

Free Trade Agreements, Poverty and Inequality in Central America*

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Abstract

We use a top-down macro-micro approach to estimate the effects on poverty and income inequality of two major trade agreements in Central America: DR-CAFTA and EU-CAAA. We first employ a macro CGE application to assess the main changes in factor and goods prices associated with each trade agreement; and then combine this information with household surveys for Costa Rica and Nicaragua. Headcount poverty is reduced in both countries, although DR-CAFTA provides the largest decreases. Inequality in Costa Rica remains unchanged with both agreements, although it increases slightly in Nicaragua under the EU-CAAA.

Keywords: trade policy, free trade agreements, CGE models, poverty, income inequality

JEL classification: F13, D31, O15

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1 Introduction

Central America (CA) has recently engaged in important trade negotiations. In 2006 the Free Trade Agreement (FTA) with the United States (i.e. DR-CAFTA) was ratified by almost all signatory countries. In the same year, trade negotiations began with the European Union (EU) to create an association agreement between both regions (EU-CAAA). Since CA is a small region with strong commercial ties with both the US and the EU, it is expected that the agreements will have significant economic and social impacts.

The aim of this paper is to use a macro-micro approach to evaluate the poverty and inequality implications of these recent trade negotiations. The analysis takes a two-step approach for which changes in factors and goods prices are estimated through a CGE model and then mapped into the income and expenditure disaggregation of individual households using recent household survey data. In this way, the macroeconomic effects of FTAs are used to assess the potential impacts on poverty and income distribution from trade agreements alone, vis-à-vis the implementation of complementary policies for productivity improvement and human capital formation.

This methodology to assess the household-specific impact of trade reforms has been recently developed and employed in the World Bank. A detailed description of the methodology can be found in Bourguignon and da Silva (2003) and Porto (2006), while some applications include Cogneau and Robilliard (2000), Bourguignon *et al.* (2003) and Löfgren *et al.* (2003). For the case of Central America, this methodology has been applied in Bussolo and Niimi (2006) and Sánchez and Vos (2007).

To obtain the macroeconomic effects of both trade agreements we employ the standard GTAP CGE model with different scenarios. For this, we draw on previous work done to assess both trade agreements. First, we report the DR-CAFTA estimated impacts following Francois *et al.* (2006), and use them as a baseline to assess EU-CAAA potential impacts, which are reported in Rivera and Rojas-Romagosa (2007). In the second step, we link these macro results of the CGE applications to the most recent household surveys for Costa Rica in 2004 (INEC-CR, 2006) and for Nicaragua in 2005 (INEC-Nicaragua, 2006).

The main feature of regional trade agreements is the change in relative prices of final goods and factors, associated with the reduction and/or elimination of tariffs and other trade barriers. It has been widely acknowledged that trade reform is in aggregate beneficial for households. However, it is also asserted that particular groups can be negatively affected by increased trade openness. Central America is characterized by widespread poverty and high levels of income inequality. Thus, it is critical to estimate the poverty and inequality effects of its trade policies.

The degree of detail and number of representative rural households is limited by the information contained in the national household income surveys available for each country. However, even with restricted data sets, the assessment obtained by this methodology provides a better and more accurate account of the micro effects of trade reforms, than done otherwise.

Once we have linked the macro price changes into each particular household, we estimate the changes in nation-wide inequality. We report both the Gini coefficient and the Atkinson index. In addition, using the existing poverty lines published by the national statistical agencies, we assess the changes in the number of poor rural households. We report both the head count poverty ratio and the poverty gap index.

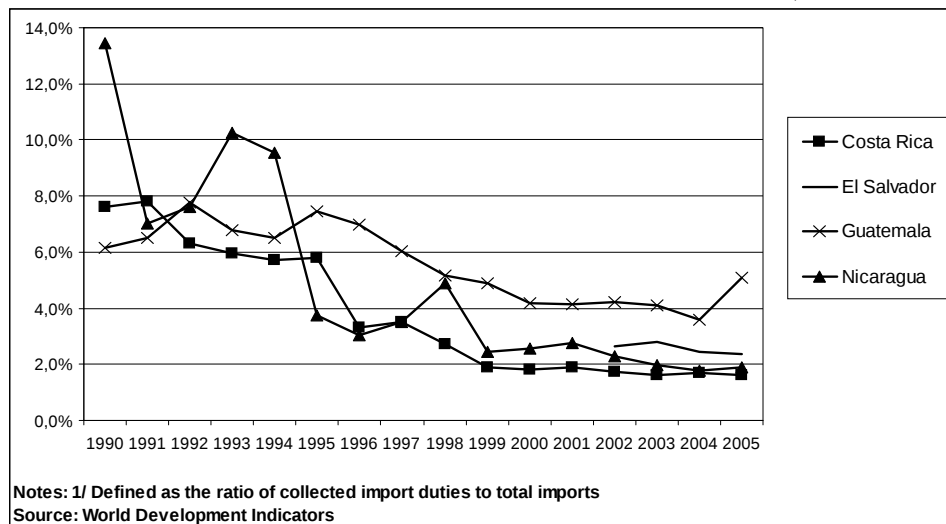
When we apply this top-down approach to Nicaragua, the most important feature is that overall and extreme poverty is substantially reduced as a consequence of both trade agreements. DR-CAFTA, however, has the higher potential for poverty reduction, given its larger average income and unskilled wage increases. On the other hand, income inequality slightly rises with both agreements, although the increase is only significant with EU-CAAA. This is a consequence of an above-average increase in agricultural goods, which affects more the consumption bundle of low-income families. However, given the high levels of poverty in Nicaragua, the sizeable reduction in poverty seems more relevant than the modest increase in inequality.

In the case of Costa Rica, we find that inequality is roughly unchanged with both agreements. Since average income is also increasing in all the trade scenarios, then overall poverty is reduced. However, and as was the case for Nicaragua, DR-CAFTA provides the biggest poverty reduction potential.

2 Trade Policy and Social Indicators in Central America

One of the most meaningful changes experienced by Central America in the last 20 years has been the consolidation of the economic openness of the region. Central America has been deliberate in opening its economies, and has established measures to accelerate it through unilateral tariff cuts, policies to attract Foreign Direct Investment (FDI), and the implementation of Free Trade Agreements (FTAs).

Figure 1: Central America, Effective average nominal tariff rate 1/, 1990-2005



From Figure 1 we observe that the trade-weighted average tariff in Central America has been steadily declining in the last two decades. During the last decade, in particular, trade policy in Central America has been based on FTAs. Currently, Central America has signed FTAs with the Canada, Mexico, Chile, Dominican Republic, and other Caribbean countries. In addition, investment agreements have been ratified with an important group of countries, European as well as Latin American.

DR-CAFTA and EU-CAAA are seen as consistent steps forward in the global integration process of Central America, which begun almost two decades ago. The agreements will not only consolidate trade and investments with the US and EU, but create a business platform in the region, to attract more companies and investors interested in entering both markets. The agreements can also improve the business environment of Central America, with more regional projects in infrastructure and logistics. Another important characteristic of these agreements is that they will facilitate a better integration of the CA regional market and create trade facilitation mechanisms.

It is important to remark, however, that although both agreements represent significant changes in trade policy and have been highly debated by the general public in Central America, they only represent an additional step forward in the ongoing trade openness process. It is clear from Figure 1 that already before these agreements, the region has gone through a significant aperture to foreign competition and this is also witnessed by the sharp increase in the exports of the region. This highlights the fact that most of the productive adjustment to increase trade openness has already been made in Central America. As a consequence, also much of the social changes associated with increased openness has also been underway. Therefore, although DR-CAFTA and EU-CAAA will likely have important economic effects in CA, they are not isolated phenomena but part of an ongoing trade openness process.

Despite the series of ongoing reforms in the region, in several fields other than trade policy, a major challenge that remains in the region is to reduce the high poverty levels and improve the distribution of income. In Table 1 we show data on poverty and extreme poverty for all CA countries, except Costa Rica.¹ It is clear that the poverty levels are extremely high for all countries, despite significant decreases in the last years. Therefore, although the ongoing reforms have yielded important poverty reductions, poverty still remains a problem to be solved.

Costa Rica has a poverty time series from 1987, which is presented in Table 2. Although the poverty levels are relatively low, compared to the rest of Central America, poverty has remained stagnant for much of the last decade. This constant poverty levels have remained despite moderate growth rates.

This combination of constant poverty and higher growth in Costa Rica is compatible with increasing income inequality. This is depicted in Table 2 where inequality has been increasing in Costa Rica. On the other hand, inequality has remained constant for El Salvador, but has decreased in all other countries.

