	Unemployment
Urban						
Quintile 1	-0.39	-0.31	-0.23	-0.19	-0.04	0.03
Quintile 2	-1.08	-1.00	-0.65	-0.61	-0.34	-0.19
Quintile 3	-2.33	-2.24	-1.41	-1.37	-0.85	-0.58
Quintile 4	-3.57	-3.49	-2.18	-2.14	-1.26	-0.94
Quintile 5	-6.64	-6.54	-4.17	-4.13	-1.91	-1.72
Rural						
Quintile 1	0.18	0.27	0.13	0.17	0.08	0.17
Quintile 2	-0.77	-0.69	-0.43	-0.40	-0.33	-0.14
Quintile 3	-0.77	-0.69	-0.40	-0.37	-0.50	-0.19
Quintile 4	-1.24	-1.17	-0.62	-0.59	-1.06	-0.47
Quintile 5	-4.78	-4.69	-2.90	-2.86	-1.88	-1.36

Source: Own calculations.

Notes: 1.- For all scenarios the closures include: (i) External Account: Flexible current account. Fixed real exchange rate. (ii) Government: Flexible savings, flexible income, fixed expenditure. (iii) Savings Investment Balance: balanced investment point share adjustment. (iv) Factor markets: land and capital sector specific. Mobile labor and two alternative scenarios: Full employment and unemployment in the unskilled wage worker labor market segment.

2.- Scenario A1: 30% fall in oil world price; 25% fall in fuels world import price; 10% fall in fish products world export price; and 10% fall in remittances. Scenario A2: 20% fall in oil world price; 15% fall in fuels world import price; 10% fall in fish products world export price; and 5% fall in remittances. Scenario A3: 10% fall in oil world price; 5% fall in fuels world import price; 10% fall in fish products world export price; and 5% fall in remittances.

3.- Scenario B1: Scenario A1 plus higher tariffs for selected commodities. Scenario B2: Scenario A2 plus higher tariffs for selected commodities. Scenario B3: Scenario A3 plus higher tariffs for selected commodities. Higher tariffs for selected commodities, by regions, are shown in Table 19.

4.- US is the United States, AC is the Andean Community, and ROW is the Rest of the World.

5.- Quintile 5 is the quintile with the highest income.

Table 27.- Factor Income
Percentage Change
Assuming Sector-specific Skilled Labor

		Simulation A: Shocks due to the crisis ^{1,2}					
		Scenario A1		Scenario A2		Scenario A3	
Factor	Labor market	Full employment	Unemployment	Full employment	Unemployment	Full employment	Unemployment
LABOR							
	Urban						
	Unskilled wage labor	-0.86	-1.16	-0.57	-0.76	-0.23	-0.32
	Skilled wage labor	-4.29	-4.81	-2.77	-3.11	-1.16	-1.32
	Self-employment	-0.69	-1.16	-0.39	-0.69	-0.03	-0.16
	Rural						
	Unskilled wage labor	-0.80	-1.06	-0.42	-0.60	-0.07	-0.16
	Skilled wage labor	-4.00	-4.54	-2.55	-2.90	-1.02	-1.17
	Self-employment	-0.44	-0.94	-0.26	-0.58	-0.03	-0.16
CAPITAL		-22.29	-23.23	-14.63	-15.25	-6.74	-7.05
LAND		0.87	0.30	0.61	0.25	0.38	0.26
		Simulation B: Shocks + policy response due to the crisis, using ROW tariffs for the AC ^{1,3,4}					
		Scenario B1		Scenario B2		Scenario B3	
Factor	Labor market	Full employment	Unemployment	Full employment	Unemployment	Full employment	Unemployment
LABOR							
	Urban						
	Unskilled wage labor	-0.79	-1.05	-0.48	-0.64	-0.14	-0.20
	Skilled wage labor	-4.09	-4.55	-2.55	-2.83	-0.93	-1.03
	Self-employment	-0.62	-1.04	-0.31	-0.56	0.06	-0.03
	Rural						
	Unskilled wage labor	-0.71	-0.94	-0.35	-0.49	0.00	-0.06
	Skilled wage labor	-3.80	-4.27	-2.33	-2.62	-0.78	-0.88
	Self-employment	-0.35	-0.79	-0.16	-0.43	0.08	-0.01
CAPITAL		-20.86	-21.70	-13.15	-13.67	-5.22	-5.43
LAND		0.74	0.23	0.49	0.20	0.27	0.21

Source: Own calculations.

