Is MERCOSUR external agenda pro-poor?

An assessment of the EU-MERCOSUR free trade agreement on Uruguayan poverty applying MIRAGE

Carmen Estrades[1]

Abstract

In 2010, after several years of being stalled, negotiations between MERCOSUR and the European Union (EU) to build a Free Trade Agreement (FTA) were resumed. This FTA is expected to have an important impact on MERCOSUR economies, especially if both blocs reach an agreement regarding the agriculture sector. For a small country as Uruguay, one of the small economies of MERCOSUR, the conclusion of this agreement may have an important impact on the economy, and also on income distribution and poverty, as the FTA will have differentiated impact on the different sectors of the economy. This paper analyzes the impact of a FTA between MERCOSUR and EU making special focus on distributional impacts on Uruguay. For doing so, we apply an improved version of MIRAGE with household heterogeneity. The representative agent in the standard version of MIRAGE model is decomposed into a private and a public agent for all regions, and into a high number of households for Uruguay. Results show that a trade agreement between MERCOSUR and EU would have a significant impact on trade flows between both blocs. MERCOSUR economies would increase agriculture exports to EU and industrial imports from EU. Welfare increase in all countries participating in the agreement, but are more pronounced for small countries of MERCOSUR: Paraguay and Uruguay. In this last country, welfare increase for different categories of households, but the richest households are the most benefited. In spite of this, income distribution improves as a consequence of the agreement, and poverty rates fall along the country.

1   Introduction

In 2010, after several years of being stalled, negotiations between the Common Market of the Southern Cone (MERCOSUR) and the European Union (EU)[2] to build a Free Trade Agreement (FTA) were resumed. According to official sources, there is optimism that this time negotiations will conclude in the medium term. This FTA is expected to have an important impact on MERCOSUR economies, especially if both blocs reach an agreement regarding the agriculture sector. For Uruguay, one of the small MERCOSUR economies with strong comparative advantages in agro-food products, the conclusion of this agreement is expected to have an important impact on the economy, as a FTA with the EU may increase the access of agriculture exports to the European market. As production sectors receive differentiated impacts, we may also expect important distributional effects as a consequence of the agreement.

Negotiations between the European Union and MERCOSUR are almost as old as the MERCOSUR itself. In 1995, the year MERCOSUR officially started to operate, both trade blocs signed the EU-MERCOSUR Framework Cooperation Agreement, which entered into force in 1999. Negotiations started in started in 2000, but in 2004, after 13 meetings of the Bi-regional Negotiations Committee (BNC) and an exchange of offers, they were suspended due to lack of agreement. The main discrepancies were in the agriculture sector liberalization. MERCOSUR countries were not satisfied with the treatment of tariff quotas offered by the European Union (affecting 20% of agriculture tariff lines), regarding the volume of the quotas, the in- and out-of-quota tariffs and the administration of the quotas (Kutas, 2006). The EU, on its side, was not satisfied with MERCOSUR's offer on liberalization on services and government procurement.

After the suspension of negotiations, both regions kept dialogue, but the negotiations were in part subject to the evolution of the Doha Round. However, as the Doha Round does not seem to conclude in the short run, negotiations between MERCOSUR and EU were relaunched in March 2010, during the Madrid Summit. Negotiations seek to reach an "Association Agreement" in three areas: political dialogue, cooperation and trade.

In this paper, we analyze the last of the pillars of the agreement, assessing the trade and macroeconomic impacts of a FTA between MERCOSUR and EU for all countries participating in the agreement, and extending the analysis to poverty and income distribution in the case of Uruguay. For doing so, we apply an extension of the MIRAGE model of the world economy that introduces household heterogeneity. General equilibrium models (CGE), especially multi-country models, are adequate for this type of analysis because they evaluate both the direct and indirect impact of trade policies on the participating economies (Monteagudo and Watanuki, 2002; Bouet et al, 2003; Laens and Terra, 2006; Laborde and Ramos, 2008). However, multi-country

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[2] In this paper, we will consider the full members of MERCOSUR: Argentina, Brazil, Paraguay and Uruguay. We do not consider Venezuela as part of MERCOSUR, because its entrance to the Customs Union, signed in 2006, has not been ratified by all member countries yet. For the European Union, we consider the 27 current member countries.

models usually include only one representative agent, so the analysis on income and welfare at a disaggregated level is not possible. For this reason, in this paper we split the original representative private agent of the MIRAGE model into a public agent and a private agent for all countries/regions in the model. In the case of Uruguay, we then split the representative private agent into 327 households. This is done with data from a recent household survey, applying a clustering method. It is the first multi-country CGE model with household disaggregation. We also link the results from the CGE model to a micro-module, applying a micro-accounting method following Agenor et al. (2003). This method allows us to compute the impact of an FTA on poverty and income distribution indicators for Uruguay.

To our knowledge, there are no previous assessments on poverty and income distribution of a FTA between MERCOSUR and EU. This exercise allows us to first analyze how the potential gains of the FTA are distributed among the MERCOSUR members. As it has been pointed out in the case of MERCOSUR, gains from a trade agreement might be distributed differently among members, and the main differences might arise in the economic size of the economies, with Argentina and Brazil on one side (large economies) and Paraguay and Uruguay on the other side (small economies). We will also explore how the gains for one country, in this case Uruguay, are distributed among its population, to identify potential winners and losers from the agreement, and to understand the different reactions of the households. Because the household disaggregation is done within the model, the reactions of households to the shock are totally captured in the model.

In the next section we present the recent evolution of trade flows and protection levels between both blocs. Then, in section 3 we briefly describe MIRAGE structure and the changes introduced in the specification applied in this paper. Section 4 presents the results of a trade agreement between MERCOSUR and EU on trade, macroeconomic indicators and households' welfare, while Section 5 concludes.

2   Trade and protection between European Union and MERCOSUR

MERCOSUR and EU show remarkable differences in terms of economic size, population and development. These differences can also be noticed between MERCOSUR countries[3]. In this section we present briefly these differences and we analyze the trends in trade and protection between both blocs.

2.1   Economic characteristics of MERCOSUR and EU

Table 1 shows there are also strong differences in terms of size (economic and population) between MERCOSUR countries, and also between MERCOSUR and the EU. The small MERCOSUR

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[3] Within the European Union, there are also countries with strong differences. However, for simplification purposes, we will consider the EU as a homogenous bloc.

countries, Paraguay and Uruguay, only account for 4% of total population and 2.4% of total GDP of MERCOSUR. However, in terms of GDP per capita, the small countries differ: Uruguay is the country in MERCOSUR with highest GDP per capita and lowest poverty rates while Paraguay is the one with highest poverty rates. In terms of income distribution, Brazil is the country in MERCOSUR more unequal and Uruguay is the most equal. The asymmetry between both trade blocs is also high: the EU doubles MERCOSUR in population, and has a GDP eight times higher than MERCOSUR GDP.

Table 1. GDP and population of MERCOSUR and EU. Year 2009

|	Argentina	Brazil	Paraguay	Uruguay	EU
GDP (million current USD)	310,065	1,574,039	14,901	31,528	15,450,335
Population (million people)	40.1	191.5	6.3	3.3	494.3
GDP per capita (current USD)	7,726	8,220	2,350	9,426	31,257
Gini coefficient a/	0.458	0.539	0.520	0.424	0.304
Poverty headcount (% of total population) b/	13.2	21.4	35.1	20.5	16.3

Source: CEI, OECD, World Bank and Eurostat
a/ For Paraguay, year 2008
b/ For Argentina, percentage of urban population. For Uruguay, year 2008

2.2 Trends in trade flows

The value of trade between MERCOSUR and European Union has shown an increasing trend in the last 20 years. Exports from European Union to MERCOSUR increased between 1990 and 1998, fell after the devaluations of domestic currencies in Brazil (1999) and Argentina (2002) and increased again sharply between 2003 and 2008, partly due to the increase in international commodity prices. The 2008 financial crisis had a negative impact on trade flows between both regions in 2009. Exports from MERCOSUR to European Union, on the other hand, showed a slight increasing trend during the 1990s and show the same trend than EU exports in the 2000s. In the last decade, exports of MERCOSUR to European Union have been larger in value than the opposite.

**Figure 1. Evolution of trade between MERCOSUR and European Union, 1994-2010, in current million USD**
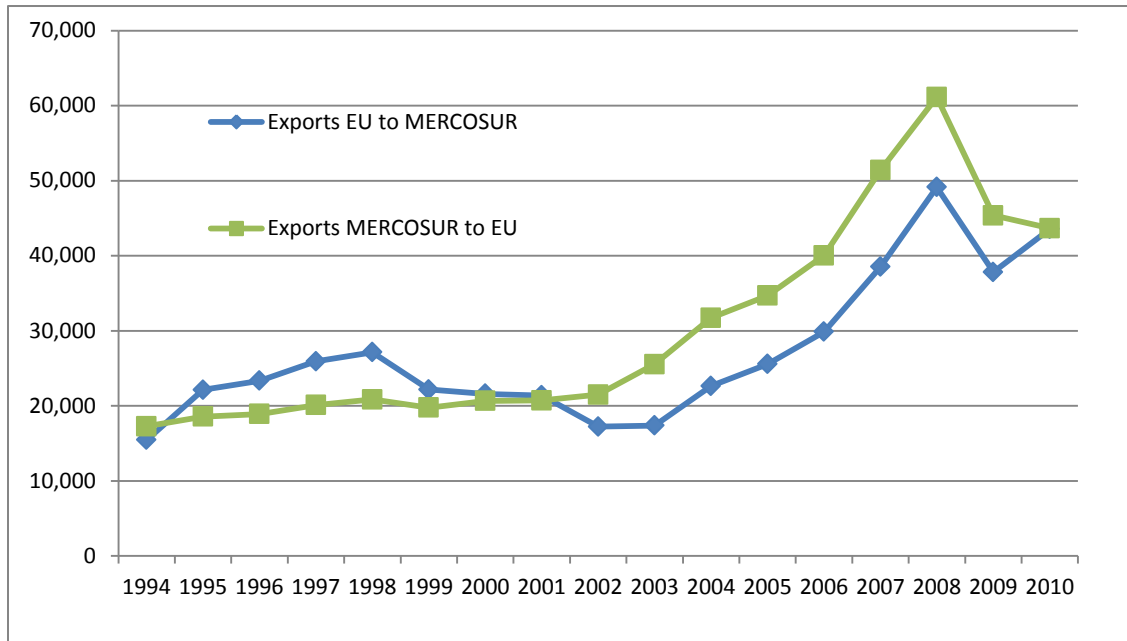
Source: Comtrade

The importance of each bloc in total trade of the other bloc is highly asymmetrical. While EU represents an important share of both MERCOSUR exports and imports (around 25% in 2009), MERCOSUR only represents 3% of European exports and imports, considering extra European trade. [4] The importance of EU in MERCOSUR trade has declined over time: in 1999, the EU represented 35% of MERCOSUR total exports and 32% of imports. On the other hand, since 2003 MERCOSUR has increased its importance as trade partner of the European Union, especially as origin of EU imports, and it is the most important partner of the EU in Latin America.

