Poverty Impacts of Increased Openness and Fiscal Policies in a
dollarized economy:
A CGE-Micro Approach for Ecuador

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Abstract

We propose to quantify the effects of both full trade liberalization policy and a budget-neutral value added tax system change (which seeks to compensate tariff revenue losses) on poverty and income distribution in Ecuador. We stress the study of fiscal policies that the government could tap in order to compensate the tariff revenue loss. This is a very important issue for Ecuador because this country adopted the US dollar as its currency in 2000.

To study these issues we combine a reduced-form micro household income and occupational choice model with a standard single-country computable general equilibrium model (CGE) for Ecuador. We follow a sequential approach that tries to ensure consistency between the micro model and the CGE model, and that tries to capture heterogeneity and simulate the full distributional impact of the trade and tax policies. The CGE model is based on input-output and SAM data. The microsimulation model uses data from a household income and expenditure survey that includes rural and urban household data.
INTRODUCTION

Ecuador is immersed in a process of economic policy changes that started in the early 1990s, led by changes in trade policy. Trade policy changes included a tariff reform, important reductions in import restrictions, export promotion laws, the modernization of trade institutions, and the simplification of trade procedures. Policy changes have also included changes in the tax system. The ultimate goal of these policy changes is to create jobs, foster economic growth and reduce poverty in Ecuador. However, little has been done to study the impacts of fiscal and trade policies on poverty in Ecuador.

In contrast to previous decades, in the 1990s Ecuador began to put in place trade policy and practices aimed at reducing trade barriers and fostering exports. A key reform was made in tariffs. These reforms brought down the tariff range from 29 – 290 percent in 1989 to 0 – 40 percent in 1994 (the highest tariff was applied to vehicle imports). The average nominal tariff was reduced from 29 percent in 1989 to 11 percent in 1994 (see Tamayo, 1997). However, there still remain sectors with high protection rates (nominal and effective). These sectors generally include agricultural sectors, where a sizeable fraction of the Ecuadorian poor concentrates.

Currently, Ecuador, together with Colombia and Peru, are about to sign a free trade agreement with the U.S., Ecuador’s main trade partner. Negotiations for a free trade agreement with the European Union are expected to start in 2006. The changes in tariff collection that these free trade agreements will bring about could spell reduced government revenues that will eventually have to be made up by increasing other taxes or reducing expenditure. Given the rigidities in the Ecuadorian government budget, it is more likely that an increase in taxes will be adopted. An increase in value added tax is a good candidate, as the government has already said so.

The analysis of fiscal policy changes is a key issue in an economy such as that of Ecuador, which has adopted the US dollar as its currency since 2000, as a way to halt a deep economic crisis. 2000 marked the beginning of a slow recovery period from the latest economic crisis that increased the levels of poverty by almost 17 points from 1998 to 1999 (see World Bank, 2004), and affected both rural and urban areas. No doubt fiscal policy changes aimed at compensating tariff revenue loss will have an impact on income distribution and poverty. However, in spite of the importance of poverty and fiscal policy impacts, little has been done to analyze the links between these subjects and how other policies may affect them.

This proposal seeks to measure the impact on income distribution and poverty of changes in fiscal policy in response to trade openness in Ecuador. Considering that Ecuador is an economy
that adopted the US dollar as its currency, the analysis of fiscal policies is crucial. Given that Ecuador is a country with high poverty levels, the study of the effect of changes in economic policies on poverty is a must.

**Ecuador: Economic and Poverty Situation Overview**

Ecuador is a small, open, middle-income, oil-dependent economy. In 2004, Ecuadorian GDP totalled US$ 30.3 billion, whereas GDP per capita reached US$ 2325 (or US$ 1460 in US dollars of 2000). Ecuadorian exports as a share of GDP reached an annual average of 24 percent in the last five years, 2000-2004. The central government budget of Ecuador is characterized by both high dependence on oil revenues (oil revenues share in total revenues for the central government represent 34 percent annual average for the period 2000-2004) and deficits. In 2004, the central government deficit reached 1.1% of total GDP. Unemployment and underemployment rates reached 11 and 42.7 percent, respectively, in 2004. See Tables 1, 2 and 3.

<table>
<thead>
<tr>
<th>Table 1.- Structural Characteristics of the Ecuadorian Economy. 2004</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>I. Macroeconomic Characteristics</strong></td>
</tr>
<tr>
<td>GDP (Millions of US$)</td>
</tr>
<tr>
<td>GDP per capita (US$)</td>
</tr>
<tr>
<td>GDP per capita (US$ of 2000)</td>
</tr>
<tr>
<td>Population (thousands)</td>
</tr>
<tr>
<td><strong>II. Sectoral Characteristics</strong></td>
</tr>
<tr>
<td>(Current) GDP share by sector</td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td><strong>III. Unemployment (as a percentage of the workforce)</strong></td>
</tr>
<tr>
<td>Urban unemployment rate</td>
</tr>
</tbody>
</table>

Notes:
1/. Includes livestock, hunting and forestry
2/. Members of the labor force working fewer than 40 hours per week or earning less than the minimum salary
3/. As November.
4/. Notice that the oil refining sector in Ecuador shows a negative value added. This is due to the different accounting treatment of input and output prices of oil refining in the national accounts. While the intermediate consumption of the refinery sector has its price set in international prices, the output of the refinery sector has its price fixed by the government. It is usually the case that the value of output in refinery is lower than the value of its intermediate consumption, which explains the negative value added of the refinery sector.
Table 2.- The Government Sector in Ecuador.  2004

<table>
<thead>
<tr>
<th>Central Government</th>
<th>Share in Revenues</th>
<th>Share in expenditures</th>
</tr>
</thead>
<tbody>
<tr>
<td>Income taxes and transfers</td>
<td>13.7%</td>
<td>Current expenditures 74.6%</td>
</tr>
<tr>
<td>Indirect taxes (VAT)</td>
<td>37.1%</td>
<td>Interests 14.8%</td>
</tr>
<tr>
<td>Import tariffs and other import taxes</td>
<td>10.4%</td>
<td>Wages and Salaries 37.3%</td>
</tr>
<tr>
<td>Oil revenues</td>
<td>30.1%</td>
<td>Purchases 6.6%</td>
</tr>
<tr>
<td>Deficit</td>
<td>6.16%</td>
<td>Investment 25.4%</td>
</tr>
</tbody>
</table>

Total Public Sector

| Income taxes and transfers from C.Gov.           | 26.7%             | Current expenditures 78.5% |
| Indirect taxes and import tariffs               | 32.6%             | Interests 10.7%           |
| Oil revenues                                    | 26.0%             | Wages and Salaries 34.6%  |
| Soc. Sec. Contr.                                | 12.2%             | Purchases 13.8%           |
| Surplus                                         | 8.4%              | Investment 21.5%          |

Financing of the Deficit (Millions of US$)

<table>
<thead>
<tr>
<th>Financing of the Deficit (Millions of US$)</th>
<th>As a percentage of GDP, Central Gov.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Foreign borrowing</td>
<td>1679</td>
</tr>
<tr>
<td>Domestic borrowing</td>
<td>1814</td>
</tr>
<tr>
<td>-249 Balance (deficit)</td>
<td>811</td>
</tr>
</tbody>
</table>


Note: Notice that “Total Public Sector” combines both ‘indirect taxes’ and ‘import tariffs’ in one account. On the other hand “Central Government” figures include separate accounts for ‘indirect taxes’ and ‘import tariffs’.

