

## **DR-CAFTA Agreement and liberalization of trade in services: Evidence from Costa Rica**

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*Preliminary version. Please do not quote.*

### **Abstract**

This paper analyzes the impact of the liberalization of services following the DR-CAFTA agreement in Costa Rica. The analysis is first performed using the Encuesta de Hogares de Propósitos Múltiples (EHPM) household survey to the changes in employment and wages by sectors (the revenue effect). In a second step, we use data from Encuesta Nacional de Ingresos y Gastos 2004 to analyze the partial equilibrium effect of possible changes in prices due to entering DR-CAFTA on household spending. The results show that the liberalization of trade in services in the framework of the DR-CAFTA agreement is successful in increasing welfare in Costa Rica. However, given the limited spending on these services by the poor, the total impact on poverty is small. The CGE analysis yield a positive impact on GDP following the reform. The total effect by 2030 is a 0.15% increase of GDP with respect to a scenario without service trade liberalization. Finally the reform benefit more to richer households with a significant budget share in financial services.

## **I. Introduction**

In January 2009 and after the first referendum approval in the country, Costa Rica entered the Dominican Republic-Central American – United States Free Trade Agreement (DR-CAFTA), which was preceded by complex negotiation, ratification and implementation processes. Initiated in 2002 by the Bush administration, the agreement establishes a free trade area between the United States and its neighbors in Central America. It first involved the US, El Salvador, Guatemala, Nicaragua, and Honduras. Costa Rica joined the agreement in 2004 and ratified in 2009. Besides liberalization of trade in goods (eliminating tariffs and reducing non-tariff barriers between member countries), the DR-CAFTA agreement also includes important provisions reducing restrictions and enhancing transparency on trade in services. In both its investment and its services components, particularly for financial services, the agreement establishes both the national treatment principle (each country should grant its partners a treatment no less favorable than that it accords to its own investors) and the MFN treatment. It also permits cross border trade among parties for services. With regard to telecommunications, the agreement requires that each country ensure access to and use of its public telecommunications services. The agreement led to important domestic reforms, as new laws were required for the liberalized market of telecommunication and new regulatory authority for telecommunications, Superintendencia de Telecomunicaciones (SUTEL), were established with clear separation between the functions of provider and regulator. Similarly, the insurance sector experienced substantial domestic reforms, opening all market segments within this sector to private competition, and establishing a regulatory body.

The aim of this paper is to assess the effects of DR-CAFTA on the Costa Rican economy, focusing on changes on growth, employment, labor income and welfare indicators. Economic theory and empirical evidence show that free trade areas can potentially bring higher output for member countries, through increase production and lower consumption prices. Lower costs of imported inputs expand the production frontier, while access to larger markets fosters output expansion and access to new production technologies. Competition from the increased availability of imported goods to domestic consumers is expected to foster domestic firms to offer competitive prices, improve production efficiency and innovation. In turn, lower prices allow greater choices for the consumer, as well as enhanced quality and variety of consumption products. Changes in relative prices due to removal of tariffs also affect the labor market. Labor and capital reallocate to sectors with higher productivity, those in which the country has a competitive advantage. The net gain for the economy is higher economic growth, higher employment and increased income through specialization in those products with competitive advantage<sup>1</sup>.

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<sup>1</sup> One important gain is higher mobility of production factors through removal of barriers. Foreign direct investment rises once barriers are removed, spurring innovation and efficiency, greater economies of scale, productivity gains, and access to improved technologies.

This study focuses on trade in services, particularly on insurance and telecommunications sectors, two sectors that experienced the most substantial transformation with the end of the government monopolies. Indeed, similarly to trade in goods, the liberalization of trade in services can affect households, either directly through prices or employments, or indirectly via economic growth (Dollar and Kraay, 2001). While the direct effect is not very intuitive since telecommunication is traditionally capital intensive with limited direct impact on employment, it seems however, potentially important due to the recent transformations which set the telecommunications as a mass consumption product. The indirect effect is more obvious because of the crucial role that telecommunications and financial services play in the competitiveness and productivity of the economy (as a whole), as an important input in production activities and as an exchange facilitators (Konan et al, 2002).<sup>2</sup>

Assessing the effects of DR-CAFTA on the Costa Rican economy is an extremely challenging task, for several reasons. First, it is uncertain when the agreement began to have economic effects. The treaty was signed in August 2004 but implemented only in January 2009 after difficult negotiations marked by considerable domestic opposition (See Gonzalez, 2009 and Frajman, 2012). The extent to which the agreement had economic effects after signature, or only after ratification, depends on firms' and workers' expectations that the policy changes included in the agreement would be implemented. Moreover, some of the implications of policy changes connected with the agreement, particularly the liberalization of services, may only be seen after considerable time. Costa Rica was experiencing a temporary economic slowdown in 2009 when the agreement went into effect. The country posted solid, increasing rates of economic growth up until 2007, just before the food, fuel and financial crisis of 2008-2009. Costa Rica's recovery from the crises has been swift and reasonably strong, recording a GDP growth rate of over four percent in 2010, only slightly below its decade average. Costa Rica, which enjoys the lowest poverty levels in Central America, experienced only a slight reduction in overall poverty rates during the decade preceding the DR-CAFTA agreement (2000–2009). Most of the country's poverty reduction in that period was driven by growth in the agricultural sector, leading to an unprecedented concentration of poverty in urban areas. Among the poor, the main sources of labor income come from employment in the agricultural, retail and domestic services sectors and did not change over time (See Cadena, K. et.al 2013, p.18). In 2010 and 2011 poverty levels remained around 21 percent while in 2012 urban poverty decreased more than rural and the overall incidence of poverty eased (See table 4 ).

Our empirical analysis relies on a two complementary approaches: i) A simple micro incidence analysis relying on the household surveys data (Encuesta de Hogares de Propósitos Múltiples (EHPM)), in order to assess changes in employment and wages; and ii) A dynamic recursive CGE model, relying on the Work Bank LINKAGE model is used to benchmark the Costa Rican

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<sup>2</sup> Number of studies evidences the positive effect of services trade liberalization on household welfare (see Warren, 2000; Verikios et al, 2002; Hertel et al, 1999; Jensen, Rutherford and Tarr, 2007; Rutherford et al (2005; and 2010); Jouini and Rebei (2014), especially when FDI flows are considered (Whalley, 2004, Rutherford and Tarr, 2012)

economy over the period 2011-2020 in order to assess the impact on growth and macro indicators. The micro analysis relies on the household surveys data (Encuesta de Hogares de Propósitos Múltiples (EHPM)), and describes possible changes in employment and wages by sectors, what we call henceforth the revenue effect. To determine the change on these indicators that could potentially be due to the implementation of the DR-CAFTA, we do consider two counterfactuals that are not perfect, but could provide an indication on the direction of the agreement effect: the average change of employment and wages of other DR-CAFTA countries and the average change of other LAC countries. The analysis consists here basically to compare the change that occurred in Costa Rica in post CAFTA period to the change that occurred in these comparators regions during the same period.

The results show that the liberalization of trade in services in the framework of the DR-CAFTA agreement is successful in increasing welfare in Costa Rica. The decline in telecommunications prices has the largest impact on per capita expenditures in the poorest quintile, while the fall in insurance prices would benefit relatively more the richer quintiles. The combined effect of a cut in markups in the two sectors is larger as a share of per capita expenditures for the lowest quintiles. However, the total impact on poverty is small, given the limited spending on these services by the poor.

The Economy wide analysis with the CGE model yields positive effects in terms of growth following the reform. All the components of GDP increase with exception of private investment and net trade. The nominal income rises for all households but consumption prices increase more for poor households. As a consequence, the welfare effects are spread unevenly: poor households' utility decrease slightly while richer one's increase. This result is driven by the significant fall in financial products for which rich households' budget share is important.

The remainder of this paper is organized as follows. Section 2 gives insights on Costa Rican trade (both merchandise and services) while section 3 covers the micro analysis focusing on changes in employment, wages, consumption and welfare. The economy-wide CGE analysis is presented in section 4. In addition to welfare effects, the growth and public finances impacts are highlighted. The last section provides some conclusions and directions for future work.

## **II. Costa Rican Trade**

### **2.1. Merchandise trade**

Costa Rica, as other Central American economies, shows a high degree of openness (ratio of import and export flows over GDP). Costa Rica trade openness accounted for more than 79 percent of GDP in 2012, which is higher than the LAC average (45 percent). While most Central economies openness relies on imports with important trade deficit, Costa Rican trade balance has been relatively stable in recent years. Costa Rica experienced a sustained increased of its exports (ratio

of total export over GDP) throughout the 1990s and most of the 2000s, with the largest increases taking place after the arrival of Intel in 1997 and signing of CAFTA-DR in 2004, before heading on a downward path since 2007 Although Costa Rica (World Bank, 2013).

**Table 1: Costa Rica key trade indicators (2012)**

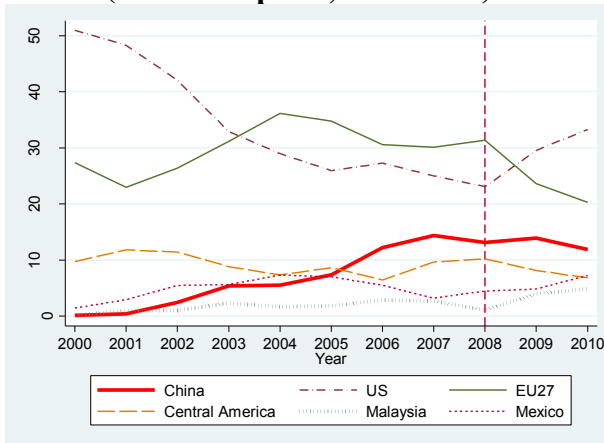
|   | Costa Rica | El Salvador | Guatemala | Honduras | Nicaragua | Panama | Memo: LAC |
|---|------------|-------------|-----------|----------|-----------|--------|-----------|
| <b>Trade (% of GDP)</b>                               | 79.2       | 69.8        | 61.1      | 108.5    | 111.0     | 134.4  | 44.7      |
| <b>Exports (% of GDP)</b>                             | 38.1       | 26.2        | 25.1      | 43.9     | 41.3      | 65.2   | 22.3      |
| <b>Trade Balance (% of GDP)</b>                       | -3.1       | -17.5       | -10.9     | -20.8    | -28.3     | -3.9   | -2.7      |
| <b>Trade in Services (% of GDP)</b>                   | 16.6       | 9.6         | 11.1      | 15.3     | 17.8      | 33.2   | 5.7       |
| <b>Share of Central America's Merchandise Exports</b> | 48.7       | 7.7         | 14.5      | 12.3     | 6.1       | 10.7   | --        |
| <b>Export Value (\$ billion)</b>                      | 13.7       | 5.6         | 10.8      | 6.8      | 3.7       | 17.4   | 1,014     |

Source: WDI and UN Comtrade.