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[4] However, this pattern is consistent with the share of each bloc in world exports. European exports represented 12.6% of world exports in 2009 (37.6% if we consider also intra-European trade), while the share of MERCOSUR exports the same year was 1.8% (source WTO). These figures reflect the fact that even though both blocs are very different in size, MERCOSUR is not a neglectful partner for the EU.
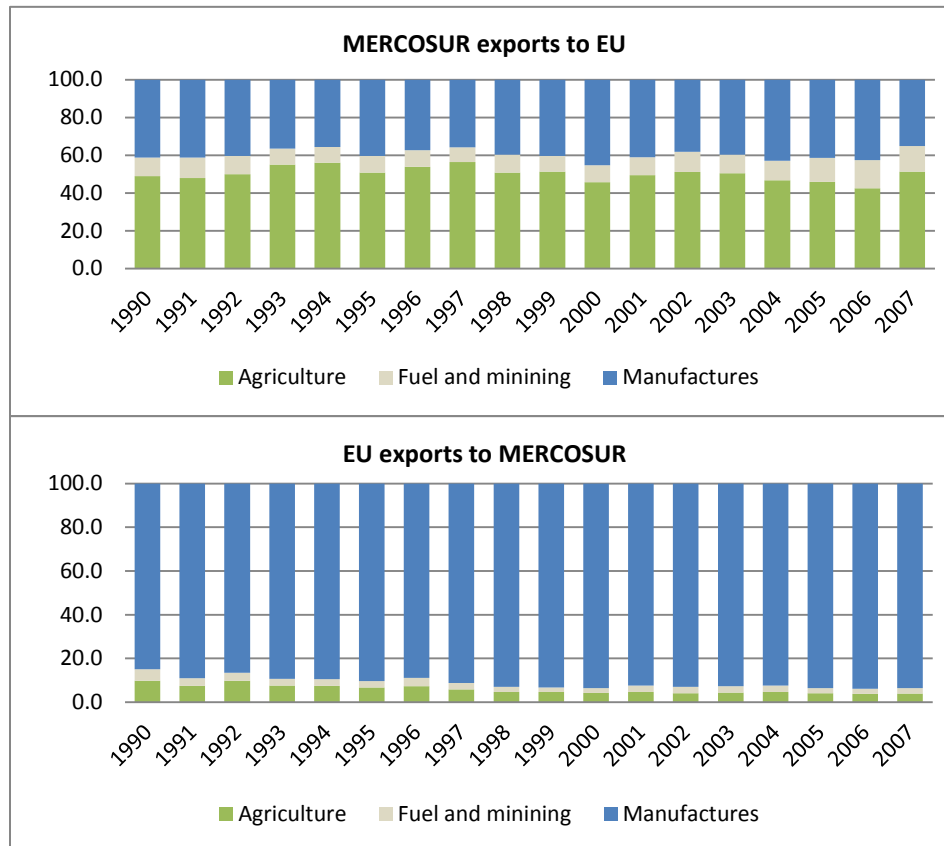
Figure 2. Importance of each bloc in other bloc trade, 1999-2009, in percentage
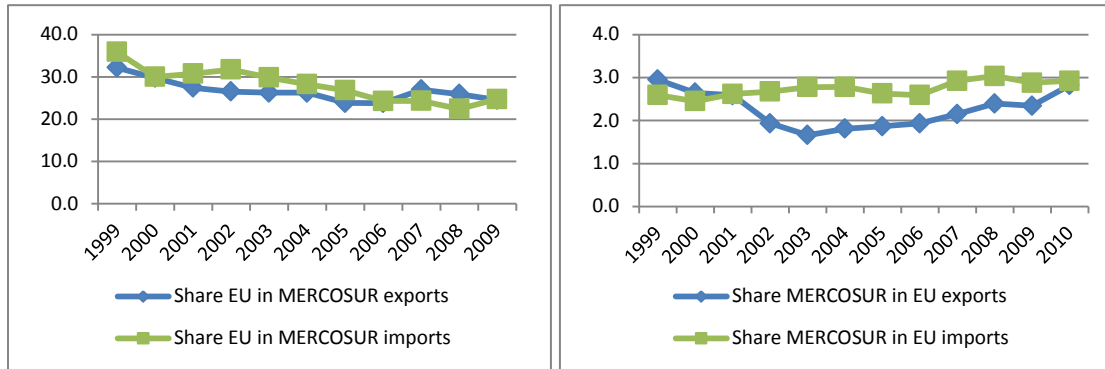
Source: author's calculation based on data from Eurostat and Centre for International Economy (CEI)

The composition of MERCOSUR exports to EU has remained similar along time, as Figure 3 shows. The share of agriculture in total exports to EU shows some fluctuations along the two decades, from 56.3% in 1997 to 45.7% in 2000, mostly at the expense of industrial exports, but these changes can be attributed to variations in world prices of agriculture products. In contrast, the composition of exports from EU to MERCOSUR varies along time. Agriculture exports have lost importance in the last decade, going from 10% in 1990 to 4% in 2007.

Figure 3. Evolution of composition of exports between both blocs

MERCOSUR exports to EU

■ Agriculture ■ Fuel and mining ■ Manufactures

EU exports to MERCOSUR

■ Agriculture ■ Fuel and minining ■ Manufactures

Source: author's elaboration with data from BACI (Base pour l'Analyse du Commerce International, Centre d'Études Prospectives et d'Informations Internationales)

The composition of exports from MERCOSUR to EU does not follow the same pattern of total MERCOSUR exports. As Figure 4 shows, while half of MERCOSUR exports to the European Union are agriculture products, these products represent 38% of total exports. Both manufactures and mining products are underrepresented in exports to the EU. In the opposite case, European exports to MERCOSUR, there is also a distinctive pattern. In this case, manufacture exports are overrepresented: while they constitute 80% of total European exports, they reach 94% of exports to MERCOSUR and almost dominate exports to the region.

Figure 4. Composition of exports. Intraregional, to the other bloc, to the rest of the world and total, 2007
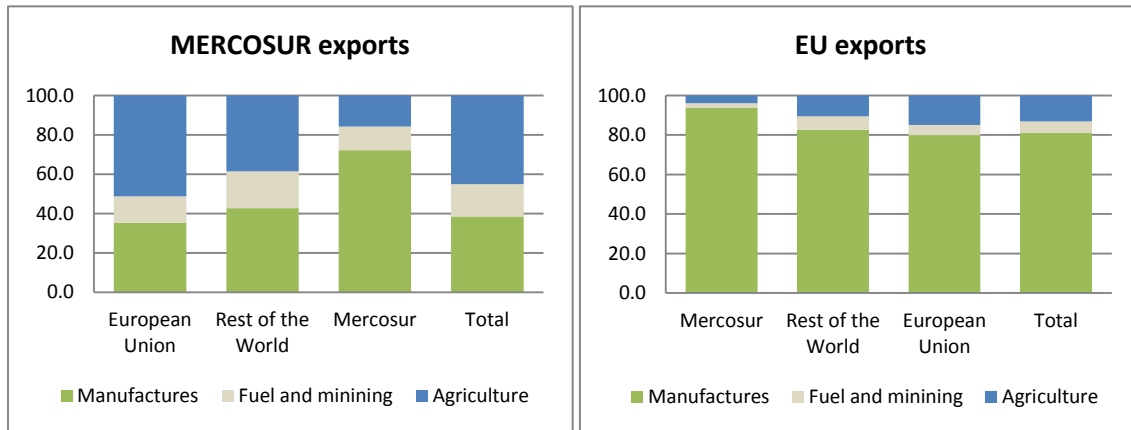
Source: own elaboration with data from BACI

The four countries in MERCOSUR present clear differences in terms of trade composition with the EU (see Figure 5). Brazil is the country with a higher share of manufacture exports to EU (almost 40%) while Paraguay has the highest share of agriculture exports (86%). Comparing the composition of total exports of the four countries with the composition of exports to European Union, we find some differences. Uruguay is the only country for which the share of agriculture exports to the EU is smaller than the share of agriculture exports to the world. This may be explained by the protection that this country's agriculture exports face in the EU, which we will analyze in the next subsection.

Figure 5. Share of agriculture products, fuel and manufactures in total exports by MERCOSUR country, 2007
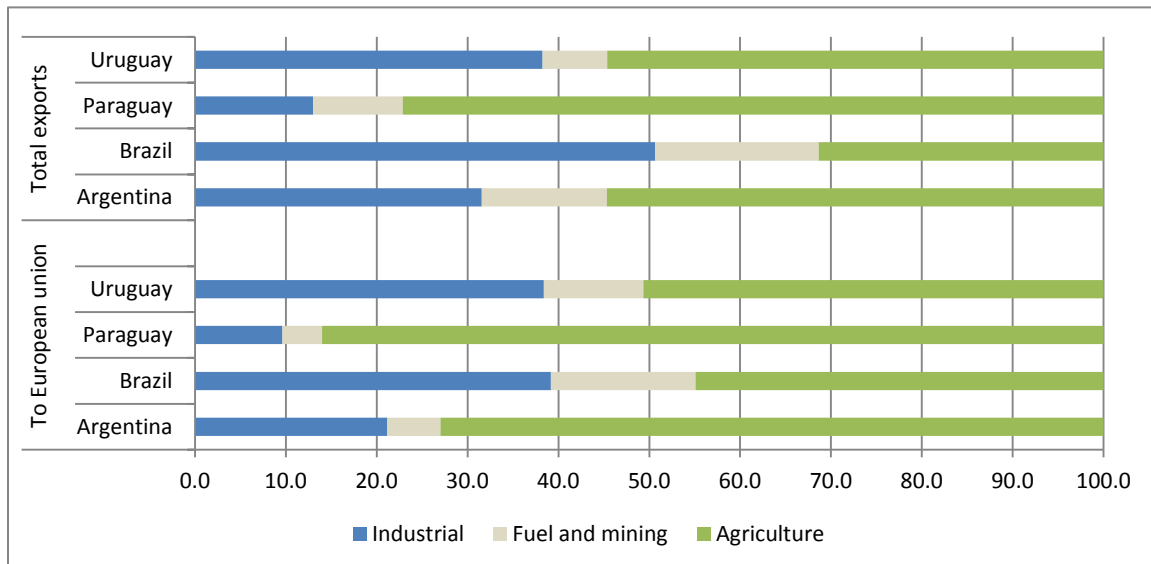
Source: own elaboration with data from BACI

Trade in commercial services between both blocs is gaining importance in the last few years. In 2009, they represented 20% of total bilateral trade flows in goods and services. Currently, 2.6% of total extra-EU in commercial services is destined to MERCOSUR, mainly to Brazil (72%) and Argentina (20%). Both countries also are the main providers of exports of services to EU. In this paper we will not analyze the impact of liberalization in services, although we acknowledge that it may be an important source of economic gains for both blocs.