Notes: 1.- For all scenarios the closures include: (i) External Account: Flexible current account. Fixed real exchange rate. (ii) Government: Flexible savings, flexible income, fixed expenditure. (iii) Savings Investment Balance: balanced investment point share adjustment. (iv) Factor markets: land and capital sector specific. Mobile unskilled labor and sector-specific skilled labor with two alternative scenarios: Full employment and unemployment in the unskilled wage worker labor market segment.

2.- Scenario A1: 30% fall in oil world price; 25% fall in fuels world import price; 10% fall in fish products world export price; and 10% fall in remittances. **Scenario A2:** 20% fall in oil world price; 15% fall in fuels world import price; 10% fall in fish products world export price; and 5% fall in remittances. **Scenario A3:** 10% fall in oil world price; 5% fall in fuels world import price; 10% fall in fish products world export price; and 5% fall in remittances.

3.- Scenario B1: Scenario A1 plus higher tariffs for selected commodities. **Scenario B2:** Scenario A2 plus higher tariffs for selected commodities. **Scenario B3:** Scenario A3 plus higher tariffs for selected commodities. Higher tariffs for selected commodities, by regions, are shown in Table 19.

4.- AC is the Andean Community and **ROW** is the Rest of the World.

Table 28.- Household Income
Percentage Change
Assuming Sector-specific Skilled Labor

Household type	Simulation A: Shocks due to the crisis ^{1,2}					
	Scenario A1		Scenario A2		Scenario A3	
	Full employment	Unemployment	Full employment	Unemployment	Full employment	Unemployment
Urban						
Quintile 1	-1.68	-2.12	-1.03	-1.32	-0.44	-0.51
Quintile 2	-2.51	-2.95	-1.55	-1.83	-0.80	-0.80
Quintile 3	-3.87	-4.32	-2.40	-2.69	-1.38	-1.27
Quintile 4	-5.28	-5.74	-3.30	-3.60	-1.89	-1.72
Quintile 5	-8.22	-8.74	-5.25	-5.59	-2.60	-2.58
Rural						
Quintile 1	-1.05	-1.49	-0.63	-0.91	-0.30	-0.36
Quintile 2	-1.97	-2.39	-1.18	-1.46	-0.71	-0.67
Quintile 3	-1.98	-2.37	-1.15	-1.41	-0.87	-0.70
Quintile 4	-2.36	-2.72	-1.32	-1.55	-1.40	-0.93
Quintile 5	-6.17	-6.63	-3.82	-4.12	-2.43	-2.07
	Simulation B: Shocks + policy response due to the crisis, using ROW tariffs for the AC ^{1,3,4}					
Household type	Scenario B1		Scenario B2		Scenario B3	
	Full employment	Unemployment	Full employment	Unemployment	Full employment	Unemployment
Urban						
Quintile 1	-1.57	-1.95	-0.91	-1.14	-0.31	-0.34
Quintile 2	-2.36	-2.75	-1.39	-1.63	-0.64	-0.59
Quintile 3	-3.66	-4.06	-2.19	-2.43	-1.16	-1.00
Quintile 4	-5.00	-5.41	-3.02	-3.27	-1.60	-1.38
Quintile 5	-7.79	-8.24	-4.81	-5.09	-2.16	-2.08
Rural						
Quintile 1	-0.94	-1.33	-0.51	-0.75	-0.18	-0.19
Quintile 2	-1.83	-2.20	-1.04	-1.27	-0.57	-0.47
Quintile 3	-1.86	-2.21	-1.03	-1.24	-0.75	-0.54
Quintile 4	-2.27	-2.59	-1.22	-1.41	-1.30	-0.79
Quintile 5	-5.87	-6.28	-3.51	-3.76	-2.12	-1.72

Source: Own calculations.

Notes: 1.- For all scenarios the closures include: (i) External Account: Flexible current account. Fixed real exchange rate. (ii) Government: Flexible savings, flexible income, fixed expenditure. (iii) Savings Investment Balance: balanced investment point share adjustment. (iv) Factor markets: land and capital sector specific. Mobile unskilled labor and sector-specific skilled labor with two alternative scenarios: Full employment and unemployment in the unskilled wage worker labor market segment.