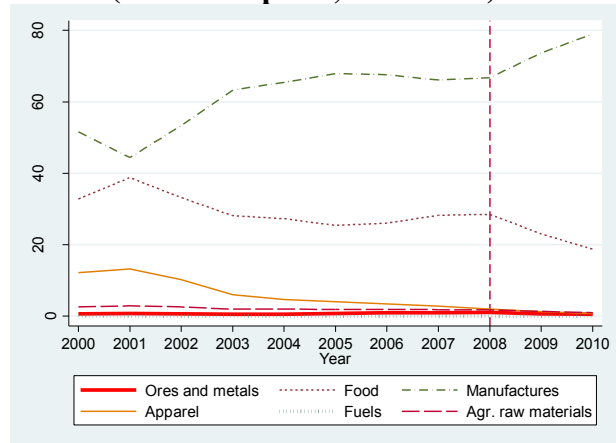
China increasingly became an important export market for Costa Rica over the last decade. The US lost market share while Costa Rica's exports to China increased steadily over the last decade and increased their importance from 0.1% of total exports in 2000 to 11.9% in 2010 (Figure 1). Over the same period, the US share declined from 50.9% to 33.3% and the share of EU27 declined from 27.3% to 20.2%. After the financial crisis exports to the United States recovered more rapidly than exports to other destinations (especially China and the EU27) and the share of total exports going to the United States increased rapidly between 2008 and 2010.

Costa Rica's exports shifted heavily from vegetables to more technology-intensive sectors like computer parts and medical instruments over the last decade. Exports were concentrated in the food, apparel, manufacturing sectors a decade ago but shifted significantly to high technology sectors such as integrated circuits, computer parts and medical appliances and instruments over the last decade. Within manufactures that account for almost 80% of total exports in 2010, these high technology sectors now account for almost half of Costa Rica's exports.

**Fig 1: Costa Rica: Exports by Destination**  
(% total exports, 2000-2010)



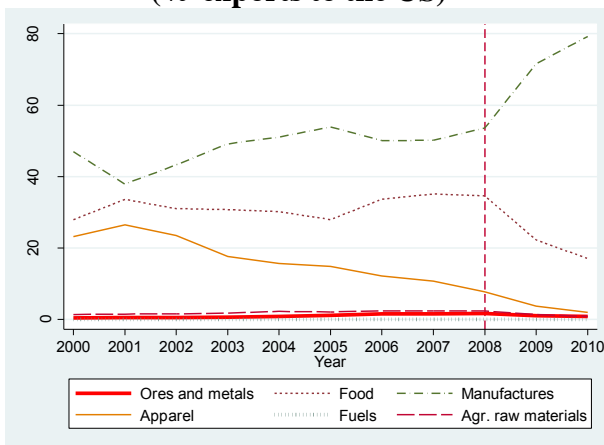
**Fig 2: Costa Rica: Exports by Sector**  
(% total exports, 2000-2010)



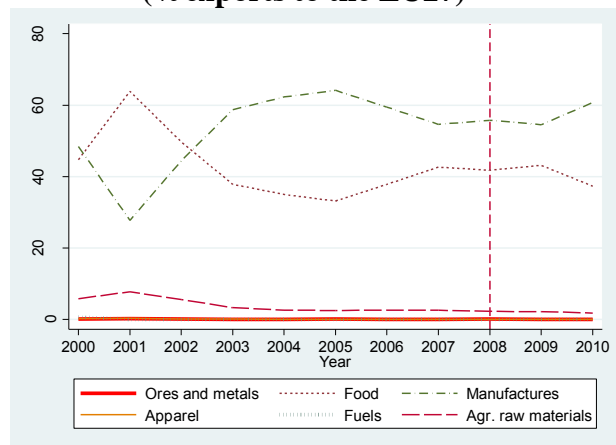
Sources. Extracted from (World Bank, 2013)

Two important industries that accounted for an important share of exports to the United States, apparel and food, have lost importance over the last decade as exports to the US became more reliant on manufacturing exports. Although the decline of apparel exports to the US is more evident and started earlier in the decade, food exports experienced a sharp decline after the financial crisis and do not seem to have recovered as of 2010 (Figure 3).

**Fig 3: Costa Rica: Exports to the United States by Sector**  
(% exports to the US)



**Fig 4: Costa Rica: Exports to the EU27 by Sector**  
(% exports to the EU27)



Sources. Extracted from (World Bank, 2013)

The list of Costa Rica's top ten exports confirms the country's strong reliance on two sectors: manufacturing and food (Table 2). The top ten products made up 79.9 percent of the total export basket, up from 58.1% in 2000, and reflecting a very high export concentration. Among the top ten, two products that represent 55.8% of exports belong to the integrated computer circuit industry cluster. Thus, the integrated circuit and computer parts industry accounts for more than half of Costa Rica's exports in 2008-10. Finally, medical instruments and appliances and several fruit products like bananas, coffee, and other fruits (like pineapples, melons and watermelons) round up the list of top ten exported products.

**Table 2: Top Ten Products Exported by Costa Rica, 2008-2010**

| SITC | Product  | % exports 98-00 | % exports 08-10 | Rank 98-00 | Rank 08-10 | Growth rate* 98-00/08-10 |
|------|--|-----------------|-----------------|------------|------------|--------------------------|
| 7764 | Electronic microcircuits                                       | 5.1             | 31.3            | 4          | 1          | 34.2                     |
| 7599 | Parts of and accessories suitable for data processing machines | 21.0            | 24.5            | 1          | 2          | 13.8                     |
| 579  | Fruit, fresh or dried, n.e.s.                                  | 5.0             | 7.2             | 5          | 3          | 16.1                     |
| 573  | Bananas, fresh or dried  | 16.4            | 6.9             | 2          | 4          | 2.8                      |
| 8720 | Medical instruments and appliances                             | 1.8             | 3.9             | 8          | 5          | 21.0                     |
| 711  | Coffee, whether or not roasted                                 | 5.6             | 1.5             | 3          | 6          | -1.7                     |
| 980  | Edible products and preparations                               | 1.3             | 1.5             | 10         | 7          | 13.3                     |
| 8996 | Orthopedic appliances, surgical bel                            | 0.0             | 1.4             | 215        | 8          | 75.9                     |
| 5417 | Medicaments(including veterinary)                              | 1.1             | 0.9             | 15         | 9          | 10.4                     |
| 585  | Juices; fruit & vegetables                                     | 0.8             | 0.9             | 20         | 10         | 13.4                     |

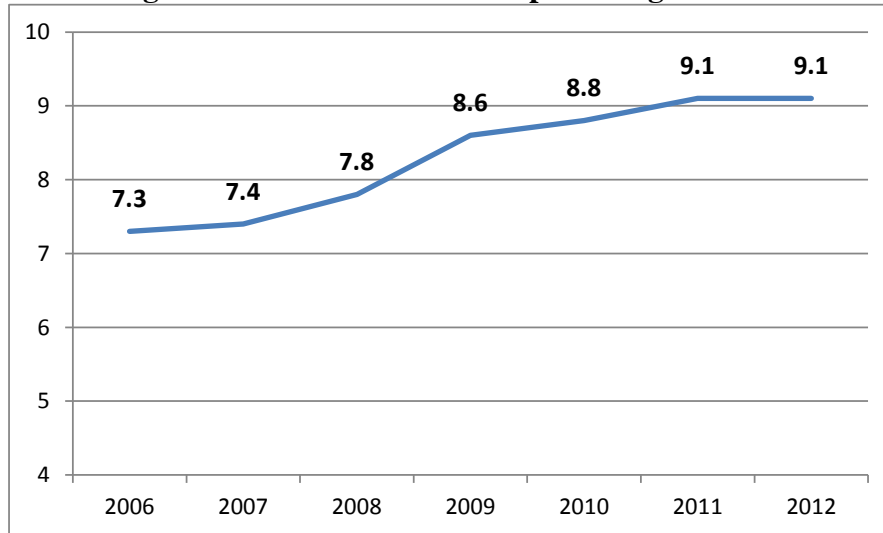
Source: UN-COMTRADE

\* Compounded annual growth rate

## 2.2.Trade in Services

Services sector contribution to Costa Rican economy is substantial. Service represents more than 69 percent of the GDP and 30 percent of total trade in 2012. Telecommunications and insurance sectors, that were key components of the DR-CAFTA agreements, have been particularly dynamic in recent years. The Telecommunication contribution to the GDP increased from 7.3 percent in 2006 to 9.1 percent in 2012 (Figure 5) due to technical progress but also to the liberalization that opened the sector to private sector and foreign investments. FDI in the telecommunication sector increased from \$339 million in 2011 to \$465 million in 2012 for the first time in Costa Rica.