Table 3.- Central Government Budget. Deficit (-) or Surplus (+)

<table>
<thead>
<tr>
<th></th>
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<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Millions of US Dollars</td>
<td>-289.4</td>
<td>-504.6</td>
<td>-278.1</td>
<td>-959.2</td>
<td>-475.7</td>
<td>19.3</td>
<td>-222.3</td>
<td>-184.6</td>
<td>-108.5</td>
<td>-319.2</td>
</tr>
<tr>
<td>As a percentage of Total Revenues</td>
<td>-9.2%</td>
<td>-15.7%</td>
<td>-8.1%</td>
<td>-29.7%</td>
<td>-17.7%</td>
<td>0.6%</td>
<td>-5.8%</td>
<td>-4.0%</td>
<td>-2.3%</td>
<td>-6.2%</td>
</tr>
<tr>
<td>As a percentage of GDP</td>
<td>-1.4%</td>
<td>-2.4%</td>
<td>-1.2%</td>
<td>-4.1%</td>
<td>-2.9%</td>
<td>0.1%</td>
<td>-1.1%</td>
<td>-0.8%</td>
<td>-0.4%</td>
<td>-1.1%</td>
</tr>
</tbody>
</table>


A heavy burden on the government budget is the presence of expensive and badly targeted subsidies. The case of liquefied petroleum gas for domestic use stands out. In the last five years, since the dollar was adopted as a currency in Ecuador, the government has spent US$1.35 billion on subsidizing liquefied petroleum gas (LPG) for domestic consumption. Cuesta et. al. assert that the richest 20 percent of the population consume 21 percent of the LPG for domestic use whereas the poorest 20 percent of the population consume only 15 percent of the LPG. LPG is also used (although it is not allowed) for public transport.
In the early 1990s Ecuador began a turnaround in trade policy, from an import-substitution policy to an export-oriented – less protective – trade policy. As a result, Ecuador has experienced a great deal of increase in trade openness in the last decade. As figure 2 indicates, the degree of openness of the Ecuadorian economy went from 36.6% in 1993 to 49.4% in 2004. The consolidation of agreements such as the Andean Community (CAN, by its acronym in Spanish) the opening-up of new markets (for example Canada, Russia and China), and the continuation of trade preferences that Ecuador receives from the U.S. (ATPA and ATPDEA) seem to have also contributed to this greater openness.

Note: Openness is measured as imports plus exports as a percentage of gross domestic product.
Other more recent policy changes in the Ecuadorian economy are the adoption of the US dollar as the official currency. The dollar was adopted in January 2000, in the midst of a currency-debt-financial crisis that was threatening the political stability of the government. High inflationary pressures were halted, and the inflation rate converged, very slowly, to levels close to those of US inflation. Thus, inflation in Ecuador was 52.2% in 1999 and reached a peak of 96.1% in 2000. Prices increased at a slower pace in 2001 (37.7%) and in 2002 (12.5%), to finally experience one-digit inflation in 2003 with 7.9%, as well as in 2004 with only 2.7%.

In 2004, Ecuador (and the rest of the Andean Community nations, Bolivia, Colombia, Peru, and Venezuela) signed a Free Trade Agreement for goods with the MERCOSUR countries (Argentina, Brazil, Uruguay, and Paraguay). Currently, Ecuador is negotiating a free trade agreement with the US (Andean partners Colombia and Peru have already signed an FTA with the US). The agreement is expected to start in or after year 2006, right after the trade preferences that the U.S. gives –unilaterally– to the Andean countries end. Ecuadorian authorities, together with authorities from other Andean countries have already proposed to start negotiating for a free trade agreement with the European Union. The U.S., the Andean Community and the European Union markets purchase around 70 percent of total Ecuadorian exports. Similarly, Ecuador receives over 55 percent of its total imports from the U.S., the Andean Community and the European Union.

### Table 4.- Ecuador: Exports and Imports by country

<table>
<thead>
<tr>
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</tr>
</thead>
<tbody>
<tr>
<td>U.S.A.</td>
<td>38%</td>
<td>39%</td>
<td>39%</td>
<td>38%</td>
<td>38%</td>
<td>38%</td>
<td>41%</td>
<td>41%</td>
<td>43%</td>
</tr>
<tr>
<td>Andean Community</td>
<td>9%</td>
<td>12%</td>
<td>13%</td>
<td>11%</td>
<td>14%</td>
<td>18%</td>
<td>16%</td>
<td>17%</td>
<td>13%</td>
</tr>
<tr>
<td>E.U.</td>
<td>19%</td>
<td>19%</td>
<td>21%</td>
<td>18%</td>
<td>12%</td>
<td>14%</td>
<td>16%</td>
<td>17%</td>
<td>13%</td>
</tr>
<tr>
<td>Asia</td>
<td>12%</td>
<td>11%</td>
<td>8%</td>
<td>11%</td>
<td>12%</td>
<td>10%</td>
<td>9%</td>
<td>6%</td>
<td>5%</td>
</tr>
<tr>
<td>Central America and Caribbean</td>
<td>2%</td>
<td>2%</td>
<td>2%</td>
<td>3%</td>
<td>3%</td>
<td>9%</td>
<td>8%</td>
<td>4%</td>
<td>2%</td>
</tr>
<tr>
<td>Rest of America and the world</td>
<td>20%</td>
<td>17%</td>
<td>17%</td>
<td>19%</td>
<td>21%</td>
<td>11%</td>
<td>10%</td>
<td>15%</td>
<td>24%</td>
</tr>
<tr>
<td>Total</td>
<td>100%</td>
<td>100%</td>
<td>100%</td>
<td>100%</td>
<td>100%</td>
<td>100%</td>
<td>100%</td>
<td>100%</td>
<td>100%</td>
</tr>
</tbody>
</table>

**Imports as a Percentage Share of Total Imports**

<table>
<thead>
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<th></th>
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<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>U.S.A. (^1)</td>
<td>31%</td>
<td>31%</td>
<td>30%</td>
<td>30%</td>
<td>25%</td>
<td>25%</td>
<td>23%</td>
<td>21%</td>
<td>21%</td>
</tr>
<tr>
<td>Andean Community</td>
<td>17%</td>
<td>19%</td>
<td>18%</td>
<td>20%</td>
<td>23%</td>
<td>22%</td>
<td>22%</td>
<td>23%</td>
<td>25%</td>
</tr>
<tr>
<td>E.U.</td>
<td>18%</td>
<td>16%</td>
<td>15%</td>
<td>14%</td>
<td>11%</td>
<td>12%</td>
<td>14%</td>
<td>12%</td>
<td>10%</td>
</tr>
<tr>
<td>Asia</td>
<td>11%</td>
<td>12%</td>
<td>14%</td>
<td>11%</td>
<td>15%</td>
<td>15%</td>
<td>15%</td>
<td>15%</td>
<td>16%</td>
</tr>
<tr>
<td>Central America and Caribbean</td>
<td>0%</td>
<td>0%</td>
<td>0%</td>
<td>1%</td>
<td>0%</td>
<td>1%</td>
<td>0%</td>
<td>1%</td>
<td>0%</td>
</tr>
<tr>
<td>Rest of America and the world</td>
<td>24%</td>
<td>23%</td>
<td>23%</td>
<td>24%</td>
<td>26%</td>
<td>25%</td>
<td>26%</td>
<td>28%</td>
<td>28%</td>
</tr>
<tr>
<td>Total</td>
<td>100%</td>
<td>100%</td>
<td>100%</td>
<td>100%</td>
<td>100%</td>
<td>100%</td>
<td>100%</td>
<td>100%</td>
<td>100%</td>
</tr>
</tbody>
</table>

Source: Central Bank of Ecuador, and own construction.