2.3 Protection

The average level of protection (taking into account tariffs and tariff quota rates) that each region applied on the other region's exports is very similar: 12.6% in the case of EU and 12.4% in the case of the MERCOSUR. However, behind these average figures there are different trade policy strategies applied by both regions. We first analyze the protection that EU exports face in MERCOSUR, and then we will present the trade policy of the EU.
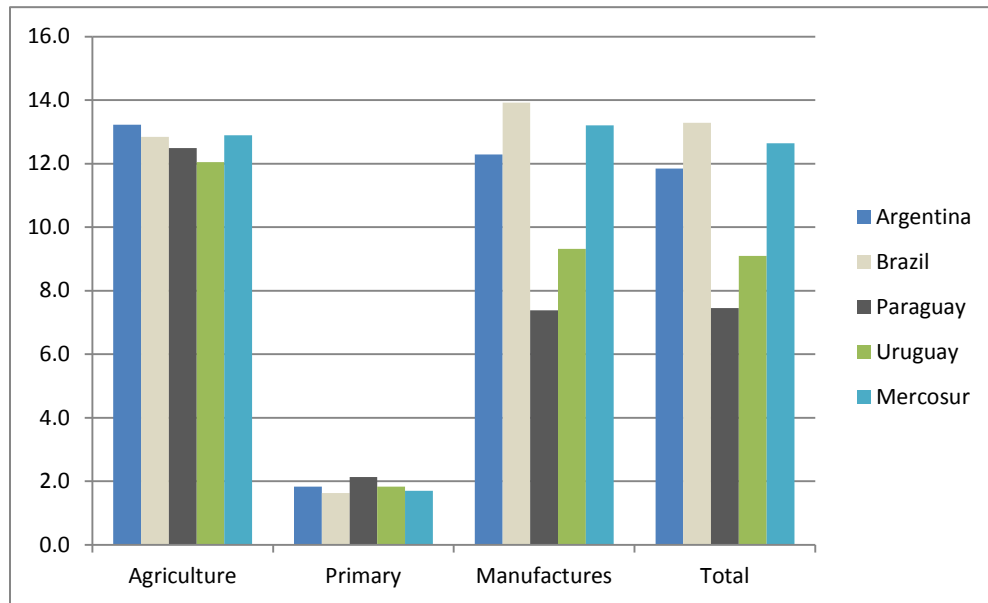
2.3.1 Protection applied by MERCOSUR countries

MERCOSUR countries apply a Common External Tariff (CET) that covers around 85% of total tariff lines. There are still exceptions allowed to capital goods, computing and telecommunications goods. Small countries (Uruguay and specially Paraguay) are granted with more exceptions that big countries (Argentina and Brazil). [5]

As Figure 6 shows, the average protection applied to EU exports in agriculture goods is very similar among MERCOSUR countries, however, EU manufacture exports face different protection levels depending on the destination country within MERCOSUR, as exceptions to CET concentrate in this sector. On average, Brazil has the highest protection levels on manufactures, followed by Argentina. In both cases this is mainly driven by high level of tariffs applied to imports of motor vehicles imports, and also footwear in the case of Brazil. Primary goods face on average the lowest tariffs.

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[5] Decision 56/10 of MERCOSUR establishes a maximum of 100 tariff lines up to 2015 excepted from CET to Argentina and Brazil, 649 tariffs lines up to 2019 for Paraguay and 225 tariff lines up to 2017 for Uruguay.

Figure 6. Protection applied by MERCOSUR countries to EU exports. Year 2007, in percentage
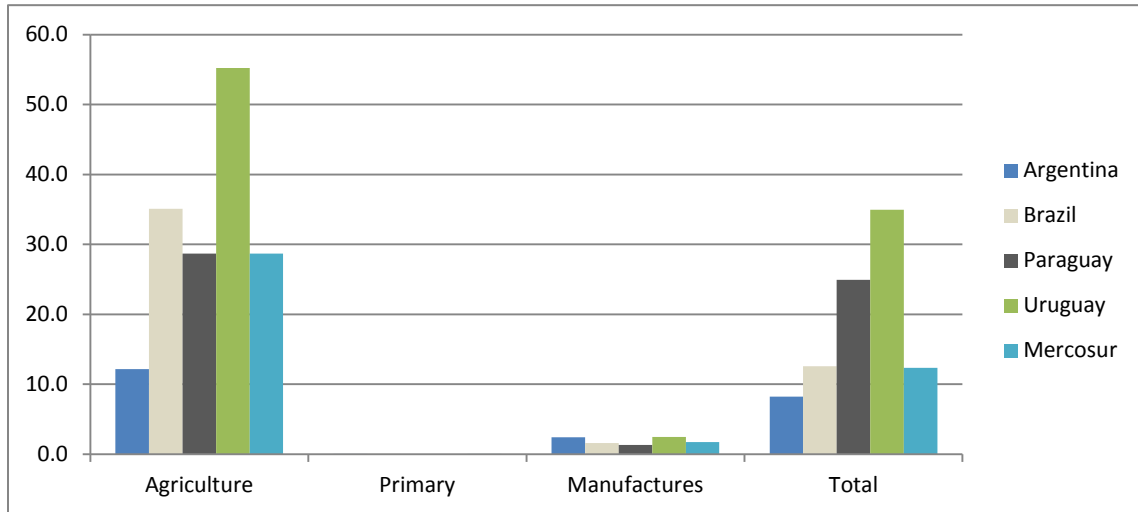

Source: Own elaboration with data from TRAD (Trade Restrictions Analytical Database) using applied tariffs and reference group weights

2.3.2   Protection applied by European Union

Protection faced by MERCOSUR exports in the EU presents a completely different picture. Protection to manufacture sectors is very low, and to primary sector is practically zero. The bulk of protection in the European Union is concentrated in agriculture sectors, mainly sugar, meat, dairy products and cereals. As Figure 8 shows, in some products protection can be higher than 100%.

MERCOSUR countries face different protection levels. Uruguay exports face on average the highest level of protection in the EU, followed by Paraguay. Again, in this case the higher level of tariffs is explained by protection in agriculture sectors, where the EU also applies tariff quota rates (TRQ). For some of the products that Uruguay exports more, such as rice, the EU not only grants smaller quotas, but also applies a higher out-of-quota tariff. Argentina and Brazil benefit more from tariff quotas in sectors such as meats, vegetables and dairy products (Laborde and Ramos, 2008). The expansion of tariff quotas has been of the controversial issues in trade negotiations between MERCOSUR and EU in the past.

Figure 7. Protection applied by EU to MERCOSUR exports by country. Year 2007, in percentage

Source: Own elaboration with data from TRAD using applied tariffs and reference group weights

Figure 8. Protection applied by EU to MERCOSUR exports. 10 highest protected HS2 products, year 2007, in percentage
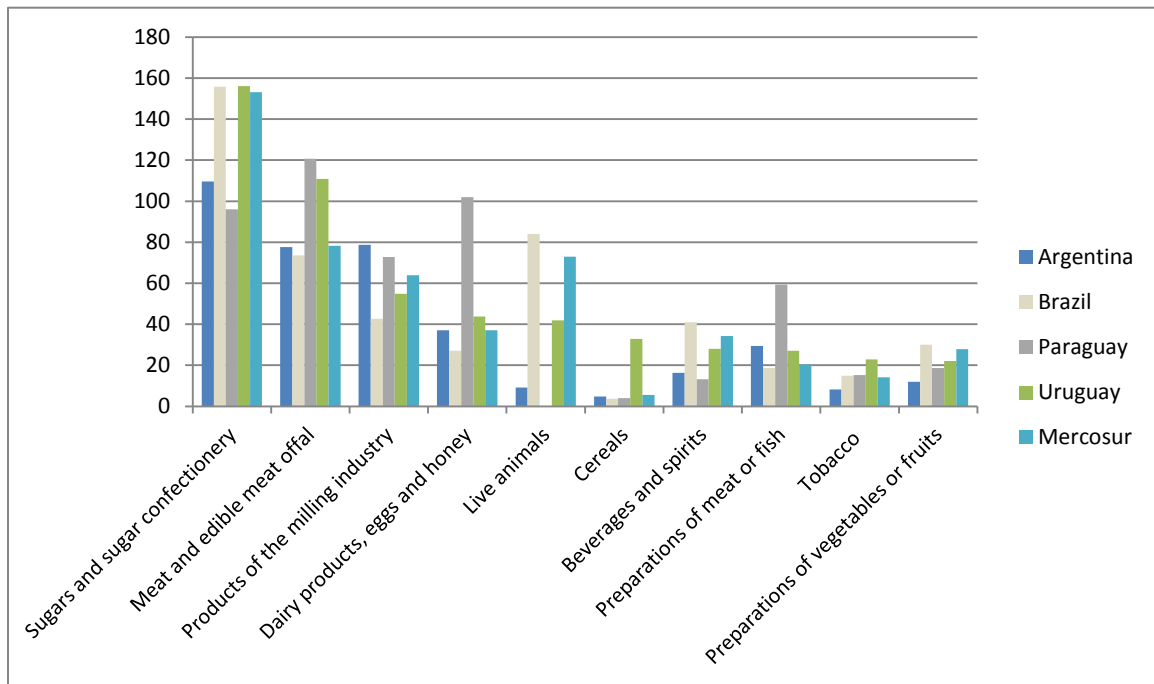
Source: Own elaboration with data from TRAD using applied tariffs and reference group weights

To sum up, protection levels applied by both blocs to the other bloc exports are highly asymmetrical, especially considering protection by sector. Protection faced by MERCOSUR agriculture exports to the EU is particularly high. The protection pattern is consistent with the comparative advantages of each bloc: agriculture goods in MERCOSUR and industrial products in

EU. Next, we present the methodology applied in this paper to evaluate the trade, economic and poverty impact of the removal of these trade barriers.

3 Methodology

This section presents the methodology applied in this paper in order to evaluate a free trade agreement between MERCOSUR and the European Union. First, we present the main features of the general equilibrium model applied, MIRAGE, and then we focus on the modifications introduced in order to incorporate an analysis of poverty and income distribution. At the end of the section we present the baseline and the scenarios simulated.

3.1 MIRAGE model

We apply the MIRAGE model of the world economy, multi-sector, multi-region Computable General Equilibrium Model devoted to trade policy analysis. In this paper, we work with an extension of MIRAGE that introduces household heterogeneity.

3.1.1 Overview of the MIRAGE model

A detailed technical description of the standard version of MIRAGE is available in Mirage wiki webpage. [6] The model assumes perfect competition across all sectors. [7] On the production side, value added and intermediate goods are complement under a Leontief hypothesis. The intermediate inputs function is an aggregate CES function of all goods: it means that substitutability exists between two intermediate goods, depending on the relative prices of these goods. This substitutability is constant and at the same level for any pair of intermediate goods. Similarly, value-added is a constant elasticity of substitution (CES) function of unskilled labor, land, natural resources, and of a CES bundle of skilled labor and capital. This nesting implies less substitutability between capital and skilled labor than between these two and other factors. In other words, when the relative price of unskilled labor is increased, this factor is replaced by a combination of capital and skilled labor, which are complementary.[8]

Factor endowments are fully employed. The only factor whose supply is constant is natural resources. Capital supply is modified each period because of depreciation and investment. Growth rates of labor supply are fixed exogenously. Land supply is endogenous; it depends on the real remuneration of land.

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[6] http://www.mirage-model.eu/miragewiki/index.php/Main_Page

[7] There is a version of MIRAGE with imperfect competition, usually in the manufacture sector. However, this version requires detailed information on economies of scale, mark-ups and number of firms in each sector under imperfect competition, so we chose to work with perfect competition.

[8] Substitution elasticity between unskilled labor, land, natural resources, and the bundle of capital and skilled labor is 1.1 - for all sectors except for agriculture and mining where it is equal to 0.2 - whereas it is only 0.6 between capital and skilled labor.

Skilled labor is the only factor that is perfectly mobile. Installed capital and natural resources are sector specific. New capital is allocated among sectors according to an investment function. Unskilled labor is imperfectly mobile between agricultural and nonagricultural sectors according to a constant elasticity of transformation (CET) function: unskilled labor's remuneration in agricultural activities is different to that in nonagricultural activities. This factor is distributed between these two series of sectors according to the ratio of remunerations. Land is also imperfectly mobile between agricultural sectors.

We assume full employment of labor; more precisely, there is a constant aggregate employment in all countries (wage flexibility). This assumption could underestimate the benefits of trade liberalization for developing countries (in this paper's case, MERCOSUR countries): in full-employment models, increased demand for labor (from increased activity and exports) leads to higher real wages, such that the origin of comparative advantage is progressively eroded; whereas in models with unemployment, real wages are constant and exports increase much more.

Capital in a given region, whatever its origin, domestic or foreign, is assumed to be obtained by combining intermediate inputs according to a specific combination. The capital good is the same regardless of the sector. In this version of the MIRAGE, we assume that all sectors operate under perfect competition, there is no fixed cost, and price equals marginal cost.

In the external sector, real exchange rate is endogenous and adjusts in order to keep the ratio of current account balance to GDP fixed.

In this paper, we introduce some changes in the way the demand side is modeled. This is presented next.