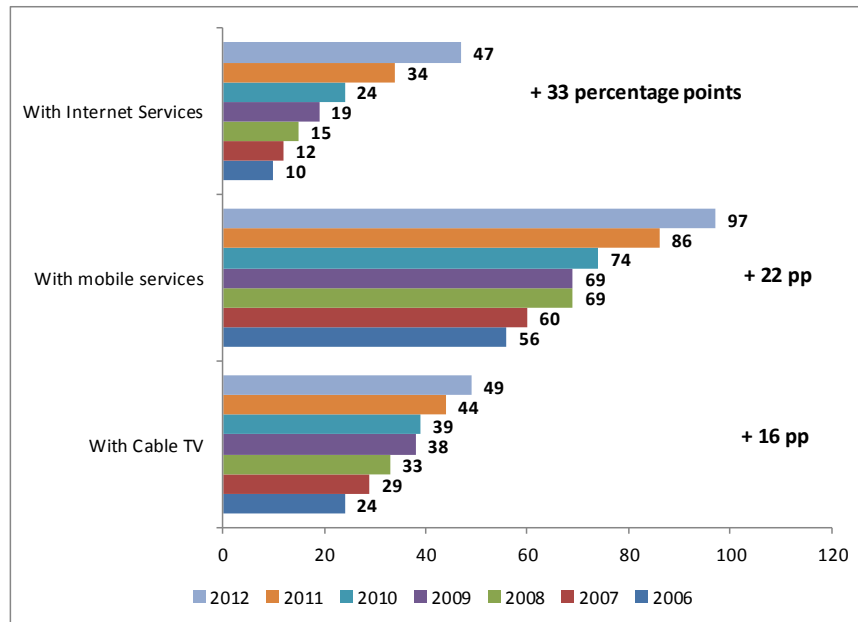
**Fig 5: Telecommunications as percentage of GDP**



Source: extracted from World Bank, 2013

The dynamism of the telecommunication sector is also reflected in increasing penetration to telecommunications services. The proportion of households with access to key telecommunications services increased substantially in recent years. Between 2006 and 2013, the level penetration to internet, mobile phone services, and cable TV, gained 37, 10, and 47 percentage points, respectively (Figure 6).

**Fig 6: Usage of telecom services in Costa Rica (percent of households)**



Source: extracted from the World bank, 2013



## **Box 1. DR-CAFTA and domestic reforms in telecommunications and insurance sectors Costa Rica**

**In a series of legislative changes in the telecommunications the Government opened three market segments, modernization of ICE, established and clarified supervision, and enacted corresponding regulation.** In June 2008, Congress approved *Ley General de Telecomunicaciones* that opened the segments of private network services, internet services, and mobile wireless services for competition. In addition, *Ley de Fortalecimiento y Modernización de las Entidades Públicas del Sector Telecomunicaciones* approved in August of the same year modernized ICE and its subsidiaries with the proper legislation to enable it to adapt to any changes in the legal regime of generation and delivery of electricity, telecommunications, info-communications, and other information services. The same law also established the Telecommunications Superintendence (SUTEL), responsible for regulating, implementing, monitoring, and controlling the telecommunications regulatory framework. Finally, several regulations were issued by the Regulatory Authority for Public Services of Costa Rica and through executive decrees to implement the legal changes. By end 2008, relevant legislation and regulation was in place with some delay vis-à-vis the deadlines established under CAFTA-DR.

**Main legal changes in the insurance sector included the establishment of a regulatory body, and the opening of all insurance products with the exceptions of automobile and occupational risk insurance.** A major step in the opening of the insurance sector was the approval of *Ley Reguladora del Mercado de Seguros* which was approved in August 2008. This new law established the general framework for carrying out insurance activities in Costa Rica, as well as the obligation for insurers, producers, local service providers, and cross-border providers to register before or be licensed by the local regulator. Moreover, it also created the General Insurance Superintendence (SUGESE), the local authority in charge of regulating the market, supervising its participants, and protecting consumers. Through the approval of the new law Costa Rica covered the requirements under CAFTA-DR and also approved the necessary regulation to implement the new legislation.

**Source. Extracted from World Bank, 2013**

### **III. Micro-incidence analysis of the DR-CAFTA impact: Static effect of the agreement**

Most of the available studies on the DR-CAFTA agreement that were written prior to its implementation indicate some potential for trade gains. Yeboah et al (2009) find that the trade created from the agreement would likely range from as low as 1 percent for Guatemala to as high as 13 percent for Nicaragua. However, the impact on Costa Rica was estimated to be a 1 percent decline in trade owing to trade diversion. Francois et.al (2008) estimate that the agreement would help balance new competition from Chinese imports in the textile and apparel sectors after expiration of the Agreement on Textiles and Clothing (ATC) in January 2005. However, they also find that the agreement would induce a strong shift in labor and capital from agricultural sectors to maquila-based industries, which could impose large adjustment costs. Brown et.al (2005) find

that the benefits of DR-CAFTA for the region are likely to be small. However, Sanchez (2005) uses a CGE model and a macro-micro simulation to find that Costa Rica had the best preconditions for entering DR-CAFTA among member countries, due to the earlier implementation of trade reforms and maintenance of a competitive real exchange rate.<sup>3</sup> Finally, Alemany (2011) concludes that exports from the Dominican Republic to the United States increased as a result of the treaty.

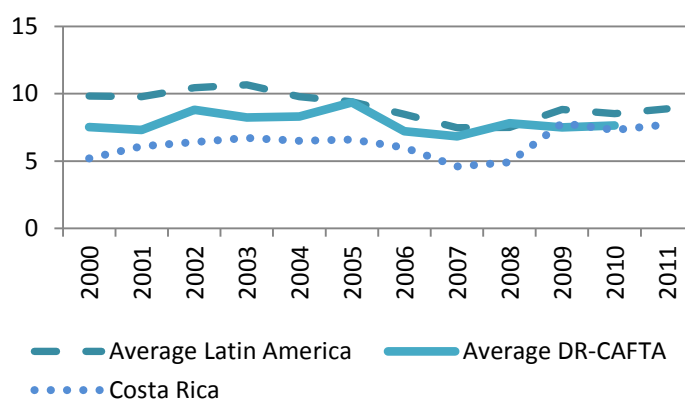
Overall, most authors expected small but positive benefits of DR-CAFTA on poverty, employment and economic growth in member countries. Costa Rica was supposed to see some reallocation of employees from traditional sectors such as agriculture and services towards manufacturing, as well as towards the sectors of telecommunication and insurance, for which competition policies changed significantly as result of the treaty.

### 3.1. Changes in employment and wages

#### 3.1.1. Changes in employment

Given the instability in global markets in the past decade, it is difficult to relate changes in Costa Rican labor markets with the DR-CAFTA agreement. The unemployment rate shrank by almost 2 percentage points over the global boom of 2004 -2008, a better performance than that of the average LAC and DR-CAFTA countries during the same period (see Figure 7). The higher FDI inflows during this period, likely related to the signing of DR-CAFTA, may have contributed. Unemployment then rose by almost 3 percentage points with the global financial crisis, which coincided with the final implementation of DR-CAFTA in 2009, and then remained stable and below LAC and DR-CAFTA averages over 2010-12.

**Fig 7: Unemployment rate**

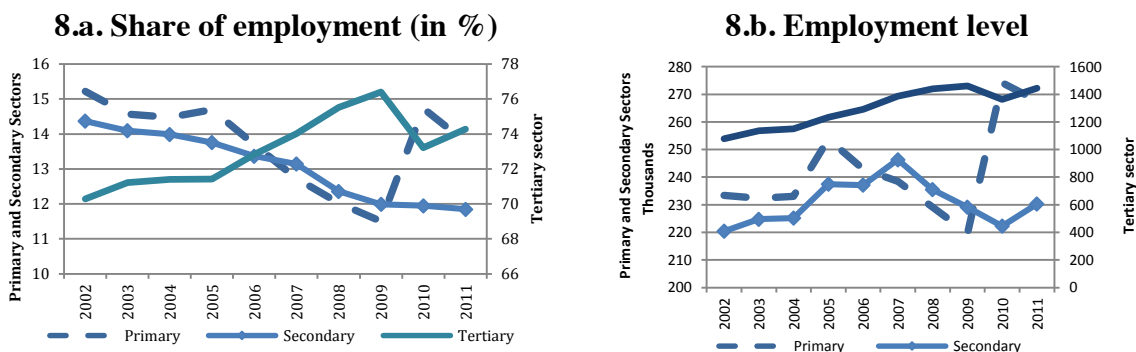


Source: World Development Indicators

<sup>3</sup> In 2006 the Banco Central de Costa Rica adopted a more flexible banded exchange-rate regime allowing the Colón to fluctuate within a narrow band.

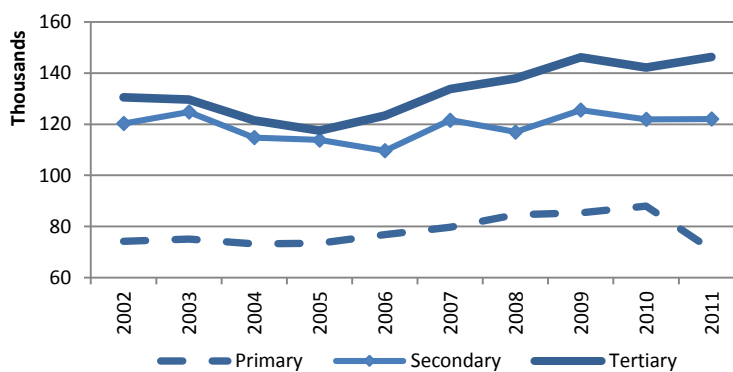
One possible indicator of the impact of the DR-CAFTA agreement is the pre-financial crisis improvement in services, which benefited from policy changes linked to the agreement. From signature of the agreement in 2004 until 2009, employment in the services sector rose by over 200 thousand, from 72.8 to 75.5 percent of total employment. However, the share of services sector employment fell sharply with the financial crisis (see Figure 2). Labor compensation in the services sector rose sharply from 2005 to 2009, much more rapidly than in agriculture and manufacturing and then stagnated (see Figure 8). The services sector also proved more resilient in the face of the global crisis than the other two sectors. The contribution of services to growth remained positive and significant from the onset of the crisis through 2012, while the contribution of growth in agriculture and manufacturing plummeted (see Figure 10). This is likely due to the much greater share of traded production in the latter two sectors, rather than any effect of the DR-CAFTA agreement.

