# BOLIVIA-EU TRADE AGREEMENT: IS IT AN OPTION FOR THE MORALES ADMINISTRATION?


## Abstract

In 2008 Bolivia ceased to benefit from the US trade preferences, which turned out in thousands of jobs lost thorough the country. Without political will to initiate a trade agreement with the US, the Morales administration has the opportunity to initiate a trade agreement with the European Union. This study evaluates macro and micro economic impacts emerging from a hypothetical trade agreement between Bolivia and the European Union. Our methodology consisted of using a CGE model as 'price generator', and a micro-simulation approach as a bridge to transmit those price changes to the household level under two liberalization scenarios.

The core conclusion of this research is that a Bolivia-EU trade agreement is a preferable alternative to maintenance of the *status quo*. Andean countries (Colombia and Peru) already have a trade agreement with the EU, while MERCOSUR counties are working towards that agreement. The Morales administration decided, for the time being, to stay away from an agreement with the US (the largest importer of goods in the world), but Bolivia could still benefit if a trade agreement with the EU (the second largest importer of goods in the world) is accomplished.


Keywords: Trade liberalization, Bolivia, European Union, Households.

# INTRODUCTION - BOLIVIAN ECONOMY AND TRADE POLICY

In recent years the trend around the world has been engaging into negotiating multilateral, regional and bilateral trade agreements. Some 546 Regional Trade Agreements were notified to the GATT/WTO up to January 2013 (WTO, 2013). Bolivia has been part of this trend, signing several trade agreements such as the Andean Community (1969), the Economic Complementation Agreement (ACE 22) with Chile (1994), the Economic Complementation Agreement (ACE 31) with Mexico (1994), inclusion into the WTO (1995), inclusion into MERCOSUR as associated member (1996), and the Economic Complementation Agreement (ACE 47) with Cuba (1999). The latest was the Bolivarian Alternative for Latin America and the Caribbean -ALBA in Spanish- (2006) that was spear-headed by Venezuela.

In 2004 Bolivia as part of the Andean Community (CAN) tried to negotiate a trade agreement with the US. However, negotiations failed due to agricultural-related disagreements within the bloc and political differences between Bolivia and Ecuador with the US. Peru and Colombia individually signed trade agreements with the US in 2005 and 2006, respectively. Bolivia did not participate due to the political crises that contributed to the election of Evo Morales as Bolivian president in 2005. Since then, Bolivia has prioritized policies that support the domestic market, rejecting any possibility of trade negotiations with the US. Furthermore, in September 2008 the Morales administration expelled the US ambassador in La Paz, while in December of the same year the US did not extend the Andean Trade Promotion and Drug Eradication Act (ATPDEA) to Bolivia arguing that country failed in cooperating with anti-narcotic efforts (US Trade Representative, 2012). More recently, May 2013, the Morales administration expelled the US Agency for International Development (USAID), making it more unlikely any option for a trade agreement with the US.

As a result of ATPDEA termination, thousands of jobs were lost in Bolivia (INESAD, 2012; Confederación General de Trabajadores Fabriles de Bolivia, 2012) with small and medium-size factories closing down or migrating to Peru to maintain their benefits from the ATPDEA preferences. The loss of the ATPDEA has been a source of deep concern for Bolivian exporters and of political discomfort to the Morales administration, which initiated trade talks with the European Union (EU) aiming at a bilateral trade agreement that could offer a viable alternative outlet for Bolivian products.

From 1989 to 2010 Bolivia has experienced a predominantly positive trade balance with the EU (IBCE, 2009; and European Commission, 2012). In 2010 the EU accounted for ten percent of total Bolivian exports or about US$ 150 million (INESAD, 2012). Even though this share is not predominant, the main advantage comes from the fact that Bolivian exports to the EU consist of labor-intensive goods such as vegetable oils, quinoa, processed coffee, nuts, wood furniture, leather products, zinc, tin and borate, all of which generate direct employment for more than 60 Bolivian firms that exclusively export to the EU (INE, IBCE, CANEB and UDAPE, 2006). The direct and indirect employment generated by exports to the EU in 2010 was 62,400 jobs (INESAD, 2012).

The main purpose of this research is to assess the economic effects on the Bolivian macro-economy and on household groups emerging from a prospective Bolivia-EU trade agreement. Colombia and Peru already signed a trade agreement with the EU in November 2011, which has been ratified by the European Parliament on December 2012 (European Parliament, 2012a). Currently, there is no economic assessment of how the economic well-being of the domestic population and macroeconomic indicators may change as a result of a Bolivia-EU trade agreement.

This study will try to fill that void and provide an assessment that can be used by policy makers in Bolivia to formulate trade policies in benefit to the country and to its main vulnerable groups.

## METHODOLOGY: A MACRO-MICRO SIMULATION APPROACH

This section presents the approach that has been followed to estimate the changes in the Bolivian economy and household groups that could result from trade scenarios between Bolivia and the EU. This approach consists of a combination of a macro simulation model, Computable General Equilibrium (CGE), and a micro-simulation approach, *Laspeyres* price indices for income and expenditure, which in short can be referred to as a 'macro-micro simulation approach'.

The macro-micro approach consists of using a CGE model to simulate trade policy shocks whose results are applied to a micro-simulation tool to estimate the effects of such policies at household-group level. In general terms, the macro-micro simulation approach aims to answer the key question of how trade reforms affect the wellbeing of different household groups (Telleria, Ludena, Shankar and Bennett, 2008). The GTAP model (Hertel, 1997), which has been widely discussed and described in many economic policy articles, has been chosen as the macro-simulation model, while the micro-simulation approach uses price indexes as defined by Ianchovichina, Nicita and Soloaga (2002). In this research we use the GTAP Data Base, version 8.0, which represents a snapshot of the world economy in the year 2007. The macro-micro approach has been applied in two stages as shown in Figure 1.

Figure 1 about here.

## Stage one: Macro-simulation

In this stage we undertook preparatory steps for the simulations namely: 1) Updating of the GTAP Data Base; 2) Aggregation of this Data Base; and 3) Setting of trade simulation scenarios using GTAP as the macro-simulation model. In regards to the first step, we updated the 2007 GTAP Data Base in order to establish 2013 as the new baseline year from which the Bolivia-EU trade agreement was then simulated. This updating consisted of incorporating into the Data Base changes in tariffs that are relevant to Bolivia, i.e. the expiration of the ATPDEA that occurred in December 2008, and the new trade agreement between Colombia-Peru and the EU signed in June 2012. Then, in turn, trade flows and other macro variables are modified in the GTAP database to make data ready for policy simulation.