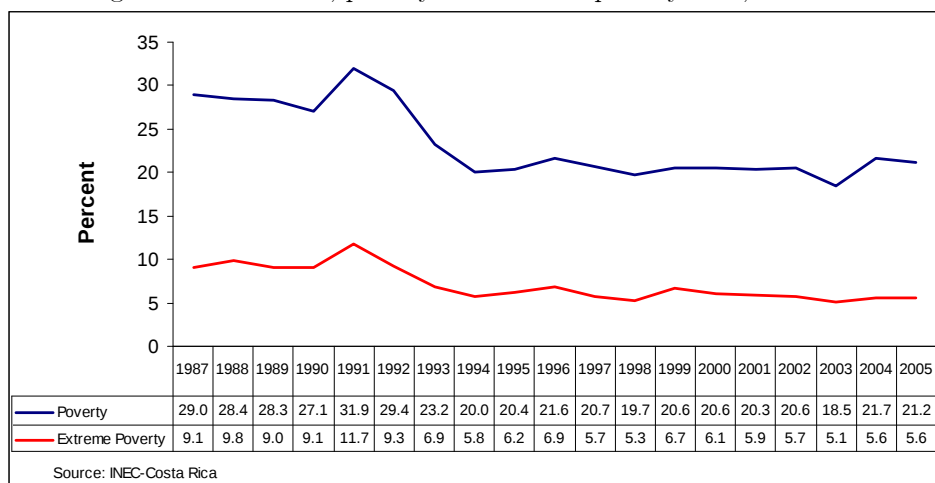
¹Given the lack of inequality and poverty time series for many countries, in Tables 1 and 2 we present one data observation for specific year intervals.

Table 1: Central America, poverty and extreme poverty data, 1988-2004

	Poverty			Extreme Poverty		
	1988-1994	1995-2000	2001-2004	1988-1994	1995-2000	2001-2004
El Salvador	n.a.	54.2	48.2	n.a.	21.7	20.6
Guatemala	69.4	61.1	60.2	42.0	31.6	30.9
Honduras	76.8	n.a.	64.2	57.8	n.a.	44.6
Nicaragua	50.3	47.9	45.8	19.4	17.3	15.1

Source: World Development Indicators 2007, CEPAL (2006), and national statistical institutes.

Figure 2: Costa Rica, poverty and extreme poverty data, 1987-2005



However, the inequality levels are also relatively high, which is a trademark of Latin American countries.

Table 2: Central America, inequality measured by the Gini coefficient, 1988-2004

	1988-1994	1995-2000	2001-2004
Costa Rica	45.6	n.a.	49.8
El Salvador	52.7	50.7	52.4
Guatemala	58.2	56.0	55.1
Honduras	61.5	56.4	58.7
Nicaragua	49.0	44.0	43.1

Source: WDI 2007, CEPAL (2006) and national statistical institutes.

It is not easy to estimate the possible impacts of a FTA on poverty and inequality. Many factors and conditions are involved. The expected impacts of DR-CAFTA and EU-CAAA will depend on the growth of employment, trade and investments, on dynamic effects resulting from increased competition within the integrated market, greater investments and technology transfers, and the impact in international relations,

including development cooperation, and agreement-pushed domestic reforms.

Moreover, there are economic and social risks that must be recognized and mitigated. Basically, the difficulties lie in the ability of the Central American nations to manage the transformation process. Upgrading competitive capacity and reallocating factors of production into different productive sectors is time and resource consuming. Fiscal and institutional constraints in all of the countries of the region limit the ability to invest in many critical areas that can help facilitate and smooth the transformation process.

Given the relative abundance of unskilled labor in the region, it is expected that better export market access to the US and the EU will increase production and trade and thus bring enhanced opportunities to this group of workers. On the other hand, the region is also characterized by a large informal sector. It is then expected that the inclusion of these unskilled workers into the formal sector will also be a critical issue related to the poverty impacts associated with the FTAs.

3 Macroeconomic results of the FTAs

The first step in the top-down macro-micro approach is to evaluate the macroeconomic changes associated with the FTAs. This is done by means of CGE models, which take into account the whole range of interactions between different goods and factors markets in the economy, constrained by basic macroeconomic identities, such as the current account and the government budget.

In this section we build on previous work to assess both trade agreements. For the CGE evaluation of DR-CAFTA we use the main results from Francois *et al.* (2006), while for the EU-CAAA we use Rivera and Rojas-Romagosa (2007). But first, we give an overview on the CGE model we applied: the standard GTAP model with two extensions.

3.1 The GTAP CGE model

Since the implementation of NAFTA in the early 1990s, CGE modeling has become the main empirical tool to assess the impact of free trade agreements. The considerable economy-wide effects expected from the policy shocks associated with trade openness require the use of general equilibrium analysis. Moreover, theoretical models and databases have been undertaking continual improvements over the years to match the extensive use of CGE models.

We use the GTAP database 6.0 the GTAP CGE model to estimate the economic implications of DR-CAFTA and EU-CAAA for Central America. For this specific application, there are two main limitations. First, the regional aggregation available in the database groups the five Central American participants (Costa Rica, El Salvador, Guatemala, Honduras and Nicaragua) together with Belize and Panama, which are not part of the agreements. This database limitation highlights the need to include the countries separately in the future. This need is especially important when evaluating the effects of DR-CAFTA for Costa

Rica, which has a different productive structure and export platform than the rest of the region. Secondly, the baseline year of 2001 is around six years apart from the implementation date of the agreements, so we need to update this database with recent economic events to obtain a reasonable approximation of the conditions faced in 2007.

First, we use a standard GTAP static model with different shocks to evaluate the alternative scenarios. In the final section we estimate some potential dynamic effects and embed them in the GTAP model as endowment shocks, based on Francois *et al.* (1996). The standard GTAP model uses a regional representative household with a Cobb-Douglas function to assign constant expenditure shares to private consumption, public expenditure and savings. This formulation allows for an unambiguous indicator of welfare offered by the regional utility function, which accounts for the three sources of utility. Household behavior is modeled using a Stone-Geary utility function where all subsistence shares are equal to zero. This specification allows for a well-defined intertemporal maximization between consumption and savings.

Firm behavior is modeled using a technology tree that depends largely on the assumptions of separability in production. This allows for decisions being made at each level, without considering the variables of other levels. Using this simplification, it is assumed that firms first choose between primary factors independently of the prices of intermediate inputs. In addition, constant returns to scale are also assumed and thus, output levels are also left out of the choice of the factor mix. The combination of production factors and intermediate inputs is assigned using a Leontief function. Thereafter, the mix of intermediate domestic and foreign inputs is selected using a CES function, the selection between foreign inputs uses an Armington specification within a CES function and finally, the mix of factors is assigned also with a CES function. All elasticities of substitution are held constant.

There is imperfect factor mobility, which is described with a CET revenue function. Full employment is also assumed, although the use of slack variables can introduce some flexibility in this assumption and initial endowments can also be changed to proxy for increases in the employment of factors previously not used.

Aggregate investment is not explained within the standard GTAP model, since it does not account for macroeconomic policies and monetary phenomena. Thus, the macroeconomic closure employed is neoclassical and investment is forced to adjust in line with regional changes in savings. In addition, a global closure is assumed and the current account deficits can be non-zero but must be balanced in the global bank (where trade deficit must be compensated between countries).

Finally, the use of a series of accounting relationships embodies all the necessary general equilibrium conditions and nonlinear programming is used to find a feasible solution to the maximization problem. In this particular application, we use a Gragg extrapolation solution method, which allows us to deal with the significant shocks that are induced by the full trade liberalization negotiated under DR-CAFTA, and an eventual free-trade outcome from EU-CAAA.

Before we analyze the results, it is important to remember that we are first using a static GTAP application that does not take into consideration possible increases in US and EU foreign direct investment in CA, in response to the incentives provided by the bilateral liberalization. Moreover, no allowance has been made for possible increases in capital formation and economic growth and improvements in productivity in the United States, the European Union and the Central American countries. However, some of these dynamic effects are indirectly assessed in the last section.

Finally, it is important to stress that the simulation results include the full adjustment of the economy to the policy shock and thus can represent the long-run effect of DR-CAFTA and EU-CAAA. Therefore, the short-run adjustment and preliminary implications of the trade agreement are not analyzed here.