Note: 1/. U.S. import data include Puerto Rico.
These changes in trade policy have had and will continue to have an economic and social impact on Ecuador that in turn may trigger changes in other policies. A very likely course that the government would pursue in seeking to compensate its revenue loss due to tariff reductions/elimination is an increase in taxes. Tariff and other import taxes represented 10.4 percent of total revenues for the central government in 2004 (Table 2). As revenue for the non-financial public sector, tariffs and other import taxes represented 1.55 percent of GDP the same year (Table 5). Unless the government reduces its current expenditure or generates more revenue from sources other than taxes, the government will have to decide how to compensate its tariff revenue loss. Such fiscal impacts have even more relevance in an economy like Ecuador’s, which has adopted the US dollar as its currency (abandoning with it other key instruments of economic policy like those in monetary and exchange rate policies). Fiscal policies in Ecuador are a unique and key instrument in managing the economy. In fact, the press has already reported a possible increase in value added tax which currently stands at 12 percent (for final sales of goods and services). Changes in fiscal policies will in turn affect poverty and income distribution in Ecuador. Despite the importance of the analysis of fiscal and poverty impacts in Ecuador there has been little research on the subject.

<table>
<thead>
<tr>
<th>Table 5.- Non-financial Public Sector, Selected Operations</th>
<th>Percentage of GDP</th>
</tr>
</thead>
<tbody>
<tr>
<td>TOTAL REVENUES (1)</td>
<td>22.8</td>
</tr>
<tr>
<td>Non-oil</td>
<td>13.54</td>
</tr>
<tr>
<td>Value Added Taxes (VAT)</td>
<td>3.09</td>
</tr>
<tr>
<td>Income taxes</td>
<td>1.71</td>
</tr>
<tr>
<td>Tariff collections</td>
<td>1.49</td>
</tr>
<tr>
<td>Social Security contributions</td>
<td>2.52</td>
</tr>
<tr>
<td>Others</td>
<td>3.9</td>
</tr>
<tr>
<td>TOTAL EXPENDITURES (2)</td>
<td>23.8</td>
</tr>
<tr>
<td>Current Expenditures</td>
<td>17.9</td>
</tr>
<tr>
<td>Interest</td>
<td>3.92</td>
</tr>
<tr>
<td>Wages and salaries</td>
<td>7.11</td>
</tr>
<tr>
<td>Purchase of goods and services</td>
<td>1.52</td>
</tr>
<tr>
<td>Others</td>
<td>5.4</td>
</tr>
<tr>
<td>Capital Expenditures</td>
<td>5.92</td>
</tr>
<tr>
<td>BALANCE</td>
<td>-1.02</td>
</tr>
</tbody>
</table>

Notes: 1/. Other small revenues, excluded from this table, are: special consumption taxes, taxes on exits from the country, and taxes no longer applied after 2000 (like the tax on purchases and sales of foreign currency, and on circulation of capital). 2/. In this table government expenditures are expenditures already accrued.
According to a recent World Bank poverty note (see Sanchez-Paramo, 2005), forty percent of the population in Ecuador lives in rural areas and sixty percent of this population is poor. On the other hand, figure 3 below shows that urban poverty hit a low level of 28 percent of urban population in 1997, increased to 47 percent in 1999 (as a consequence of a deep economic crisis), and recovered twelve points to reach 35 percent in 2001.

Sanchez-Paramo points out two key problems with social expenditure in Ecuador: they are highly volatile and poorly targeted. Some social expenditures are progressive – primary and secondary education, for instance. But others are regressive, such as the case of the subsidy for cooking gas, as discussed above. On several occasions the elimination of the gas subsidy has been recommended (see for instance, World Bank 2004). Several governments have tried to reform or eliminate the gas subsidy, but it has proven a very hard political issue to deal with. The elimination of this subsidy could be a way to compensate tariff revenue loss, but the high political cost makes the adoption of this expenditure-reduction measure unlikely.

<table>
<thead>
<tr>
<th>Table 6.- Ecuador: Social expenditure, Selected years</th>
</tr>
</thead>
<tbody>
<tr>
<td>As percentage of GDP</td>
</tr>
<tr>
<td>Total</td>
</tr>
<tr>
<td>Education</td>
</tr>
<tr>
<td>Health</td>
</tr>
<tr>
<td>Social Assistance</td>
</tr>
<tr>
<td>Bono Solidario</td>
</tr>
<tr>
<td>Other</td>
</tr>
</tbody>
</table>

Source: Sanchez-Paramo (2005).
The VAT in Ecuador

The VAT in Ecuador is levied on domestic sales and import sales of goods and services. Export sales of goods and services have zero VAT rate. There is a rebate for intermediate and investment purchases, so we can see the VAT as administered using the “invoice method”: all transactions being taxed, and firms deducting taxes paid on intermediate inputs as well as on purchases that add to their assets. The tax amount is reported on the invoices for inputs.

The current VAT rate stands at 12 percent, with a few but important exemptions rated at 0 percent\(^1\). Among the exemptions are:

- **Domestic sales and imports of:**
  - Food products in primary stage, that is, not subject to manufacturing, processing or treatment that implies a change in their structure.
  - Raw milk and milk for baby and child feeding.
  - Bread, sugar, salt, fat, margarine, etc (which includes all basic food items).
  - Certified seeds, plants, and roots. Fish feed. Fertilizers, pesticides, insecticides, fungicides, and veterinarian products.
  - Tractors and other farm equipment.
  - Medicines and drugs for human use, included in list published by the Ministry of Health; including its containers and labels.
  - Paper, magazines, and books.
  - Exports.

- **Services:**
  - Passenger and cargo transport: sea, maritime, air, by river.
  - Leasing (for home living purposes only).
  - Public services.
  - Education, childcare, retirement houses.
  - Religious.
  - Printing.
  - And few other services. For a complete list of exemptions, see the Law and Rules for VAT in Ecuador.

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\(^1\) This is so, since raw food products, basic food items, agricultural inputs and equipment, transport and other services are exempt and constitute either an important income source for rural households –or affect income generation in the rural sector– or are important expenditure sources, as poverty tends to concentrate in the rural sector and food makes up for a relatively high expenditure share for poor households in general.
The Internal Revenue Service has been on target of VAT expected collections in almost all years during the 2000s (Table 7).