3.1.2   Household heterogeneity in MIRAGE

The main changes introduced in the MIRAGE model in order to consider household heterogeneity are presented next and in more detail in Bouet et al. (2010; 2011). In the traditional version of MIRAGE the demand side is modeled in each region through a representative agent with an intratemporal utility function. This agent presents a constant propensity to save, and uses the remaining income to purchase final consumption of goods following a LES-CES function. In this new version, we first split the representative agent in a public and a private agent, for all regions in the model. Second, we split the private agent in different households only for Uruguay.

The public agent receives income from taxation. It can spend more (public deficit) or less (public surplus) than tax receipts but this difference remains constant in proportion of country's GDP.

In order to keep tax receipts constant as a result of liberalization and avoid a crowding out effect on private investment, we introduce a consumption tax that affects all households equally.[9]

Consumption of the public agent is modeled through Cobb Douglas preferences, which implies that the share of public consumption of sector *i* in total public expenditures is constant in value. There is a consumption tax on public expenses, which is the same as for the private consumption.

The private agent receives income from production activities, public transfers and private transfers. It pays income tax, defined by a constant tax rate over income from production activities. Public transfers to households are constant as proportion of country's GDP. Private transfers are modeled following the model of pure altruism developed by Lucas and Stark (1985), which implies that an inter-households private transfer varies positively with the donor's after-tax pre-remittance income and negatively with an increase of the recipient's after-tax pre-remittance income as compared to the initial situation[10].

Preferences of the private agent, as in previous versions of MIRAGE, are represented through a LES-CES function. These preferences define private final demand for each good. This implies that consumption has a non-unitary income elasticity; when the consumer's income is increased by x percent, the consumption of each good is not systematically raised by x percent, other things being equal. The sector sub-utility function used in MIRAGE is a nesting of four CES-Armington functions that define the origin of the goods. In this study, Armington elasticities are from GTAP 7 database and are assumed to be the same across regions.

Saving rate for the private agent is constant along time. When the private agent is disaggregated in several households, savings rate are different among households. This assumption leads to changes in the gross national savings rate, as households' revenue may react differently to the trade policy shocks. Because poorer households have usually lower savings rates, a pro-poor shock might decrease national savings in relative terms. Total final consumption is the sum of public consumption and private consumption for each good.

3.1.3   Micro-accounting approach for poverty analysis

The disaggregation of households in MIRAGE, especially the high disaggregation applied in this paper, allows us to enrich the analysis of welfare at the household level. However, it still has some limitations to measure poverty and income distribution. Different approaches have been applied in order to link CGE results, and other macro models, to microsimulations models to compute impact on poverty and inequality. [11] In this paper, we will apply a micro-accounting

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[10] See Bouet et al (2012) for a more detailed presentation of this point.

[11] We will not review the different approaches in this paper. Davies (2009) provides a review of the different macro-micro approaches, while Agenor et al. (2003) and Colombo (2010) compares different methods.

approach, as presented in Lofgren et al. (2002) and Agenor et al. (2003). This approach is for some authors considered a top-down microsimulation approach, in that it takes results from the macro model, in this case MIRAGE, into a household survey. In the micro-accounting approach, each household in the survey is linked to a representative household in the model. In our case, this is straightforward, because we use the household survey to disaggregate households in MIRAGE in the first place.

Once households are matched between the macro and the micro modules, and after computing the shock in the CGE model, we feed the household survey with the results obtained in the macro model. In the first place, changes in prices in order to update poverty lines. In this case, we take the changes in Consumer Price Index. In the second place, we take variation of income by sources. By doing this, we account for intra-group income variation.[12] With the new income after the shock, we compute poverty and income distribution indicators. In this paper we chose to compute FGT poverty headcount index and poverty gap and Gini and Theil coefficients.[13] Except in the case of Gini coefficient, all indicators are decomposable (World Bank, 2005), so we compute the indicators for different demographic groups. Specifically, we present results by gender and geographic location.

Our approach has still some caveats, as for example not taking into account dynamics in the model. This can be solved at a later stage through re-weighting techniques, as proposed in Agenor et al (2003).

3.2   Data

The main source of data for the MIRAGE model is the GTAP7[14] database that provides an exhaustive picture of the world economy for the year 2004 (see Narayanan and Walmsley, 2008). We aggregated the data into 19 countries/regions, identifying the four MERCOSUR countries and the European Union (27), and 30 sectors, as presented in Table 2 and Table 3.

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[12] As Lofgren et al (2002) present, we could take average income per representative household, and in this case we would assume a constant distribution of income within groups.

[13] This procedure follows the methodology applied by official sources to calculate poverty indicators in Uruguay.

[14] www.gtap.org

Table 2. Countries/regions considered in the model

Argentina	ARG	Rest of Latin America and Caribbean	XLAC
Brazil	BRA	EFTA	EFTA
Paraguay	PRY	China	CHN
Uruguay	URY	Developed Asian countries	Dvp_AS
European Union (27)	EU27	Rest of Asia	XAS
United States	USA	Australia and New Zealand	ANZCERTA
Mexico	MEX	Commonwealth of Independent States	CIS
Chile	CHL	Middle East and North Africa	MENA
Venezuela	VEN	Sub-Saharan Africa	SSA
Andean countries	ANDC	Rest of the World	ROW

Source: own elaboration

Table 3. Sectors included in the model

Rice	Agro-food	Textiles	Industry
Cereals	Agro-food	Leather products	Industry
Vegetable and fruits	Agro-food	Wood and paper	Industry
Other seeds	Agro-food	Chemicals, plastics, rubber	Industry
Sugar	Agro-food	Manufactures	Industry
Other crops	Agro-food	Motor vehicles	Industry
Cattle meat	Agro-food	Transport equipment	Industry
Other meat	Agro-food	Electronic equipment	Industry
Dairy products	Agro-food	Machinery and equipment	Industry
Other agriculture products	Agro-food	Electricity and gas distribution	Services
Vegetable oils	Agro-food	Other services	Services
Other food	Agro-food	Construction	Services
Beverage and tobacco	Agro-food	Private services	Services
Primary	Primary	Transport services	Services
Crude oil and gas	Primary		
Minerals	Primary		

Source: own elaboration

Household disaggregation in Uruguay was made through a clustering procedure (hierarchical analysis), taking into account three variables: income per capita of the household (in logarithm), consumption structure (share of each GTAP product in total consumption) and income structure (share of capital, labor, self-employed labor and transfers in total income of the household). [15] As the clustering procedure seeks to minimize the variance within the clusters and maximize the variance between clusters, the choice of these variables guarantees that households grouped in clusters have similar income and consumption structure and also similar levels of income per

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[15] A more detailed explanation of data treatment is found in Bouet et al. (2011).

capita. Table 4 shows how income variation within clusters is minimized using this technique: for all generalized entropy indices presented, the income distribution is mainly explained by between group dispersion and very little by within group dispersion of income. The household data used for Uruguay is the 2005/2006 Income and Expenditure Survey carried out by the National Statistics Office (INE).

Table 4. Decomposition of generalized entropy indices of income distribution, Uruguay

	GE(0)	GE(1)	GE(2)
Within groups	0.00020	0.00003	0.00001
Between groups	0.37362	0.38547	0.67447
Total population	0.37382	0.38550	0.67458

Source: own elaboration with data from Income and Expenditure Survey, 2005/2006

Note: GE(a) are the generalized entropy indices, where a is the income difference sensitivity parameter (the higher the value the more sensitive is the index to income differences at the top of the distribution). GE(1) is known as Theil index

We identified 327 households in Uruguay. Poorest households are usually located in areas other than the capital city, Montevideo, are more dependent on income from unskilled labor and transfers, spend a higher percentage of total consumption in food and beverages and have a higher average number of children. Richest households, on the other hand, live in the capital city, receive their income mainly from skilled labor but also from land and capital, have a low average number of children and spend a higher percentage of total expenditure in services.

Table 5 presents information on households gathered in three categories: poor, vulnerable and non-poor. Poor households are 18.1% of total population. In this group we also include the extreme poor households, which represent 1.6% of population. We define "vulnerable households" as those for which average income is above the poverty line, but with values very close to them (up to 30% higher). Non-poor households, that represent the highest share of the population, are less vulnerable to fall into poverty. We can find very distinct characteristics for the three categories. The ratio of children to total members is higher the poorest the household, and so is the share of rural households. Non-poor households are mainly urban and located in the capital city, Montevideo. Consumption pattern is very distinctive as well (poor households spend a higher share of their income in food and a lower share in services), and so is income structure by sources: the main sources of income for poor households are transfers and unskilled labor remuneration, while richer households gets income from skilled labor, capital and land to a higher extent.

17

Table 5. Characteristics of households

	Poor	Vulnerable	Non poor
Percentage in total population	18.1	29.3	52.6
Socio-demographic characteristics			
Ratio children/members	0.47	0.29	0.17
Share of female headed households	0.35	0.33	0.41
Share of rural households	0.45	0.43	0.25
Share of households located in Montevideo	0.18	0.24	0.52
Consumption structure (in %)			
Share of food in total consumption	24.6	15.3	9.2
Share of services in total consumption	55.2	66.8	74.9
Sources of income (in %)			
Transfers	31.8	26.6	22.7
Capital	0.5	1.2	5.2
Skilled labor	7.2	11.9	37.7
Unskilled labor	60.5	59.9	34.1
Land	0.1	0.3	0.3

Source: own elaboration with data from Income and Expenditure Survey, 2005/2006

3.3 Baseline and simulations

In the baseline we include a pre-experiment, in which we compute some changes of the world economy from 2004 (year of GTAP database) to 2009, such as the end of multi-fiber agreement and the expansion of the EU to 27 members. The reference baseline is run up to 2020, and includes exogenous population growth and economic growth. We only include the current four full members of MERCOSUR: Argentina, Brazil, Paraguay and Uruguay. We do not include Venezuela as part of MERCOSUR.

We simulate four different scenarios of bilateral liberalization (complete elimination of tariffs) among the two blocs between 2011 and 2015: a complete liberalization of trade between MERCOSUR and EU (FTA), and three scenarios including sensitive products: sensitive products in both regions (SENS1), sensitive products only for MERCOSUR countries (SENS2), and sensitive products for European Union (SENS3). The list of sensitive products of the EU follows the offer made by the bloc to MERCOSUR in 2004, and the list for MERCOSUR follows the methodology proposed by Jean et al (2010). In this last case, the choice of sensitive products depends on the initial level of tariffs, the share of the product in bilateral imports and the suggested tariff cut. EU sensitive products cover 55 tariff lines for which the bloc offered an increase in quotas, and are concentrated in meat (44% of sensitive lines), dairy products (24%) and cereals (10%). MERCOSUR sensitive products, on the other hand, consist in 25 tariff lines and are concentrated in motor vehicles and parts, beverages and tobacco and other food products. In the scenarios with sensitive products, we assume that tariffs for those products remain unchanged. This is an extreme assumption. In reality, in the EU we might expect an increase in tariff quotas for those

products. However, as our specification of the model does not include rent allocation of quotas, we do not simulate explicitly tariff quota expansions. This is not a big caveat of our study because we are not focusing in depth on trade effects, but on the distributional effects of a trade agreement. Effects of the scenario with sensitive products can be interpreted as a lower bound for an agreement with tariff quota expansions.