3.2 Macroeconomic Outcomes from DR-CAFTA

The United States and five Central American countries, El Salvador, Guatemala, Honduras, Nicaragua and Costa Rica, concluded negotiations on the US-Central American Free Trade Agreement (DR-CAFTA) in January 2004. The agreement was signed on May 2004, and ratified by the US House of Representatives on July 27, 2005. The agreement has also been ratified by El Salvador, Dominican Republic, Guatemala, Honduras and Nicaragua. In Costa Rica the agreement is waiting for a referendum vote scheduled for September 2007.

3.2.1 Main Issues Negotiated

Under the US Caribbean Basin Trade Partnership Act (CBTPA), and the Generalized System of Preferences (GSP), many exports from Central America already enter the United States duty-free. DR-CAFTA will consolidate these benefits and make them permanent. More than 80 percent of US tariff codes (consumer and industrial products) exported to Central America will be duty-free immediately upon ratification of the agreement, and 85 percent will be duty free within five years. All remaining tariffs will be eliminated within ten years.

Close to 98 percent of all goods produced in Central America will enter the US market duty-free immediately. The Central American countries also accorded substantial market access across their entire services regime (i.e. banking, insurance, telecommunications), subject to very few exceptions. Regarding agriculture, DR-CAFTA opens the market widely, with the elimination of almost 100 percent of import tariffs. The only excluded products are sugar in the US, white corn in all Central American countries, potatoes and onions in Costa Rica. The sensitive agricultural products of Central America (rice, beans, poultry, beef and pork meat, dairy products) obtained protection with long tariff phase-out periods.

United States is the main trading partner of the Central American countries. Almost 50 percent of the region's international trade (exports and imports) is with the US. The US exported nearly US\$11 billion in goods to the five Central American countries in 2003. Two-way trade was over US\$23 billion in

2003. In 2001, the DR-CAFTA countries exported US\$11 billion to the US market. Through November 2004, the figure was US\$12 billion. Although traditional exports like bananas and coffee still represent a very important share of regional exports, in recent years there has been a diversification of exports towards more technologically advanced sectors like electronics and medical instruments, non-traditional agricultural products like fruits and vegetables, beverages and prepared meats, seafood, and chemical products.

Almost no agricultural products are excluded from DR-CAFTA. Tariffs will be eliminated for all products, except sugar for the United States, fresh potatoes and fresh onions for Costa Rica, and white corn for the rest of Central America. More than half of current US agricultural exports to Central America will become duty-free immediately. Each Central American country will have a separate schedule of commitments providing access for US products. The United States will provide the same tariff treatment to each of the five countries, but will make country-specific commitments on tariff-rate quotas.

Sensitive sectors were granted special treatment (safeguards, protection from imported goods, specific schedules for tariff phase-out) under DR-CAFTA. To address asymmetrical development and transition issues, DR-CAFTA specifies rules for lengthy tariff phase-out schedules as well as transitional safeguards and tariff rate quotas (TRQs) for sensitive goods in Central America. Although almost all goods will attain immediate duty-free treatment, others will have tariffs phased out incrementally so that duty-free treatment is reached in 5, 10, 15, or 20 years. Duty-free treatment would be delayed and in some cases, the tariff reductions would not begin until 7 or 12 years into the agreement.

From the US perspective, import tariffs have generally been higher on processed agricultural products than on their primary commodities. Even after the full implementation of the Uruguay Round tariff concessions, high levels of nominal tariff escalation remained in the US markets for a high number of agricultural commodities. The most important areas with the highest frequencies and the highest rates are the major agricultural staple foods, in particular meat, sugar, milk, butter and cheese, and cereal, as well as tobacco products. In most cases, peak duties for major fruits, vegetables and some fish and crustaceans range from 12 to 30 per cent. However, import duties for many fruits and vegetables are substantially lower or zero.

Under the US Caribbean Basin Trade Partnership Act (CBTPA) and the Generalized System of Preferences (GSP), many agricultural exports from Central America already enter the United States duty-free. However, Monge *et al.* (2003) document that hundreds of Central American agricultural goods with significant revealed comparative advantages have been excluded from US preferential access schemes. Despite CBI preferences, a long list of Central American agricultural products (over one-half of goods exported to the world but not the US) face important barriers in the US market. In addition, tariff escalation could have blocked the exports of many processed higher added-value agricultural goods.

One of the advantages of DR-CAFTA is that almost 100 per cent of all agricultural goods produced in Central America will enter the US market duty-free. DR-CAFTA will make unilateral CBI preferences

permanent. As a result, many agricultural goods from the region would have the opportunity to compete in the US market. Goods like fruits and vegetables, forestry products, and processed food have growth potential, particularly if higher value is added with further processing, product differentiation, and quality improvements.

On the other hand, after DR-CAFTA, the relevance of non-tariff barriers for agricultural trade with the US will increase. Incidence of non-tariff barriers has historically been significant, and will gain more importance parallel to agricultural tariffs elimination. As an example, avocado exports from Central American countries to the US are currently prohibited as a result of the outbreak of Mediterranean fly disease. Other agricultural products have faced difficulties entering US markets because of lack of information, weak health and safety standards, technical limitations, packaging restrictions and certification capacities. This is a key competitiveness issue that must be addressed as a high priority.

The trade agreement entails large opportunities and threats to the region. Chinese competition highlights the importance of implementing policies aimed at diversifying exports and increasing agricultural production, which can reduce the high unemployment and poverty rates of the region. On the other hand, the main achievement of the DR-CAFTA is the formalization of market access concessions currently set by the U.S. on a unilateral basis under the CBTPA, and the institutional and legal framework that has been negotiated to ease FDI flows to the region. Thus, the potential increase in FDI is expected to stimulate growth and employment opportunities.

3.2.2 CGE Simulations for DR-CAFTA

This section is based on the results presented in Francois *et al.* (2006). Here we present a summary of their results. Firstly, the database is aggregated into 20 sectors and 4 regions: USA, Central America, China and the Rest of the World (ROW). With this regional grouping we can estimate the impact of DR-CAFTA, as well as the influence of China on its bilateral trade. The sectoral aggregation was done considering the relevant exporting and importing sectors for CA. Secondly, we update our database to include the quota reduction to Chinese exports of T&A that follows from the application of the ATC protocol in 2005. Thereafter we proceed to estimate the different scenarios.

In our base case scenario, we assume a full liberalization of trade between the US and Central America, as well as free trade within CA. Thus, we reduce all tariffs between both regions to zero and eliminate all tariffs within CA. However, we keep the original tariffs with China and the ROW, and moreover, in accordance with the agricultural exclusions made in the agreement we do not remove the tariffs for sugar from CA to the US, or for “other_cereal” from the US to CA. Finally, some minor quotas across both regions and within CA were also eliminated.

Subsequently, we estimate four alternative scenarios that build on the base case scenario, each one aggregating some distinctive feature. In the sugar liberalization scenario we further assume than the US

eliminates its tariffs to Central American sugar. The following scenario includes a 2% reduction in trading costs that we associated with the potential outcomes of enhanced trade facilitation mechanisms. The capital accumulation scenario includes the potential FDI inflows into the region, which will increase the capital endowment in CA. Finally, the full impact scenario is a combination of the base case scenario, together with the inclusion of both the trade facilitation and capital accumulation features.

Table 3: DR-CAFTA, summary of macroeconomic results for all scenarios

SCENARIO:	Welfare gains (mill. US\$)		Welfare net gains /1 (mill. US\$)		GDP (% change)		Household Income (% change)	
	USA	CA	USA	CA	USA	CA	USA	CA
Initial values (mill. US\$)	-	-	-	-	10,082,153	70,149	-	-
ATC protocol	6,293	-541	6,293	-541	0.0	-0.2	-0.1	-2.3
CAFTA: Baseline	116	1,028	6,408	487	0.0	0.3	0.0	4.1
Full sugar liberaliz.	55	1,149	6,348	608	0.0	0.3	0.0	4.6
Trade facilitation	395	1,756	6,688	1,216	0.0	0.8	0.0	6.4
Endog. capital acc.	247	2,845	6,540	2,305	0.0	4.1	0.0	6.3
CAFTA: Full impact	1,006	4,471	7,299	3,931	0.0	12.3	0.0	6.8

Notes: /1 After excluding the effects of the ATC protocol scenario

Source: Francois, *et al.* (2006)

The main results of DR-CAFTA are presented in Table 3. The most welfare-improving mechanism in DR-CAFTA is the increase in FDI and the capital stock of the region. This emphasizes the importance of exploiting the investment opportunities associated with permanent market access to the US. Without complementary economic policies, the trade agreement can be considered mainly as a balancing force to counteract the negative impact that the implementation of the ATC protocol has for the regional economy with the increased competition of Chinese textiles and apparel goods.