**Fig 8: Evolution of employment by sector**



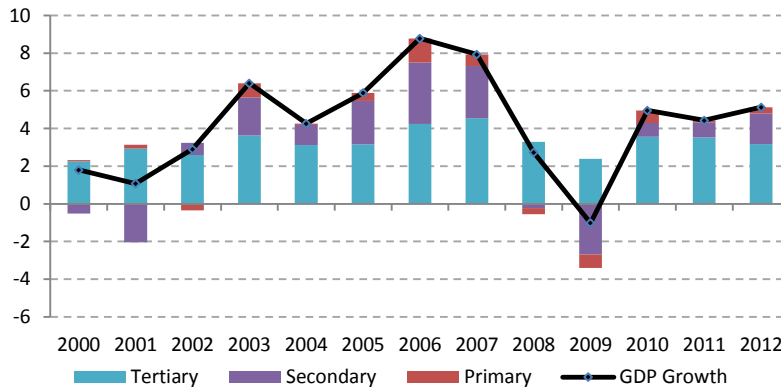
Source: own calculations using Encuesta de Hogares de Propósitos Múltiples and Encuesta Nacional de Hogares

**Fig 9: Average labor income in Costa Rica. 2002 to 2011. Primary, Secondary and Tertiary Sectors. Constant Colones 2000.**



Source: own calculations using Encuesta de Hogares de Propósitos Múltiples and Encuesta Nacional de Hogares

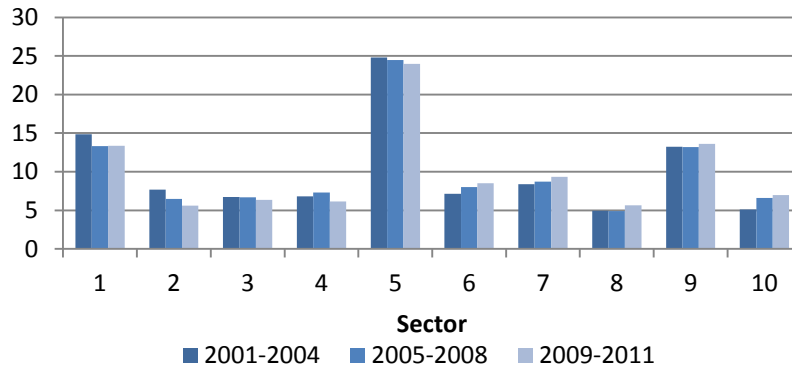
**Fig 10: Contribution to growth by sector (in percent)**



Changes in employment shares among some subsectors provide some evidence of a beneficial impact of the agreement. While construction and retail lost participation in total employment by the end of the decade, the share in total employment as well as the employment level of all other services subsectors increased (see Figure 11). In particular, subsectors that include insurance and telecommunications, both of which benefited from policy improvements connected to the DR-CAFTA agreement, saw a sharp rise in employment in the second half of the last decade. Employment in telecommunications expanded significantly from 2006 to 2009, as regulatory changes that took place even before liberalization boosted competition (see [Figure-12](#)).<sup>4</sup> Employment changes in other subsectors expected to benefit from the DR-CAFTA agreement were more erratic and difficult to interpret. For example, employment in insurance varied sharply from year to year, while employment in some high-technology products (electronic components) fell and others (office, accounting and computing machinery) rose (see Figure 13).

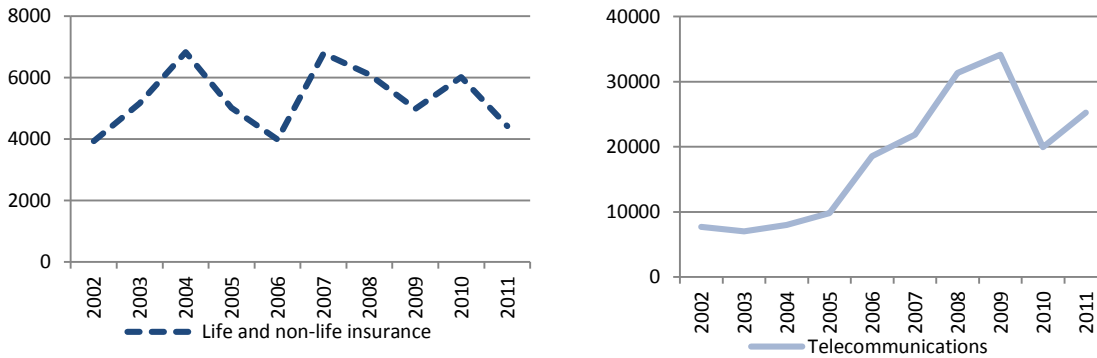
<sup>4</sup> The analysis of employment and wages was performed at four different aggregation levels. The first one is by major sectors (primary, secondary and tertiary), the second contains 10 large groups, and the third uses 17 using divisions of the ISIC rev.3 in order to follow changes in medicines, insurances and telecommunication. In selected cases we show figures at a higher level of detail. i.e by group or class of the ISIC rev.3 (See United Nations, 2005 for details on aggregation levels).

**Fig 11: Average share of employment for selected periods**

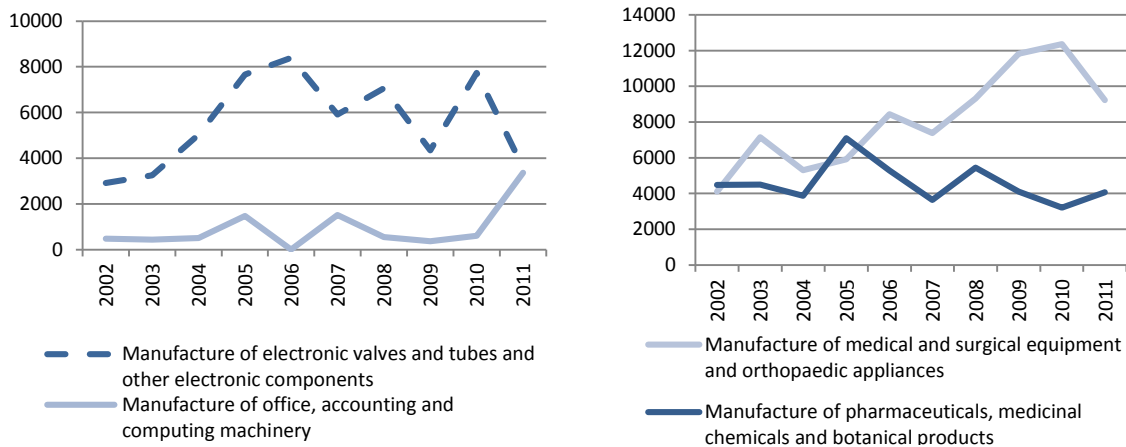


Horizontal axis: (1) Agricultural, primary (2) Food, beverage, tobacco, textiles and clothing (3) Rest of manufacturing industry (4) Construction (5) Retail, restaurants and hotels (6) Electricity, gas, water, transport and communications (7) Banking sector, finance, insurances and professional services (8) Public administration and defense (9) Education, health, personal services (10) Domestic service

**Fig 12: Employment level in insurances and telecommunications**



**Fig 13: Number of employees in selected manufacturing divisions**



Note: Household surveys are not representative at detailed sectoral disaggregation levels. Results shown here suggest main trends but cannot be interpreted as exact point estimates.

The rise in employment shares in services and certain manufacturing divisions was reflected in changes in sectoral GDP. Transport, storage and communications, and financial services were among the fastest growing sectors with positive rates even in the turbulent years from 2008 to 2010 (Table 3). The contribution of the telecommunication sector to GDP increased substantially, led by large FDI flows and lower consumer prices that fostered higher demand.

**Table 3: Average growth rates of real gross domestic product by sector (percent)**

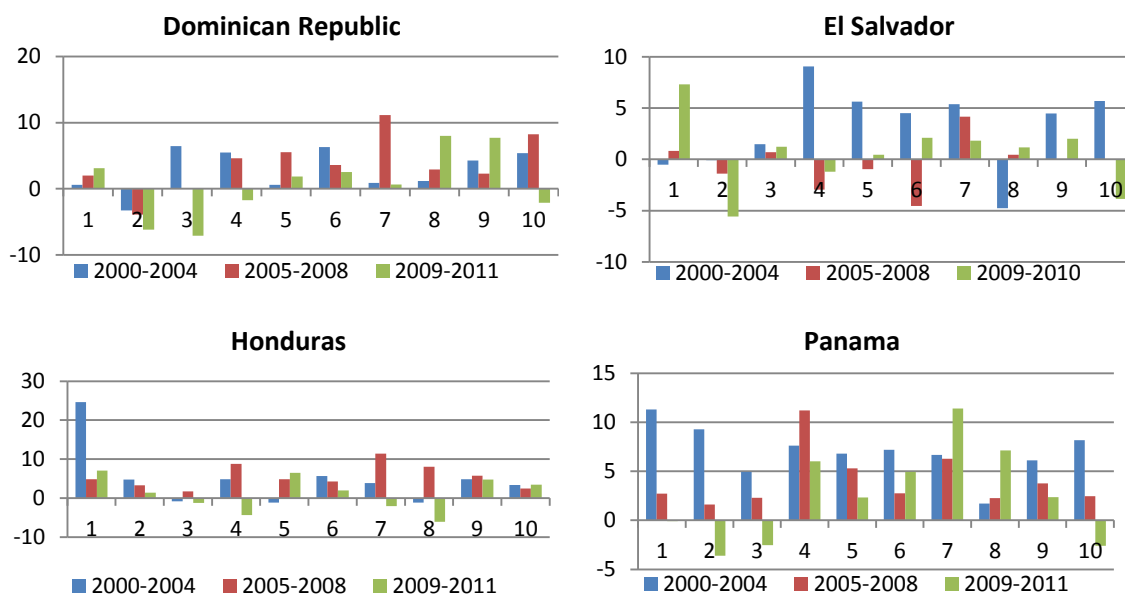
|   | 2000-2004 | 2005-2008 | 2009-2011 | All years |
|---|-----------|-----------|-----------|-----------|
| Agriculture, forestry and fishing       | 1.4       | 4.8       | 2.2       | 2.7       |
| Mining & quarrying                      | 4.3       | 6.5       | -4.8      | 2.2       |
| Manufacturing industry                  | 0.8       | 6.2       | 2.7       | 3.0       |
| Construction                            | 5.7       | 13.4      | -1.3      | 5.9       |
| Electricity and Water                   | 5.2       | 3.4       | 3.2       | 4.0       |
| Business, restaurants and hotels        | 2.5       | 4.7       | 1.6       | 2.9       |
| Transport, storage and communications   | 11.4      | 9.4       | 5.9       | 9.1       |
| Financial Services                      | 8.6       | 9.5       | 4.7       | 7.7       |
| Real Estate                             | 2.5       | 4.2       | 3.2       | 3.2       |
| Other business services                 | 11.3      | 12.7      | 11.5      | 11.8      |
| Public administration services          | 2.0       | 2.3       | 2.3       | 2.2       |
| Community, social and personal services | 2.5       | 3.6       | 3.8       | 3.2       |

Source: World Development Indicators

Other DR-CAFTA members, such as the Dominican Republic and Honduras, also experienced a rise in the share of employment in the services sector. The largest growth rates were observed in the 2005-08 boom prior to the financial crisis (see Figure 14). The Dominican Republic was even

able to sustain positive growth rates in most of subsectors pertaining to the tertiary sector even in the period 2008 to 2012.