Table 7. Ecuador: VAT collection, 2000-2005

(USD$ dollars)

<table>
<thead>
<tr>
<th>Year</th>
<th>Expected</th>
<th>Collected</th>
<th>Fulfillment</th>
</tr>
</thead>
<tbody>
<tr>
<td>2000</td>
<td>1,181,647,990</td>
<td>1,675,039,964</td>
<td>141.6%</td>
</tr>
<tr>
<td>2001</td>
<td>1,754,886,072</td>
<td>2,345,653,385</td>
<td>133.66%</td>
</tr>
<tr>
<td>2002</td>
<td>2,477,782,633</td>
<td>2,704,447,280</td>
<td>109.15%</td>
</tr>
<tr>
<td>2003</td>
<td>3,037,700,000</td>
<td>2,908,089,354</td>
<td>95.73%</td>
</tr>
<tr>
<td>2004</td>
<td>3,218,000,000</td>
<td>3,264,704,791</td>
<td>101.45%</td>
</tr>
<tr>
<td>2005</td>
<td>3,461,000,000</td>
<td>3,929,000,978</td>
<td>113.52%</td>
</tr>
</tbody>
</table>

1. Main research questions and core research objectives

The ultimate goal of this proposal is to contribute to the availability of tools to perform income distribution and poverty impact studies of changes in fiscal and trade policies in Ecuador. We believe that two key tools to perform such impact analyses are CGE models and microsimulations. Through this study we also aim to expand the knowledge of Ecuadorian policy makers and of the international community regarding fiscal and trade policies in Ecuador, and their effects on poverty and income distribution. We take as an illustration the study of poverty and income distribution effects of a combined policy of full trade liberalization with changes in value added tax system –designed to compensate for government’s tariff revenue loss- in Ecuador.²

² We believe that this scenario of full trade liberalization can be seen as a benchmark for trade liberalization policies pursued by Ecuador in recent years. Ecuador has complementary economic agreements with several Latin American countries (these agreements grant trade preferences to signatory trade partners). Ecuador recently signed a Free Trade Agreement for goods with MERCOSUR, is negotiating an expected broader Free Trade Agreement with its main trade partners –U.S., Colombia, Peru-, is already in a free trade zone with Andean partners, and is expecting to soon negotiate Free Trade Agreements with the European Union and Chile. Ecuador (and fellow Andean countries) already receives tariff preferences from its main trade partners (the U.S. and the EU). We take this proposed study as an upper benchmark of poverty effects of recent trade liberalization policies pursued in Ecuador because we are studying a full liberalization scenario. We, for the sake of modeling simplicity, do not include a multi-region CGE model (again, Ecuador already enjoys zero- or very small tariff access in most of its trade with its most important trade partners).
The main research questions we pose in this study are:

-What would be the effects on income distribution and poverty of a policy of almost full liberalization\(^3\) (zero tariff rates, with key trade partners) and a change in the value added tax system designed to keep the government budget neutral?

- What would be the changes in the poverty headcount, the poverty gap and the intensity of poverty [FGT(0), FGT(1), FGT(2)] after free trade and changes in the value added tax rates are implemented?

-Are there any other possible tax/trade scenarios that could have less negative impacts on the poor?

The core research objectives include:

-Document the main domestic prices and labor market effects of trade liberalization policies in Ecuador and establish the links between the CGE and micro-model regarding these prices and labor market effects.

-Document the changes in income distribution and poverty resulting from combined free trade and changes in value added tax policies.

-Establish the main links and mechanisms by which these trade and fiscal policies affect income distribution and poverty across and within different labor types (wage, self-employment; rural, urban; and, by education level), in Ecuador. The types of factor incomes to be considered are constrained by data availability.

2. Knowledge gaps and scientific contribution of the research

This study is part of a growing branch of the empirical economics literature that tries to examine the effects on poverty and income distribution in countries that have opened their markets to global competition. We add to it the study of fiscal policies that the government could tap in order to compensate tariff revenue loss. The impact analysis of changes in fiscal policies on poverty and income distribution is a very important issue for a country such as Ecuador where poverty rates are high and where the US dollar has been the official currency since 2000 (and thus authorities have lost monetary and exchange rate policy instruments to face economic
imbalances). These issues are significant as the agricultural sector remains one of the most protected and where, therefore, further trade liberalization will have the larger impact. Also, potential elimination of current VAT exemptions will affect agricultural income and food expenditures the most. Both heavily influence poverty since it tends to concentrate in the rural sector and the poor in general expend a large share of their income in food. However, there has been no systematic evaluation of the extent to which fiscal and trade policies affect poverty and income distribution in Ecuador.

We propose to use micro and computable general equilibrium models of the Ecuadorian economy. There are various ways to approach the analysis of the impact on poverty and income distribution of changes in economic policies within a combined CGE-microsimulation framework. These approaches are classified according to the interrelation between the CGE and the micro model or data they apply (top-down, bottom-up, both top-down and bottom-up; layered, fully integrated; representative, extended representative or real household data). Two recent surveys (Bourguignon, Pereira, and Stern (2002), and Davies (2004)) highlight the main characteristics, applications, and advantages and disadvantages of these approaches. Lofgren, Robinson, and El-Said (2003) explain the representative household approach. Cockburn (2005) is an example of a fully-integrated CGE-microsimulation model. Bourguignon, Robilliard and Robinson (2003) follow a top-down layered or sequential approach. Savard (2003) designed a top-down/bottom-up approach. In our study we propose the application of a sequential approach with a CGE and a micro model along the lines of Bourguignon, Robilliard and Robinson (2003).

One main technical contribution will be the analysis of impacts on poverty and income distribution of fiscal policies using a CGE for the Ecuadorian economy and microsimulation analysis with real household data. A recent study on the impact of trade liberalization on poverty in Ecuador using the CGE microsimulation framework is Vos and De Jong (2003). But in this study there is no fiscal policy change involved, and the micro modeling is approached as a random process. We will depart from this approach and will try to model earnings and occupational choice households’ decisions by building a system of equations as in Bourguignon, Robilliard and Robinson (2003). (See also Robilliard and Robinson (2005), Robilliard, Bourguignon and Robinson (2001), and Bussolo and Lay (2005)). A key contribution will be to identify the central links between the CGE and micro models.

This research will contribute to the development of both CGE modelling and micro modelling in Ecuador. And very importantly, it will build tools for the analysis of impacts of fiscal and trade policies. At the same time this study will focus attention on a key aspect of fiscal and trade

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3 As tariffs vis-à-vis the rest of the world will not be removed.
policy changes usually ignored in the public debate in Ecuador: their effects on income distribution and poverty.

Key points of this study.

This study differs from previous CGE studies of Ecuador because:

1. It links fiscal and trade policy changes to poverty and income distribution effects, using own single-country CGE model and a micro simulation model.

2. It links macroeconomic variables to income distribution across different labor groups (according to area – rural and urban, and education level – primary and higher than primary; for wage earners and the self-employed).