2.- Scenario A1: 30% fall in oil world price; 25% fall in fuels world import price; 10% fall in fish products world export price; and 10% fall in remittances. **Scenario A2:** 20% fall in oil world price; 15% fall in fuels world import price; 10% fall in fish products world export price; and 5% fall in remittances. **Scenario A3:** 10% fall in oil world price; 5% fall in fuels world import price; 10% fall in fish products world export price; and 5% fall in remittances.

3.- Scenario B1: Scenario A1 plus higher tariffs for selected commodities. **Scenario B2:** Scenario A2 plus higher tariffs for selected commodities. **Scenario B3:** Scenario A3 plus higher tariffs for selected commodities. Higher tariffs for selected commodities, by regions, are shown in Table 19.

4.- AC is the Andean Community and ROW is the Rest of the World.

5.- Quintile 5 is the quintile with the highest income.

Table 29.- Percentage Change in Labor Employment
Assuming Unemployment in the Unskilled Wage Labor Market

Part I: Assuming Mobile labor				
		Simulation A: Shocks due to the crisis ^{1,2}		
Labor market		Scenario A1	Scenario A2	Scenario A3
LABOR				
	Urban			
	Unskilled wage labor	0.38	0.19	0.15
	Rural			
	Unskilled wage labor	0.29	0.22	0.24
		Simulation B: Shocks + policy response due to the crisis, using US tariffs for the AC ^{1,3,4}		
Labor market		Scenario B1	Scenario B2	Scenario B3
LABOR				
	Urban			
	Unskilled wage labor	0.07	-0.09	-0.08
	Rural			
	Unskilled wage labor	0.28	0.23	0.27
		Simulation B: Shocks + policy response due to the crisis, using ROW tariffs for the AC ^{1,3,4}		
Labor market		Scenario B1	Scenario B2	Scenario B3
LABOR				
	Urban			
	Unskilled wage labor	0.27	0.11	0.09
	Rural			
	Unskilled wage labor	0.21	0.17	0.19

Part II: Assuming Sector-specific Skilled Labor				
		Simulation A: Shocks due to the crisis ^{1,2}		
Labor market		Scenario A1	Scenario A2	Scenario A3
LABOR				
	Urban			
	Unskilled wage labor	-1.16	-0.76	-0.32
	Rural			
	Unskilled wage labor	-1.06	-0.60	-0.16
		Simulation B: Shocks + policy response due to the crisis, using ROW tariffs for the AC ^{1,3,4}		
Labor market		Scenario B1	Scenario B2	Scenario B3
LABOR				
	Urban			
	Unskilled wage labor	-1.05	-0.64	-0.20
	Rural			
	Unskilled wage labor	-0.94	-0.49	-0.06

Source: Own calculations.

Notes: 1.- For all scenarios the closures include: (i) External Account: Flexible current account. Fixed real exchange rate. (ii) Government: Flexible savings, flexible income, fixed expenditure. (iii) Savings Investment Balance: balanced investment point share adjustment. (iv) Factor markets: land and capital sector specific. Mobile labor unless otherwise specified.

2.- Scenario A1: 30% fall in oil world price; 25% fall in fuels world import price; 10% fall in fish products world export price; and 10% fall in remittances. **Scenario A2:** 20% fall in oil world price; 15% fall in fuels world import price; 10% fall in fish products world export price; and 5% fall in remittances. **Scenario A3:** 10% fall in oil world price; 5% fall in fuels world import price; 10% fall in fish products world export price; and 5% fall in remittances.

3.- Scenario B1: Scenario A1 plus higher tariffs for selected commodities. **Scenario B2:** Scenario A2 plus higher tariffs for selected commodities. **Scenario B3:** Scenario A3 plus higher tariffs for selected commodities. Higher tariffs for selected commodities, by regions, are shown in Table 19.

4.- US is the United States, AC is the Andean Community, and ROW is the Rest of the World.