**Fig 14: Average employment growth rates - selected Central American countries**



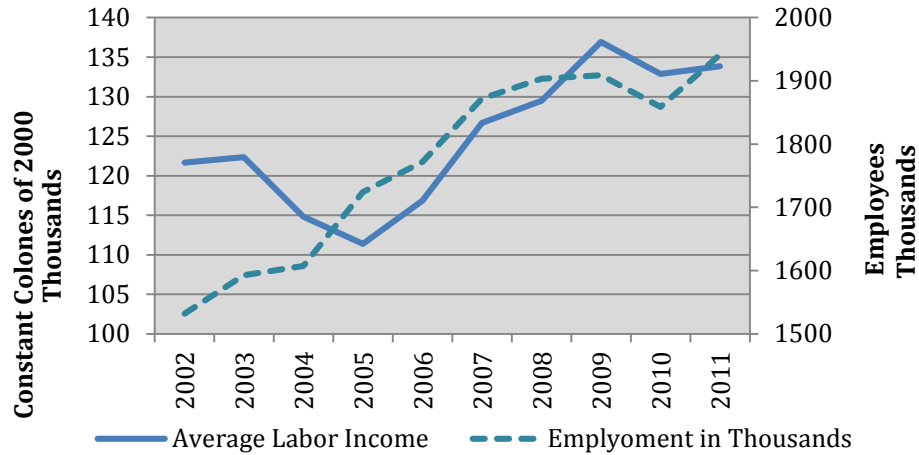
Horizontal axis: (1) Agricultural, primary (2) Food, beverage, tobacco, textiles and clothing (3) Rest of manufacturing industry (4) Construction (5) Retail, restaurants and hotels (6) Electricity, gas, water, transport and communications (7) Banking sector, finance, insurances and professional services (8) Public administration and defense (9) Education, health, personal services (10) Domestic service

### 3.1.2. Wages

Labor income in Costa Rica rose in real terms following signature of the DR-CAFTA agreement, until the financial crisis (see Figure 15). This is consistent with some specialization towards higher value added products that require higher skills, particularly in the services sector. However, this period also coincided with the global boom. Still, even in the turbulent years from 2009-2011 labor income of individuals working in services increased, except for the subsectors construction, retail, restaurants and hotels (see Figure 16).<sup>5</sup>

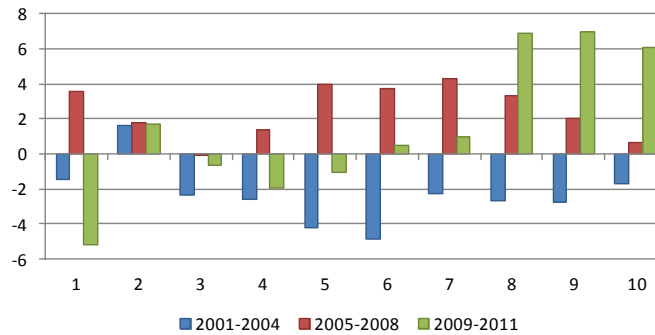
<sup>5</sup> Methodological changes between Encuesta de Hogares de Propósitos Múltiples and Encuesta Nacional de Hogares, do not allow to use all sources of per capita income for the analysis. The analysis focuses therefore on labor income using up to 2010 harmonized data of CEDLAS. For 2011 we recreated labor income using raw data of Encuesta Nacional de Hogares.

**Fig 15: Average real labor income and employment**



Source: own calculations using Encuesta de Hogares de Propósitos Múltiples and Encuesta Nacional de Hogares

**Fig 16: Average annual growth rates of labor income by subsector- Costa Rica**

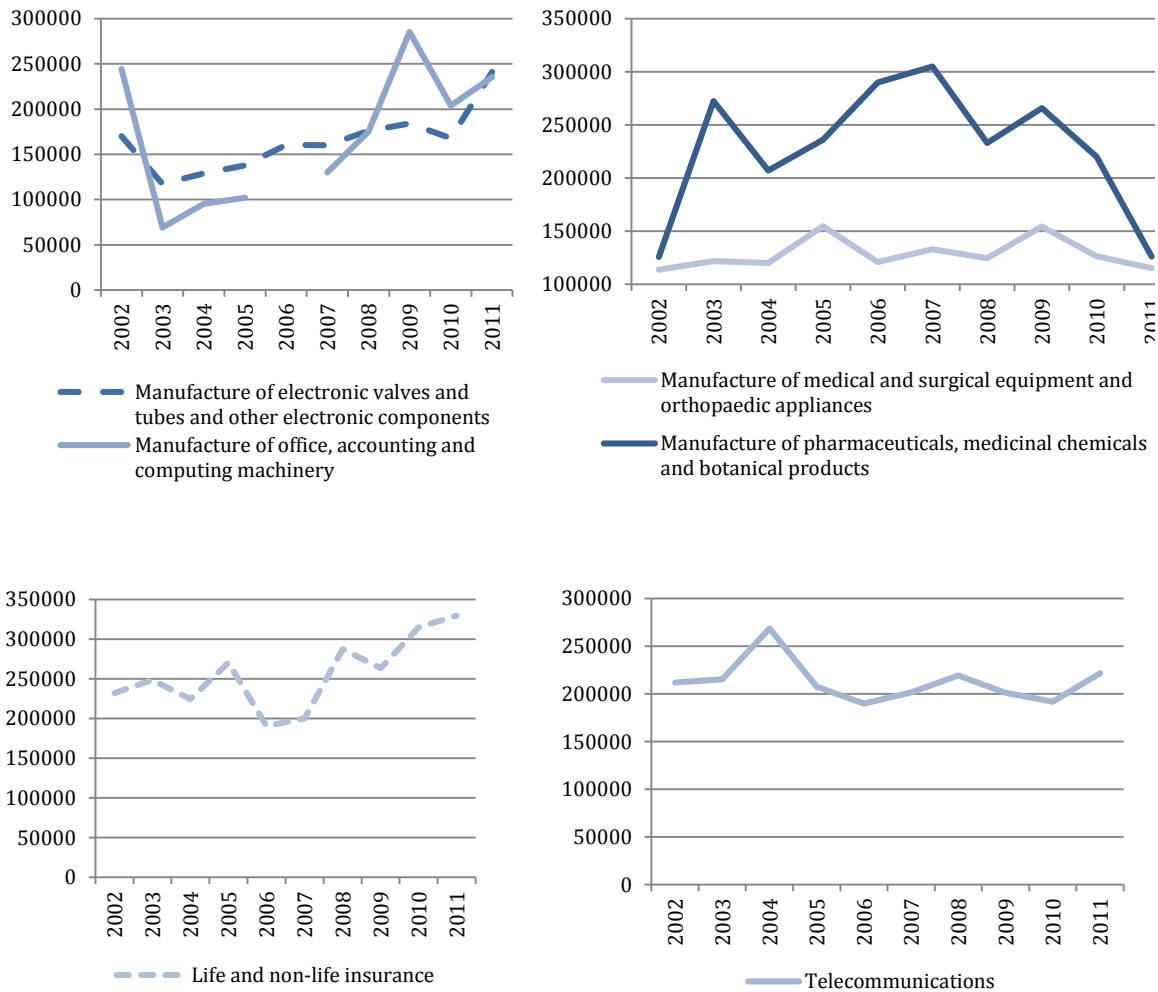


Horizontal axis: (1) Agricultural, primary (2) Food, beverage, tobacco, textiles and clothing (3) Rest of manufacturing industry (4) Construction (5) Retail, restaurants and hotels (6) Electricity, gas, water, transport and communications (7) Banking sector, finance, insurances and professional services (8) Public administration and defense (9) Education, health, personal services (10) Domestic service

The evolution of labor income in sectors that were favored by the DR-CAFTA agreement was mixed (see Figure 17). Employees working in high tech industries saw a steady increase in labor income from 2003 to 2009. Labor income in medical equipment expanded from 2004 to 2007, while labor income for employees of pharmaceutical firms was volatile and had no clear trend. Insurance saw increasing remunerations for its workers starting in 2007, while labor income in telecommunications did not increase. Thus the available data on labor income do not show significant benefits from the agreement.



**Fig 17: Average labor income in selected subsectors (constant Colones 2000)**



Note: Household surveys are not representative at detailed sectoral disaggregation levels. Results shown here suggest main trends but cannot be interpreted as exact point estimates.

The rise in employment and increases in labor income experienced prior to the financial crisis do not appear to have had a major impact on poverty. Costa Rica, which enjoys the lowest poverty levels in Central America (22.4% in 2013<sup>6</sup>), experienced some reduction in the poverty rate prior to the financial crisis (See Table 4). Most of the poverty reduction was driven by growth in the agricultural sector, leading to some concentration of poverty in urban areas. Among the poor, the main sources of labor income come from employment in the agricultural, retail and domestic services sectors and did not change significantly over time (See Cadena, K. et.al 2013).

<sup>6</sup> Poverty headcount at national poverty line (World Bank, 2013)

**Table 4: Evolution of Poverty, 2003 to 2012**

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| Year | Headcount Index |       |       |
|------|-----------------|-------|-------|
|      | Total           | Urban | Rural |
| 2003 | 18.5            | 15.4  | 23.1  |
| 2004 | 21.7            | 18.9  | 26    |
| 2005 | 21.2            | 18.7  | 24.9  |
| 2006 | 20.2            | 18.3  | 23    |
| 2007 | 16.7            | 15.7  | 18.3  |
| 2008 | 17.7            | 16.9  | 18.7  |
| 2009 | 18.5            | 18    | 19.2  |
| 2010 | 21.3            | 18.3  | 26.3  |
| 2011 | 21.6            | 19.1  | 26    |
| 2012 | 20.6            | 17.6  | 25.8  |

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Source: Instituto Nacional de Estadística y Censos, Costa Rica based on Encuesta de Hogares de Propósitos Múltiples up to 2009 and Encuesta Nacional de Hogares from 2010 to 2012.