3. The CGE and micro models designed and used in this proposal are intended to be kept and further applied in Ecuador as an analysis tool of the poverty impacts of other policy changes. And, potentially, to the analysis of the impact of important trade policy developments with neighbouring and partner countries (Colombia and Peru).

3. Policy relevance

Ecuador is a dollarized economy immersed in a trade openness process which will likely trigger changes in fiscal policies. In fact, the Ecuadorian government has already said that an increase in VAT rates would likely be the source of revenues to make up for tariff revenue loss coming from trade liberalization policies. A main concern of the government is the fiscal impact of trade liberalization, given that Ecuador is an economy that has adopted the US dollar as her currency and has forgone use of important policy instruments. These policy changes in turn will affect income distribution and poverty rates in a country with high poverty rates in rural and urban areas (see World Bank, 2004).

Our emphasis on both fiscal policies and the use of CGE and microsimulation models as basic analysis tools is necessary. In a country such as Ecuador, which is a dollarized economy pursuing trade liberalization policies, with high poverty rates, and lacking research tools for impact analyses of changes in economic policies, the availability of analysis tools should contribute to the adoption of better-informed policy decisions concerning the poverty effects of fiscal and trade policies.

It is time to draw the attention of Ecuadorian authorities and the Ecuadorian community and public in general to key topics such as fiscal and poverty impacts. We hope that the analysis of
poverty and income distribution impacts will become common practice in the discussion of the effects of policy changes. This study would be a first step in that direction.

4. Methodology

The method we plan to follow to address the impacts on poverty and income distribution of a combined policy of full liberalization and a change in the VAT system to keep the budget neutral is to combine a CGE model with a micro model. The method will include four main stages, and will have a sequential approach, given that the macro and the micro modelling part will be developed separately, but we will try to ensure consistency between the CGE and the micro model results. We believe this is an insightful approach as it will allow us to transmit to the household level domestic price and resource reallocation changes expected from trade liberalization policy that may have a key influence on household poverty and income distribution. It will also allow us to analyze the full distribution of real household income within households and not just between households, which is a criticism received by models which use a representative household approach with few groups. The approach with real household data we follow is not free of criticism either. Main criticisms against this approach are the lack of feedback from households’ results to the main macro model (the CGE country model, in our case), and the ad-hoc nature of the micro-model equations. Our microsimulation work follows the spirit of the work in Bourguignon, Robilliard and Robinson (2003), Robilliard, A., F. Bourguignon, and S. Robinson (2001), and Bussolo and Lay (2005).

The four main modelling stages proposed are:

1) Linking, in a consistent way, the micro and the CGE models. This step in turns implies, broadly speaking, two steps: (i) estimating the equations in the micro model and obtaining a set of coefficients and household characteristics that will be used to calibrate the CGE model, and (ii) running a benchmark simulation in the CGE model so that the model is calibrated, in a consistent way to the set of coefficients and household characteristics from the micro model. We expect to follow the consistency rules provided by Bourguignon, Robilliard and Robinson (2003). In a nutshell, according to Bourguignon et. al., consistency requires changes in variables of the micro-model equations to be equal to changes in similar variables of the CGE model.
2) Solving the trade and fiscal policy changes in the CGE country model for Ecuador (which seek to raise revenues in response to the revenue lost due to tariff elimination, so as to keep the government budget neutral), and get a new set of variables (a vector of appropriate prices, wages, and aggregate employment variables) that will be used to communicate with the micro-simulation model. In order to appraise the isolated impact of both types of policy changes, trade and fiscal changes will be implemented sequentially. An overview of the CGE model is presented below.

3) Using the micro-simulation model to generate changes in variables that account for heterogeneity in the household data (individual wages, self-employment income, and employment) so that the results are consistent with the post-policy-change macro variables generated by the CGE model.

4) Evaluating the impact of the policy changes on poverty and income distribution, with due regard for the marginal impact of the fiscal policy changes.

Key issues in this research project that need to be addressed with care are how to make the proper links between the CGE country model and the micro-simulation model to ensure consistency between them. Another issue that will need to be addressed, prior to the macro-micro links issue, is the modelling of both the single-country CGE model for Ecuador and the micro model so that the models take into account key features of the Ecuadorian economy and households (such as the oil sector, the VAT, and unemployment).

One step prior to the modelling stages will be a good deal of data work. The data work includes (i) cleaning up the rural and urban household survey data, (ii) constructing income distribution and poverty indicators using the (initial) rural and urban household survey data, and, (iii) calibrating the CGE model with the make and use table and Social Accounting Matrix data.

In what follows we present a preliminary outline of the micro model and an overview of the CGE model proposed.

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4 To deal with unemployment we adopt a proper closure that keeps wages fixed and allows for adjustment in labor quantities. Whether unemployment in Ecuador (9 to 11% annual average in the last 5 years) is really a problem (of rationing) worth dealing with in a more detailed fashion, within the framework proposed, is an issue that we would like to discuss with PEP. The same applies to underemployment. And if these are issues we need to deal with, we would also appreciate to have some discussion on how to deal with them.
The Micro Model: A preliminary outline

As in Bourguignon, Robilliard and Robinson (2003), the micro model will be based on a set of reduced form equations that describe individual earnings, household self-employment income, and the occupational choices of individuals in the household survey.

- The wage earnings equation is a semi-logarithmic equation of the logarithm of wages of individual $i$ with independent variables: years of schooling, years of work experience, and dummies for: gender, location (rural, urban), marital status, head of household.  
- The self-employment income equation is a semi-logarithmic equation of the logarithm of self-employment income, with independent variables: years of schooling, years of work experience, and dummies for: gender, location (rural, urban), marital status, head of household, and skill level (working in the formal versus the informal sector).

We estimate both total wages and earnings equations by OLS (and Heckman 2-stage to control for sample selection bias, which may arise given that the wage and income is observed by those who actually participate in the labor market).

- The occupational choice equation is a multinomial logit of four occupational alternatives:
  i) inactive or unemployed (benchmark, not estimated)
  ii) wage earner
  iii) self-employed
  vi) others (“en lo que salga”, according to survey data classification)

This multinomial equation includes as independent variables: years of schooling, work experience, number of small children in the household, and dummies for: gender, marital status, head of household, head of household’s years of schooling, and for somebody in the household who owns a family business.

Micro model simulation: Benchmark case

The benchmark case simulation ensures that household data should match CGE model data. This is the so-call “consistency” of the micro model with the CGE model.

The general consistency rule means:

Summary figures from Household data = Aggregates in CGE model. So that:

For the number of wage earners: the sum of all wage earners from the household survey (the sum over each individual, whether heads, or other members, in a household and then sum over all households) equates the total wage employment level of the wage labor market as reported in a

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5 Our team is considering the use of both income- and expenditure-base indicators of poverty.
6 See Mincer, 1974. Work experience is defined in the literature as: age minus years of schooling minus five. See Alatas and Bourguignon, 2000.
SAM underlying the CGE model. Similarly, for the number of self-employed and “others” the total number of workers in each category from household data should equal the aggregate number in the CGE model.