We leave out of our study other issues of an agreement between MERCOSUR and EU, such as liberalization of services or export tax removal. Both issues are of interest to the EU and might have important effects on MERCOSUR economies, where the service sector accounts for more than 60% of value added and 14% of total exports in goods and services. Export taxes removal is particularly important if we would focus on Argentina, but as our focus is on Uruguay, which applies export tax rates on few products (meat and meat products, hides and wool, with taxes no higher than 1.6%), this issue is not very relevant. In spite of these limitations, our simulations provide interesting insights about the potential gains of an agreement between MERCOSUR and EU, as we present next.
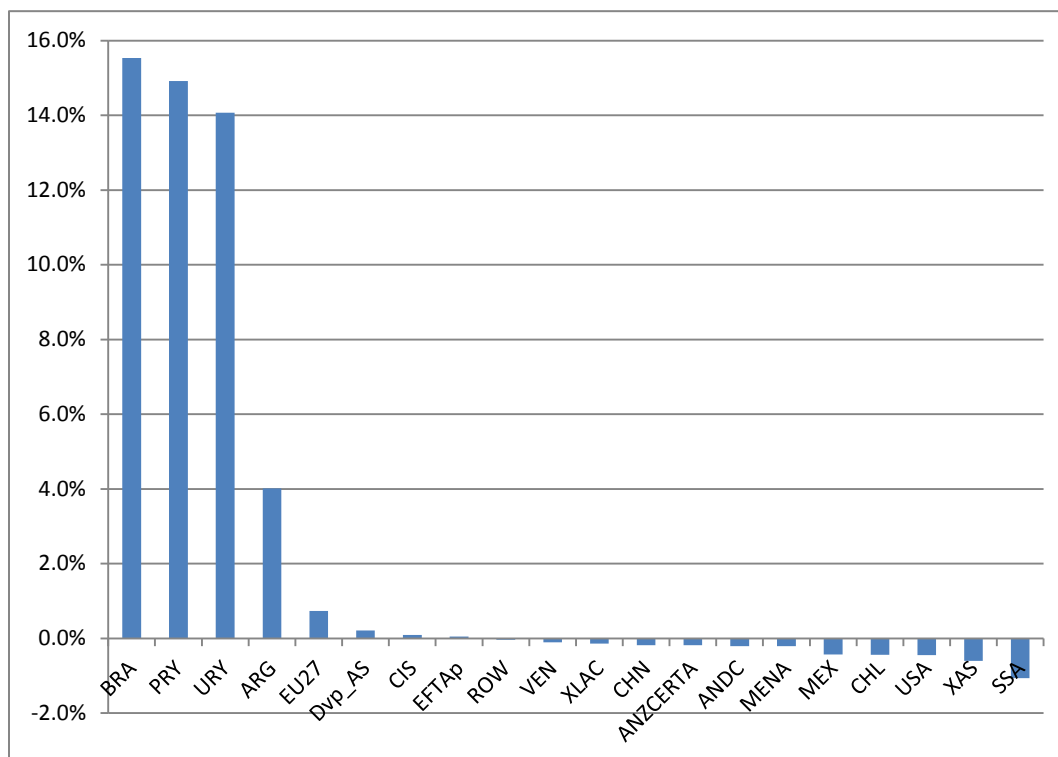
4   Results

In this section we present the main results from the simulation scenarios presented above. All results are presented for year 2020, and are expressed as percentage change of the values in the simulation with respect to the values in the same year at the baseline. We first present results on trade flows, then on macroeconomic variables and finally on labor market and welfare. The final section focuses on the impact on poverty and income distribution that a FTA with the EU might have on one of the small countries of MERCOSUR, Uruguay.

4.1   Trade

Full trade liberalization between MERCOSUR and European Union brings about an increase in exports for the countries participating in the agreement. In relative terms, Brazil, Paraguay and Uruguay are the countries that benefit most: exports in value for those countries increase 15.5%, 14.9% and 14.1% respectively, followed by Argentina (4%). Argentina benefits less because it faces initially lower protection levels in the EU, as shown in Figure 7. In current dollars, this represents a total increase in MERCOSUR exports of 38.7 billion dollars. European Union exports increase slightly in relative terms (0.7%), but significantly in absolute terms: 44.4 billion dollars.

As it might be expected, exports fall for those countries/regions with an important trade relation with MERCOSUR countries (Mexico, Chile, USA), or Europe (Sub-Saharan Africa, Rest of Asia).

Source: MIRAGE results

Also as expected, MERCOSUR countries expand their exports of agriculture and food products, especially dairy products, cereals, meat and rice, while the European Union increases mainly industrial exports, and also primary exports.

Table 6. Impact on exports in value, by sector, percentage change, year 2020. Full liberalization scenario

	Argentina	Brazil	Paraguay	Uruguay	European Union
Agro-food	11.5	88.8	52.7	66.2	-3.2
Industry	-1.6	-9.4	-22.3	-22.1	1.4
Primary	-3.5	-6.4	-8.4	-25.1	0.5
Services	-1.6	-6.7	-12.7	-15.0	0.0

Source: MIRAGE results

These results are significantly affected when sensitive products are included in negotiations. MERCOSUR exports to the European Union increase in those sectors sensitive for the latter, and thus when sensitive products are included, exports still increase, but much less, as shown in Table 7. Considering only sensitive products for the European Union (SENS3 scenario), we find the exports flows are particularly affected in Uruguay, as exports in this country are highly concentrated in sectors that are sensitive for the EU (meat, dairy, rice). On the other hand, the impact on European exports is small, but this is related to the slight relative increase in exports

of this region in the first place. For small MERCOSUR countries, especially Uruguay, including sensitive products in MERCOSUR lists (SENS2) has a small positive impact on their exports, due to an attenuated trade diversion effect. Exports from Paraguay are the least affected when sensitive products are included in the negotiations, and that is because the expansion of exports occur in one agro-food sector not considered as sensitive by the European Union: sugar[16].

Table 7. Impact on exports in value, percentage change, year 2020. Full liberalization scenario and scenarios with sensitive products

	FTA	SENS1	SENS2	SENS3
Argentina	3.8	2.4	3.5	2.7
Brazil	15.4	6.8	14.7	7.6
Paraguay	14.5	8.9	14.5	8.9
Uruguay	13.3	2.5	13.5	2.4
European Union	0.7	0.4	0.6	0.5

Source: MIRAGE results

Import flows also increase between both blocs as a consequence of the trade agreement. For EU, agro-food imports increase significantly. MERCOSUR imports increase for all products, but the increase is higher in agro-food and manufactures, especially motor vehicles and machinery from EU. The inclusion of sensitive products in MERCOSUR lists reduces significantly import flows from the EU.

Table 8. Impact on imports in value, percentage change, year 2020. Full liberalization scenario and scenarios with sensitive products

	Argentina	Brazil	Paraguay	Uruguay	European Union	Argentina	Brazil	Paraguay	Uruguay	European Union
	Full liberalization (FTA)					FTA with sensitive products (SENS1)				
Total	5.6	21.2	17.6	11.9	0.7	3.6	9.4	11.1	2.5	0.4
Agro-food	10.4	38.5	25.1	17.6	8.2	10.5	9.8	14.3	4.7	2.3
Industry	6.9	28.3	18.8	11.6	0.3	4.7	15.4	12.4	3.5	0.3
Primary	2.1	10.0	5.7	2.1	0.0	-0.1	0.5	2.6	-0.4	0.0
Services	0.5	6.7	17.0	16.8	0.0	-1.2	-0.7	8.0	-0.3	0.2

Source: MIRAGE results

We should not forget that the existence of TRQ by the EU imposes a restriction to the increase of exports from MERCOSUR to the bloc. Indeed Table 9 shows that the impact of a full FTA on

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[16] Sugar was not considered as sensitive product in the 2004 EU offers to MERCOSUR. However, we might expect this product, together with ethanol, to be considered as one in current negotiations. We tested the sensitivity of results to inclusion of this product as sensitive; results are presented in the Appendix II. Including sugar as sensitive product for the EU affects results for Paraguay significantly and for Brazil to a lower extent, but not for other MERCOSUR countries or the EU.

exports in volume would be significant. However, exports would show a higher increase between 2004 and 2020 only as a consequence of economic and population growth. Given that exports from MERCOSUR to the EU are expected to increase sharply in sectors with TRQ in the baseline, such as meat, dairy and cereals, the quotas are estimated to be initially binding and to remain binding even after the enlargement currently discussed in the negotiations. Therefore, the FTA scenario is clearly overestimating the gains of the negotiated agreements and the sensitive cases are a more realistic scenario. Indeed, if the TRQs remain binding no extensive effects (trade creation) will take place and we will only see rent shifting: from EU tariff revenue to TRQ rents. Then, the key issue is the TRQ rent allocation between agents and countries. This issue and its implications at the household level are beyond the scope of this paper.

Table 9. Exports in volume, percentage change, year 2020. Full liberalization scenario and scenarios with sensitive products

	Baseline changes from 2004 to 2020	FTA	SENS1	SENS2	SENS3
Argentina	35.4	-0.4	-0.4	-0.4	-0.3
Brazil	34.0	3.1	2.6	2.4	3.3
Paraguay	73.8	-0.5	-0.5	-0.5	-0.5
Uruguay	25.6	0.9	0.4	0.8	0.4

Source: MIRAGE results

4.2 Macroeconomic impact

As a consequence of the agreement, terms of trade improve for MERCOSUR countries while for the European Union they deteriorate, although slightly (Table 10). Gains are particularly important to small MERCOSUR countries, as they face higher protection levels at the benchmark. In the four MERCOSUR countries, real exchange rate appreciates as a consequence of the agreement, to compensate the initial higher increase in exports than imports and keep the current account balanced. When sensitive products are included, the appreciation occurs only in Paraguay, because exports to EU still increase sharply for this country. Welfare gains are significant in all countries participating on the agreement, especially for small MERCOSUR countries. The strongest gains are for Paraguay, even when sensitive products are included. However, if we consider sugar as sensitive product, welfare falls for this country (see Table A 1 in Annex).

22

Table 10. Terms of trade and Real Exchange rate, percentage change, year 2020. Full liberalization scenario and scenarios with sensitive products

	Real Exchange rate				Terms of trade			
	FTA	SENS1	SENS2	SENS3	FTA	SENS1	SENS2	SENS3
ARG	-0.2	-0.3	0.0	-0.5	0.1	-0.2	0.3	-0.4
BRA	2.7	-0.1	3.0	-0.4	3.2	-0.1	3.5	-0.4
PRY	5.2	3.3	5.2	3.3	6.0	3.8	6.0	3.8
URY	5.9	-0.1	6.0	-0.2	7.5	-0.1	7.6	-0.2
EU27	-0.1	0.1	-0.1	0.1	-0.1	0.0	-0.1	0.0

Source: MIRAGE results

Table 11. Impact on welfare (private consumption), percentage change, year 2020. Full liberalization scenario and scenarios with sensitive products

|	FTA	SENS1	SENS2	SENS3
Argentina	0.4	0.0	0.4	0.0
Brazil	1.0	0.1	1.1	0.0
Paraguay	6.5	3.9	6.5	3.9
Uruguay	4.5	0.2	4.5	0.2
European Union	0.2	0.1	0.2	0.1

Source: MIRAGE results

4.3 Factor remuneration and household income

The differentiated impact of the agreement on exports by sector changes relative factor remuneration in the different countries part of the agreement. As shown in Figure 10, in MERCOSUR countries, payment to land and unskilled labor in agriculture sector increase sharply, due to the expansion in agriculture production. We should keep in mind that we are not considering FDI in our model, and thus supply of capital is limited. With the inclusion of FDI flows, as well as labor unemployment, we could expect a less significant impact on factor remuneration.

In Brazil, skilled wages and non-agriculture unskilled wages fall, due to the contraction in production of some manufacture sectors, such as textiles, chemicals and plastics and machinery and equipment. In the rest of MERCOSUR countries, payment to capital is negatively affected, although slightly. In Uruguay, this is related to a fall in production in leather, textiles and wool.

In the small MERCOSUR countries skilled labor and unskilled labor in non-agriculture sector also gain, mainly because in both countries some service sectors expand (mainly "other services", that gather recreation and public services). In Paraguay, the increase in production in sugar also explains the increase in wages for skilled workers.