From a Central American perspective, our simulations find a noteworthy welfare increase from DR-CAFTA. However, the agreement also induces a larger export specialization in the already significant maquila-based sectors (i.e. textiles and apparel). This effect increases the region's trade and growth dependence on a single sector, and it draws resources from other industries and the agricultural sector. On the other hand, the US economy is barely affected.

In Table 4 we show the price changes associated with the different scenarios. This information will be later on plugged into the household data from the surveys to assess the poverty and inequality impacts of DR-CAFTA. It is important to note that wage, for both skilled and unskilled workers has a significant increase in all scenarios. Moreover, this increase is higher than the price rise for the consumption and intermediate goods. Thus, real income is increasing in average. But only until we link these price changes with the individual household income and consumption composition, can we assess the changes in real income for each particular household.

Table 4: DR-CAFTA, price changes for factor and goods in Central America

Scenario:	Base case	Sugar liberalization	Trade facilitation	Capital accumulation	Full impact
Factor / good					
Land	-7.7	-6.1	-9.0	-3.1	-2.5
UnSkLab	5.6	6.1	8.1	7.6	11.1
SkLab	5.6	6.0	8.2	7.2	10.6
Capital	6.3	6.8	8.9	1.3	1.7
Rice	0.7	1.2	1.5	0.9	1.8
Other_cereal	2.0	2.9	3.0	2.9	4.2
Veg_fruits	1.7	2.2	2.8	2.1	3.5
Sugar	3.0	4.0	4.3	2.1	3.1
Other_agric	1.6	2.2	2.7	2.2	3.4
Cattle_anim	1.8	2.5	2.9	2.6	4.2
Milk_diary	2.5	3.0	3.7	2.2	3.3
Forest_wood	3.8	4.2	5.3	2.1	2.8
Fishing	1.2	1.5	3.0	3.3	6.2
Minerals	0.1	0.1	1.0	0.5	1.6
Meat_bovine	2.8	3.3	4.2	2.7	4.1
Meat_nec	2.8	3.3	4.2	3.0	4.5
Bev_tobacco	4.0	4.4	5.6	2.1	2.9
Otherfoodpro	2.3	2.7	3.4	1.6	2.4
Textiles	1.1	1.4	1.8	0.0	0.2
Apparel	0.7	1.0	1.5	-0.5	-0.2
Leather	2.5	2.8	3.6	1.5	2.2
Mineral_prod	2.6	2.8	3.5	1.5	1.9
Other_manuf	2.7	3.0	3.8	1.5	2.0
Services	4.5	4.9	6.4	3.5	5.0

Source: Francois, *et al.* (2006)

3.3 Evaluating the Potential Macroeconomic Effects of EU-CAAA

The European Union (EU) and five Central American countries, El Salvador, Guatemala, Honduras, Nicaragua and Costa Rica, will start negotiations of an EU-Central America Association Agreement (EU-CAAA) in the second semester of 2007. After the US, the European Union is the second biggest commercial partner of CA. Therefore, the expected increase in the bilateral trade of both regions, as a result of this trade agreement, will have significant macroeconomic effects on Central America.

Under the Generalized System of Preferences (GSP plus), many exports from Central America already enter the European Union duty-free. Notwithstanding, many agricultural goods face important tariff and non-tariff barriers in the EU market, particularly bananas and sugar, two export commodities with significant comparative advantages in Central America.

An Association Agreement would consolidate GSP plus benefits and make them permanent, so that an important amount of products made in Central America could enter the EU market duty-free immediately upon ratification of the agreement. However, the recent experience with EU negotiated FTAs (e.g. with Chile, Mexico, and South Africa) suggests that many “sensitive” products, mainly EU agricultural goods with high protection, would be excluded from any future agreement.

3.3.1 Database Update and Scenarios for Different Negotiation Outcomes

Before running the macroeconomic CGE application for the EU-CAAA, we first take two steps. As was done for DR-CAFTA, we first update the initial GTAP database to include events that will occur before the agreement is implemented. In particular we make two sequential simulations. In the first sequence adjustment we account for the expansion of the European Union (from 15 to 25 member states) with the consequent elimination of tariffs and subsidies affecting inter-country trade between the old and new member states. In this update we also include the application of the Agreement on Textiles and Clothing (ATC) protocol, which will expand China's exports of apparel and textile products to the US and the EU, and increase competition with Central American products. In the second sequential adjustment we apply the DR-CAFTA base case scenario implementation, as described in Section 2.2.2.

Once the database has been updated to account for these events, we proceed to construct scenarios that can describe potential outcomes of the upcoming negotiations. These scenarios will provide useful information, not only about the magnitude of the potential macroeconomic effects of EU-CAAA, but also about the comparative results between different prospective negotiation outcomes.

The base case scenario will be one of total liberalization: all tariffs and quotas between both regions will be eliminated. This is, however, the most unlikely scenario, since it implies the total liberalization of EU agricultural markets. The second scenario consists of an intermediate step in the agricultural liberalization of the EU. In particular, we assume that the sensitive Central American agricultural products will receive the same treatment as is currently enjoyed by the ACP (Africa, the Caribbean and Pacific) countries. These are a group of ex-colonies from the EU and/or least developed countries that receive preferential access to the EU. In particular, we assume that the GTAP sector "vegetable and fruits", which is mainly represented by the export of bananas, will face a tariff of 12.9%; while the sector "sugar" (i.e. processed sugar) will have a EU tariff of 125.8%.

The third –and most likely– scenario consists of the exclusion of these two sensitive sectors. In accordance, the current tariffs² of 44.9% for vegetables and fruits, and of 177% for processed sugar, will be maintained. In addition, and expecting that CA will also ask for a special treatment of its sensitive products, we further assume that the Central American tariffs for the sectors: other cereals, meat (i.e. bovine meat products), dairy products and sugar are not abolished. While the EU tariff for bovine meat products is also maintained.

Finally, the last scenarios consist of the dynamic simulations that build on the base case static scenario.³ As with DR-CAFTA, these dynamic cases are the implementation of trade facilitation mechanisms, the

²These are the tariffs taken from the GTAP database. For details on all the tariffs by sector and the estimation of the ACP equivalents, see (Rivera and Rojas-Romagosa, 2007).

³Although this base case of full liberalization is not likely to be the final outcome of the forthcoming negotiations, it does provide an upper bound to the expected macroeconomic results for these dynamic cases.

endogenous accumulation of capital, and the full impact scenario that includes both cases.

3.3.2 CGE Simulations for EU-CAAA

To assess the macroeconomic effects of a prospective EU-CAAA we also use the standard GTAP CGE model and database, which were already described in Section 2.1. For the EU-CAAA simulations we aggregate the database in 43 sectors (all the agriculture and manufacture sectors, plus a single aggregated services sector) and 5 regions: USA, EU, Central America, China and the Rest of the World (ROW).

Table 5 describes the main macroeconomic results for each scenario. In the base case full liberalization scenario, CA obtains significative welfare gains of around US\$1.100 million, while GDP increases by 0.2%. However, the possible exclusion of bananas and processed sugar from the final agreement will offset most of these static gains and GDP remains unchanged. When both sectors face EU tariffs equivalent to the preferential treatment given to the ACP countries, around three quarters of the initial gains are lost. In the case where all sensitive products are excluded, then CA will even experience welfare losses. These results highlight the importance for CA of liberalizing agricultural sectors.

Table 5: EU-CAAA, summary of macroeconomic results for all scenarios

SCENARIO:	Welfare changes (mill. US\$)		Welfare changes (as % of GDP)		GDP (% change)	
	CA	EU25	CA	EU25	CA	EU25
Base case: full liberalization	1,128.5	-93.2	1.6	0.0	0.2	0.0
ACP-type concessions	266.7	227.6	0.4	0.0	0.0	0.0
Exclusion sensitive products	-92.9	212.2	-0.1	0.0	0.0	0.0
Trade facilitation	1,360.5	82.9	1.9	0.0	0.4	0.0
Endog. capital accumulation	1,758.3	-84.8	2.5	0.0	1.5	0.0
EU-CAAA: full impact	2,174.9	95.3	3.0	0.0	2.0	0.0

Source: Rivera and Rojas-Romagosa (2007).

If we analyze the dynamic estimations of EU-CAAA, the effects are bigger and the welfare implications are more favorable for CA. Implementing trade facilitation mechanisms will increase welfare by 1.9% of GDP and the expected increase in capital endowments associated with higher inflows of FDI from the EU, accounts for welfare gains of around US\$1.750 million. The full impact of EU-CAAA is expected to increase welfare by more than US\$2.150 million and increase GDP by two percentage points.