Second, to obtain solvable the simulations we grouped the large GTAP Data Base v. 8.0 (129 regions or countries and 57 sectors or commodity groups) into 8 regions and 35 sectors (Table 1). For region, our aggregation criterion consisted of choosing countries that have been important trade partners for Bolivia, which include the US, the EU and South American countries that accounted for 77 to 97 percent of total Bolivian exports to the world between 1994 and 2006 (INE et al., 2006). For sectors, our criterion consisted of choosing commodities groups relevant for trade flows (importing and exporting sectors), employment generation and food security. For presentation purposes, these 35 sectors were further aggregated into five commodity sectors named ‘Agriculture’, ‘Mining and natural resources’, ‘Light manufacturing’, ‘Heavy manufacturing and ‘Services’.

Table 1 about here.

Third, we set trade simulation scenarios between Bolivia and the EU as follows:

**Scenario 1: Bolivia – EU Total Liberalization**. In this scenario all Bolivian tradable products enter duty-free into the EU, and vice-versa.

**Scenario 2: Bolivia – EU excluding 'sensitive products'**. In this scenario all Bolivian tradable products enter duty-free into the EU, and vice-versa, except tariff lines belonging to the so-called sensitive commodity groups. For the EU, sugar, bakery products, processed fruits and vegetables, confectionary products, and beverages and tobacco were the sensitive commodity groups (European Parliament, 2012b), while for Bolivia we selected paddy rice, bovine and meat products, dairy products, textiles and leather products. For Bolivia we chose these commodities taking into account that safeguarding their production is important for employment and livelihood generation, as well as for future opportunities in trade expansion.

Thus, under the full liberalization scenario we simulated that the EU removed tariffs to 29% of Bolivian commodities (the remaining 71 percent of commodities were already duty-free as per the EU's Generalised Scheme of Preferences - GSP), while Bolivia removed tariffs to 71% of EU commodities (the remaining 29 percent were duty-free as per the most-favored-nation treatment). Under the second scenario, liberalization excluding 'sensitive commodities', we simulated that Bolivia decided (under the sensitive commodity provision) to keep import tariffs to 14.3 percent its commodities, while the EU decided to keep import tariffs to 9 percent of the commodities.

## Stage two: Micro-simulation and estimation procedure

The second stage to estimate the effects of the Bolivia-EU trade agreement at household level involved the following steps: 1) We aggregated the household survey into different household categories; 2) We set the household utility function; 3) We corrected price change results (obtained from GTAP) with price transmission

coefficients; 4) We transferred the GTAP results to Bolivian household database; and 5) We compared the pre and post liberalization scenarios so shedding light on the possible effects of the agreement upon different household groups in Bolivia.

First: The household data comes from the Bolivian National Institute of Statistics (BNIS, 2002) which surveyed 5,746 households in Bolivia. The survey is the latest available from the BNIS containing information on household income (salaries and wages) and expenditures on food. Given the large size of the sample and for presentation purposes, we grouped household data in various forms: by geographical location, education status, economic condition and activity (Table 2).

**Table 2 about here.**

A geographical dimension in the classification was critical given the disparity in income and incidence of poverty in rural and urban areas and across regions in Bolivia. For education, households were classified according to their 'literate/illiterate' status, where literate were those household heads able to read and write, and illiterate those that were not. Only household heads were considered as the survey does not provide information on education for the rest of household members. Finally, households were grouped according to the economic activity that contributed the most to the household's income.

Second: For household utility function we use the GTAP's private utility approach to measure changes in economic wellbeing (Ianchovichina, Nicita and Soloaga, 2002). The term 'private utility' refers here to an individual's difference between the *Laspeyres* index for income and the *Laspeyres* index for expenditure as follows:

$$up(r) = \frac{yp(r) - \sum_{i \in TRAD} [CONSHR(i,r) \text{ x } pp(i,r)]}{\sum_{i \in TRAD} [CONSHR(i,r) \text{ x } INCPAR(i,r)]} \quad \textbf{(1)}$$

Where *up(r)* is the percentage change in private utility in region *r*; *yp(r)* is the percentage change in private household income in region *r*; *CONSHR(i,r)* is the share of *i* in total consumption in region *r*; *pp(i,r)* is the percentage change in the demand price of commodity *i* in region *r*; *INCPAR(i,r)* is the income expansion parameter (elasticity) of commodity *i* in region *r*. If preferences are homothetic (i.e. a change in budget will allow for proportional changes in the demand of commodities) the *INCPAR(i,r)* equals 1 for all commodities, and therefore Equation 1 collapses into the difference between a *Laspeyres* price index for income and a *Laspeyres* price index for expenditure (Ianchovichina *et al*, 2002):

$$up(r) = yp(r) - \sum_{i \in TRAD} [CONSHR(i,r) \text{ x } pp(i,r)] \quad \textbf{(2)}$$

Equation 2 is the difference between the change in household income and consumption share times the percentage change in prices summed over all commodities. Thus *up(r)* measures the change in economic wellbeing by computing the difference between changes in income and expenditure. A *Laspeyres* price index provides a fixed-weight approximation in the economic private utility emerging from a change in income sources and a change in expenditure. A limitation of this approach is that the *Laspeyres* index overstates the increase in expenditure as no account for substitution in consumption when prices increase (zero elasticity of substitution) is considered. Thus, as pointed out by Ianchovichina *et al* (2002), the *Laspeyres* index provides an upper bound measurement of the change in expenditure, setting down the worst possible scenario.

Third: Price transmission analysis was introduced to acknowledge that international commodity prices that change as result of trade reforms may not affect domestic prices uniformly (Hertel and Winters, 2005). Nicita (2005) found that in Mexico price transmission was 66 percent for manufactured products, but only 25 percent for agricultural products, showing that households living in urban areas are more sensitive to price fluctuations than households from rural areas.

We tested price transmission by analyzing market integration. That is, two or more markets are integrated when changes in prices in one market are transmitted to one or more markets in equal or different degrees. To measure integration we determined causality relationship between prices in main markets (from large and well-connected cities) and prices in secondary markets (from smaller and weakly-connected cities) using the Vector Error Correction Model (VECM). The VECM used price data that we collected from the Fundación Valles, a local research institution in Cochabamba, Bolivia. The Fundación Valles provided us with daily price data of 33 commodities that they collected in various markets of La Paz, Santa Cruz, Cochabamba, Chuquisaca, Tarija and Oruro departments from 2002 to 2009. We averaged these prices into monthly prices (time series) for each of those commodities. Given that Cochabamba, La Paz and Santa Cruz are more populous and better connected to international markets in Bolivia (from where the majority of agricultural and industrial exports come from), we considered these three as main domestic markets. Beni, Chuquisaca, Oruro, Pando, Potosí and Tarija, with lower populations and fewer exporting companies were considered secondary markets for which price transmission coefficients were estimated (Table 5).