Table 30.- Poverty Impacts

Base line				
	Bellow one dollar a day		Bellow two dollars a day	
Total Households	14.87%		35.28%	
Hhd, headed by male	13.64%		33.91%	
Hhd, headed by female	19.57%		40.46%	

Full Employment				
I. Labor Mobile				
	Scenario A1		Scenario B1	
	Bellow one dollar a day	Bellow two dollars a day	Bellow one dollar a day	Bellow two dollars a day
Total Households	-0.10%	0.01%	-0.07%	0.01%

II. Sector-specific Skilled Labor				
	Scenario A1		Scenario B1	
	Bellow one dollar a day	Bellow two dollars a day	Bellow one dollar a day	Bellow two dollars a day
Total Households	0.14%	0.40%	0.13%	0.35%

Unemployment in the unskilled wage labor market				
I. Labor Mobile				
	Scenario A1		Scenario B1	
	Bellow one dollar a day	Bellow two dollars a day	Bellow one dollar a day	Bellow two dollars a day
Total Households	-0.20%	-0.03%	-0.15%	0.01%

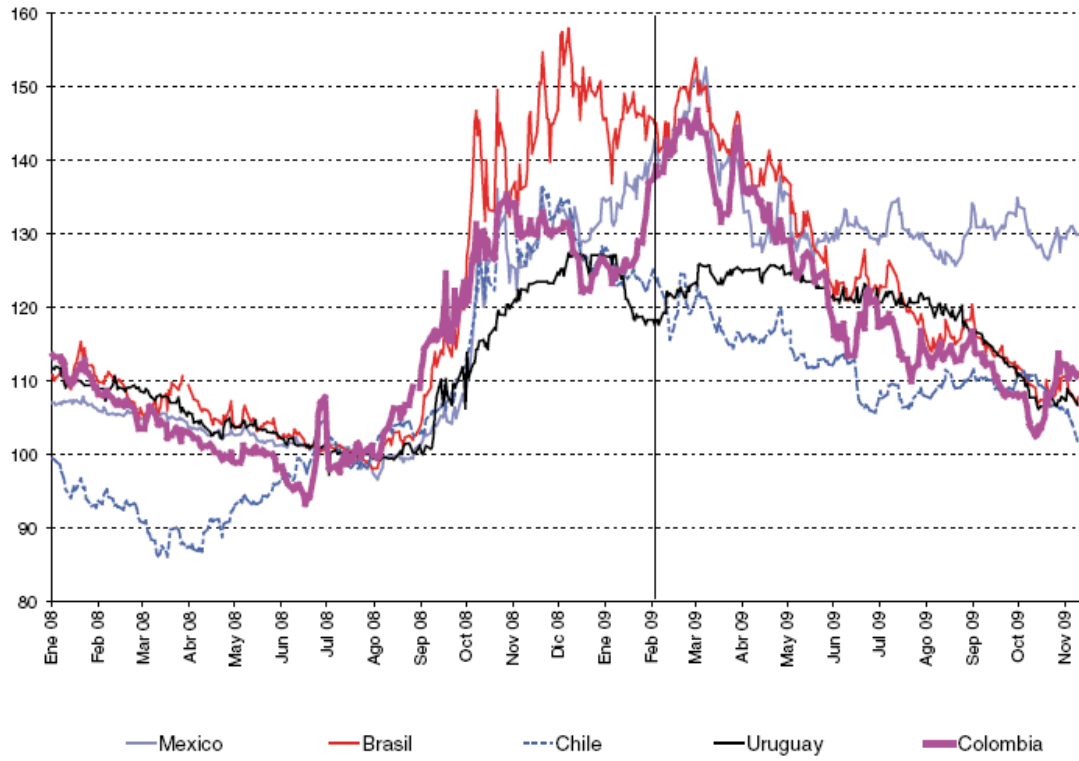
II. Sector-specific Skilled Labor				
	Scenario A1		Scenario B1	
	Bellow one dollar a day	Bellow two dollars a day	Bellow one dollar a day	Bellow two dollars a day
Total Households	0.36%	0.63%	0.33%	0.59%

Source: Own calculations.

Notes: 1.- For all scenarios the closures include: (i) External Account: Flexible current account. Fixed real exchange rate. (ii) Government: Flexible savings, flexible income, fixed expenditure. (iii) Savings Investment Balance: balanced investment point share adjustment. (iv) Factor markets: land and capital sector specific. Mobile labor or sector-specific skilled labor, assuming unemployment in the unskilled wage worker labor market segment. 2.- *Scenario A1*: 30% fall in oil world price; 25% fall in fuels world import price; 10% fall in fish products world export price; and 10% fall in remittances. 3.- *Scenario B1*: Scenario A1 plus higher tariffs for selected commodities. Higher tariffs for selected commodities, by regions, are shown in Table 19.