In Table 6 we present the price changes that emerge from the implementation of the different scenarios of EU-CAAA. As noted before, these price changes are the direct link between the macro CGE application and the disaggregated household data from the national surveys.

The most remarkable feature of this table is the variation in land rents, which increase close to 50% in all the scenarios that include full agricultural liberalization (static and dynamic). This outcome is a direct implication of the agricultural expansion that will occur in CA if the EU opens its agricultural markets.

Table 6: EU-CAAA, price changes for factors and goods in Central America

Scenario:	Full liberalization	ACP-type concessions	Exclusion sens. prod.	Trade facilitation	Capital accumulation	Full impact
Factor / good						
Land	46.4	20.2	0.4	49.3	48.8	52.5
UnSkLab	3.3	0.8	0.0	3.9	4.0	4.7
SkLab	2.8	0.5	-0.1	3.5	3.3	4.1
Capital	2.5	0.3	-0.1	3.0	0.8	0.8
Paddy_rice	10.5	3.0	0.2	11.2	10.9	11.7
Wheat	7.5	2.6	0.0	8.0	7.8	8.4
Other_cereal	9.9	3.1	-0.1	10.6	10.2	11.1
Veg_fruits	13.4	6.2	-0.1	14.4	13.7	14.7
Oil_seeds	8.3	2.7	0.0	8.9	8.5	9.3
Sugar_cane	20.2	3.3	-0.1	21.4	20.7	22.1
Plant_fibers	9.5	3.0	0.0	10.1	9.9	10.7
Crops_nec	6.3	2.4	0.0	7.1	6.5	7.3
Cattle	9.6	3.4	-0.1	10.4	10.0	10.9
Animprod_nec	8.9	3.3	-0.1	9.6	9.2	10.1
Raw_milk	9.2	3.5	-0.1	9.9	9.5	10.4
Wool	8.8	2.9	-0.1	9.4	9.1	9.9
Forestry	2.7	0.3	-0.2	3.1	2.8	3.2
Fishing	1.3	-0.2	-0.2	1.7	1.9	2.4
Coal	0.1	0.0	0.0	0.5	0.1	0.5
Oil	0.2	0.0	-0.1	0.3	0.3	0.4
Gas	1.3	-0.1	-0.5	1.7	2.2	2.8
Minerals_nec	1.0	0.1	-0.3	1.1	1.0	1.2
Meat	6.1	2.0	-0.1	6.7	6.2	6.8
Meatprod_nec	6.6	2.2	-0.1	7.2	6.7	7.4
Veg_oils	4.1	1.1	-0.1	4.5	3.8	4.1
Dairy	3.8	1.2	-0.1	4.2	3.5	3.8
Proc_rice	3.5	1.0	-0.1	3.9	3.5	3.8
Sugar	5.5	1.2	-0.1	6.0	5.2	5.6
Foodprod_nec	3.7	1.0	-0.2	4.0	3.5	3.8
Bev_tobacco	2.8	0.5	-0.3	3.2	2.2	2.3
Textiles	1.9	0.3	-0.2	2.1	1.5	1.6
Apparel	1.6	0.2	-0.2	1.8	1.2	1.3
Leather	2.1	0.3	-0.3	2.3	1.7	1.9
Wood_prod	2.4	0.3	-0.1	2.8	1.5	1.6
Paper_prod	1.7	0.2	-0.2	1.9	1.3	1.4
Petrol_coal	0.3	0.0	0.0	0.3	0.2	0.3
Chemical_pla	1.5	0.1	-0.3	1.7	1.1	1.1
Minprod_nec	1.8	0.1	-0.3	2.0	1.2	1.3
Ferrous_met	1.6	0.2	-0.2	1.8	1.3	1.4
Metals_Nec	1.7	0.2	-0.2	1.9	1.2	1.3
Metal_prods	1.5	0.1	-0.3	1.7	1.3	1.4
Motor_veh	0.3	-0.3	-0.4	0.2	0.1	-0.1
Trans_eq_nec	0.4	-0.2	-0.4	0.4	0.3	0.2
Electronic	1.4	0.1	-0.2	1.5	0.9	0.9
Machine_nec	1.7	0.2	-0.2	1.9	1.1	1.1
Manufact_nec	1.8	0.2	-0.2	2.1	1.3	1.5
Services	2.3	0.4	-0.1	2.7	2.0	2.2

Source: Rivera and Rojas-Romagosa (2007)

However, in the other two static scenarios without full agricultural liberalization, the land rents decrease with the level of openness: 20% when the intermediate ACP-type concessions are granted and 0.4% when sensitive agricultural products are excluded from EU-CAAA.

This same pattern also applies to wages. In the scenarios that include agricultural liberalization, both unskilled and skilled wages increase moderately around 4 percentage points. In the scenarios with partial and no agricultural liberalization, the wages increase by less than 1%. Again, it is clear that for CA the economic benefits from EU-CAAA are directly linked to EU agricultural liberalization. Finally, it is important to note that the relative price of agricultural goods also increases significantly in the full liberalization cases.

Taken into account these price changes, poverty is expected to decrease in the full liberalization scenarios, since unskilled wages are risen, as well as land rents. For low-income household these production factors are usually the most important source of income. However, the relative price increase of agricultural products can offset part of these income gains, by increasing the food expenditure of these poor households. The relative importance of these forces will become clear when we apply these price changes into the income sources and consumption bundle of each individual household.

4 Poverty and Inequality Assessment

The second step in the top-down approach consists in translating the macro results from the CGE models to the disaggregated household data available from national surveys. For this purpose we use the recent surveys from Costa Rica for 2004 (INEC-CR, 2006) and Nicaragua for 2005 (INEC-Nicaragua, 2006).

There are three main mechanisms through which changes in trade policy can affect household income (Bourguignon and da Silva, 2003). First, changes in aggregate goods and factor prices directly affect the expenditure and income levels of individual households. Of these, the change in wages and food prices are usually the most important to assess poverty effects. Secondly, changes in employment levels –induced by the economy-wide adjustments that follow from FTAs– directly affect household income. Sometimes, this can be the single most important factor for a household to be lifted out of poverty. Finally, governmental transfers to poor individuals may also be affected by trade agreements through tariff revenue changes. This is also true for private transfers and financial gains in non-poor households, which can induce significant inequality effects.

In this paper, we focus mainly on the first mechanism: economy-wide price changes. As a starting point, it is assumed that the labor market adjustments are made via changes in wages and not through changes in existing employment levels. When the economy is not in full employment it can be expected that the wages will not vary much, but employment levels will increase in response to a rise in the labor demand. In this paper we do not take into account these employment variations. In addition, our CGE model it is assumed that the governmental budget is adjusted to compensate for potential tariff revenue losses and therefore, transfers to households are also assumed to remain constant.

Using this approach, therefore, the main effect of the FTAs on individual households is represented by the change in the price of the goods consumed and the variation in the factor prices (i.e. wages, capital and land rents). The overall welfare effects for an individual household will be then, a combination of both price effects. For example, if the price of the bundle of goods consumed by the household increases more than the price of its factor endowments, it is likely that its real income will diminish.

4.1 Household Survey Data

In order to map the macro CGE price changes into each household's expenditure and income data we aggregate the individual household data following the GTAP sectors and factor aggregations. This procedure is achieved in two steps. First, all expenditures are aggregated into the 57 GTAP sectors and for both FTAs the expenditures are further aggregated to match the particular sector dimension of each simulations. In other words, to evaluate the micro effects of DR-CAFTA we divide the total expenditure of each household by the 20 sectors used in this simulation. Similarly, for the EU-CAAA simulations, the expenditure data is divided into 43 GTAP sectors.

The second step consists in aggregating each household's income into four GTAP factors: unskilled labor, skilled labor, capital and land. In addition, we create a fifth group of income that consists of transfers, and capital and financial gains. As explained above, the level of this last income group is kept constant.