Fourth: The GTAP results (emerging from the trade agreement with the EU) related to percentage changes in returns to household income (returns from skilled

labor, unskilled labor, capital, land and natural resources) and commodity prices (corrected by price transmission coefficients) were transferred to the Bolivian household database. This transfer consisted of multiplying these percentage changes by the prices and values of income contained in the original household database. This multiplication was undertaken for each of the 5,746 families included in the household data base.

Fifth: Having estimated the new commodity prices and returns to household income that resulted from the Bolivia-EU trade agreement, we estimated changes in household spending and revenues using the 'private utility' function as defined above. Then, by comparing both the pre- and post-liberalization scenarios using the difference in *Laspeyres* index for income and expenditure, we estimated the impacts of trade reforms on the economic wellbeing of households.

While this macro-micro simulation approach provides a direct way to estimate the impact of a trade agreement upon household wellbeing, we acknowledge that economic wellbeing measured this way gives a narrower picture of wellbeing. A more comprehensive concept of wellbeing would include wellbeing coming from better health, education, housing and/or environment, which are important factors but beyond the scope of the methodology and analysis used in this paper. While non-tariff barriers (NTB) are important in international trade, the methodology we used does contain neither the tools nor the data that would be needed to incorporate NTB into the analysis. Thus, trade implications emerging from NTB is left here as an area that needs further research.

# MACRO-SIMULATION RESULTS

## *A FTA between Bolivia and the EU: Impacts on Bolivia*

As expected, the trade agreement between Bolivia with the EU does not have significant impacts on the Bolivian economy (Table 3). Under the full liberalization scenario, minor increases in Bolivian global GDP (0.03 percent) and average household income (0.14 percent) would take place. Exports (0.61 percent) and imports (0.49 percent) would modestly improve for Bolivia, while terms of trade would barely deteriorate (-0.09 percent). When we exclude sensitive products from trade liberalization, the estimations remain pretty much the same. Both domestic GDP and household income would slightly increase (0.03 and 0.13 percent respectively), exports and imports would modestly increase (0.55 and 0.42 percent respectively), while terms of trade would slightly deteriorate (-0.10 percent). Overall, these results suggest that Bolivia would experience slightly favorable outcomes under both scenarios as GDP, household income, exports and imports show some improvements, while terms of trade tend to display minor but negative results.

Table 3 about here.

### Changes in exports, imports and in factors of production

The trade agreement between Bolivia and the EU, for both full liberalization and liberalization excluding sensitive commodities, would prompt to increased exports in all sectors within ‘agriculture’, ‘mining and natural resources’, ‘light manufacturing’, ‘heavy manufacturing’ and ‘services’ (Table 4). The model projected increases to be more substantial for some commodities within ‘agriculture’ and ‘light manufacturing’ sectors. In agriculture, rice and other cereals (corn, quinoa and barley) would experience important increases in the production of exportable commodities, while in light

manufacturing other processed foods (confectionary products, processed fruits and vegetables, bakery products), sugar, leather products, textiles, apparel and paper products (in that order) would increase. These increments are due to a substitution effect that the model simulates impacted on the prices of Bolivian products in the EU market. That is, because the EU eliminated import tariffs on Bolivian products, consumer prices were reduced in the EU market.

GTAP projected a substantial increase in rice exports (about 100% in both scenarios). The methodological explanation for this result rests on two points: First, when the 58 percent of ad-valorem tariff rate (as set in the GTAP database) that the EU charges to Bolivian rice was removed, the model simulated increased EU demand for Bolivian rice (due to high elasticity response) that provoked higher prices attracting internal transfer of production factors (such labor and capital). In turn, production and specialization increased, which all together improved rice production. Second, the initial rice production level as stated in the GTAP data base was low, and therefore any increase in production (as result of the simulation) turned out in a high percentage change in relation to the low initial production level. The 'down-to-earth' explanation lays on the fact that rice has been an increasingly popular crop in Bolivia, and became the focus of governments since the 1970s. By 1980s, the country was already self-sufficient in rice. Given that Bolivia's rice has not been of enough quality for international standards, export markets were limited. Throughout the 1990s research institutions such the Santa Cruz Tropical Center for Agricultural Research (CIAT), released first-quality varieties (e.g. the Mac-18, a disease-tolerant seed variety with high content of iron and zinc) that were high yielding and mostly cultivated in fertile lands of Santa Cruz and Beni departments. These two departments harvested 180,000 hectares of rice and produced over 470,000 tons in 2011 (FAOSTAT, 2013). Bolivia has enormous

potential to export high quality rice, which the GTAP model captures through production elasticity (high supply response to increased prices). This potential is geographically located in Santa Cruz department where fertile lands, suitable rainfall levels, mechanized agriculture and acceptable infrastructure can facilitate rice production and exports.

The model also projected important increases in exports of other cereals (corn, quinoa and barley). Corn covers more hectares than any other crop in Bolivia. By 2011 approximately 350,000 hectares were cultivated providing more than one million tons of white and yellow corn (FAOSTAT, 2013), the traditional corn varieties of Bolivia. Corn is produced all over the country with about 60 percent grown by small farmers in the valleys, and the remaining 40 percent cultivated by medium-large farmers in Santa Cruz. In the case of quinoa Bolivia is the largest producer of quinoa in the world. Quinoa has been cultivated in the country for hundreds of years. The international demand for quinoa has grown geometrically in the last years. According to FAOSTAT (2013), Bolivia produced 27 million tons in 2008, which increased to 38 million tons in 2011 and to 50 million tons by 2012, out of them 26 million were exported. The increased demand for quinoa comes from the fact that quinoa is a cereal rich in proteins, minerals and vitamins and has become increasingly popular in the United States, Europe and Asia. Even the UN's Food and Agriculture Organisation (FAO) has been promoting quinoa as one of the world's "superfoods" that can substantially help in reducing the world’s food insecurity situation (The UN has declared 2013 as the international year of quinoa). In 2006 the price averaged US$ 1,000 per ton, which more than tripled by 2011 averaging US$ 3,115 per ton (Collyns, 2013). Colored varieties such as Red Royal quinoa and Black Royal quinoa sell at US$ 4,500 and US$ 8,000 per ton respectively (Collyns, 2013). The Bolivian government has set as objective to increase the

cultivation of quinoa to one million hectares to produce one million tons, which would generate one billion dollars to the country (BBC, 2013). In a country that has annually been exporting about seven billion dollars in the last years, quinoa would become the second most important exported commodity after natural gas. Thus, the potential for increased exports of quinoa is huge, and the Bolivian government is boosting production and productivity knowing that the country has a particular comparative advantage in the production of this cereal (quinoa grows only above 2,000 meters that corresponds to the vast high plateau areas of Bolivia).