For wages; the sum of individual wages times a dummy for wage-earning individuals based on household survey data (for the economy as a whole) should be equal to the total wage bill as reported in the CGE model. Similarly, for self-employment income and other incomes the total income in each category from household data should equal the aggregate income in the CGE model. To ensure consistency, we follow recent literature and add back estimated residuals into the estimated household behavior equations. If inconsistencies are found, then one way to solve this is to adjust sampling weights of individuals in the household survey data until consistency is reached. (Also check Robilliard and Robinson, 2001).

**Linking the micro-simulation model with the CGE model**

The micro-simulation model is linked with the CGE model through a set of aggregate changes in wage employment, self-employment, wages, self-employment income, and prices. The changes in some or all of these aggregates are triggered by a policy change or shock that hits the economy (in the CGE model). These changes are incorporated then in the micro-simulation model into the household behavior for wages, income, and employment, so that consistency requirements are met. We plan to follow recent literature and simulate changes via changes in intercepts, that is, we would not re-estimate micro equations behavior. Again, consistency checks shall be performed in simulation results. Our team acknowledges that micro simulation is a new tool in academic and policy studies in Ecuador, and a rather complex tool to master. We will put all the efforts needed to learn it. We will appreciate all the help from the PEP network on microsimulation. We will propose to do a research visit at this stage of the process.

**Overview of the CGE Model**

The CGE model proposed is a standard static CGE model. We propose to use a static model considering both that in Ecuador a key policy concern is the impact of trade liberalization on government revenues, and that our proposed project’s concern is, precisely, the impact of policy changes on income distribution and poverty. We acknowledge that a dynamic model could also tackle interesting medium- and long-run developments of the economy, such as labor market dynamics, trade balance, capital formation, and the rate of growth, that have an impact on poverty. However, the focus of the proposal are the impact effects, not the very long-run effects
of trade and fiscal policies and hence it is well served by using a static model. Our concern on
the fiscal impacts of trade liberalization policy is justified by a number of studies which conclude
that fiscal deficits should be corrected early in the trade reform process. “Since trade taxes are a
major revenue source for most developing countries, careful planning is needed to ensure that
revenue reducing effects of rate reduction do not upset the fiscal balance... but it is also
necessary to look at ways of shifting away from trade taxes to less distortionary forms of taxation,
such as VAT.” (Nash and Takacs, eds (1998), pp. 186-7. See also IMF (2005).

The model will follow the standard neoclassical CGE structure with equations that describe
producers’ production and input decisions, households’ behaviour, government demands, export
demands, market clearing conditions for commodities and factors markets, and numerous
macroeconomic variables and price indices. Demand and supply equations for private-sector
agents are derived from the solutions to optimization problems, where agents are assumed to be
price-takers and markets are assumed to be competitive. Table 8 summarizes some of the
intended features of the CGE model. The model will include trade flows with the main trade
partners of Ecuador (the U.S., the E.U., the Andean countries of Colombia and Peru),
MERCOSUR, and the Rest of the world. We will make efforts to model the oil refining sector,
which is a heavily regulated sector in Ecuador. There also remains work to be done with the CGE
model, in particular regarding the households and labor market structure. We will appreciate the
advice from the PEP network considering the modeling of these key features (oil sector and labor
market structure) of the Ecuadorian economy.

Scenarios:

i) Tariff elimination vis-à-vis Ecuador’s main trade partner, the U.S.

ii) Tariff elimination vis-à-vis Ecuador’s main trade partner, the U.S., plus alternative
changes in the VAT system (tax replacement policy) to keep the government budget
neutral.

iii) Tariff elimination vis-à-vis Ecuador’s main trade partner, the U.S. and the E.U.

7 Nonetheless, we consider that the future development of a dynamic CGE model for Ecuador is important and
would greatly contribute to understand relevant issues for its economy. A key step for this is to develop a static
CGE model which be able to capture key features of the Ecuadorian economy such as the oil refining sector, the
VAT system, trade policies, and household characteristics. Also from the national capacity building viewpoint
it is preferable to start from a static rather than a dynamic model.

8 The alternatives to be considered include: (a) a uniform increase in the VAT rate without eliminating current
exemptions to the tax; (b) an increase in the VAT rate for currently covered goods and services, plus
implementation of a differential VAT rate (lower) for currently exempted goods and services; (c) a flat VAT
rate for all goods and services; (d) a differential increase for goods and services currently covered by the VAT,
with a larger increase for goods and services characteristically consumed by high income households.
iv) Tariff elimination vis-à-vis Ecuador’s main trade partner, the U.S., and the E.U., plus alternative changes in the VAT system (tax replacement policy) to keep government budget neutral.

v) For scenarios (ii) and (iv), under the alternative change in the VAT system that we consider most likely to be implemented by the government, we will run another alternative: a mix of the VAT system change and an increase in direct taxes.

vi) For scenarios (ii) and (iv) the change in the VAT system will be alternatively replaced by a (sole) change in direct taxes to make up for tariff revenue loss.

**A Note on Closures**

We expect to perform at least two sets of closures (corresponding to scenarios under analysis).

In the first closure (corresponding to the trade liberalization scenarios) all expenditure-side aggregates are fixed. Therefore, if shocks affected GDP, the balance of trade (fiscal balance) is endogenous. Both capital stock and real wages are fixed. Also fixed are: all technological change, distribution of investment between industries, number of households and their consumption preferences. All tax rates are exogenous.

In a second closure (for the trade liberalization cum VAT system change scenarios) we experiment alternative changes in the VAT system so as to keep the fiscal balance at the same level as in the benchmark situation. Here, real government expending is fixed as is nominal total government income. Reductions in government income arising from tariff revenue forgone are compensated by means of either changes in the VAT system or changes in direct taxes or both. Also, real investment is held fixed. When appropriate, real wages are fixed so as to account for unemployment so that the labor market clears through changes in employment level. Also fixed are: all technological change, distribution of investment between industries, number of households and their consumption preferences.
Table 8.- Main Features of the Ecuador CGE Model (*)