FIGURES

Figure 1.- Nominal Exchange Rate 2008-2009
Selected Countries
Base Index July 2008=100



Source: ECLAC 2009, p. 60.

Annex 1.- Calculating new applied tariffs

To implement the policy response scenarios (scenarios B) that include the crisis shock plus import restrictions on 627 NANDINA (or HS) lines,⁸ we need to calculate new applied tariffs at the SAM sector level.⁹ The main steps to achieve this goal are:

- (i) Estimate new nominal ad-valorem equivalents per HS (NANDINA) line for the specific tariffs and quotas (when no ad-valorem tariff equivalent is given by the Government).
- (ii) Aggregate the nominal tariffs at the HS level to the SAM sector level.
- (iii) Estimate corresponding applied tariffs from these aggregate nominal tariffs.

Estimating new nominal ad valorem tariffs per HS (NANDINA) line

- For the specific tariffs.-

To calculate the ad-valorem equivalent (AVE) tariffs of specific tariffs we apply the formula outlined in Stawowy, W. (2001).

$$AVE = \frac{100 * ST}{UCF * UV * XR}$$

Where:

AVE = Ad-valorem Equivalent of specific tariff (percentage)

ST = specific tariff

UCF = Quantity Units Conversion Factor

UV = Import Unit Value (in US\$ per imports quantity unit). Year 2009 applied

XR = Currency exchange rate, set to 1 given that Ecuador is a dollarized economy

For example, a specific tariff of 5 US cents per kilogram will produce an estimated AVE of 20 percent, provided that the import unit value is 0.25 US\$ per kilogram (see Stawowy, p. 2).

- For the quotas.-

For quotas the study uses the ad-valorem tariff equivalents published by the Government of Ecuador a few weeks later after the quotas were officially announced, except for 20 tariff lines for which there were no AVE provided. The study estimates ad-valorem equivalents for these 20 tariff lines (mostly manufactures), assigning them an average of the nominal tariff rate for the rest of the tariff lines (including the new ad-valorem tariff surcharge calculated for the HS lines with import restrictions).

Aggregating nominal ad valorem per HS (NANDINA) line to SAM sectors

This study aggregates the nominal ad-valorem tariffs to the SAM sector level using two approaches: (a) a simple average, and (b) a trade weighted average, where the weights are the import value of the goods. Both ways to aggregate tariffs are subject to criticism in the literature, as they may produce results that indicate that the increase (or reduction) in protection moves in the wrong direction (see for instance, Anderson and Neary 1994, Kee et.al. 2005).

Both averages yield similar *nominal* tariff rates at the SAM sector level (See Table A1). In the study we use the set of nominal rates obtained with simple averages to calculate the new *applied* tariffs (see next step).

⁸ NANDINA stands for Andean Nomenclature for tariff lines, similar to the HS lines, but at the 10-digit level.

⁹ The study does not consider the additional HS lines with import restrictions applied only to Colombia, given that these additional restrictions –adopted in July 2009– were short lived.

Table A1.- Nominal ad-valorem equivalent (AVE) Tariffs ¹

SAM sector	Product	2004 ²		2009 ³
		Simple average	Weighted Average (%)	Weighted Average (%)
1	Banana, coffee, and cocoa	13	11	10
2	Cereals	13	12	12
3	Flowers	8	0	0
4	Other agricultural products	13	13	21
5	Livestock	10	6	6
6	Forestry products	12	15	14
7	Shrimps	-	-	-
8	Raw fish	18	17	20
9	Crude oil, mineral products and fuel oils and other oil products	5	1	4
10	Meat, meat products and sub products	19	24	23
11	Canned fish and other manufactured aquatic prod.	19	14	17
12	Oil and fats	17	17	17
13	Dairy products	19	19	18
14	Milling and bakery products	21	23	24
15	Sugar products	21	37	37
16	Alcoholic and non-alcoholic beverages	43	47	42
17	Other miscellaneous food products, tobacco	19	19	21
18	Textiles and apparel, leather, and footwear	35	35	26
19	Wood and wooden prod.	21	33	30
20	Paper and paper products	13	12	11
21	Chemicals, rubber and plastic	9	11	11
22	Metallic mineral products and non-metallic	11	11	11
23	Transportation equipment	11	20	11
24	Machinery and equip., other non-food manufactured	10	9	10
25	Transportation services and storage	-	-	-
26	Telecommunication and mail services	14	19	-
27	Other services	10	10	10