The model projected modest growth in both scenarios for exports of 'mining and natural resources' and 'heavy manufacturing' commodities. The underlying reason is that Bolivian commodities did not become much cheaper than the same commodities exported into the EU from other countries. That is, as the EU already imposes low import tariffs on Bolivian mining and natural resources and heavy manufacturing products, when tariff reductions were simulated Bolivian prices were not significantly reduced. In addition, Bolivia already benefits from the GSP, which grants duty-free status to Bolivian commodities in the categories of 'mining and natural resources' and 'heavy manufacturing' sectors exported to the EU.

When we accounted for sensitive products, similar results to the full liberalization scenario were estimated, except in the case of the sensitive commodities whose import tariffs were untouched. Thus, Bolivian exports of sugar or other processed foods (confectionary products, processed fruits and vegetables, bakery products) did not increase much as they were excluded from tariff reductions. Increases in exports of agricultural commodities (such as fruits, tubers, vegetables, soybeans, oil palm, peanuts, sugar cane, cotton, yute, cacao, coffee, tobacco, cattle, raw milk, wool production, forestry and fishing) were small because when we simulated the Bolivia-EU

trade agreement, we also simulated an earlier trade agreement between the EU with Colombia and Peru. In these simulations, the model took into account the diversion effect created by lower import tariffs on similar commodities exported from the other Colombia and Peru, resulting in small increases in exports of Bolivian commodities.

Table 4 about here.

In terms of imports, the first point of impact of the reduction in Bolivian import tariffs was increased demand for imports from EU into Bolivia at the expense of imports from the other markets (Table 4). In both scenarios, the model projected that the volume of Bolivian imports of agricultural commodities (specifically rice, cacao, coffee, tobacco, cattle, raw milk and wool) would increase by three percent in average. As land-locked country, Bolivian imports of fish would also increase by 2.1 percent. Imports of light manufacturing sector from the EU into Bolivia would also increase specifically in the case of bovine meat products, vegetable oils and fats, beverage and tobacco products, and clothing (apparel).

The model projected small increases of Bolivian imports of heavy manufacturing, except in the case of electronic equipment and motor vehicles. In general three reasons explain the limited growth of Bolivian imports from the EU: a) Some of these commodity groups were already tax-free in the pre-reform scenario (71 percent), thus prices of EU commodities in the Bolivian market changed only moderately (as shown in Table 5); b) The Bolivian price of aggregate imported commodities did not change significantly as the share of EU commodities on the Bolivian market is small (about ten percent as mentioned in the introduction part); and c) The Bolivian market is already dominated by light and heavy Chinese manufactures that exert ‘low price’ competition policy, leaving little room for other imports that

would want to compete on the same basis. In general, import growth under the first scenario is bigger than that of the second scenario. This difference is explained by the different settings of these scenarios. That is, when comparing the scenarios that simulate an agreement with and without sensitives, the second one imposes quantitative restrictions (i.e. higher tariffs) that are not present in the first one. Thus the possibility of an increase in the exchange of commodities between the EU and Bolivia is curtailed.

## Changes in production

By analyzing the domestic production of commodity sectors helps in understanding the general equilibrium of demand response simulated in GTAP. Changes in aggregate production refer to increases or decreases in total production in Bolivia as a result of Bolivia-EU trade reforms (with and without sensitives). Table 4 shows that as some commodity group exports increase under full liberalization, so does production. In both scenarios the model projected an increase in the production of 'agricultural', 'mining and natural resources' and 'light manufacturing' commodities, and reduction in the production of 'heavy manufacturing' commodities, with no changes in production of 'services" (such household utilities, construction, transport, communications, financial and business services, and public administration).

Within 'agriculture', the production of cereals (maize, rice, wheat, quinoa and barley) would increase in both scenarios (by 0.14 and 0.11 percent per year respectively). To increase production, the model projected that cereal sector would increase demand of land, unskilled labor and capital by 14, 22 and 13 percent respectively. The driving force behind reallocation of production factors towards the cereal sector was increased international demand for cereals whose import tariffs were reduced. Production in the 'heavy manufacturing' sector would decrease (-1.2 percent) in both scenarios. This reduction would mostly occur in the production of chemical,

paper and beverage and tobacco products (in ranges that vary from -1.4 to -3 percent). In general, total production increased slightly more in the scenario that simulates full liberalization than in the one that excludes sensitive commodities.

## MICRO-SIMULATION RESULTS

This section presents the results from the macro-micro simulation approach that combines macro results, which emerge from the trade scenarios, across the various household classifications. The analysis has taken into account different degrees of price transmission across the country, computing changes in private utility through the difference between *Laspeyres* index for income and *Laspeyres* index for expenditure, thus producing an estimate of the post-reform private utility at pre-reform quantities.

### *Changes in prices*

Prices of EU products imported into Bolivia would decrease as a result of the trade agreement (Table 5). This result was expected given that the two scenarios hypothesize a reduction in import protection tariffs which pushes down domestic prices and promotes wider competition from abroad. However, the model projected that such reductions in tariff protection would not produce huge reductions in domestic prices, but moderate ones because of: a) the relatively low rates of protection in Bolivia, and b) the relatively low share of EU trade imports from Bolivia (about 10 percent).

Table 5 also shows our estimations of price transmission (for Bolivia no previous estimations were found). We set La Paz, Santa Cruz and Cochabamba, main economic and better export endowed departments, as reference points to estimate price transmission to the smaller capital cities in Tarija, Beni and Pando (Group A) and Chuquisaca, Oruro and Potosí (Group B). For the 'agriculture' sector we estimated that price transmission in Group A is between 61 and 97 percent, while that of Group B

varies from 68 to 100 percent. In the case of 'light manufacturing' sector, price transmission was estimated to be between 75 and 100 percent for Group A, while that of Group B was estimated to fluctuate between 80 and 100. Thus, our findings suggest that price transmission for both agricultural and light manufacturing goods is slightly higher in Group B in relation to Group A. This result is not surprising given that infrastructure facilities for domestic and international transportation of goods are more developed in Chuquisaca, Oruro and Potosi when compared to those of Tarija, Beni and Pando.

Table 5 about here.

The effect of the simulations on the income side turned out in mixed results for Bolivian production factors (bottom part of Table 5). While reductions were projected in returns to mobile factors (unskilled labor, skilled labor and capital) under both scenarios, increases were projected for sluggish factors (land and natural resources). These results are mainly explained by the way GTAP models changes in demand for endowment factors. That is, the model assumes that land and natural resources are sluggish, meaning that the amount of both of them is almost fixed in the economy. Therefore, model results indicate that demand for sluggish increased in the two scenarios implying, in the face of a very inelastic supply curve, an increase in the relative price of land and natural resources. With regard to the mobile factors, the model assumes that they are not fixed in the economy and, thus, can be increased or decreased in quantities (more elastic supply curve). The model projected a decrease in the demand for mobile factors under the first two scenarios, leading to a reduction in their relative prices.

