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THE COST OF TARIFF AND NON-TARIFF PROTECTION IN COLOMBIA: A COMPUTABLE GENERAL EQUILIBRIUM EXERCISE.

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I. Introduction

Computable General Equilibrium Models can be considered as a theoretical tool having great utility when simulating the great diversity of economic adjustments arising from exogenous shocks in an economy. Upon modeling the behavior of both the productive sectors and the macroeconomic sources of demand, these models have the capacity to capture interrelations and forces that enhance or mitigate the macroeconomic impact of a measure of economic or trade policy. The strength of these models underlies in estimating the redistribution of resources between different demand sectors and sources, generated from an efficient allocation of existing resources in the economy; thus, from a Base scenario, which describes a state of equilibrium in the economy, they are able to generate a scenario against factual and simulate sector redistribution as a result of an exogenous shock.

However, the General Equilibrium analysis also has limitations. First, these models are not constructed to project the behavior of an economy but to simulate its reaction to an exogenous shock, so the Base scenario has to be chosen by the modeler, generally based on information availability. Second, being models of comparative statics, and therefore non-dynamic, they do not shed information on the path of adjustment of the economy, but only its final state. Finally, since General Equilibrium Models are based on economic information of the Social Accounting Matrix - SAM, they are good at capturing information on backward and forward linkages and product and employment multipliers, but long-term factors such as impacts on innovation, technological development or increases in productivity other than an efficient allocation of factors are beyond the scope of their analysis. Therefore, dynamic effects associated with improvements in competitiveness being generated from the introduction of competition in traditionally protected sectors are excluded from the exercise, limiting the results to gains arising from the efficient reallocation of resources.

II. Brief Literature Review

The evaluation of the trade policy through computable general equilibrium models (CGE) has a long tradition in Colombia and in the world. In this brief section, two specific topics are addressed: recent trends in the analysis of trade policies

through CGE models, and the analysis of non-tariff restrictions in general equilibrium models.

The robust tradition of CGE models in the 80s and 90s, for trade policy analysis, served as the basis for implementing Free Trade Agreements in all regions of the planet. The rise of the models was associated with the specification of functions of aggregation of domestic and imported goods, in Armington's tradition (1969). The basic idea in the formulation is that domestic and imported goods are not perfect substitutes, and that response to price signals can be captured through the expansion path in the problem of minimizing costs of the demanding agents, given the CES function that adds both types of goods.

But parallel to the development of the CGE models, another tradition of analysis has been consolidated, which could be called "new theory of trade": *"Since the 1980s trade theorist has been working on models in which varieties are distinguished by firms rather than countries. Land-mark models in this literature are Krugman (1980) and Melitz (2003)" 130.* In this tradition, the fundamental elements are the Dixit-Stiglitz (1977) model of monopolistic competition (often referred to in this literature as the "preference for variety" model), economies of scale and fixed costs, entry and exit of participants to the market and (particularly from Melitz) the differentials in productivity, which are modeled by functions of probability distribution of the individual productivities of the firm.

While CGE models assume that all firms within the country are homogeneous, small and operate in perfect competition, introduction of the Dixit-Stiglitz model assumes that firms in the country are differentiated firms and operate on a function of Individual demand, featuring a negative slope. In addition, the new theory of trade assumes that companies incur fixed costs (often, relating those fixed costs with product differentiation) and that markets operate in long-term equilibrium (equaling the average cost with the price) by means of the entry/exit of companies in the market. Finally, it assumes the possibility of productivity differentials, often modeled as a "threshold", from which companies can successfully participate in external markets, and whose distribution reflects exposure to competition, eliminating from the market those companies which are not efficient, and thus raising the average productivity: According to Melitz*, "(the model) shows how further increases in the industry's exposure to trade lead to additional inter-firm allocations towards more productivity firms"*.

The path of convergence of both approaches seems to be already taking place: two general articles, addressing the issue, are necessary references of this convergence: the article by Balistreri and Rutherford (2013) in the Handbook of Computable General Equilibrium Modeling, (which also contains another important article to link the two traditions, Francois, Manchin and Martin (2013)), and the

article by Dixon, Jerie and Rimmer (2016) in the Journal of Gobal Economic Analysis.