23

Figure 10. Real factor remuneration, percentage change, year 2020. Full liberalization scenario
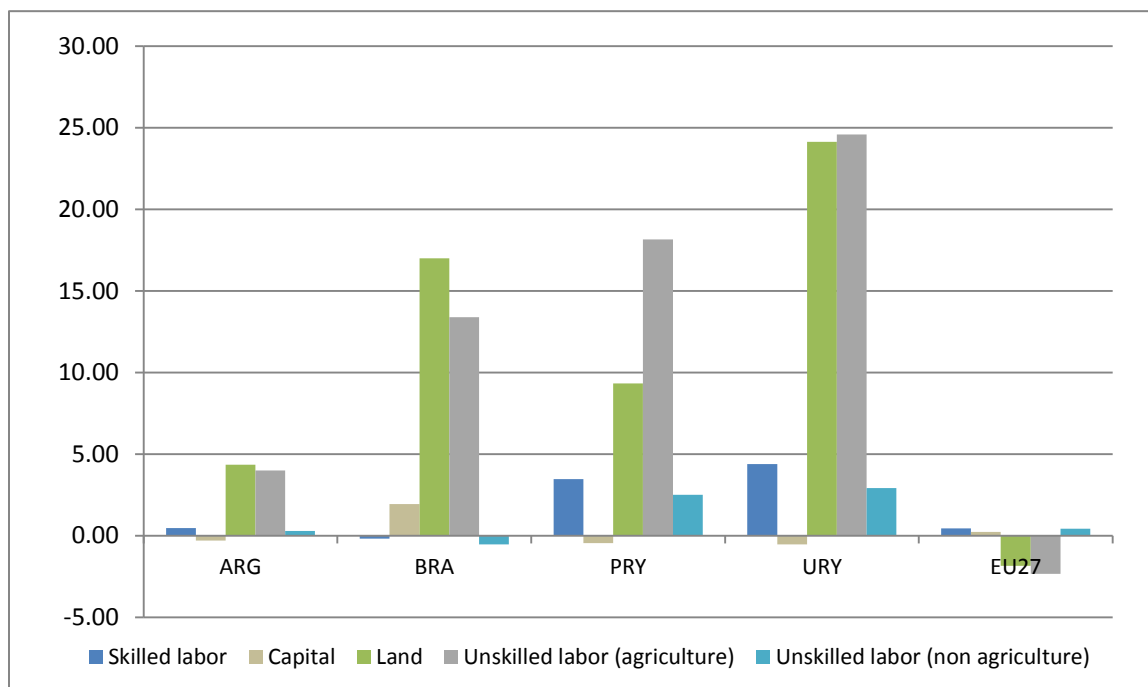
Source: MIRAGE results

In the EU, the agriculture sector is negatively hit, and this has an impact on remuneration to land and to unskilled workers in the agriculture sector. The remaining factors of production gain, but the increase in less pronounced than in MERCOSUR.

As Table 12 shows, on average, households' real income increases in all countries participating on the agreement. Again, the highest increase is for small MERCOSUR countries, even when sensitive products are included in negotiations.

Table 12. Impact on households' real income, percentage change, year 2020. Full liberalization scenario and scenarios with sensitive products

|	FTA	SENS1	SENS2	SENS3
Argentina	0.4	0.0	0.4	0.0
Brazil	1.0	0.1	1.1	0.0
Paraguay	6.5	3.9	6.5	3.9
Uruguay	4.5	0.2	4.5	0.2
European Union	0.2	0.1	0.2	0.1

Source: MIRAGE results

4.4   Poverty and income distribution

The improved version of MIRAGE applied in this paper allows us to analyze with higher detail the impact of the agreement Uruguayan households. On average, gains from the full agreement are positive and significant, but when we analyze differentiated impact on 327 household groups,

we find distinctive results, mostly explained by original factor endowments of the households and the differentiated impact on factor remuneration, as presented in Figure 11.

Figure 11. Uruguay: Real factor remuneration, percentage change, year 2020. Full liberalization scenario and FTA with sensitive products
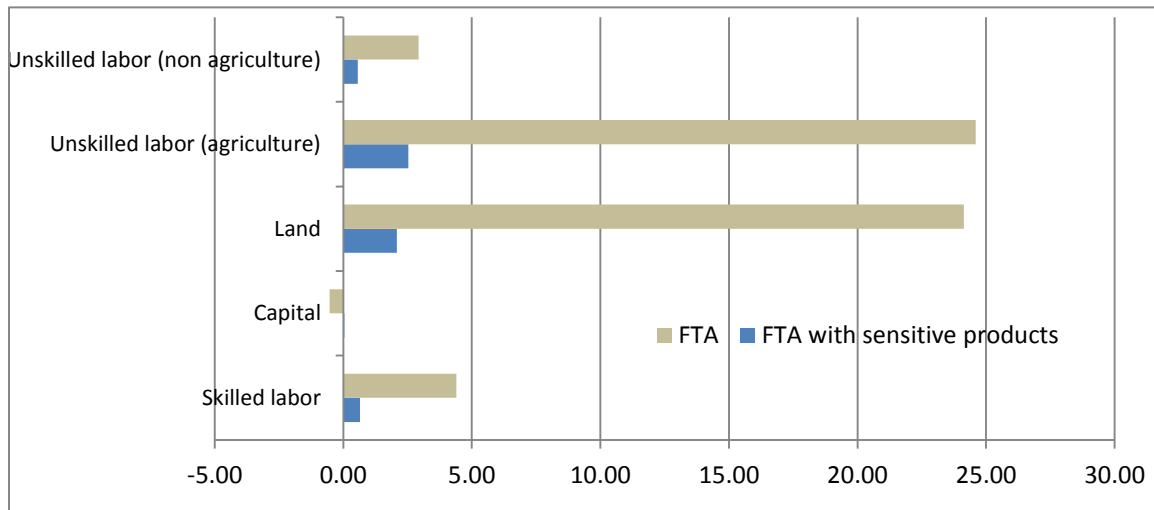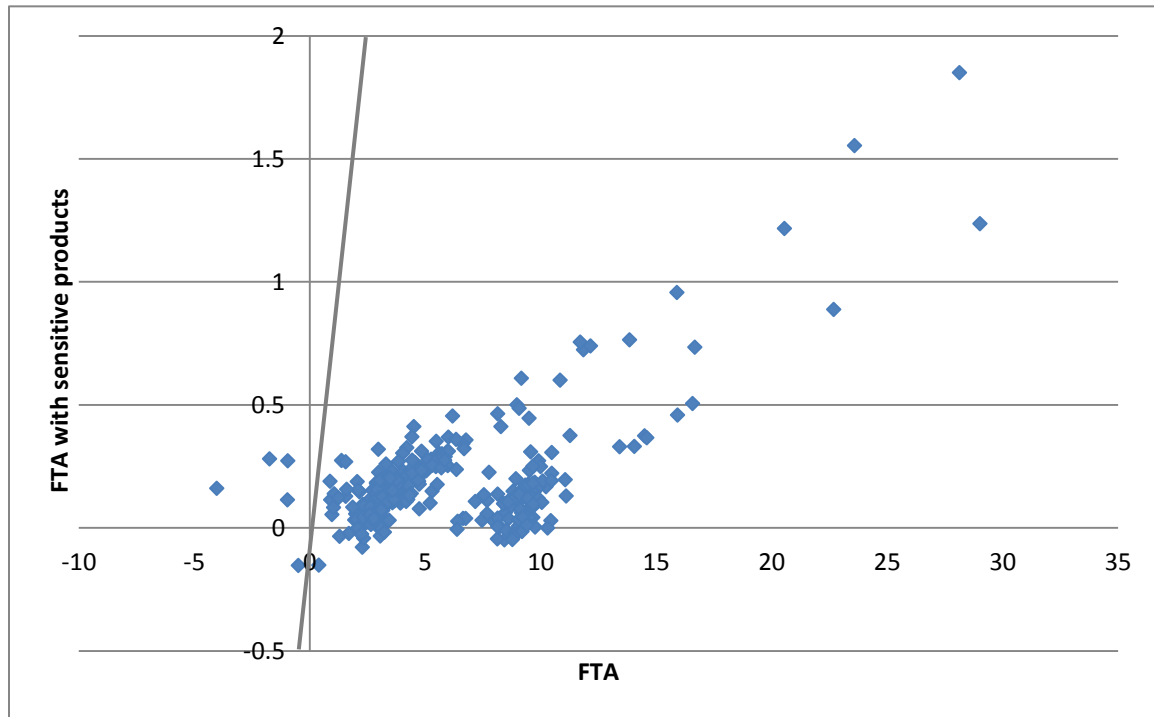

Source: MIRAGE results

As a consequence of a FTA with EU, most households gain from the agreement (Figure 12). A very small part of the population (slightly below 1%) loses welfare, because their income comes mainly from non-agriculture skilled labor wages, which show a small increase, and they experience an increase in consumer prices.[17] On the opposite side, also a small part of the population experience very significant increases in welfare: above 10%. They represent 1.5% of total population, and have high income per capita values at the initial level. Most of them are land owners (richest households), but there are also households with high percentage of their income from unskilled agriculture labor.

Gains from the agreement are significantly attenuated when sensitive products are included. In this case, welfare gains are not higher than 2%, and most households are worse-off than under a FTA scenario, as shown in Figure 12. A higher number of household groups lose from the agreement, but they weigh less in total population: they represent only 0.4% of total population. They are usually non-poor households, with an average income per capita above the average and with income mostly from skilled labor and capital. The few households that are better-off from an agreement with sensitive products are those that experienced welfare loses under a FTA but small welfare gains under a FTA with sensitive products, because their consumption capacity expands: their income is not highly affected (remuneration to non-agriculture unskilled labor does not change much under this scenario) while consumer prices fall.

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[17] On average, consumer price index in Uruguay increases 5.1% under the FTA scenario.

Figure 12. Impact on welfare in Uruguay by household group. Percentage change, year 2020. Comparison between FTA and FTA with sensitive products scenarios

Note: the grey line is defined by x=y

Source: MIRAGE results

The impact of the FTA on income and consumption by household type is presented in Table 13. Under a full FTA scenario, income and consumption show a more significant increase for all household groups. In this case, poor households are the least benefited from the agreement in terms of factor income gains. Increase in the income is lower than for other households, because among these households there is higher unemployment, and transfers represent a higher proportion of their income. Their consumption, however, increases more than their factor income, as transfers received from other household raise. Thus, as long as net transfer providers experience an increase in income, private transfers help improve income distribution.

This does not happen under the scenario of an FTA with sensitive products, as non-poor households do not benefit as much from the agreement. Thus, private transfers to poor households are actually reduced, and thus their consumption is affected, increasing but less than factor income.

Table 13. Effects on real income and real consumption by household type. Percentage variation, year 2020.

	FTA		FTA with sensitive products	
	Real factor income	Real consumption	Real factor income	Real consumption
Poor	3.94	3.99	0.19	0.16
Vulnerable	5.22	4.57	0.26	0.21
Non poor	4.41	4.56	0.17	0.18

Source: MIRAGE results

The evaluation of poverty and income distribution indicators, for total population and for socio-demographic groups, is possible thanks to the application of a micro-accounting approach as described in section 3.1.3. Table 14 shows that poverty falls under a FTA, both without and with sensitive products, although in this last case the impact is much less pronounced. The fall is more significant among male-headed households and households located in urban areas. These results are consistent with the above analysis: under a FTA, remunerations to all factors increase, and as most households increase revenue and welfare, poverty falls.