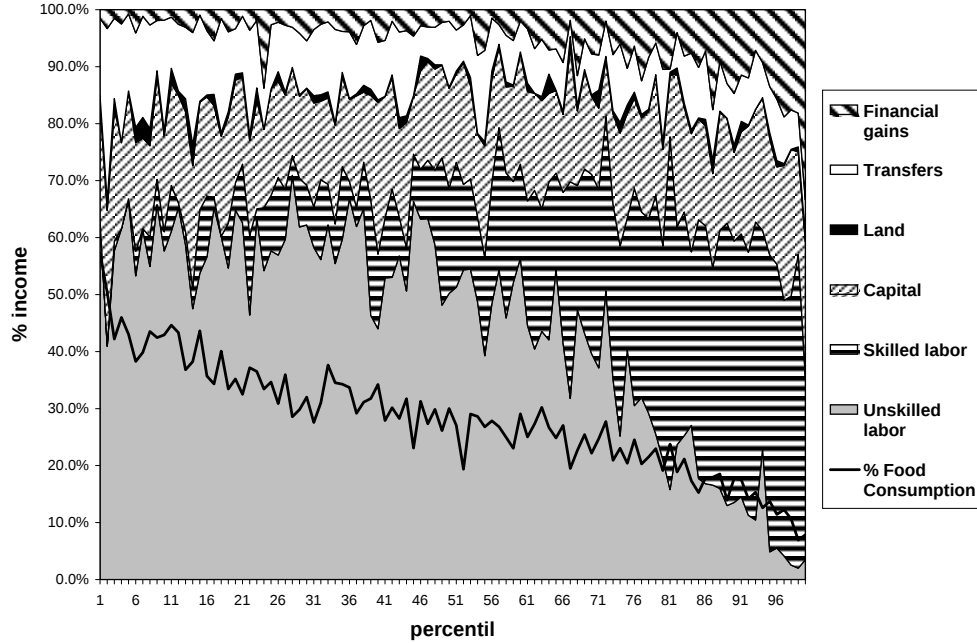
To sum up, for each of the sample households in the survey, we obtain its expenditure and income in terms of the CGE divisions used in the macro simulations. Thus, we can directly link the changes in final goods and factor prices into the real income changes of each household. Thereafter, the expansion factors of the surveys are used to extrapolate the effects to the whole country population. With this procedure we can directly compute the nation-wide income inequality effects associated with each FTA. Additionally, using the national poverty lines, we can estimate the variation in poverty and extreme poverty.

In addition, once we have the income and expenditure divided by the GTAP sectors, we can also construct the income composition by household. To summarize the results, we first use the expansion factors to obtain the whole population information and then, divide this population by percentiles. Thus, each percentile is a representative figure of each income level. The results for Costa Rica are shown in Figure 3. We observe that the income composition of the low-income families consists mainly of unskilled labor, in to a lesser extent capital and transfers. On the contrary, for the high-income households skilled labor, capital rents, and financial gains are the most significant.

This figure provides us with important information to evaluate the potential inequality impacts. First, capital represents a constant fraction of household income, irrespective of the income level.⁴ It is important to notice that the constant share of capital among income levels does not mean that the absolute levels of capital are equal among different household, only the relative fraction. Thus, high-income households will have higher capital gains compared to poorer households, but it will represent the same fraction of their total income. On the other hand, financial gains and transfers are assumed to be constant. Therefore, income inequality variations is by large affected by the relative income of skilled workers with respect to

⁴This follows the way the household divides own-activity income, assigning part of the revenues to capital gains and the rest to labor income. Thus, for the low-income individuals that work in independent activities, part of their income will be reported as capital rents and the rest as unskilled labor income.

Figure 3: Costa Rica, Income Composition and Food Consumption by percentil, 2005



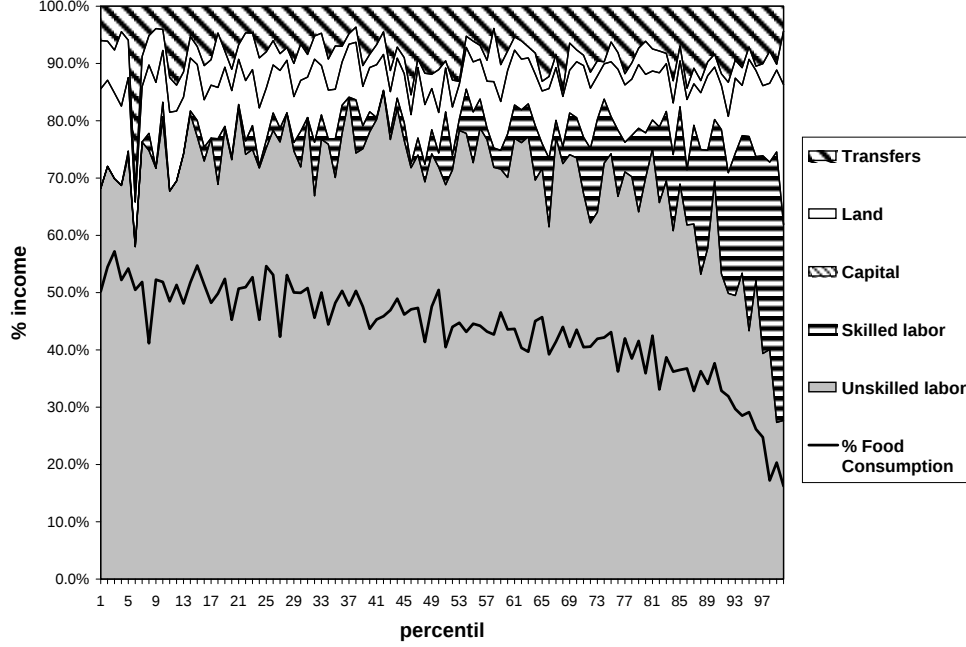
unskilled ones. Following these conditions, it is expected that when the wage of unskilled labor increases more than the wage for skilled labor, then inequality will decrease.

With respect to poverty, the changes in unskilled labor earning will be key. This follows from the fact that for the lowest two quintils of the population, unskilled labor represents more than half of its income. Moreover, given the relative importance of food consumption for the poorest household, the relative price of food will also be a key factor in the changes in poverty.

For the case of Nicaragua, the income composition is heavily skewed toward unskilled labor earnings. From Figure 4 we can observe that unskilled labor represents around 70% of income for all families up to the last quintil, where its relative importance diminishes. On the other hand, skilled labor income is only significant for the richest families. As with Costa Rica, capital rents represent a similar share of total income for all the population. However, land rents are more significant in Nicaragua, and contribute to almost 10% of total income of the poorest families. Finally, transfers are significant for all income levels.

Under these conditions, increases in inequality can be expected if the wages for skilled wages increase relative to other income sources. While reductions in land rents can also have a negative impact on income inequality. However, the main concern for Nicaragua is the reduction of its high poverty levels and this can be achieved by an increase in the unskilled labor earnings, which is the main income source for most households. Moreover, the share of food consumption in total expenditure is also relatively high for most income levels, and therefore, changes in the relative prices of food will have a key contribution on the

Figure 4: Nicaragua, Income Composition and Food Consumption by Percentil, 2004



changes in poverty.

4.2 Poverty and Inequality Measurement

To evaluate income inequality we use two indicators, the widely used Gini coefficient and the Atkinson index with an inequality parameter value of 1 (Atk1). The Gini coefficient is more sensitive to changes in the middle of the income distribution, while the Atkinson index is more sensitive to changes at the extremes. Hence, using both indicators provides a robust inequality evaluation, which is better than just relying on the Gini coefficient.⁵

To measure poverty, we use the Foster-Greer-Thorbecke indexes $FGT(\alpha)$ that are defined in discrete terms as:

$$FGT(\alpha) = \frac{1}{n} \sum_{h=1}^q \left(\frac{z - y}{z} \right)^\alpha$$

where n is total population, and q is the number of households h with income y that are below the poverty line z .

For $\alpha = 0$ we obtain the Head Count Poverty index: $FTG(0) = \frac{q}{n}$, which counts the number of poor individuals defined by q . For $\alpha = 1$ we obtain the Poverty Gap index $FTG(1)$, which captures the

⁵For more information on inequality measurement issues, see (Francois and Rojas-Romagosa, 2005).

acuteness of poverty, since it measures the total shortfall of the poor from the poverty line. We have also estimated the Foster-Greer-Thorbecke $FGT(2)$ index, also known as the square poverty gap, since $\alpha = 2$. However, we do not report this index.

4.3 FTAs Effects on Poverty and Inequality in Costa Rica

Based on the household survey, we first compute the baseline poverty and inequality levels for 2005 and then estimate the real income changes associated with DR-CAFTA and EU-CAAA. The results for Costa Rica are depicted in Table 7.