Undoubtedly, convergence of CGE models with the "new theory of trade" will be decisive for the more realistic use of models in the analysis of trade policy problems. Introduction of monopolistic competition, the consideration of economies of scale, the effect of the entry and exit of firms in the market and the dynamic modifications in the probability distribution function of firms' productivity, are indispensable aspects to address the impact of the tariff and non-tariff measures, giving contents specific to the intuition that exposure to competition generates important changes in the allocation of resources, which have an impact on global well-being.

In line with the aforementioned, the model used in this chapter includes two levels of modeling: in the first, the demanders choose between importing and domestic product, taking into account the price signals that are derived from various factors, among them, the tariff and non-tariff protection.

But at a second level, the companies of the country participate in a market of monopolistic competition, in which their production is added through a CES function, and in which the elasticity of substitution measures the degree of differentiation of the products that each company manufactures. This degree of differentiation determines, for its part, the margin that each company charges on its cost, to define the product price.

In the model, the competitive pressure effect is measured through the mark-up. The more open the sector is to the competition, the lower the mark-up observed in it. This can have two foundations: the first, presence of external competitors can restrict the market power of national companies; and the second, introduction of new varieties from abroad can reduce the elasticity of substitution between products (and, consequently, mark-up).

Undoubtedly, advancing the implementation of the Krugman and Melitz models is one of the major priorities of CGE modeling. This will allow the endogenization of many trade policy effects, which today can only be analyzed through exogenous changes in the parameters. But, certainly, information requirements for this modeling will undoubtedly be greater, imposing limits on the implementation of the models.

Regarding the modeling of non-tariff restrictions, this also has a long tradition: since the 1990s, the economists of the U.S. International Trade Commission (USITC) have worked on the subject. Anderson and Neary (2005), on the other hand, include the analysis of these barriers in the construction of the restrictivity indices they propose.

But an approach currently in force is that proposed by Kee, Nicita and Olarreaga (2005), which has served as a basis for constructing the AVE (Ad-valorate Equivalent of Non-Tariff Barriers) that can be found today on the World Bank website. These AVEs are those being used in the model, weighted by the observed participation of exports of each good in Colombia, in the 2010-2015 period. The literature in that direction has been deepened, addressing several additional problems (such as, for example, AVE's negative values, when some non-tariff measure facilitates trade) and using alternative estimation techniques. Ghodi, Gruebler and Stehrer (2016), summarize the recent work in that measurement, and review the calculations for 2002-2011, for about 100 members of the WTO.

III. Model Detailed Description

Costs of protection are evaluated in this chapter by means of a computable general equilibrium model, calibrated for 2014 national accounts of Colombia. The short-term perspective is addressed by evaluating the behavior of consumers and producers who readjust, respectively, their baskets of consumption and demand for productive inputs, in response to the change in relative prices that would be generated by eliminating agricultural protection. In general, consumers benefit from price reductions generated, although the overall effect of liberalization will depend on the resource endowment of each type of consumer and the impact of the measure on their factor incomes. The magnitude of the effects is measured by a conventional measure of well-being, the equivalent variation, which quantifies the change in income through which, in the initial conditions, the same level of welfare reached in the simulation would be reached.

Producers, on their own, modify their production and their demand for productive factors. The prices of these change as a result of readjustments in the basket of inputs chosen by the producers in the revision of their optimization process, which determines new balances in the factor markets. Changes in the optimal behavior of consumers and producers alter the equilibrium of the markets, the demands of mobile factors, the levels of production, the incomes of the agents and the level of well-being they reach. These new balances are compared with the initial balance, to determine the implicit cost in protection. The model details the factorial flows, operations amongst institutions and balances between saving and investment in the aggregate economy, guaranteeing the balance of cash flows, and building the resulting social accounting matrix following each simulation.

The long-term perspective is addressed by endogenizing the destination of the land, through a portfolio allocation scheme, which allows changing the productive use of the land (and the corresponding capital) in the face of signs of profitability, which arise from tariff modifications. When a tariff is eliminated, the optimal basket of consumption and demand of factors changes, the price of the product is modified, and the remuneration that the fixed factors (land and capital) obtain in the

productive process is altered. Long-term simulation allows land to be redirected to those sectors whose relative profitability is modified, thus taking into account the price signals generated by the model.