Poverty falls also under the FTA scenario with sensitive products. In this case, a higher proportion of households lose welfare, but they are mostly non-poor households with income from skilled wages, and thus poverty still falls. Income distribution improves slightly under this scenario, because the richest households still gain from the agreement.

Poverty falls in rural areas in both scenarios and the gap between the poor and non-poor in rural areas reduces more. As poverty rates in Uruguay are higher in these areas, this is an important result. However, we should keep in mind that most population in the country lives in urban areas.

Income inequality also falls as a consequence of the agreement, in both cases. However, in rural areas income distribution worsens. This is due to the high increase in land revenue among rich households. This happens despite the fact that unskilled agriculture wages in rural areas improve as a consequence of the agreement and thus poverty reduces. Again, we should keep in mind that rural population is a small part of total population in Uruguay. For the country as a whole, an agreement with the EU reduces poverty and inequality, even when sensitive products are included in negotiations.

Table 14. Impact on poverty headcount and income distribution, base year values and percentage variation, year 2020

	Base value	Baseline	FTA	FTA with sensitive
Poverty headcount				
Total population	0.2052	-30.6	-8.8	-0.5
Male headed households	0.2092	-33.4	-11.2	-0.9
Female headed households	0.1990	-26.1	-5.4	0.0
Montevideo	0.2029	-30.9	-9.3	0.0
Rest of urban areas	0.2055	-29.4	-8.9	-1.2
Rural areas	0.2111	-33.7	-7.3	-0.3
Poverty gap				
Total population	0.0741	-35.0	-9.6	-0.4
Male headed households	0.0700	-37.9	-11.1	-0.5
Female headed households	0.0804	-31.1	-7.7	-0.3
Montevideo	0.0748	-33.3	-9.2	-0.4
Rest of urban areas	0.0745	-36.0	-9.5	-1.0
Rural areas	0.0706	-37.2	-11.5	-1.1
Inequality (Theil index)				
Total population (Gini coefficient)	0.4559	3.4	-1.1	-0.1
Total population	0.3855	1.4	-0.6	-0.1
Male headed households	0.4032	4.4	-1.3	-0.1
Female headed households	0.3584	1.8	-0.8	-0.1
Montevideo	0.3825	3.6	-1.1	-0.1
Rest of urban areas	0.2974	3.5	-1.5	-0.1
Rural areas	0.3263	-0.3	3.3	0.1

Source: MIRAGE and microsimulation results

5 Concluding remarks

In 2010, after several years of being stalled, negotiations between MERCOSUR and the European Union to build a Free Trade Agreement (FTA) were resumed. This FTA is expected to have an important impact on MERCOSUR economies, especially if both blocs reach an agreement regarding the agriculture sector. For a small country as Uruguay, one of the small economies of MERCOSUR, the conclusion of this agreement may have an important impact on the economy, and also on income distribution and poverty, as the FTA will have differentiated impact on the different sectors of the economy.

This paper analyzes the impact of a FTA between MERCOSUR and EU making special focus on distributional impacts on Uruguay. Even though there are previous evaluations of this agreement, none of them focus on the effects on poverty and income distribution. For doing so, we apply an improved version of MIRAGE with household heterogeneity. This methodological

tool consists in a multi-region, multi-sector general equilibrium model of the world economy in which we split the representative agent into a private and a public agent for all regions, and into a high number of households for Uruguay. It is the first global general equilibrium model with household disaggregation.

Results show that the potential gains of an agreement between MERCOSUR and the EU are high: MERCOSUR countries would potentially increase exports by 38 billion dollars and the European Union 43 billion dollars. Welfare gains are also potentially high, and particularly important for the small MERCOSUR countries, Paraguay and Uruguay, where welfare increases by 6.3 and 4.4 percent respectively. Gains of the agreement are associated with an increase of trade flows between both countries. MERCOSUR exports specialize in agro-food sectors, while EU exports to MERCOSUR are mainly on manufactures. This has important consequences on production structure and factor remuneration. The manufacture sector in MERCOSUR is eroded, and wages paid to skilled workers and unskilled workers in the urban sector fall, especially in the big MERCOSUR countries. On the other hand, the agriculture sector in the EU is negatively affected.

However, these figures are a result of a full liberalization scenario. Most likely, countries will include sensitive products for which liberalization is not granted or not complete. Under such scenario, gains are smaller, and even not significant for most countries. Only Paraguay is not affected by the inclusion of sensitive products, because it expands exports on one sector not included in 2004 EU lists: sugar. This fact emphasizes the importance of negotiating carefully the terms of the agreement, especially for small countries, where one sector can have a strong incidence on the whole economy.

The new version of the MIRAGE model applied in this paper allow us to analyze with higher detail the differentiated impact on households in one of the small countries of MERCOSUR, Uruguay. Households that receive their income mainly from capital and land are benefited, as well as from unskilled labor in agriculture sector. Real income and real consumption increases for all types of households. Thus, we might expect a fall in poverty rates as a result of the trade agreement. Income distribution, on the other hand, also improves if we consider total population, but deteriorates in rural areas, where richer households gain more from the agreement. These results emphasize the fact that gains from a trade agreement are not distributed equally among the population, and that it is extremely important to count with a methodological tool that allow to account for this differentiated impact and help policymakers take the potential impacts into account during negotiations.

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Appendix 1. Sensitivity of results to inclusion of sugar as sensitive product

Table A 1 presents how the main results change when we include sugar as a sensitive product for the EU. The inclusion of sugar as sensitive product strongly affects results for Paraguay, and to a lower extent Brazil, but does not affect significantly other countries participating in the agreement. Exports and imports for Paraguay increase slightly now, and the effect on real GDP and welfare is negative. The inclusion of sugar slightly benefits Uruguay, for which exports increase and terms of trade improve. Under this new scenario, welfare increases slightly more for Uruguay, although the difference with respect to SENS1 scenario is not significant.

Table A 1. Comparison of FTA with sensitive products including sugar. Percentage change, year 2020

Variable	Scenario	Argentina	Brazil	Paraguay	Uruguay	European Union
Exports (value)	SENS1	2.6	6.9	9.5	3.0	0.4
	SENS1 (incl. sugar)	2.6	5.9	1.4	3.1	0.4
Imports (value)	SENS1	3.6	9.4	11.1	2.5	0.4
	SENS1 (incl. sugar)	3.6	8.1	1.6	2.6	0.4
Welfare	SENS1	0.0	0.1	3.9	0.2	0.1
	SENS1 (incl. sugar)	0.0	0.0	-0.1	0.3	0.1
Terms of trade	SENS1	-0.2	-0.1	3.8	-0.1	0.0
	SENS1 (incl. sugar)	-0.1	-0.5	-0.4	0.1	0.0

Appendix 2. Closure of public transfers and expenditures

1. Choice of closure

The following two figures show the evolution of public transfers and public expenditures in the last decade in nominal terms, in real terms and as percentage of national GDP. We can see that the assumption of considering public expenditures as percentage of GDP, which is the closure adopted in the model, is the most pertinent one in the case of Uruguay.

Figure A 1 Uruguay: Public transfers and expenditures, 1999-2010. Index 1999=100
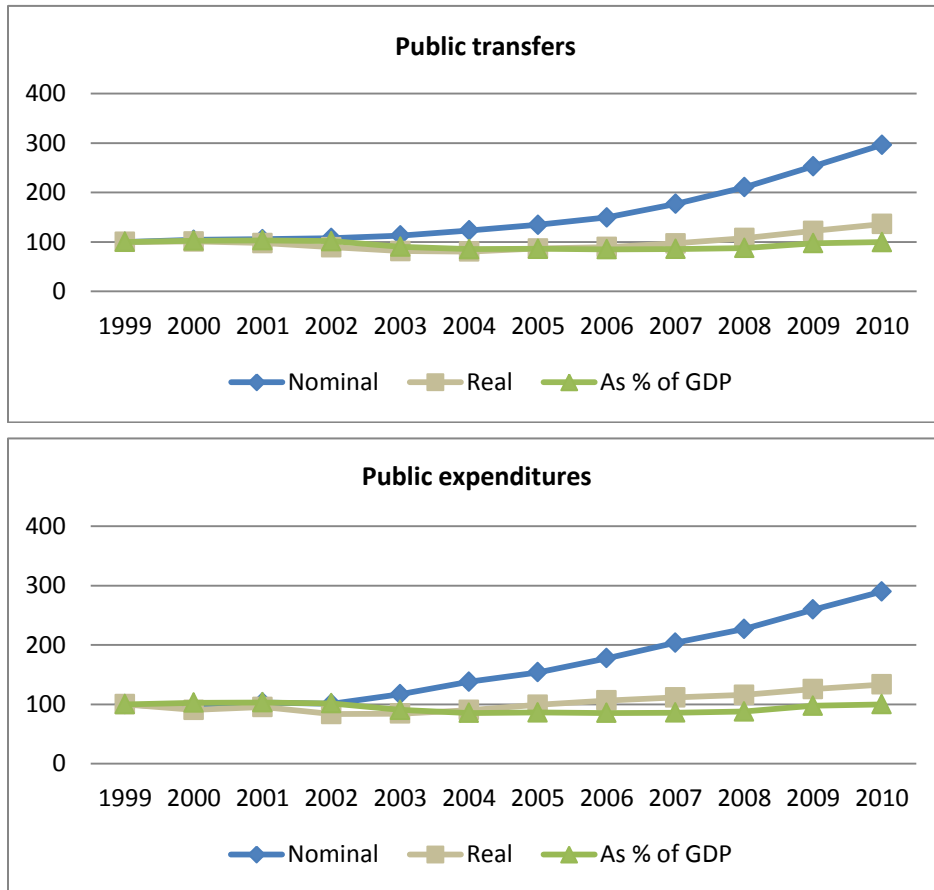
Source: author's elaboration with data from Ministry of Economics, Uruguay

2. Sensitivity analysis to changes in closure
   a. Public transfers closure

Results presented in the paper are slightly sensitive to changes in the closure of public transfers and public deficit. Even though the main conclusions remain, under the chosen closure –public transfers and public deficit constant as percentage of GDP- we obtain the highest impact on poverty and income distribution indicators. Indeed, under this closure, public transfers increase more, and so do private income, thus having the strongest reduction on poverty. On the other hand, assuming transfers and public deficit as constant in nominal terms leads to the slightest impact. Impact on macroeconomic variables is slightly different under the three closures, but not significantly and the main conclusions remain.