<table>
<thead>
<tr>
<th>Sections</th>
<th>Description</th>
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| 1. Production     | Each industry may produce several commodities, using as input domestic and imported commodities, labor, capital, and land. 1/  
Commodity composites, a primary-factor composite and other costs are combined in a Leontief function. Each commodity composite is a CES (constant elasticity of substitution) function of the domestic and imported goods. Primary-factor composites are a CES aggregate of land, capital and composite labor. Composite labor is a CES aggregate of occupational labor types. Input proportions and behavioral parameters may vary between industries. |
| 2. Household demands | Follow also a nesting structure, where commodity composites are aggregated by a Klein-Rubin, which results in a linear expenditure system (LES). The choice between domestic and imported commodities is a CES. These structure determines the composition of households demands but not total consumption. Total consumption can be determined in several ways: (i) exogenously, (ii) by a consumption function, or (iii) via a balance of trade constraint. |
| 3. Investment demands | The production of new units of fixed capital shows a similar structure as the nesting structure for production of commodities. No primary factors are used directly as inputs to capital formation. At top level the total cost of commodities composites is minimized subject to a Leontief, at the bottom level, the total cost of imported and domestic good i is minimized subject to a CES. The total amount of investment in each industry is exogenous and is determined by other equations. |
| 4. Export demands | For an individual export commodity, foreign demand is inversely related to its commodity price. For collective export commodities, foreign demand is inversely related to the average price of all collective export commodities. |
| 5. Government demand | The level and composition of government consumption can be set exogenously. Aggregate government consumption can also be assumed that moves with real aggregate household consumption. |
| 6. Market-clearing equations | The model includes the standard equations to show that markets are in equilibrium. |
| 7. Taxes | The model includes rules for setting sales-tax rates for producers, investors, households, and government. Sales taxes are ad valorem on basic values (that is, the price received by producers; it excludes sales taxes and margins involved in the transfer of the good from producers to users). Changes in the relevant tax rates can be commodity- or user-specific. |
| 8. Primary factors aggregates | These measures indicate the aggregate productive capacities of labor, land, and capital. For instance, if needed and if data is available, the model can compute aggregate employment measures, using wage-bill weights that reflects the relative marginal products of different workers. |
| 9. The labor market | The model allows for different settings, according to the desired assumptions. Employment can be set exogenously, with market-clearing wage rates determined endogenously, or wage rates (real or nominal) can be set exogenously, allowing employment to be demand determined. Labor market modelling decisions are usually made at the economy-wide level, but could be applied individually and differentially to different industries or different types of labor. |
| 10. Some Key assumptions | In production: input-output separability. Armington assumption in the sourcing of intermediate inputs, so that imports are considered imperfect substitutes for domestic supplies. Capital is produced with inputs of domestically produced and imported commodities. No financial markets, the model focuses on the real side of the economy. |

(*) This overview is based on the ORANIG description found in Horridge (2000). The model for Ecuador will be adapted from this model and Lofgren (2002). We will use GAMS.

Notes:
1/. The input-output table of Ecuador originally has 60 commodities and 47 industries.
A note on VAT modeling

To model the VAT system we plan to follow Go et. al. (2005), extending the CGE model we use to include VAT payments with rebates on intermediate inputs, and Cororaton and Cockburn (2005) so that the VAT tax rate needed to make up the tariff revenue lost is determined endogenously. Similarly, we follow the latter for modeling changes in direct taxes.

First we replace tariff revenue lost with alternative changes in the VAT system, following Cororaton and Cockburn (2005) so that we can discriminate between sectors, allowing implementation of the alternatives considered (see footnote 7). Then, we use, instead of a sole change in the VAT system, a mixture of the alternative VAT system change that most likely will be implemented by the government and of an increase in direct taxes. For this we also follow Cororaton and Cockburn (2005). Finally, we implement a proportional increase in the income tax. In all these scenarios we maintain public expenditure levels and do not change government revenue (with respect to the benchmark equilibrium) so that the budget remains neutral after trade liberalization.

As in Go et al, we will assume that the observed VAT revenue in the Make and Use (and SAM) data is the gross payment by sector. To compute the rebate on intermediate expenditure for each production activity we will compute the rebate using data on input-output relationships. As Go et al point out, a CGE model is useful to analyze income (and poverty) incidence of taxes because it captures the effects of taxes on prices.

A note on the Oil sector modeling

To model key features of the oil refining sector in Ecuador we plan to focus on the fact that output prices of gas for domestic consumption in this sector are fixed by the government, but the purchases of such gas (all imported) are in international prices. The difference between the international price and the domestic prices constitutes a subsidy. We focus on the gas for domestic consumption because of the key policy implications on income and poverty impacts.

5. Data requirements and sources

The data we expect to use in this study include an input-output table and a social accounting matrix (SAM) for Ecuador for the year 2001, both developed by the Central Bank of Ecuador. We expect to also use the latest household data available for Ecuador. These data come from the 1998-1999 survey of urban and rural households’ life conditions (“Encuesta de Condiciones de

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9 Whose characteristics are to be appropriately determined based upon fiscal revenue information.
This survey includes data on income, expenditures and occupational choices at the individual level. This survey is carried out by the Ecuadorian Institute of Statistics and Census (INEC, by its acronym in Spanish). The unit of study of the ECV is the household and its members. The World Bank also has this Ecuador household survey data (the so-called Living Standards Measurement Study (LSMS) household surveys for Ecuador). Note: INEC is currently processing a 2005 ECV, and has published some preliminary results; the expected date for the official release of this household survey data is October 2006.

6. Dissemination strategy

We plan to hold CICYT-organized seminars at ESPOL to present work-in-progress and final results of this research (CICYT is a department at ESPOL which is in charge of publishing research results as well as organizing seminars for big audiences, where researchers, professors, and students from across all disciplines at ESPOL and other universities can attend). The same holds for presenting work in progress and final results in Bogota, Colombia, under the joint coordination of ESPOL and the Universidad del Rosario. Around the same time we will organize a seminar to present final results we expect to hold press conferences in the cities of Quito and Guayaquil. We also plan to present results at the School of Management, where the targeted audience will be private constituency, businessmen, and graduate students. We expect to attract the attention of the government and national institutions and organize seminars where government officials will be invited to attend. Working papers will also be submitted to suitable regional meetings for presentation during 2006 and 2007. We would also like to have the opportunity to attend PEP general meetings and the MPIA workshops. This will certainly be an excellent opportunity to discuss this proposal and research in progress, and exchange ideas with other scholars and policy makers. We expect the results of this study to be the basis of future journal publications, in Ecuador and abroad. Final output results will be made available in our institutions’ websites. See http://www.espol.edu.ec, http://www.espae.espol.edu.ec, and http://www.urosario.edu.co/FASE1/economia/index.htm.

7. Shortlist of key references


8. List of team members’ prior training and experience in the issues and techniques involved.

- Sara Wong, female, 36, has a PhD in Economics with specialization in International Economics, Public Finance and Economic Development from the Economics Department at the University of California, Los Angeles (UCLA). She has received training in CGE models. She attended both the Trade Policy Modeling and the Database Construction courses for applied General Equilibrium models at the Center of Policy Studies, Monash University, in Melbourne, Australia (July 2004). She has also attended the Annual Short Course at the Global Trade Analysis Project (GTAP), Purdue University, in West Lafayette, Indiana, U.S.A. (August 2004). She recently attended the Dynamic CGE Modelling course offered by Monash University at the US International Trade Center in Washington, DC (December 2005). She has applied her CGE training to the study of the economic impacts of the foreign trade agreement that Ecuador is about to sign with the U.S.A., Colombia, and Peru. Sara contributed to the inclusion of input-output
tables of both Ecuador and Bolivia in the GTAP database. As a result, these two countries are for the first time included in that database (version 6.1). She has worked with income and expenditure household micro-data in previous consultancy jobs in the U.S.A., applying both STATA and SAS programs.

- **Ricardo Argüello**, male, 48, is a PhD candidate in Regional Science from Cornell University with specialization in international trade and economic geography issues. He also holds an MSc in agricultural economics from the same university. He has received training in CGE modeling in the City and Regional Planning Department at Cornell as well as from Purdue University in the framework of an agreement between the GTAP and Cornell’s Department of Applied Economics and Management. He has worked on international trade and economic integration issues for the Andean Community and the Colombian government and on rural poverty and structural change in the agricultural sector for the Colombian government. Ricardo has experience using GAMS and doing CGE modelling.