## *Impacts on household welfare*

Overall, household's private utility would increase in Bolivia under any of the two simulated trade scenarios. All criteria used in Table 6 to measure impacts on private

utility (sixtiles, production factor, education and situation) indicate that percentage changes in income increased faster than percentage changes in expenditure, yielding positive results in terms of utility. This finding suggests that Bolivia should embark into a trade agreement with the EU. Furthermore, private utility tends to be higher under the second scenario (that simulates trade liberalization excluding sensitive commodities), when compared with the first one (that simulates complete liberalization). This finding suggests that if Bolivia decides to embark into a trade agreement, the country does not need to go for a complete liberalization, but it could consider providing tariff protection to few and key sensitive commodities that are important for ensuring employment and domestic production of specific commodities. According to our simulations, protection should be provided to paddy rice, bovine and meat products, dairy products, textiles and leather products.

Poverty analysis is important to analyze the extent to which trade agreements can help in reducing poverty. Bolivia is South America's poorest country (IFAD, 2013), where poverty has widespread affecting 60 percent of the Bolivian population (IFAD, 2013). Such poverty is mostly a rural phenomenon ($\chi^2_{(1)}= 287$; $p<0.001$)[1] that has affected 72.4% of the households living in rural areas, though it has also affected more than half of households living in urban areas. Table 6 shows that household private utility would increase more for households that are better off than poorer households. Households in the third sixtile (694.96 - 1,032.89 Bs./month) and onwards would increase their utility by one percent or more, while the poorer households (first two sixtiles) would improve their private utility by less than one percent in the case of total liberalization or less than 1.4 percent in the case of liberalization excluding sensitives.

[1] The null hypothesis was that poverty is a country-level phenomenon, while the alternative hypothesis was that poverty is mostly a rural issue. The estimated Chi-square value (287) proved to be statistically significant, and thus the null hypothesis was rejected. The claim that poverty is mostly a rural phenomenon in Bolivia can be made under the alternative hypothesis.

Thus, the agreement would benefit both poorer and richer, but it would benefit the most to the richest segments.

According to Table 2, illiterate rate in Bolivia is 13.4 percent, who are mostly located in rural areas. Given that the trade agreement under either of the two scenarios would also benefit households from rural areas working in the agricultural sector (Table 6), we conclude that the trade agreement would benefit both illiterate and literate households. Yet, more skilled and literate households would be more competitive and better endowed to benefit from changes and displacements that would take place in the manufacturing, services and agricultural sectors. The most vulnerable households (i.e. poor households depending mainly on agriculture for their livelihoods) would benefit less under both scenarios, while other households depending on the remaining production factor categories (capital, natural resources, non-agriculture and diversified resources) would slightly, but consistently, benefit more.

Table 6 about here.

The poorest departments in Bolivia have been found to be Potosí ($\chi^2_{(1)}$= 39.2; $p$<0.001) and Oruro ($\chi^2_{(1)}$= 50.3; $p$<0.001), both located highlands of Bolivia. The better off departments have been found to be Santa Cruz ($\chi^2_{(1)}$= 26.2; $p$<0.001) and Pando ($\chi^2_{(1)}$= 4.6; $p$<0.032), both located in the lowlands.[2] Both findings are in line with other studies (UDAPE, 2006; and BNIS, 2005) that also rank Potosí and Oruro as the poorest departments in the country, and Santa Cruz and Pando as the better off ones. Our estimations of regional impacts within Bolivia suggest that urban households tend to benefit more than rural households under both scenarios (Figure 2). Under the trade agreement that excludes sensitive commodities, urban households from Santa Cruz,

[2] In all of these four cases, the null hypothesis was that poverty/wealthy is not a phenomenon exclusive of a particular department of Bolivia. The alternative hypothesis was that poverty/wealthy is a characteristic of a specific department. Statistically significant values of the Chi-square suggest that the null hypothesis should be rejected in all of these four cases.

Pando, Beni, La Paz, Cochabamba and Tarija (in that order) would benefit more, while urban households from Oruro, Chuquisaca and Potosi would benefit less. In general Figure 2 displays modest improvements in private utility, though for the poorest segments in the country (i.e. rural households) those improvements could translate into sensitive expansion towards more welfare.

Figure 2 about here.

In general, private utility results indicate that changes in returns to production factors overtook changes in commodity prices. That is, changes in the *Laspeyres* income index were larger than changes of the *Laspeyres* expenditure index, making households' expenditure on their consumption basket less costly. For the scenario that excludes the sensitive commodities, the cost of such consumption basket becomes slightly cheaper because of higher returns to production factors, leading to an increase in welfare. The moderate changes in household private utility reflect the rather small change in commodity prices and returns to production factors (Table 5). This minor impact on domestic prices in Bolivia mainly comes from the relatively small rates of protection Bolivia has been applying to EU products and to the relatively small share of EU imports into Bolivia.

The combined macro-micro results suggest that economic growth could contribute to poverty reduction. In general, there seems to be some agreement on the positive effects of economic growth on poverty reduction. The World Bank (2001) points out that a one percent increase in real income reduces headcount poverty by two percent. Cragg and Epelbaum (1996) suggest that, in the long-run, returns to skilled labor have risen in Mexico as a result of trade liberalization in the late 1980s and early 1990s. In Colombia, which drastically reduced tariffs in the early 1990s, returns to production factors increased due to an increase in the demand for skilled workers

(Attanasio, Goldberg and Pavcnik, 2003). Winters (2000) also reports that trade liberalization has been associated with a marked acceleration in formal employment creation.

Overall, household level results show signing a trade agreement with the EU is a better option than the *status quo*. Other Andean countries (Colombia and Peru) already did it not only with the EU, but with the US too. MERCOSUR countries (Argentina Brazil, Paraguay and Uruguay) are currently negotiating a trade agreement with the EU (CEPAL, 2012). In general having a trade agreement with the EU would be positive for Bolivian macro indicators as a whole, and would also be advantageous for household groups in Bolivia. Therefore, on the question on embarking or not into a trade agreement with the EU, the answer seems to be leaning towards an integration process, but not only because it is convenient the agreement with the EU, but also because being out of the agreement implies loosening competitiveness against its Andean and MERCOSUR neighbors (a clear case of trade-deviation could take place). An implication of this analysis is that if Bolivia decides engaging into a trade agreement with the EU, then the government should consider implementing policies to ensure rural and urban poor obtain gains from the agreement. The evidence from Latin America (Estevadeordal, Freund and Ornelas, 2006) and from developing regions (Page, 2008) suggest that countries should not assume that trade agreements alone will automatically generate development benefits. Complementary and/or compensatory policies might be needed, depending on the country, to ensure the most vulnerable and poor segments also benefit from trade agreements.