Figure A2 Sensitivity of results on poverty and income distribution to public closure
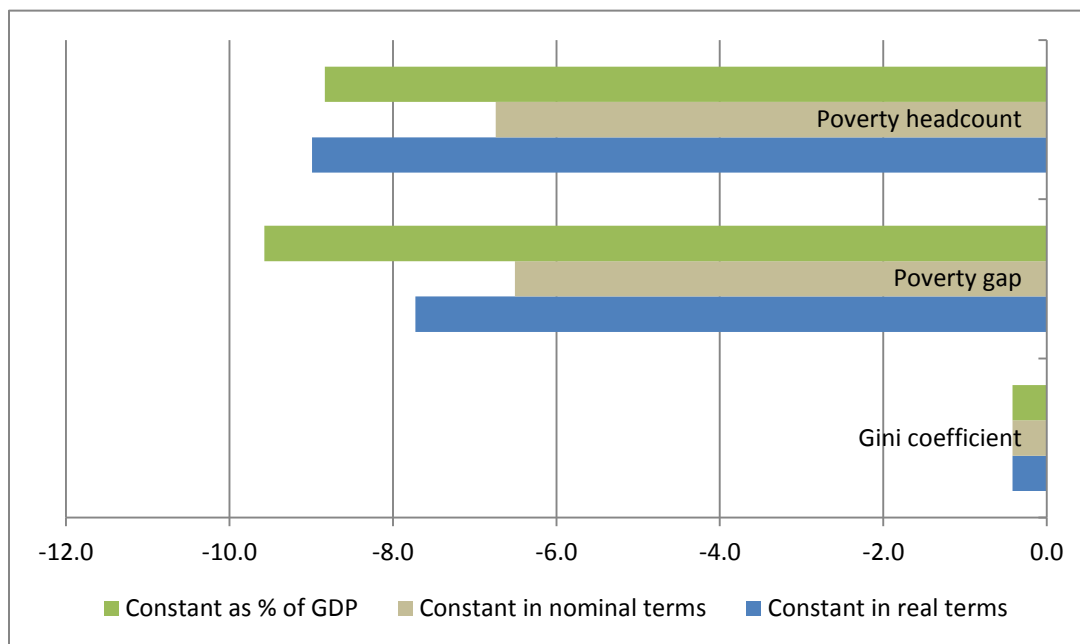
Source: MIRAGE and microsimulation results

Figure A3 Sensitivity of results on macroeconomic impact to public closure
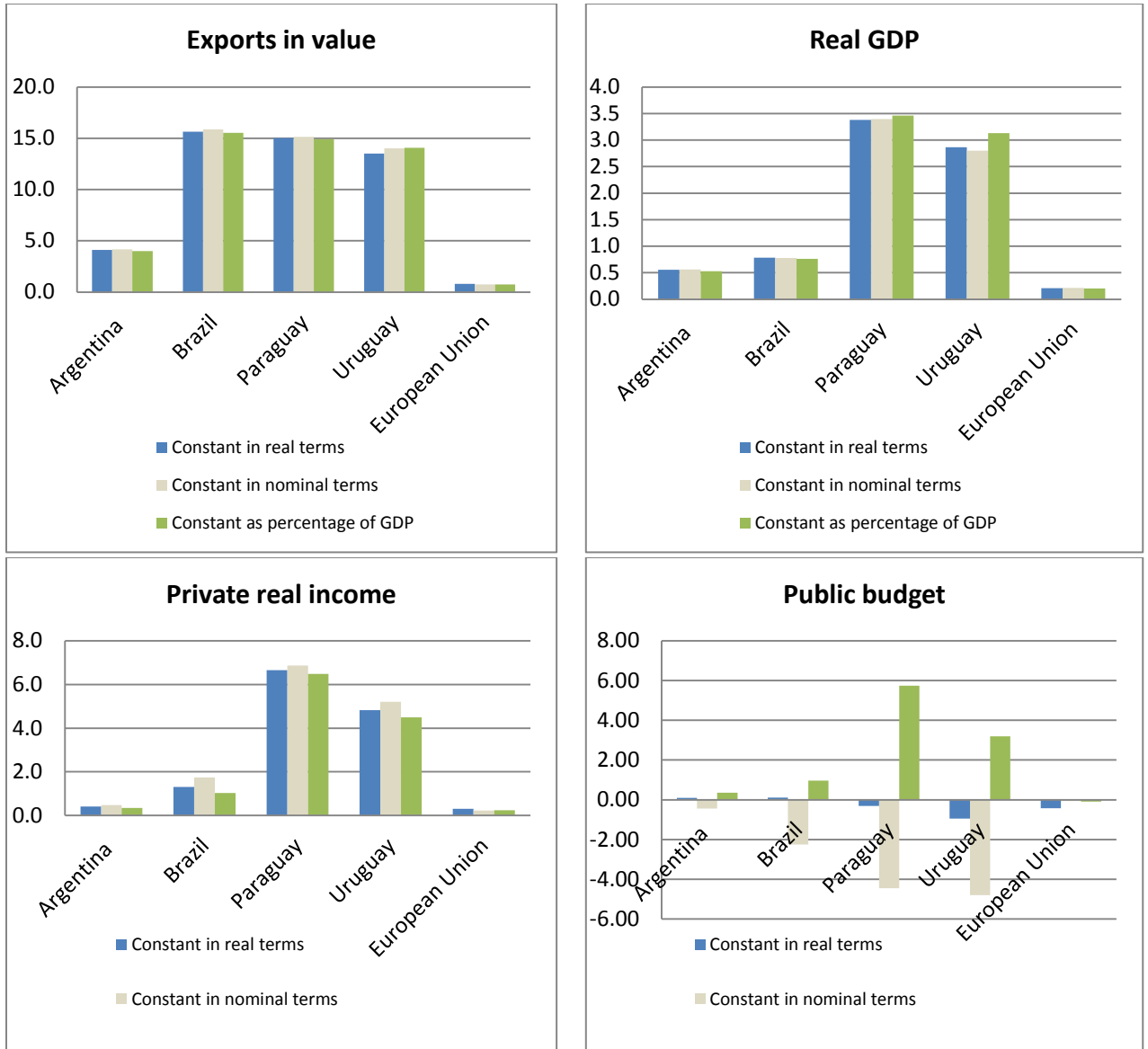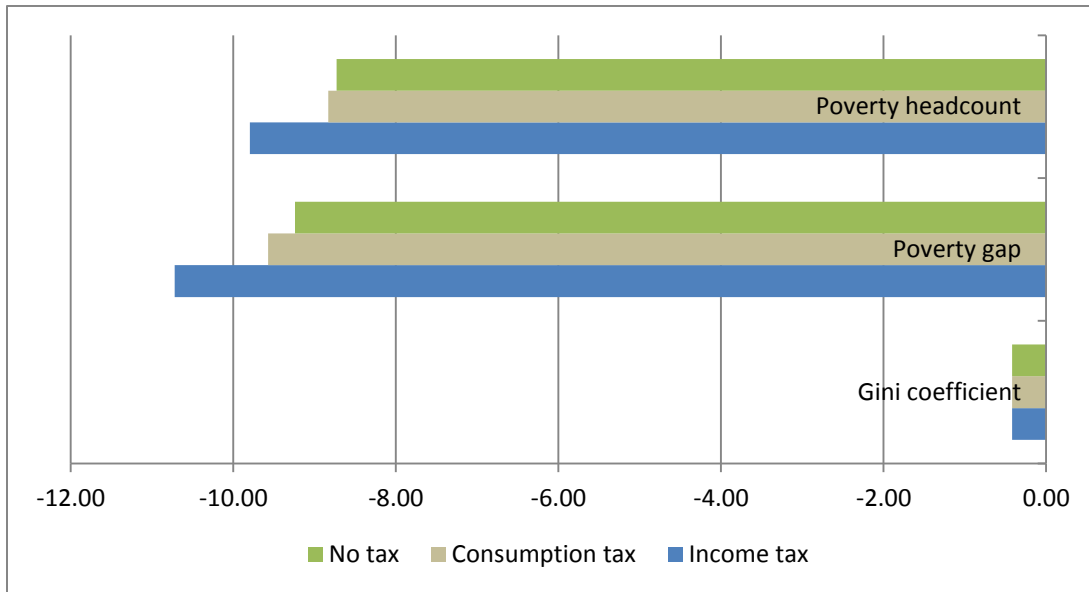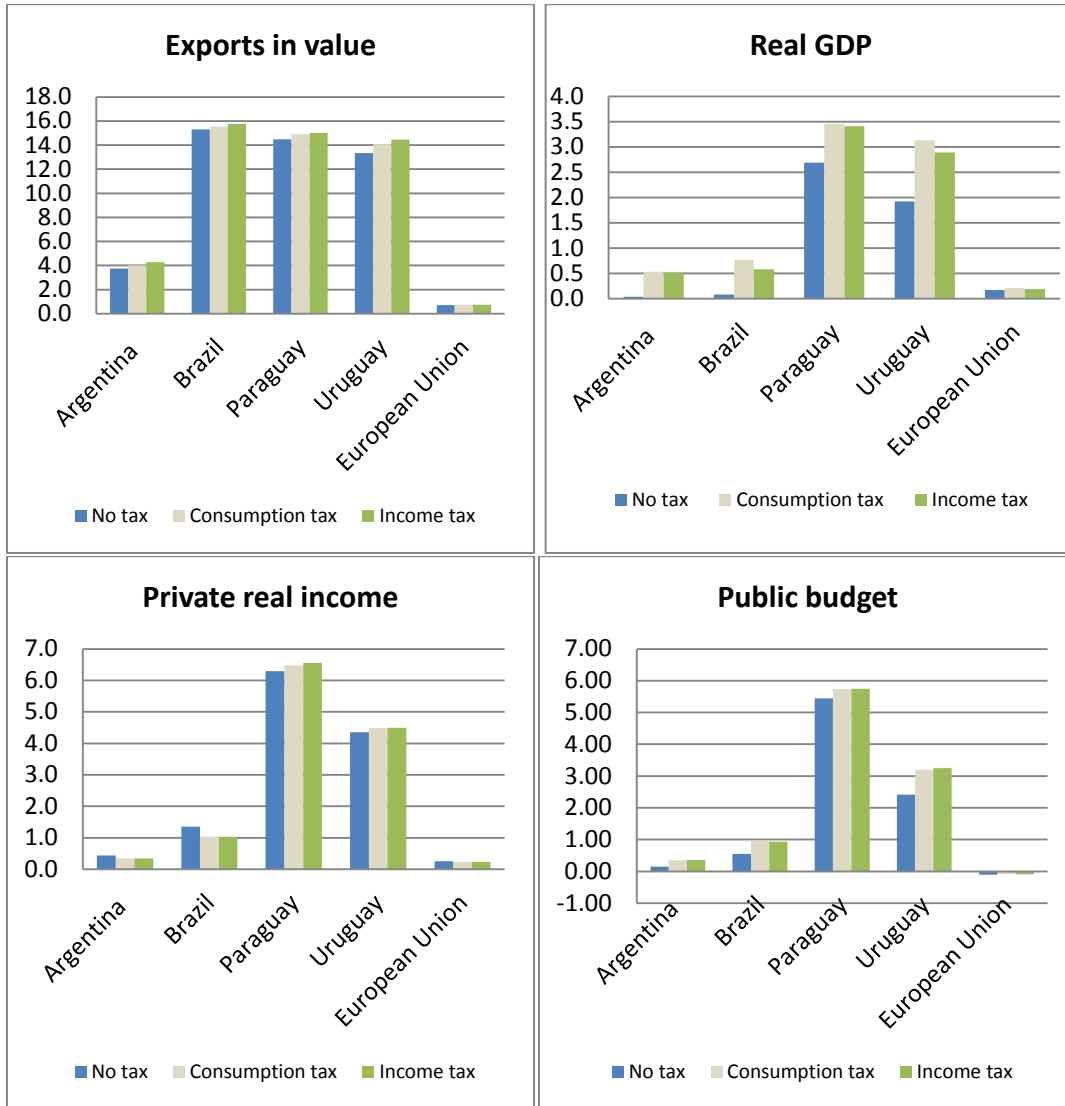

Source: MIRAGE results

b. Compensation tax closure

In this subsection we present how results on poverty and macroeconomic indicators vary when we change the tax implemented in order to compensate fiscal revenue loss from tariff revenue. The core closure implemented is the implementation of a consumption tax, which affects all households equally. Alternative closures are to implement an income tax, which affects more household that earn more, or not implement any compensatory tax and let fiscal deficit grow. The closure that affects the most poverty is income tax, as it does not impose any further taxation on poor households, as a consumption tax does. No compensatory tax, on the other hand, implies a lower fall in poverty, as GDP increases less and so do public transfers (we are back to the core closure about public transfers, which are constant in terms of GDP). GDP is affected as public consumption increases less under this closure. In spite of these differences, the impact on the main variables is very similar.

Figure A4 Sensitivity of results on poverty and income distribution to compensating tax

Source: MIRAGE results

36

Figure A5 Sensitivity of results on macroeconomic impact to compensating tax

Source: MIRAGE results