Table 7: Costa Rica, poverty and inequality effects of both trade agreements

	Average income	Income Inequality		Poverty		Extreme Poverty	
		Gini	Atk1	FGT(0)	FGT(1)	FGT(0)	FGT(1)
2005 levels		0.551	0.420	19.6%	6.4%	4.0%	1.3%
DR-CAFTA							
Base case	2.6%	0.551	0.421	18.8%	6.1%	3.7%	1.2%
Sugar liberalization	2.7%	0.552	0.421	18.8%	6.1%	3.7%	1.2%
Trade facilitation	3.7%	0.552	0.422	18.6%	6.0%	3.6%	1.2%
Capital accumulation	3.1%	0.550	0.420	18.6%	6.0%	3.6%	1.2%
Full impact	4.6%	0.550	0.420	18.3%	5.8%	3.4%	1.2%
EU-CAAA							
Base case	1.2%	0.552	0.422	19.1%	6.3%	4.1%	1.3%
ACP concessions	0.3%	0.551	0.420	19.5%	6.3%	4.1%	1.3%
Agricultural exclusions	0.1%	0.551	0.420	19.6%	6.3%	4.0%	1.3%
Trade facilitation	1.5%	0.552	0.422	19.0%	6.3%	4.1%	1.3%
Capital accumulation	1.4%	0.552	0.422	19.0%	6.2%	4.1%	1.2%
Full impact	1.7%	0.552	0.422	18.7%	6.2%	4.1%	1.2%

Source: Own estimations

In Costa Rica, both trade agreements produce only marginal inequality changes. Although the EU-CAAA shows a slight deterioration, DR-CAFTA has the opposite marginal effect. However, both marginal changes are small and we can ascertain that the trade agreements do not have meaningful inequality effects.

The main difference between low and high-income households in Costa Rica, is the composition of labor earnings. Low-income households rely heavily on unskilled labor wages, while richer households depend more on skilled labor wages. From Tables 4 and 6 we know that both wages are rising in parallel, with small differences between them. Therefore, the income changes between both groups is also modest, and this is reflected in the very small changes in both the Gini and the Atkinson index. Only for the trade facilitation scenario in DR-CAFTA does the skilled labor wage increase more than the unskilled one, and it is precisely in this scenario where inequality rises the most of all DR-CAFTA scenarios.

The other source of real income differences between household is the composition of their expenditure (i.e. their consumption bundle) and the changes in prices induced by the trade agreements. These

differences in expenditure costs by household are apparent for most of the EU-CAAA scenarios, where the relative price of agricultural goods is increasing with respect to the rest of consumption goods (see Table 6). Agricultural goods are used mainly as food consumption. In turn, food consumption represents a higher share of expenditures, the lower the income level of the household. Therefore, the cost of the consumption bundle for poor households increases, in relative terms, more than the cost of the bundle of goods consumed by richer families. Even when the relative price of final consumption goods is declining with respect to wages, the differences in the costs of the consumption bundles can provoke changes in the real income of different income level groups. Thus, inequality in Costa Rica increases slightly when the full agricultural liberalization scenarios of EU-CAAA are implemented. However, these changes are only marginal and inequality in Costa Rica remains broadly unchanged.

Poverty, on the other hand, is reduced in Costa Rica. From Table 7 we observe that poverty decreases with both trade agreements. For DR-CAFTA the number of poor falls between 0.8% in the base case scenario, up to 1.3% in the full impact scenario. In absolute terms, this represents respectively, 37000 and 60000 individuals lifted out of poverty. This result is a direct consequence of average income increasing, and inequality remaining roughly unchanged. In other words, all households benefit similarly with the trade agreement and thus, some low-income households can cross the poverty line. For the full impact scenario the average income increase is the largest (4.6%), and therefore, this is also the scenario with the highest poverty reductions. Extreme poverty is also reduced by DR-CAFTA. In the base case scenario the head count index falls by 0.3% or 13000 individuals. In the full impact scenario these figures are roughly doubled and extreme poverty is reduced by 25000 individuals.

With the implementation of EU-CAAA, the overall poverty reductions are smaller than with DR-CAFTA. This is a result of the lower average income increases expected from EU-CAAA. In particular, for the scenarios with the lowest income increases (ACP concessions and exclusions of agricultural products) overall poverty is barely affected. Moreover, the relative increase of agricultural goods also plays a role in the poverty reduction potential of EU-CAAA. Since the consumption bundle of poor families has a high share of food (around 40% in Costa Rica), then these families are negatively affected by the increase in agricultural products. In particular, this can be the main reason why extreme poverty slightly increases with EU-CAAA. Even when the change only represents around 4000 individuals.

Another explanation to the negative effects on extreme poverty, is that low-income households in Costa Rica rely substantially on transfers, which represent around 20% of their total income. Since we assume that transfer income does not change, then total income for these low-income families increases less than the income of families that rely only on factorial income, which is increasing. Thus, the increase in absolute prices is not completely offset by the rise in total income. In particular, some households that rely more heavily in non-factorial income can be negatively affected.

Even when this impact is only marginal, it does stress the importance of governmental income support

and poverty alleviations programs in the short-run. While the medium and long term solution should be focused in increasing the participation of these households in the labor market by means of formal employment.

When we analyze the poverty gap index, we also observe a reduction in measured poverty. This reduction is visible in the two trade agreements and for both poverty and extreme poverty. For the case of extreme poverty under the EU-CAAA the poverty gap remains constant for most of the scenarios and is reduced in the full impact scenario. Thus, although a small group of individuals fall to extreme poverty in this scenario, the total income shortfall to alleviate extreme poverty is reduced.

4.4 FTAs Effects on Poverty and Inequality in Nicaragua

Applying the same inequality and poverty indicators as before, Table 8 presents the summary results for Nicaragua. A first distinction is that average income increases more in Nicaragua with both trade agreements, as compared to Costa Rica. This result is a consequence of transfers representing around 10% of income for most households in Nicaragua, irrespective of income level. On the other hand, in Costa Rica the share of transfers and financial gains is higher, an set at around 20%. Since these income sources are kept constant, then total income can only increase by changes in the price of factors (labor, capital and land). The share of this factorial income is higher in Nicaragua than in Costa Rica, and thus, it also has a higher average income increase.

Table 8: Nicaragua, poverty and inequality effects of both trade agreements

	Average income	Income Inequality		Poverty		Extreme Poverty	
		Gini	Atk1	FGT(0)	FGT(1)	FGT(0)	FGT(1)
2005 levels		0.496	0.356	39.4%	15.8%	16.9%	5.2%
DR-CAFTA							
Base case	2.6%	0.497	0.360	38.5%	15.3%	16.4%	5.0%
Sugar liberalization	2.8%	0.498	0.360	38.5%	15.2%	16.4%	5.0%
Trade facilitation	3.9%	0.499	0.361	38.0%	15.1%	16.1%	4.9%
Capital accumulation	4.1%	0.496	0.358	37.7%	14.9%	15.8%	4.8%
Full impact	6.0%	0.497	0.360	36.9%	14.5%	15.4%	4.7%
EU-CAAA							
Base case	2.4%	0.501	0.364	38.9%	15.4%	16.5%	5.1%
ACP concessions	0.8%	0.497	0.359	39.3%	15.6%	16.7%	5.1%
Agricultural exclusions	0.1%	0.495	0.357	39.3%	15.7%	16.8%	5.2%
Trade facilitation	2.8%	0.502	0.365	38.8%	15.4%	16.5%	5.1%
Capital accumulation	2.9%	0.501	0.364	38.7%	15.3%	16.4%	5.0%
Full impact	3.4%	0.501	0.364	38.5%	15.2%	16.3%	5.0%

Source: Own estimations

With respect to poverty, Nicaragua experiences a sharp reduction in both poverty measures. The number of poor individuals is reduced by 2.5% in the full impact scenario of DR-CAFTA. This accounts

for around 135000 individuals. Moreover, extreme poverty is also reduced substantially by 1.2% or 81000 individuals in this scenario. For the rest of scenarios, which have a lower average income increase, the effects are of a lesser magnitude but still important.

The poverty reduction potential of EU-CAAA, however, is smaller. Again, this is directly related to the lower average income changes expected from this particular trade agreement and the relative increase in agricultural prices. Another reason why poverty is reduced less by EU-CAAA is because unskilled labor wages increase less than in DR-CAFTA. Even when land rents are experiencing exceptional increases in EU-CAAA, the share of land in total income is relatively small, at less than 10%. On the other hand, the prices of agricultural goods are also increasing by around 10% and this offsets part of the real income gains of poor families.

In any case, poverty is also reduced with EU-CAAA and in the full impact scenario 45000 individuals are lifted from overall poverty and 32000 from extreme poverty. Moreover, extreme poverty decreases for all scenarios, in contrast to the case of Costa Rica. This is a consequence of poor households relying less on transfers (which is held constant) and unskilled labor and land rents, which are increasing in both trade agreements. Finally, the poverty gap index decreases in all the trade scenarios and for both overall and extreme poverty.