### **3.2. Impact on consumption and welfare**

Measuring the benefit of the DR-CAFTA agreement for consumers is even more challenging than measuring its impact on employment. Given the absence of data, one approach is to assume that the agreement will reduce prices in sectors where the elimination of monopolies will significantly increase competition leading to procompetitive gains. The impact on consumers is measured using data from Encuesta Nacional de Ingresos y Gastos of 2004. The decline in prices is assumed to free up resources to be devoted to other purposes, either increased expenditures on other goods or savings. The analysis is restricted to the effect of price changes on per capita expenditures after implementing DR-CAFTA. That is, we make no attempt to model the change in quantities purchased.<sup>7</sup>

We assume that the liberalization of telecommunications and insurance will eventually result in a 50 percent decline in markups on products in these two sectors.<sup>8</sup> The impact on consumers is limited, because the two sectors' share of expenditures is relatively small. Average per capita spending declines by only 1.6 percent as a result of halving of the margins in telecommunications and services (see Table 5). As with any normal good, the average amount spent on

telecommunications and insurance is higher in the higher-income quintiles (see Figure 13). For example, average household expenditure on insurance in the richest quintile is 39 times the level in the poorest quintile. This same ratio is 6.5 in the case of telecommunications.

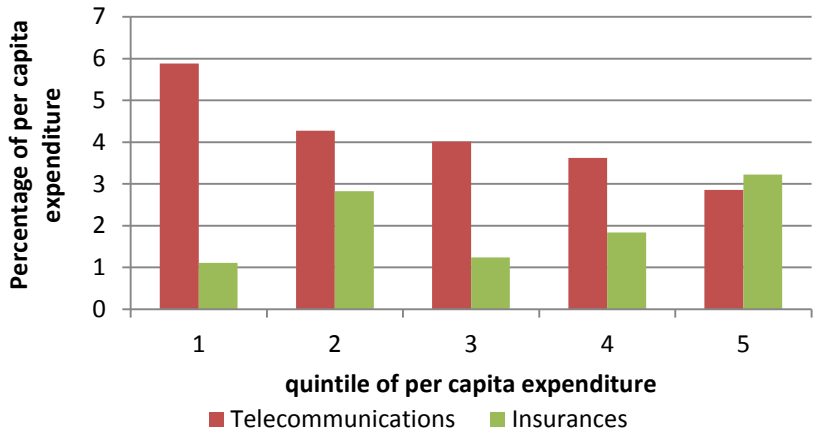
**Table 5: Changes in average per capita expenditure after 50% decline in markups in telecommunications and insurance**

| Average per capita spending                     |                 |            |
|---|-----------------|------------|
|   | Colones of 2004 | Percentage |
| <b>Average per capita spending</b>              | 99132           | 100        |
| Telecommunications                              | 3941            | 4.0        |
| Insurance                                       | 5826            | 5.9        |
| <b>Per capita spending after markup change</b>  | 97526           | 100.0      |
| Telecommunications                              | 1970            | 2.0        |
| Insurance                                       | 2913            | 3.0        |
| <b>Percentage change in per capita spending</b> |                 | -1.6       |

Source: own calculations using Encuesta Nacional de Ingresos y Gastos 2004 (ENIC 2004)

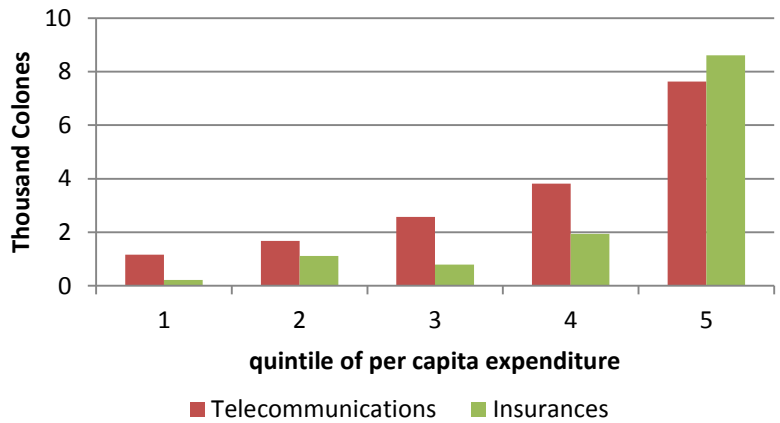
The share of expenditures in each quintile varies between the two sectors. Poorer households tend to spend a larger share of their income on telecommunications than richer households (see Figure 18), perhaps because the decline in cell phone prices have made them more accessible to the poor, albeit still expensive. By contrast, the average share of spending on insurance increases by income quintile. Insurance typically is a luxury service with an income elasticity higher than 1, meaning that demand increases faster than income. Thus, halving the markup on telecommunications services is expected to have the strongest impact (on average) on the poorest, while halving the price of insurance would benefit relatively more the richer quintiles.

**Fig 18: Average share of expenditures in telecommunications and insurance by quintiles.**



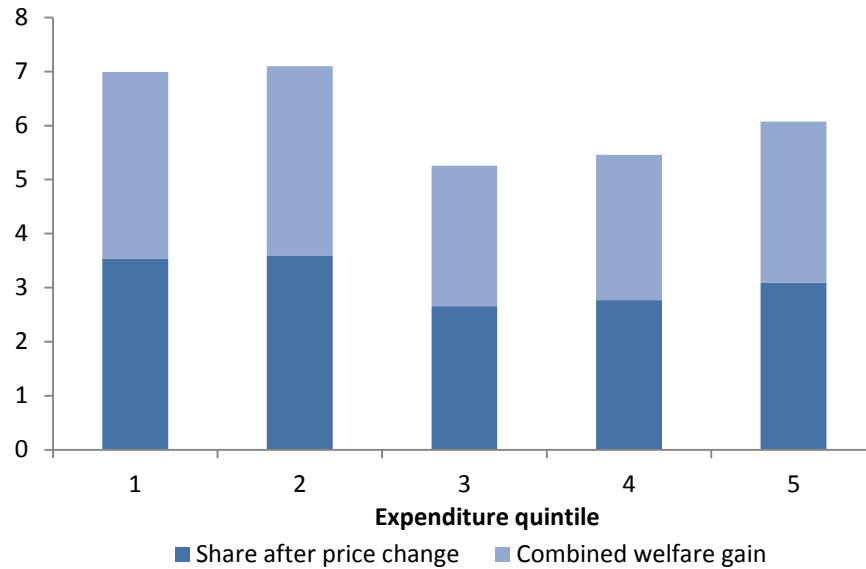
Source: own calculations using Encuesta Nacional de Ingresos y Gastos 2004 (ENIC 2004)

**Fig 19: Average expenditures in telecommunications and insurance by quintiles (Colones of 2004).**



The combined effect of a onetime markup decrease of 50 percent in the two sectors is larger as a share of per capita expenditures for the lowest quintiles. Thus, the poorest households would benefit more in relative terms from decreasing markups (see [FigFigure–20](#)). Nevertheless, the total impact on poverty is relatively limited (see Table 6), given the limited spending on these services by the poor. However there is a slight increase in inequality both in rural and urban areas, meaning that the effect coming from the insurance sector dominates the one coming from telecommunications.

**Fig 20: Combined effect of a 50% fall in markups**



Source: Encuesta Nacional de Ingresos y Gastos 2004 (ENIC 2004)

**Table 6: Poverty- Headcount Index**

|       | Baseline |         | 50% decline in markup |         |
|-------|----------|---------|-----------------------|---------|
|       | Moderate | Extreme | Moderate              | Extreme |
| Urban | 18.4     | 3.9     | 17.9                  | 3.5     |
| Rural | 25.7     | 7.9     | 25.4                  | 7.6     |
| Total | 21.3     | 5.5     | 20.8                  | 5.1     |

Source: own calculations using Encuesta Nacional de Ingresos y Gastos 2004 (ENIC 2004)

**Table 7: Gini coefficient.**

| Inequality | Baseline | 50% decline in markup |
|------------|----------|-----------------------|
| Urban      | 0.460    | 0.461                 |
| Rural      | 0.480    | 0.481                 |
| Total      | 0.489    | 0.490                 |

Source: own calculations using Encuesta Nacional de Ingresos y Gastos 2004 (ENIC 2004)

#### **IV. Economy-wide (CGE) analysis: Dynamic effects of services trade liberalization**

To assess the macro impact of the liberalization of trade in services on the Costa Rican economy we use a recursive dynamic general equilibrium model, building upon the World Bank - Linkage – model (Van der Mensbrugghe, 2005). The CGE analysis relies on a 2011 Social Accounting matrix (SAM) to simulate over the period 2011-2030 the liberalization effect of the two sectors of interest: telecommunications, and insurance. The modeling of the services follows the framework set in Rutherford et al (2005), Konan et al (2006), and Djiofack (2010) by considering two main channels through which the liberalization of trade in services affects household welfare: the productivity effect, and the markup effect. The productivity gains occurring from trade in services is captured through the global productivity of factors.

The market power (markup) is captured through the Eastman-Stykolt (1960) approach (see Warren (2000) and Konan et al (2002)). This approach consists for producers, to impose a surplus (representing the markup rate) over the average cost. The level of markup is the same determined for the partial equilibrium analysis.

The recursive dynamic approach consists of solving sequentially the model (one period at a time) with an update of the main macroeconomic variables at every period. Since the model is similar to standard CGE models in the literature (Dervis, De Melo and Robinson (1982), Shoven and Whalley (1984), De Melo and Tarr (1992), Francois and Reinhert (1997)), we will highlight here only the specificities/changes made to fit the Costa Rican case. We first present the static and the dynamic modules of the model and then introduce the way we model the effects of the liberalization of trade in services.

##### *4.1. The core model*

###### 4.1.1. Static module

###### ***Production and trade block***

The production in all sectors takes place under constant returns to scale and perfect competition. Producers are assumed to maximize their profit by minimizing their cost of production. The production technology consists of a nested sequence of Constant Elasticity of Substitution (CES). At the top level, output is specified by a Leontief technology of the value added and the intermediate aggregates. The aggregate intermediate input is a Leontief function of the primary inputs. Value added is a CES function of an aggregated factor: the “capital skilled labor aggregate” and the “unskilled labor”. The SAM distinguishes two types of labor distinguished by skill: unskilled labor and skilled labor and two types of capital: agricultural and non-agricultural capital. The “capital skilled labor aggregate” factor is itself obtained by a CES function of capital and skilled labor.