Source: Central Bank of Ecuador, Corporación de Promoción de las Exportaciones e Inversiones (CORPEI), Consejo de Comercio Exterior e Inversiones (COMEXI) - Resolution 467, Arancel de Importaciones de Ecuador, and own calculations.

Notes: 1.- For specific tariffs the ad-valorem equivalent was calculated using the import unit value from 2009.

2.- Weights correspond to trade data from 2004.

3.- Weights correspond to trade data from 2009.

Calculating new applied tariffs by SAM sector

In the SAM, the tariffs are not nominal ad-valorem but applied ad-valorem tariffs. To estimate new applied tariffs from the new set of nominal tariffs that include the import restrictions, the study calculates the implied coefficients in the SAM. To calculate these implied coefficients or factors, we compare the aggregate ad-valorem nominal rates (with no import restrictions) with their corresponding applied tariffs (calculated from the SAM). We then apply these factors to the new nominal ad-valorem aggregate rates and obtain the new applied tariffs by SAM sector. The use of these implied factors in the SAM –where there is no additional import restriction policy applied- may not be the ideal. Probably the factors to convert nominal rates to applied rates may have varied as a response to additional restrictions on imports. The new applied tariffs rates will be a good approximation to the extent that the variations in these factors are small for the duration of the additional restriction period (1 year). Table 19 shows the new applied tariffs.

Annex 2.- Elasticities used in the CGE model

Table A2-1.- Ecuador: CET, CES, and Production Elasticities

No.	Product	Export Supply Elasticities - CET ^{1,2}	Armington Elasticities - CES ^{3,4,5,6}	Factor Substitution Elasticities ^{7,8}
1	Banana, coffee, and cocoa	0.4	0.8	0.6
2	Cereals	0.6	0.99	0.8
3	Flowers	0.8	0.8	0.8
4	Other agricultural products	0.6	0.317	0.8
5	Livestock	1	1.349	0.8
6	Forestry products	0.6	0.8	0.8
7	Shrimps	1.5	1.2	0.8
8	Raw fish	0.2	1.001	0.8
9	Crude oil, mineral products and fuel oils and other oil products	1.3	0.8	0.2
10	Meat, meat products and sub products	0.6	1.001	0.8
11	Canned fish and other manufactured aquatic products	0.2	1.001	0.8
12	Oil and fats	1.3	0.8	0.8
13	Dairy products	0.9	0.782	0.8
14	Milling and bakery	0.9	0.99	0.8
15	Sugar products	0.9	0.782	0.8
16	Alcoholic and non-alcoholic beverages	0.9	1.319	0.8
17	Other miscellaneous food products, chocolate, and tobacco	0.9	0.782	0.9
18	Textiles and apparel, leather, leather products, and footwear	0.5	0.93	0.9
19	Wood and wooden products	0.5	2.383	0.8
20	Paper and paper products	0.5	0.763	0.8
21	Chemicals, rubber, and plastic	0.5	0.371	0.8
22	Metallic and non-metallic mineral products	0.5	0.612	0.8
23	Transportation equipment	0.5	0.482	0.8
24	Machinery and equipment, other non-food manufactured goods	0.6	0.482	0.6
25	Transportation services and storage	1	0.534	0.9
26	Telecommunication and mail services	1	0.825	0.95
27	Other services	0.2	0.2	0.9

Source: Cho, S, and J. Díaz (2006) "Trade Liberalization in Latin America and Eastern Europe: The Cases of Ecuador and Slovenia". Table 4.5, p. 13. Vos, R., and N. DeJong (2003), "Trade Liberalization and Poverty in Ecuador: a CGE Macro-Microsimulation Analysis". Economic Systems Research, Vol. 15, No. 2, June 2003. Table A.1, p. 230. Wong, S., and M. González (2005) "Elasticidades de Substitución de Importaciones para Ecuador". Revista Tecnológica ESPOL, Vol 18, No. 1, October 2005. Table No. A3, p. 180.