- **Paul Herrera**, male, 30, has a PhD in Agricultural Economics from the Department of Agricultural Economics at Gent University (Gent-Belgium). Although he has no direct experience in the research topic of this project, he has worked in research with primary data (surveys), in topics relating to rural development, farm systems, the measurement of social capital, the economics of property rights and transaction costs. Parts of his research articles have been published in international journals.

- **Ketty Rivera**, female, 20, is an undergraduate student at the Economics Department (of the Escuela Superior Politécnica del Litoral, ESPOL). She has received training on tax issues including VAT. Ketty is her senior year and expects to graduate at the end of the current academic year.

9. **Expected capacity building**

   Our university, ESPOL, has a mission to “undertake research, technology transfer and quality outreach programs to serve society.” To contribute to the process of trade openness that Ecuador is committed to, ESPOL has given support to projects oriented towards the study of economic impacts using a computable general equilibrium framework. The impact studies have so far focused on macro issues. We would like to deepen our experience and knowledge of CGE macro
modeling while focusing on key microeconomic issues for Ecuador, such as the study of poverty impacts. In Ecuador, poverty analysis is a field where there is a pressing need for developing tools and theoretical frameworks to carry out studies.

This is why we would like to have this opportunity to work on developing and implementing a framework and tools that could help us tackle poverty issues and the poverty impacts of policy changes in Ecuador. We refer to the proposed sequential CGE-microsimulation framework. We have worked on a Computable General Equilibrium Model for Ecuador, we expect to work on a micro model of earnings and occupational choice, and we propose to apply these models to a poverty impact study of trade and fiscal policy changes.

In summary, we want to strengthen the CGE macro modelling capacities of the team members and to learn and deepen the knowledge of micro-simulation techniques that professors at ESPOL have. Some members of the team have knowledge and experience in the modelling and application of CGE models. Other team members have knowledge and experience in poverty issues. All members have a great deal of experience using statistical and econometric software and techniques. The corresponding curriculum vitae can provide more details on the background of each team member. This project may give team members the opportunity to participate in events that could enhance their capacity to teach and train others (undergraduate and graduate students) in issues and techniques in applied macro and microeconomics.

Prof. Wong and Prof. Arguello will be in charge of CGE modelling and policy simulations. They will also contribute to the development of the micro model. Prof. Herrera will develop and present seminars on the results to academics, businesspeople, and government officials. He will work on poverty indicators and the micro model.

Prof. Herrera would like to stress the importance of linking micro and macro models in order to be able to derive macro-policies that could be enforced at institutional level, which in turn could support the effectiveness of micro-policies at local levels. This last point is of extreme importance in Ecuador given the weak institutional structure and the great potential of local initiatives to improve the welfare of rural populations, which are the ones that are mostly living in extreme poverty conditions. It is clear, however, that any effort at the micro local level will lose effectiveness if no enforcement is achieved at institutional level.

In addition, we will hire research assistants to work on data issues. All team members expect to apply the new knowledge and techniques learned through this project in their respective economics and management classes. For instance, we expect to design and teach a seminar with the main techniques used to foster/motivate the interest of undergraduate and graduate students in economics and management in the study of poverty issues and the CGE-micro framework. This
will certainly be a great extra benefit of the project, because, as far as we know, no school in Ecuador teaches these subjects.

On the other hand, the participation of Prof. Arguello, from the Universidad del Rosario in Colombia, raises the importance that integrating academic and research team efforts has for our institutions and for the strengthening of a research network in our region. The research group of the Department of Economics of the Universidad del Rosario is highly recognized and counts social policy studies among its main research themes. We currently develop a number of research projects touching upon poverty, two of them related to the PEP network.

Besides the importance of enhancing academic and research cooperation in the region, the proposed project has importance on its own for the Universidad del Rosario. It will not only provide new knowledge in a topic whose relevance is evident but can also contribute to the analysis of trade, fiscal and poverty issues in Colombia, both from the methodological and analytical view points.

Prof. Arguello teaches a seminar on international trade and poverty for seniors and, along the lines of the seminar that Prof. Herrera plan to develop, this project could greatly contribute to further enhance the empirical part of the seminar (which is currently being designed as a two-course seminar). Furthermore, a research assistant, from a pool of senior undergraduate students or from the master of economics program, will be incorporated for working in this research project (as part of the Department policy for training young researchers).

10. Any ethical, social, gender or environmental issues or risks which should be noted.

At this stage of the proposal, and considering the data available, we do not foresee any ethical, social, gender or environmental issues or risks that should be noted or that we could analyze.

11. List of past, current or pending projects in related areas involving team members
(name of funding institution, title of project, list of team members involved)

Sara Wong
-Characterizing Rural Households and measuring the impact of trade liberalization on Rural Households in Ecuador. Funding Institution: FAO. Role: Principal Researcher.
-Estimation of Armington Elasticities for Ecuador. Funding institution: ESPOL. Role: Project leader and researcher.
-Inclusion of an Input-Output Table of Ecuador in the GTAP database. Funding institution: ESPOL. Role: Project leader and researcher.
-Inclusion of an Input-Output Table of Bolivia in the GTAP database. Role: Adjunct researcher.
-Pro-competitive effects of trade openness in Ecuador: micro-level evidence. Funding Institution: Graduate Management School (ESPAE). Role: Project leader and principal researcher.

Ricardo Arguello
-Exploring the existence of a poverty trap in Colombian rural sector. Funding institution: Universidad del Rosario. Role: Project director
-Income diversification in the Colombian rural sector. Funding institution: Universidad del Rosario. Role: Project director
-Pobreza Rural: Evaluación y diagnóstico de las políticas nacionales. Funding institution: Interamerican Development Bank. Role: associate researcher
-Cost benefit analysis of the restructuring of the Colombian agricultural sector. Funding institution: Colombian National Planing Department. Role: Technical director
-Consultancy for the negotiation of the Free Trade Agreement with the U.S. Funding institution: Colombian Ministry of Agriculture and Rural Development. Role: Team member
-Identification of interests of Andean Community country members for the Doha negotiations. Funding institution. United Kingdom’s Department for International Development. Role: Country consultant for University of Sussex’ IDS

Paul Herrera
-Institutional Economics of Pollution in the Chaguana River Basin. Funding institution: VLIR-ESPOL competitive funds for research. Role: Project Leader.
- Agro Industrial Opportunities for the Peninsula of Santa Elena. Funding institution: Ministry of Agriculture of Ecuador. Participants: ESPOL, University of Florida (Gainesville-USA), CEDEGE. Role: in charge of coordinating all extension activities.

- Andean Competitiveness Project (PAC-ESPOL). Funding institution: Andean Development Corporation. Role: participated in the team of researchers that developed the proposal and the final studies.

Ketty Rivera

- Measuring Agricultural Distortions in Ecuador. Role: Research Assistant.