We assume perfect competition and mobility of labor across the different sectors. Equilibrium is reached via a flexible wage rate, uniform across all sectors. However, we assume that capital is specific to each sector. Hence each activity pays an activity specific remuneration for capital.

Imports are modeled using the Armington (1969) assumption, which states that demand for commodities is a function of their origin. Hence a CES aggregation function is used to take into account imperfect substitutability between imports and commodity sold domestically. The export side is treated in a symmetric fashion. Domestic output is allocated between domestic markets and exports via a Constant elasticity of transformation (CET) function.

### ***Institutions block***

#### **Household's income and consumption**

Households receive income from factors of production and transfers from other institutions (enterprises, the government and the rest of the world). However they do not receive any direct payment from the gold companies since the government is the sole agent owning a share of the capital in this sector. Transfers from the rest of the world are fixed in foreign currency.

Households use their income to pay direct taxes, save, consume and make transfers to other institutions. The share of savings and direct taxes in household income is held constant.

Households' consumption of the composite commodity is determined by a linear expenditure system (LES) demand function, derived from maximization of a Stone-Geary (1954) utility function.

#### **The government**

The Government collects taxes (income taxes, indirect taxes on intermediate and final consumption, production taxes and tariffs) and receives transfers from other institutions. In the model, unless otherwise stated, all tax rates are fixed, so are the volumes of government current and investment spending as shares of real GDP. Hence government savings are flexible and adjust to clear the balance between revenues and spending. This is achieved through domestic and foreign borrowing.

### ***Macroclosure***

Three macroeconomic balances are important for the model: the government balance, the external balance and the savings-investment balance. The first balance has been presented in the previous subsection, so we will focus here on the last two ones.

Regarding the savings-investment balance, we assume a savings-driven closure, meaning that savings rates for all nongovernmental agents (households and firms) are fixed. Investment is flexible to ensure that the investment cost will be equal to the total savings value.

For the external balance, the current account (foreign savings) is fixed and equilibrium is achieved through adjustment of the real exchange rate.

#### 4.1.2. Dynamic Module

The model has a recursive dynamic structure, meaning that there is no inter-temporal optimization by agents. Also this is mainly driven by computational convenience as the later models are pretty hard to solve. Hence, the model is solved as a sequence of static equilibria in each period. The dynamic of the economy is given by productive capital accumulation, exogenous labor supply growth and productivity changes.

Capital accumulation in each period is endogenous and given by the sum of depreciated capital stock inherited from the previous period and gross (new) investment as follows:

$$K_{i,t+1} = K_{i,t}(1 - \delta) + \chi_i INVTOT_t$$

where  $\delta$  is the annual depreciation rate of the capital,  $INVTOT_t$  is the total investment in the current period (t), and  $\chi_i$  is the share of each sector in total capital in the initial year. The allocation of capital among sectors depends on the return to capital in each sector in the previous period.

Labor stock available in each period grows exogenously at the growth rate of the working age population (ages 15-64), obtained from United Nations Population Division forecasts. This rate for Mali is estimated at 3.17% on average annually.

$$LS_{t+1} = LS_t(1 + p)$$

Regarding productivity changes, the model assumes technical progress specific to sector and production factors. The change in productivity is derived by a combination of factors, but is also partially judgmental. First, agricultural productivity is assumed to be factor-neutral and exogenous, and is set to estimates from empirical studies (for example Martin and Mitra, 2001). Productivity in manufacturing and services is labor-augmenting, and a constant wedge is imposed between productivity growths in the two broad sectors with the assumption that productivity growth is higher in manufacturing than in services.

## 4.2. Modeling the effects of the liberalization of trade in services

Trade in services differ from trade in goods in various ways. Indeed contrary to goods, services are intangible and require personal contact with the final client. They do not need to cross the



border and are thus not subject to customs procedures and tariffs. This particular nature of services complicate both their measurements with regard to international balance of payments and their impediments (Karsenty, 2000, Konan et al., 2004). Thus any attempt to study the impact of the liberalization of trade in services has to deal with this issue.

Before coming to the technical issues, it is particularly important to note that “services” cover a broad category with different features (construction, insurance, telecommunications...). This distinction is important as it will guide the modeling work. To that regard, the GATS classification is particularly interesting and help shape the modeling framework. This classification distinguishes 4 modes depending on the territorial presence of the supplier and the consumer at the time of the transaction (Cross border trade, Consumption abroad, commercial presence and presence of natural persons). In the Costa Rican case we will be mainly dealing with the mode 3 (commercial presence) for telecommunication and insurance services, meaning that we assume that these services will be partly provided to Costa Rican users by “locally-established affiliate, subsidiary, or representative office of a foreign-owned and — controlled company”, according to WTO definitions.

When it comes to assessing the barriers in the services sector and the potential impact of the liberalization, the aforementioned distinction is of great importance. Indeed, most of the challenges rely on how to come up with a quantitative evaluation of the protection of a sector for which all the available information is qualitative. The markets for services operates under regulations (licenses, quotas, interdiction of foreign presence...) that restrict their access and discriminate against foreign firms. The way these qualitative information is transformed into a quantitative measure that a modeler can use is not obvious and depend on the type of service under consideration. For mode 1 services that may be subject to cross border trade, the task of the modeler generally consist of transforming the qualitative information into an index and then an ad valorem equivalent of this index. One can make a distinction between direct and indirect approaches (Fontagne et al., 2011). The direct approach consists of gathering the information on the characteristics of the sector (regulation and its degree of restrictiveness), aggregate them in a global index and use that index as a regressor for price-cost margins (Dihel and Shepherd, 2007; Fontagné and Mitaritonna, 2013). The indirect approach relies on econometrics – particularly gravity type equations – and consists of computing ad valorem equivalents by comparing actual trade flows against a benchmark (Francois et al., 2005; Walsh, 2006; Fontagne et al., 2011).

For mode 3 services, which concern commercial presence, things are a little bit different. Indeed this require the presence of foreign firms and is linked to Foreign Direct Investment issues. Since no cross border flow will take place, tariffs ad valorem equivalent would not make sense. However a methodological issue arises when there is no FDI in the benchmark equilibrium for a particular sector, as this cannot me modeled as tax on the existing investment flow (Konan and Maskus, 2004). To that extent it is generally assumed that, since services sector that are protected and

regulated, the liberalization process will change the ownership and the market structure of the sector. Indeed in most cases these markets depart from perfect competition. As a consequence, a markup arises from imperfect competition among domestic producers. The liberalization process is supposed to suppress (or reduce) that markup.

For Costa Rica, we build on this assumption, and follow the Eastman-Stykolt (1960) approach. This approach consists for producers, to impose a surplus (representing the markup rate) over the average cost. The markup variation due to liberalization come from the literature (Bradinger and Breuss, 2005).

The second channel through which the liberalization of the services sector will affect the Costa Rican economy is the productivity gains occurring from trade. We assume that the regulation and barriers yield inefficiency gains due to the failure of domestic service providers to adopt least-cost practices. Indeed the availability of low-cost, high-quality producer services increase the productivity in other sectors, particularly for manufacturing firms ((Francois and Hoekman, 2010). Also, following the liberalization process, the greater intensity of competition in the markets affected leads suppliers to operate closer to their frontier levels of costs. As a consequence, liberalizing trade will yield productivity gains that are captured through the global productivity of factors. The elasticities characterizing these relationships are borrowed from recent literature (Mattoo et al., 2006; Arnold et al., 2012).

### **4.3. Data and calibration**

The model is calibrated to a 2011 SAM of the Costa Rican economy, which is base in Input- Output matrix and National Accounts Information, both provided by the Central Bank of Costa Rica with base year 2011. The SAM includes 31 sectors of productions and commodities, from which 15 are service sectors. Among them we include the telecommunication sector and financial services. The SAM has four factors of production: capital, skilled labor, unskilled labor employed in the rural sector and unskilled labor employed in the urban sector. There are 10 representative households in the SAM, by deciles of income. In order to include 10 representative households and split labor by categories, we used information from the Encuesta de Hogares de Propósitos Múltiples (EHPM). The SAM also includes one representative firm and the public sector. Firms earn income from capital and interest from public debt. We consider only one trade partner. There are four types of taxes: production taxes, domestic taxes on commodities, import taxes and direct taxes. Investment is split into public and private investment. Information for public investment was obtained from the Minister of Finance.

Table 8: Sectors and commodities included in the SAM

| Goods  | Services                        |
|--|---------------------------------|
| Paddy  | Electricity and gas             |
| Other grains                                   | Water supply                    |
| Food crops                                     | Building construction           |
| Non food crops                                 | Other construction              |
| Livestock and poultry                          | Wholesale and retail trade      |
| Forestry                                       | Transportation                  |
| Fishery  | Telephone and telecommunication |
| Non metallic ore and quarrying                 | Finance and insurance           |
| Milled grain and flour                         | Real estate                     |
| Fish products                                  | Education and research          |
| Slaughtering, meat products and dairy products | Medical and health services     |
| Other food products                            | Restaurants                     |
| Beverages                                      | Hotel                           |
| Heavy electrical equipment                     | Other services                  |
| Electronic computing equipment                 | Public administration           |
| Other manufactures                             |                                 |

Other information in order to calibrate the model included values for income elasticity of households, taken from GTAP database; initial capital stock values from WEO-IMF; initial population and estimations on population growth up to 2020 from INEC; and debt stocks and exchange rates from Central Bank of Costa Rica.

#### 4.3.1. Simulations and Results

##### 4.3.1.1. Definition of scenarios

As we already anticipated in the previous section, we model service liberalization through two channels:

- 1) Decrease in markups due to service trade liberalization; and
- 2) Increase in total productivity of factors

In the first case, we simulated a 30% fall in markups in the telecommunications and financial services sectors. We also simulated a 50% fall as a sensitivity analysis scenario<sup>9</sup>. These numbers come from previous literature on the topic (Bradinger and Breuss, 2005).

In the second case, we increased the total productivity of labor and the total productivity of capital by 2%, and we also performed a sensitivity analysis increasing productivity by 4%.