Notes: 1.-Data for products number 1, 3, 7, 10, 17, 24-27 from Vos and DeJong (2003). 2.-Data for the rest of products are assumptions for Ecuador using reference data from other countries. 3.-Data for products number 1, 3, 6, 9 and 18 from Cho and Díaz (2006). 4.- Data for products number 7 and 27 from Vos and DeJong (2003). 5.-Data for product number 12 is an assumption for Ecuador using reference data for other countries. 6.-Data for the rest of the products from Wong and González (2005). 7.-Data for products number 1, 3, 7, 9, 10, 17, 24-27 from Vos and DeJong (2003). 8.-Data for the rest of products are assumptions for Ecuador using reference data from other countries.

Table A2-2.- Ecuador: Household Consumption Elasticities^{1, 2, 3}

SAM	Product	Household type				
		Rural		Urban		
		Agriculture	Non-agriculture	High education	Medium level education	Low education
1	Banana, coffee, and cocoa	0.87	0.84	0.81	0.83	0.88
2	Cereals	0.87	0.84	0.81	0.83	0.88
3	Flowers	1.5	1.5	1.2	1.2	1.2
4	Other agricultural products	0.87	0.84	0.81	0.83	0.88
5	Livestock	0.87	0.84	0.81	0.83	0.88
6	Forestry products	1.5	1.5	1.2	1.2	1.2
7	Shrimps	0.87	0.84	0.81	0.83	0.88
8	Raw fish	0.87	0.84	0.81	0.83	0.88
9	Crude oil, mineral products and fuel oils and other oil products	1.02	0.98	0.72	0.74	0.78
10	Meat, meat products and sub products	0.87	0.84	0.71	0.73	0.77
11	Canned fish and other manufactured aquatic products	0.87	0.84	0.71	0.73	0.77
12	Oils and fats	0.87	0.84	0.71	0.73	0.77
13	Dairy products	0.87	0.84	0.71	0.73	0.77
14	Milling and bakery products	0.87	0.84	0.71	0.73	0.77
15	Sugar products	0.87	0.84	0.71	0.73	0.77
16	Alcoholic and non-alcoholic beverages	0.87	0.84	0.71	0.73	0.77
17	Other miscellaneous food products, chocolate, and tobacco	0.85	0.81	0.66	0.74	0.78
18	Textiles and apparel, leather, leather products, and footwear	1.27	1.22	1.12	1.15	1.22
19	Wood and wooden products	1.27	1.22	1.12	1.15	1.22
20	Paper and paper products	1.27	1.22	1.12	1.15	1.22
21	Chemicals, rubber, and plastic	1.27	1.22	1.12	1.15	1.22
22	Metallic and non-metallic mineral products	1.27	1.22	1.12	1.15	1.22
23	Transportation equipment	1.27	1.22	1.12	1.15	1.22
24	Machinery and equipment, other non-food manufactured goods	1.27	1.22	1.12	1.15	1.22
25	Transportation services and storage	1.02	0.98	0.72	0.74	0.78
26	Telecommunication and mail services	1.11	1.07	1.13	1.17	1.23
27	Other services	1.02	0.98	0.72	0.74	0.78

Source: Vos, R., and De Jong, N., (2003), "Trade Liberalization and Poverty in Ecuador: a CGE Macro-Microsimulation Analysis". Economic Systems Research, Vol. 15, No. 2, June 2003. Table A.1, p. 230.

Notes: 1.-Data for products number 1, 3, 7, 9, 10, 17, 24-27 from Vos and DeJong (2003). 2.-Data for the rest of products are assumptions for Ecuador using reference data for other countries. 3.-In the Ecuador CGE model rural and urban households are each divided by income quintile. For *rural* household the elasticities for agriculture are applied to households in the last four income quintile categories, and elasticities for non-agriculture are applied to households in the highest income quintile. For *urban* households, the elasticities for low education are applied to households in the last two income quintile categories, the elasticities for medium level education are applied to the third and fourth income quintile categories, and the elasticities for high education are applied to the households in the highest income quintile.