## CONCLUSIONS

The main conclusion of this research is that a Bol-EU trade agreement is a more convenient option to the *status quo*. The macro results suggest that a trade agreement with the EU, with or without sensitive commodities, do not bring significant changes to the macro variables related to GDP, income, exports, imports and terms of trade. At micro level benefits are small, but consistent and beneficial to the poorest income groups of the society. Benefits are slightly higher in the scenario that simulates excluding the sensitive commodities from the trade agreement, implying that if Bolivia embarks into a trade agreement with the EU, complete liberalization is not needed, but providing tariff protection to few and key sensitive commodities is important to ensure employment and domestic production of specific commodities.

Our findings suggest that the trade reforms alone do not achieve substantive changes in poverty reduction. Therefore, complementary and/or compensatory policies might be needed to ensure the most vulnerable and poor income groups also benefit from the agreement. We consider that Bolivia should not remain separate from the liberalization process that characterizes the current globalized economy. Other Andean countries (Colombia and Peru) have already achieved a trade agreement with the EU, while MERCOSUR countries (Argentina, Brazil, Paraguay and Uruguay) are negotiating such agreement. If Bolivia is unable to lower EU tariffs, it will lose competitiveness in comparison to most South American countries. Thus, to keep its share of the market, the country needs to implement a trade policy strategy that maintains open niche outlets for Bolivian products.

Bolivia already applies low tariffs to EU goods. Therefore, the effort that the government would have to make is not large, and there seems to be more to gain in terms of market access to the EU than to lose in terms of tariff elimination. Bolivia

already excluded itself from the agreement with the US (the largest importer of goods in the world), but it could achieve gains if decides to engage into a trade agreement with the EU (the second largest importer of goods in the world).

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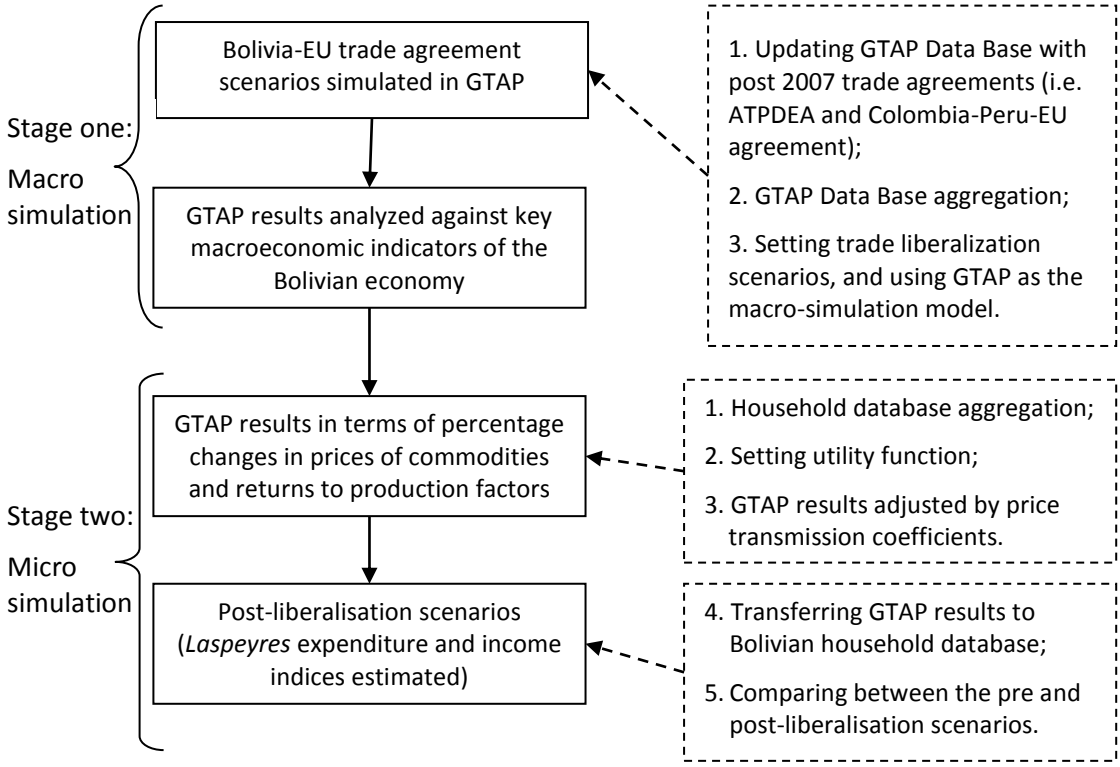
**Figure 1: Macro-micro methodological approach**




Source: Own elaboration.

**Table 1: Sectoral and regional aggregation based on GTAP Data Base, Version 8.0**

| No. | Region | Description |
|---|---|---|
| 1 | BOL | Bolivia |
| 2 | USA | United States of America |
| 3 | EU27 | European Union 27: Austria, Belgium, Bulgaria, Cyprus, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Italy, Ireland, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Poland, Portugal, Romania, Slovakia, Slovenia, Spain, Sweden and UK |
| 4 | ARG | Argentina |
| 5 | BRA | Brazil |
| 6 | COLPER | Colombia and Peru |
| 7 | ROLAC | Rest of LAC: Mexico, Chile, Ecuador, Paraguay, Venezuela, Uruguay, Guyana, Suriname, Central America, Caribbean |
| 8 | ROW | Rest of the World: Asia, Africa, Oceania |

| No. | Sector | Sub-sector | Description |
|---|---|---|---|
| 1 | | pdr | Paddy rice |
| 2 | | wht | Wheat |
| 3 | | gro | Other cereals |
| 4 | | v_f | Fruits, tubers, vegetables, nuts |
| 5 | Agriculture | osd | Soybeans, oil palm, peanuts |
| 6 | | c_b | Sugar cane |
| 7 | | pfb | Cotton, yute, etc. |
| 8 | | ocr | Cacao, coffee, tobacco |
| 9 | | Cattle | Bovine cattle, sheep and goats, horses |
| 10 | | frs_fsh | Forestry and fishing |
| 11 | Mineral and | oil_coa | Oil and coal extraction |
| 12 | Natural | gas | Gas extraction |
| 13 | Resources | omn | Extraction of silver, gold, zinc |
| 14 | | cmt_omt | Bovine meat products |
| 15 | | vol | Vegetable oils and fats |
| 16 | | mil | Processed milk, cheese, butter |
| 17 | | pcr | Processed rice |
| 18 | Light | sgr | Sugar, molasses |
| 19 | Manufacturing | ofd | Bakery products, processed fruits and vegetables, confectionary products |
| 20 | | b_t | Beverage and tobacco products |
| 21 | | tex | Textiles |
| 22 | | wap | Clothing |
| 23 | | lea | Leather products |
| 24 | | lum | Wood products |
| 25 | | ppp | Paper products |
| 26 | | p_c | Gasoline, diesel |
| 27 | | crp | Chemical products |
| 28 | | nmm | Glass, cement, etc. |
| 29 | Heavy | i_s_nfm | Ferrous and non-ferrous metals |
| 30 | Manufacturing | fmp | Metal products |
| 31 | | mvh_otn | Motor vehicles and transport |