##### 4.3.1.2. Results of the simulations

<sup>9</sup> The results of the sensitivity analysis are available upon request.

In this section we present results of both scenarios separately and combined. All results are expressed as percentage change with respect to Business as Usual (BaU) scenario in year 2030.

Table 9 present results on macroeconomic indicators. The fall in markups and increase in productivity in the economy thanks to service trade liberalization has a positive effect on GDP growth. The total effect by 2030 is a 0.15% increase of GDP with respect to a scenario without service trade liberalization. Among the different components of GDP, private consumption increases the most, whereas investment falls and so do exports and imports. These overall results are mostly driven by markup decrease effect, which has a negative impact on private investment, which fall by 0.25%. The productivity effect, on the other hand, has a positive effect on investment and trade.

Table 9. Impact on macroeconomic indicators. Percentage change with respect to BaU scenario. Year 2030.

|                                     | Markup effect | Productivity effect | Total effect |
|-------------------------------------|---------------|---------------------|--------------|
| GDP at constant prices              | 0.09          | 0.06                | 0.15         |
| Private consumption                 | 0.26          | 0.05                | 0.31         |
| Public consumption                  | 0.09          | 0.06                | 0.15         |
| Investment                          | -0.25         | 0.10                | -0.20        |
| Public Investment                   | 0.09          | 0.06                | 0.15         |
| Private Investment                  | -0.25         | 0.10                | -0.20        |
| Exports                             | -0.28         | 0.07                | -0.21        |
| Imports                             | -0.21         | 0.06                | -0.15        |
| Real exchange rate                  | 0.24          | -0.01               | 0.24         |
| Current account balance as % of GDP | 0.06          | -0.06               | 0.00         |

The decrease of trade flows in the markup scenario is related to an appreciation of the real exchange rate. Exports of telecommunications and financial services increase significantly as a consequence of liberalization while exports of other goods and services decrease as a consequence of the fall in production of those sectors. Total exports decrease slightly and since the current account balance is fixed, the real exchange rate depreciates. The productivity effect affects positively agricultural exports and to a lower extent service exports. Here again since the current account balance is fixed, the real exchange rate appreciates and total imports increase.

Table 10. Impact on exports by sector. Percentage change with respect to BaU scenario. Year 2030.

|                    | Markup effect | Productivity effect | Total effect |
|--------------------|---------------|---------------------|--------------|
| Telecommunications | 28,73         | -0,01               | 28,72        |
| Financial services | 33,46         | 0,00                | 33,47        |
| Total services     | -0,67         | 0,05                | -0,63        |
| Agriculture        | -0,02         | 0,10                | 0,08         |
| Manufactures       | -0,24         | -0,01               | -0,26        |

A similar effect is observed when we analyze impact on production, although in this case, non-tradable sectors increase production and total service production rises. When we analyze the total effect, we observe that services liberalization and expansion is partly at the expense of the manufacture sector, which decreases production by 0.07% in 2030.

Table 11. Impact on domestic production by sector. Percentage change with respect to BaU scenario. Year 2030.

|                            | Markup effect | Productivity effect | Total effect |
|----------------------------|---------------|---------------------|--------------|
| Agriculture                | -0.02         | 0.09                | 0.07         |
| Manufactures               | -0.09         | 0.02                | -0.07        |
| Services                   | 0.16          | 0.05                | 0.21         |
| Telecommunication services | 3.92          | 0.04                | 3.96         |
| Financial services         | 3.22          | 0.05                | 3.27         |
| Total                      | 0.09          | 0.06                | 0.15         |

Under the markup effect, labor demand rises for all sectors, while capital demand falls, mostly for agriculture and manufacture sectors. Under the productivity effect, service sectors reduce demand for labor, and all sector increase capital demand. The overall effect is an increase in labor demand, especially among service sectors, and a fall in capital demand.

Table 12. Impact on factor demand by sector. Percentage change with respect to BaU scenario. Year 2030.

|                | Markup effect | Productivity effect | Total effect |
|----------------|---------------|---------------------|--------------|
| Labor demand   |               |                     |              |
| Agriculture    | 0,13          | 0,00                | 0,14         |
| Manufacture    | 0,13          | 0,00                | 0,14         |
| Services       | 0,29          | -0,04               | 0,25         |
| Total          | 0,24          | -0,03               | 0,21         |
| Capital demand |               |                     |              |
| Agriculture    | -0,78         | 0,06                | -0,72        |
| Manufacture    | -0,49         | 0,02                | -0,47        |
| Services       | -0,11         | 0,04                | -0,07        |
| Total          | -0,21         | 0,04                | -0,17        |

Table 13. Impact on factor remuneration. Percentage change with respect to BaU scenario. Year 2030.

|                       | Markup effect | Productivity effect | Total effect |
|-----------------------|---------------|---------------------|--------------|
| Unskilled rural wages | 0,32          | 0,09                | 0,41         |
| Unskilled urban wages | 0,29          | 0,09                | 0,38         |
| Skilled wages         | 0,28          | 0,09                | 0,37         |
| Capital remuneration  | 1,52          | 0,02                | 1,54         |

In terms of household's welfare, the trade reform has a positive impact on richer households. The impact on poor households is not significant, but households in the eighth, ninth and tenth deciles gain welfare. This happens mainly as a consequence of the fall in consumption prices of their consumption basket (particularly for telecommunication and financial services as a consequence of the reform), as nominal income increases evenly for all households. This result tend to suggest that the effect of financial services tend to outperform the one of telecommunications. Indeed the budget share for financial services is particular high for rich households compared to poor ones. Consumption prices increase mostly for middle-income households, which are the ones that are more negatively hit by the reform.

Table 14. Impact on households' welfare and real income. Percentage change with respect to BaU scenario. Year 2030.

| Utility            |       |      |       |
|--------------------|-------|------|-------|
| Poorest decile     | 0,00  | 0,00 | 0,00  |
| Second decile      | 0,00  | 0,00 | 0,00  |
| Third decile       | -0,01 | 0,00 | 0,00  |
| Fourth decile      | -0,01 | 0,00 | -0,01 |
| Fifth decile       | -0,01 | 0,01 | 0,00  |
| Sixth decile       | -0,01 | 0,01 | -0,01 |
| Seventh decile     | -0,01 | 0,01 | 0,00  |
| Eight decile       | 0,02  | 0,01 | 0,03  |
| Ninth decile       | 0,06  | 0,02 | 0,08  |
| Richest decile     | 0,37  | 0,03 | 0,40  |
| Nominal income     |       |      |       |
| Poorest decile     | 0,22  | 0,05 | 0,27  |
| Second decile      | 0,22  | 0,05 | 0,27  |
| Third decile       | 0,22  | 0,05 | 0,28  |
| Fourth decile      | 0,23  | 0,06 | 0,28  |
| Fifth decile       | 0,25  | 0,06 | 0,31  |
| Sixth decile       | 0,23  | 0,06 | 0,29  |
| Seventh decile     | 0,23  | 0,06 | 0,29  |
| Eight decile       | 0,22  | 0,06 | 0,28  |
| Ninth decile       | 0,21  | 0,05 | 0,27  |
| Richest decile     | 0,20  | 0,05 | 0,25  |
| Consumption prices |       |      |       |
| Poorest decile     | 0,24  | 0,00 | 0,24  |
| Second decile      | 0,30  | 0,00 | 0,30  |
| Third decile       | 0,31  | 0,00 | 0,31  |
| Fourth decile      | 0,36  | 0,00 | 0,36  |
| Fifth decile       | 0,33  | 0,00 | 0,33  |
| Sixth decile       | 0,31  | 0,00 | 0,31  |
| Seventh decile     | 0,28  | 0,00 | 0,28  |
| Eight decile       | 0,14  | 0,00 | 0,14  |
| Ninth decile       | 0,01  | 0,00 | 0,01  |

|                |       |      |       |
|----------------|-------|------|-------|
| Richest decile | -0,37 | 0,00 | -0,37 |
|----------------|-------|------|-------|

## V. Conclusions

Results point to a small but consistent reallocation of employment from agriculture and manufacturing to services following signature of the DR-CAFTA agreement. Research previous to implementation of DR-CAFTA expected a stronger reallocation of employment towards manufacturing, which cannot be corroborated with household survey data so far. Traditional manufacturing subsectors lost shares in employment while employment changes in other manufacturing subsectors were minor, with the exception of some niche activities that benefited substantially from trade liberalization. New competition of Chinese imports in the textile and apparel sectors and expiration of the Agreement on Textiles and Clothing (ATC) may explain the failure of manufacturing to gain employment shares. Additionally, small employment changes in high tech sectors might be associated with higher capital intensity of those sectors compared to maquila-based manufacturing. By contrast, employment changes in services strongly benefited from deep restructuring and liberalization of telecommunications as a result of negotiations and preparation for DR-CAFTA.

Changes in poverty before entering DR-CAFTA were minor, while poverty increased substantially at the onset of the food and financial crises. The agricultural sector was poverty reducing up to 2009, before DR-CAFTA implementation (see Cadena, K. et.al 2013). However the fall in agricultural average income from 2009 to 2011, even in light of higher employment shares in this sector, might explain the large increase in rural poverty in 2010. According to Sanchez, M (2005) Costa Rica had the best pre conditions for entering CAFTA, particularly due to increased productivity and diversified production in the agricultural sector. Further analysis of exports and production in this sector is needed to test if the agricultural Costa Rican sector has indeed a competitive advantage in international markets.

With regard to poverty the poorest quintiles could benefit more (in relative terms) than the richest from price reductions in telecommunications and insurance resulting from the DR-CAFTA agreement. Even though the share of consumer expenditures on these services is small, changes in their prices could have a significant impact on welfare for the poorest quintiles. It would be important to simulate changes in prices of those goods and services that have a large share of per capita income of these quintiles and test if prices actually changed in their favor. Finally there is a slight increase in terms of inequality, meaning that the richest could have benefited more from the price fall.

The results of CGE analysis suggest a positive impact in terms of growth with an uneven feature. While the other components of GDP increase, private investment and net trade decrease. Contrary to previous findings, we found small but more evenly and equally spread effects for the

productivity increase. This may be explained by the small magnitude of the shock (2%). The reform also yields unequal outcomes in terms of welfare. The group that benefit the most from the liberalization is rich households. This latter effect gives room for more debate on the growth versus inequality nexus.



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