Inequality in Nicaragua, however, does experience a small increase, specially for the EU-CAAA scenarios. Given the high dependence of poor households on unskilled labor earnings in Nicaragua, and the increase of the wage of this factor, the result is a bit contradictory. However, since unskilled labor is important for most households and not only low-income ones, then the most likely source of inequality comes from expenditure changes. As explained before, the relative price increase in agricultural goods affects low-income more than high-income families, and this is an important source of relative real income changes between households. In the DR-CAFTA scenarios, the price of agricultural goods does not increase above the average price rise in the economy. Thus, inequality increases less than in EU-CAAA.

5 Summary and Final Remarks

Costa Rica and Nicaragua benefit with both trade agreements. Not only is overall income and welfare increased, but also poverty is reduced for most scenarios. This points to widespread gains –among households– of the derived economic gains of DR-CAFTA and EU-CAAA. Since Costa Rica and Nicaragua are at the extreme of the per-capita income range in CA, we expect that the rest of the Central American countries will experience similar benefits. However, it will provide better economic assessments if the CA countries can be separated within the GTAP database. In this way we can account for the different production structures of each economy. This is specially true for Costa Rica which has a distinctive economic structure than the rest of the region.

Moreover, since the study mainly depicts the static gains from the FTAs, the results presented here can be viewed as the lower bound benefits from DR-CAFTA and EU-CAAA. Even when we simulate the economic effects of higher FDI inflows to CA and increased efficiency through the implementation of trade facilitation mechanisms, other dynamic effects are not accounted for. In particular, we assume that productivity and competitiveness do not change with the trade agreements, and both these effects can have a substantial positive impact on growth rates and consequently on poverty reduction.

In addition, we can also expect a larger poverty reduction potential when labor market adjustments are given by increased employment. In all our scenarios, we assumed that the increased demand for labor was met through a wage rise. However, when an alternative macroeconomic closure is applied and labor markets adjust through employment levels –and wages remain constant, then the potential for poverty reduction is increased.

Using this alternative macroeconomic closure in additional scenarios for DR-CAFTA, we find that unskilled employment increases by 5.6%, while the corresponding figure for EU-CAAA is a 3.4% rise. From Table 9 we find that most of the CA countries have low unemployment rates –except Nicaragua– but have relatively high under-employment rates. This characteristic of the labor market indirectly reflects the size of the informal labor. Thus, there is a significant slack in the labor market to accommodate the increased employment in the region that can occur with both FTAs.

Table 9: Central America, employment characteristics, averages for 1995-2003

	Unemployment	Under-employment	Total sub-utilization
Costa Rica	5.9%	7.5%	13.4%
El Salvador	7.2%	16.2%	23.4%
Guatemala	6.2%	45.1%	51.3%
Honduras	6.1%	25.6%	31.7%
Nicaragua	12.9%	20.8%	33.7%
Average	7.7%	23.0%	30.7%

Notes: The averages are taken from the available information for the period.

The average for CA is not weighted.

Source: Central Banks and national statistical institutes.

However, for the case of Costa Rica, which has both a low unemployment and under-employment rates, an increase in employment levels is hard to obtain and the labor market resembles a full-employment situation. Thus, the increase in wages simulated in our main scenarios is a good approximation of how the increased labor demand can be adjusted.

Nicaragua, on the other hand, has both high unemployment and under-employment rates. Thus, the economy is far from full-employment and it is likely that changes in labor demand are adjusted through changes in the employment levels, and not through wage changes. Under these circumstances, the use of the alternative closure rules is a better approximation to market adjustments and the procedure employed

here will produce lower poverty reductions than can be expected. For poor households that experience under-employment, an increase in the hours worked yields a larger income increase than a wage increase. Therefore, it is expected that the poverty reduction impacts of the FTAs will be higher if employment levels vary. Given the large rates of total employment sub-utilization in El Salvador, Guatemala and Honduras, it is also expected that this particular labor market closure will be more relevant for these countries.

When employment levels change with trade policy, the linkage between the CGE macro model and the micro-data from household surveys is more complicated. Instead of assuming that the factor endowments for all households are held constant and only their prices change, now the increased employment levels must be assigned to particular households. There are several approaches to assign new employment within households. One approach is to use the main socioeconomic characteristics of the households to construct a logit or probit econometric model. This model will assign the probability of being employed, conditional on the characteristics of each household (see for example Bussolo and Niimi, 2006). However, these extensions are out of the scope of our present work.

To sum up, Central America can experience significant economy-wide output and consumption increases with DR-CAFTA and EU-CAAA. When we link these macroeconomic effects to particular households, we find that poverty is reduced and inequality remains relatively constant, for both Costa Rica and Nicaragua. Thus, the macro gains are spread across households in all income levels. However, we can consider these results as a lower-bound assessment of the poverty impacts of the trade agreements. If dynamic macroeconomic effects were included and employment increases, we can expect larger income raises and a higher potential for poverty reduction.

References

- Bourguignon, F. and da Silva, L. P. (2003). *The Impact of Economic Policies on Poverty and Income Distribution: Evaluation Techniques and Tools*, The World Bank and Oxford University Press, Washington, D.C.
- Bourguignon, F., Robilliard, A.-S. and Robinson, S. (2003). "Representative versus Real Household in the Macro-Economic Modelling of Inequality", Document de travail DIAL / Unité de Recherche CIPRE DT/2003-10.
- Bussolo, M. and Niimi, Y. (2006). "Do Regional Trade Pacts Benefit the Poor? An Illustration from the Dominican Republic-Central American Free Trade Agreement in Nicaragua", World Bank Policy Research Working Paper 3850.
- CEPAL (2006). *Panorama Social de América Latina*, United Nations, New York, USA.

- Cogneau, D. and Robilliard, A.-S. (2000). “Growth, Distribution and Poverty in Madagascar: Learning from a Micro-simulation Model in a General Equilibrium Framework”, IFPRI TMD Discussion Paper 61.
- Francois, J. F. and Rojas-Romagosa, H. (2005). “The Construction and Interpretation of Combined Cross-Section and Time-Series Income Inequality Datasets”, World Bank Policy Research Working Paper 3748.
- Francois, J., McDonald, B. and Nordström, H. (1996). “Liberalization and Capital Accumulation in the GTAP Model”, GTAP Technical Paper No. 7.
- Francois, J., Rivera, L. and Rojas-Romagosa, H. (2006). “Economic Perspectives for Central America after CAFTA: A GTAP-based Analysis”, Presented at the GTAP Ninth Annual Conference on Global Economic Analysis. United Nations Economic Commission for Africa, Addis-Ababa, Ethiopia.
- INEC-CR (2006). “Encuesta Nacional de Ingresos y Gastos de los Hogares 2004: Documento Metodológico y Principales Resultados”, Mimeo, Instituto Nacional de Estadísticas y Censos, San José, Costa Rica.
- INEC-Nicaragua (2006). “Encuesta Nacional de Hogares sobre Medición de Niveles de Vida 2005: Manual del Usuario de la Base de Datos”, Mimeo, Instituto Nacional de Estadísticas y Censos Nicaragua, Programa MECOVI, Managua, Nicaragua.
- Löfgren, H., Robinson, S. and El-Said, M. (2003). “Poverty and Inequality Analysis in a General Equilibrium Framework: The Representative Household Approach”, *in* F. Bourguignon and L. P. da Silva (eds.), *The Impact of Economic Policies on Poverty and Income Distribution: Evaluation Techniques and Tools*, The World Bank and Oxford University Press, Washington, D.C.
- Monge, R., Loría, M. and González-Vega, C. (2003). “Retos y Oportunidades para los Sectores Agropecuario y Agroindustrial de Centro América ante un Tratado de Libre Comercio con los Estados Unidos”, Report prepared for the World Bank DR-CAFTA Studies Program.
- Porto, G. G. (2006). “Using Survey Data to Assess the Distributional Effects of Trade Policy”, *Journal of International Economics* **70**: 140–160.
- Rivera, L. and Rojas-Romagosa, H. (2007). “Economic Implications of an Association Agreement between the European Union and Central America”, Paper prepared for the Policy Coherence Program for Sustainable Development. InWEnt-INCAE, Costa Rica.
- Sánchez, M. V. and Vos, R. (2007). “Domestic Linkages as a Condition for Gains from Free Trade Agreements: Welfare and Poverty Implications of DR-CAFTA for Costa Rica and Nicaragua”, Presented at the GTAP Tenth Anniversary Conference, June 7-9, Purdue University, Indiana, United States.