| | | | |
|---|---|---|---|
| 32 | | ele | Electronic equipment |
| 33 | | ome | Machinery and equipment |
| 34 | | omf | Other manufacturing |
| 35 | Services | Services | Utilities, construction, trade, transport, communications, financial and business services, public admin. |

**Source: Authors' classification based on GTAP 8.0 Data Base.**

**Table 2: Bolivian household information by location, education, poverty condition and economic activity, 2002**

*Household Distribution by Geographic Location*

| Department | Rural | Urban | Total | Share (%) |
|---|---|---|---|---|
| 1. La Paz | 430 | 789 | 1,219 | 21.2 |
| 2. Oruro | 239 | 297 | 536 | 9.3 |
| 3. Potosí | 350 | 282 | 632 | 11.0 |
| 4. Cochabamba | 373 | 538 | 911 | 15.9 |
| 5. Chuquisaca | 262 | 215 | 477 | 8.3 |
| 6. Tarija | 199 | 277 | 476 | 8.3 |
| 7. Beni | 147 | 265 | 412 | 7.2 |
| 8. Pando | 95 | 48 | 143 | 2.5 |
| 9. Santa Cruz | 320 | 620 | 940 | 16.4 |
| **Total** | **2,415** | **3,331** | **5,746** | **100** |

*Household Distribution by Education*

| Education Group | No. of Households | Share (%) |
|---|---|---|
| 1. Literate | 4,977 | 86.6 |
| 2. Illiterate | 769 | 13.4 |
| **Total** | **5,746** | **100** |

*Household Distribution by Economic Condition*

| Condition | No. of Households | Share (%) |
|---|---|---|
| 1. Poor | 3,421 | 59.5 |
| 2. Non-poor | 2,325 | 40.5 |
| **Total** | **5,746** | **100** |

*Household Distribution by Economic Activity*

| Economic Activity | No. of Households | Share (%) |
|---|---|---|
| 1. Agriculture | 2,086 | 36,3 |
| 2. Capital | 1,303 | 22,7 |
| 3. Diversified | 623 | 10,8 |
| 4. Natural resource | 764 | 13,3 |
| 5. Non-agriculture | 614 | 10,7 |
| 6. No information | 356 | 6,2 |
| **Total** | **5,746** | **100** |

Households were also classified into sextiles in order to analyze the impact of the tariff reforms from the poorest to the wealthiest household group.
Source: Own elaboration based on data from the Bolivian National Institute of Statistics (2002).

**Table 3: Impacts on Bolivia of a FTA with the EU, with and without sensitive commodities (percentage changes)**

| Economic Variable | FTA Bol-EU | FTA Bol-EU, no sensitives |
|---|---|---|
| GDP | 0.03 | 0.03 |
| Income | 0.14 | 0.13 |
| Exports | 0.61 | 0.55 |
| Imports | 0.49 | 0.42 |
| Terms of trade | -0.09 | -0.10 |

Source: Authors based on results from GTAP 8.0 simulations.

**Table 4: Bolivian exports, imports, production and factor use (percentage change)**

| Commodity group | Bolivian exports to the EU | | Bolivian imports from the EU | | Production in Bolivian sectors | |
|---|---|---|---|---|---|---|
| | FTA Bol-EU | FTA Bol-EU, no sensitives | FTA Bol-EU | FTA Bol-EU, no sensitives | FTA Bol-EU | FTA Bol-EU, no sensitives |
| Agriculture | 11.4 | 11.7 | 1.3 | 0.8 | 0.2 | 0.1 |
| Mining and natural resources | 0.4 | 0.4 | -0.1 | -0.2 | 0.1 | 0.1 |
| Light manufacturing | 2.9 | 1.3 | 1.2 | 0.8 | 0.2 | 0.1 |
| Heavy manufacturing | 1.1 | 1.2 | 1.1 | 1.0 | -1.2 | -1.2 |
| Services | 0.6 | 0.7 | -0.3 | -0.4 | 0.0 | 0.0 |

Source: Authors based on results from GTAP 8.0 simulations.

**Table 5: Changes in commodity prices, factors of production, and price transmission coefficients (percentage change)**

| Commodity group | Commodity | Change in prices | | Price transmission coefficients | |
|---|---|---|---|---|---|
| | | FTA Bol-EU | FTA Bol-EU, no sensitives | Tarija, Beni, Pando (Group A) | Chuquisaca, Oruro, Potosí (Group B) |
| Agriculture | 1. Rice | -0.07 | -0.12 | 0.97 | 0.97 |
| | 2. Wheat | -0.11 | -0.15 | 1.00 | 0.93 |
| | 3. Cereals | -0.01 | -0.06 | 0.97 | 0.95 |
| | 4. Vegetables and Fruits | -0.05 | -0.11 | 0.92 | 0.82 |
| | 5. Oil seed | -0.03 | -0.07 | 0.68 | 0.96 |
| | 6. Sugar Cane | -0.07 | -0.17 | 0.93 | 0.96 |
| | 7. Plant Based Fibers | -0.12 | -0.14 | 0.99 | 1.00 |
| | 8. Other Crops | -0.07 | -0.12 | 1.00 | 0.89 |
| | 9. Cattle | -0.08 | -0.13 | 1.00 | 0.86 |
| | 10. Forestry & Fishing | -0.07 | -0.10 | 0.61 | 0.68 |
| Mining and natural resources | 11. Oil & Coal | -0.09 | -0.10 | 1.00* | 1.00* |
| | 12. Gas | -0.02 | -0.02 | 1.00* | 1.00* |
| | 13. Mineral Extraction | -0.08 | -0.09 | 1.00* | 1.00* |
| Light manufacturing | 14. Meat | -0.11 | -0.15 | 1.00 | 0.84 |
| | 15. Vegetable Oils & Fats | -0.1 | -0.13 | 0.75 | 0.80 |
| | 16. Dairy Products | -0.15 | -0.18 | 0.94 | 1.00 |
| | 17. Processed Rice | -0.1 | -0.14 | 0.97 | 0.97 |
| | 18. Sugar | -0.16 | -0.19 | 0.93 | 0.96 |
| | 19. Other Food | -0.14 | -0.17 | 1.00 | 1.00 |
| | 20. Beverages & Tobacco | -0.2 | -0.23 | 1.00 | 1.00 |
| | 21. Textiles | -0.22 | -0.21 | 1.00* | 1.00* |
| | 22. Clothing | -0.22 | -0.21 | 1.00* | 1.00* |
| | 23. Leather Products | -0.23 | -0.21 | 1.00* | 1.00* |
| | 24. Wood Products | -0.16 | -0.19 | 1.00* | 1.00* |
| | 25. Paper Products | -0.28 | -0.3 | 1.00* | 1.00* |
| Heavy manufacturing | 26. Petroleum Products | -0.09 | -0.1 | 1.00* | 1.00* |
| | 27. Chemical Products | -0.21 | -0.23 | 1.00* | 1.00* |
| | 28. Mineral Products | -0.16 | -0.18 | 1.00* | 1.00* |
| | 29. Ferrous & Non Ferrous Metals | -0.12 | -0.14 | 1.00* | 1.00* |
| | 30. Metal Products | -0.16 | -0.18 | 1.00* | 1.00* |
| | 31. Motor Vehicles | -0.18 | -0.2 | 1.00* | 1.00* |
| | 32. Electronic Equipment | -0.17 | -0.19 | 1.00* | 1.00* |
| | 33. Machinery & Equip. | -0.19 | -0.21 | 1.00* | 1.00* |
| | 34. Other Manufacturing | -0.16 | -0.18 | 1.00* | 1.00* |
| Services | 35. Services | -0.16 | -0.18 | 1.00* | 1.00* |
| Production factors | 1. Land | 0.41 | 0.25 | - | - |
| | 2. Unskilled labor | -0.18 | -0.20 | - | - |
| | 3. Skilled labor | -0.09 | -0.13 | - | - |
| | 4. Capital | -0.06 | -0.10 | - | - |
| | 5. Natural Resources | 0.34 | 0.39 | - | - |

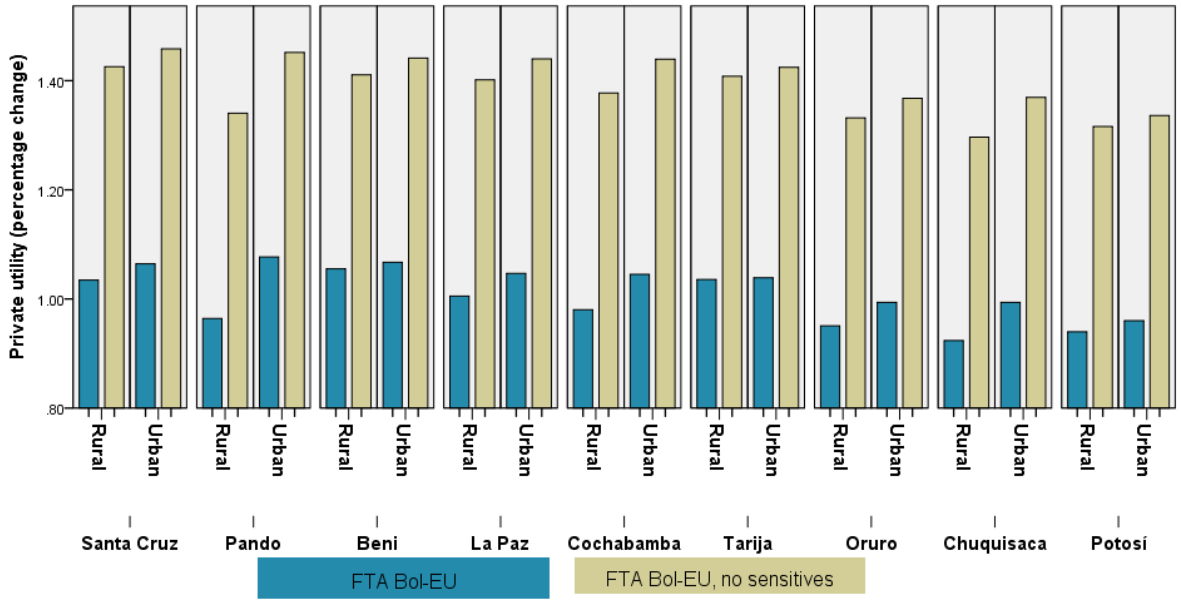
* Commodities marked with an asterisk (mainly ‘mining and natural resources’, ‘heavy manufacturing’ and ‘services’) indicate that time series data needed to estimate their price transmission coefficients were not found. Therefore we assumed complete price transmission. For the rest of the commodities, mainly ‘agricultural’ and ‘light manufacturing’ goods, we estimated their price transmission coefficients based on time series data obtained from the Fundación Valles.
- Not applicable.
Source: Authors’ estimations based on results from GTAP 7.0 simulations, and on data from the Fundación Valles (Bolivia).

**Table 6: Change in household private utility by sixtile, production factor, education and situation (percentage change)**

| Indicator | Private utility | | Indicator | Private utility | |
|---|---|---|---|---|---|
| | FTA Bol-EU | FTA Bol-EU, no sensitives | | FTA Bol-EU | FTA Bol-EU, no sensitives |
| **A) Sixtile** | | | **B) Production factor** | | |
| 1) <= 389.7 | .98 | 1.36 | Agriculture | .98 | 1.36 |
| 2) 389.7 - 694.9 | .99 | 1.38 | Capital | 1.04 | 1.42 |
| 3) 694.9 - 1,032.9 | 1.01 | 1.40 | Diversified | 1.04 | 1.43 |
| 4) 1,032.9 - 1,538.4 | 1.02 | 1.40 | Natural resources | 1.02 | 1.41 |
| 5) 1,538.4 - 2,546.7 | 1.03 | 1.41 | Non-agriculture | 1.04 | 1.42 |
| 6) 2,546.68+ | 1.06 | 1.44 | No information | 1.05 | 1.43 |
| **C) Education** | | | **D) Situation** | | |
| Illiterate | .97 | 1.35 | Poor | 1.00 | 1.38 |
| Literate | 1.02 | 1.41 | Non-poor | 1.04 | 1.43 |
| Total | 1.01 | 1.40 | Total | 1.01 | 1.40 |

Source: Authors' estimations based on results from micro-simulations.

**Figure 2: Change in household private utility by department in Bolivia**




Source: Authors' estimations based on results from micro-simulations.