In the model, two types of market structures are considered: structures of perfect competition (in agricultural markets and in some service sectors, characterized by abundance of suppliers) and structures of monopolistic competition, in essentially oligopolistic sectors. The formers are adjusted by price, while the latter are adjusted by quantities, since entrepreneurs define the price by means of a fixed mark-up rule, depending on the degree of substitution of products they manufacture. Consideration of this type of market structures, allows analyzing the effects that the elimination or reduction of tariff or non-tariff barriers has on the economy, through changes in the "competitive pressure" being exerted on the sectors in monopolistic competition. Thus, an additional simulation exercise is carried out, evaluating the impact of these changes on the economy through an increase in the elasticity of substitution of goods produced and the consequent reduction of the mark-up applied to the cost.

To address issues associated with the expansion of the agricultural frontier and its relationship with the competitive conditions of the economy, an additional simulation exercise is carried out, which compares the economic effects of the expansion of the agricultural frontier, under various conditions of allocation of the land: an extreme case, in which the land is allocated to simple modes of production, without a corresponding adequate capital structure; or through efficient allocation processes, in which entrepreneurs respond to price signals in the decision to allocate land.

The aforementioned exercises allow, finally, proposing a final proactive exercise, in which the expansion of the agricultural frontier is evaluated, the simultaneous effect of a specific adjustment to the tariff and non-tariff-measures structure of the agricultural sectors, and in which long-term effects (on allocation of fixed resources) and changes in the parameters defining the determination of prices in sectors in monopolistic competition are included. This final exercise allows us assessing the interaction of trade policies with other public policies, in a long-term horizon, which illustrates the challenges being faced in the design of these policies.

a. Sectorization

The model considers 6 agricultural sectors (depending on the type of activity and the tradable or non-tradable nature of the goods produced); two mining sectors (oil and mining); 13 industrial sectors, discriminating in detail those linked to the agricultural sector; and 9 service sectors, as detailed in Table 1.

Agricultural sectors being considered:

- Expo-intensive agricultural products: coffee, bananas, roses, carnations, pompoms, tobacco, sugar cane, and cane plantations.
- Potential exporting agricultural products: Other farmed and captured animals, wood logs, fish and saltwater fish, other vegetables and "arracacha" (*Arracacia xanthorrhiza*), bananas, other fruits and nuts (grapes, pineapple, mango, passion fruit, etc.), cocoa beans, other raw plant materials used in perfumery and chemicals, and freshwater fish.
- Importable agricultural products: wheat, corn, rice, sorghum, African palm fruit, soybeans, oil palm plantations, forests and by-products, barley, legumes (beans, etc.), other seeds and oleaginous fruits, live plants, other plants to make drinks, species and cotton.
- Non-tradable agricultural products: potatoes, tomatoes, legumes (onions, garlic, mushrooms, cassava, other vegetables and tubers (yam, "arracacha", etc.), milk, sheep, firewood, orange and other citrus fruits, fruit tree plantations, poultry, eggs, swine, planted forests for protective purposes, crustaceans and other aquatic products.
- Cattle raising.
- Other agricultural support activities.

b. Supply Modeling

The model general structure is described in Figure 1: the sectors add, in a first level, capital (*KS*) and land (l), through a *CES* function, to obtain total capital (K). On the other hand, unskilled salaried work (*TANC*) and unskilled non-salaried work (*TNNC*) are added, also through a *CES* function, to obtain total unskilled work (*TNC*). This is added in the next level to the qualified work (*TC*), to obtain total work (*TT*).

Aggregation of capital (*k)* and total labor (*TT)* by means of a *CES* function produces added value (*VA*) of the sector, which is added to intermediate purchases (*IO*), through a function of fixed coefficients, to generate the production of the sector without taxes (*Y).* The taxes of the sector (*IMPR*) are added to this production (by fixed coefficients) to obtain the production of the sector including taxes (*YIMP*). Production of the sector is distributed between the different products (*YY*) by means of the production matrix.

The products are assigned, through a production possibility frontier CET, to exports (X) or to domestic sales (D). The former are demanded abroad, in a process that is modeled by Armington-type functions of the rest of the world, while the latter are added to imports (M), likewise by CES functions, Armington-type, in which imports have previously paid tariffs (*ARAN*) in fixed proportions.

The resulting total domestic supply pays indirect taxes (IVA), in order to meet domestic demand, consisting of consumption (C), public expenditure (G), investment (FBKF), inventories (INV) and intermediate purchases (V).

c. Market Foreclosure

Industrial, mining and some services sectors (transport, communications, finance, and government services) are modeled as sectors in monopolistic competition, in such a way that they determine a mark-up that they apply to their Total cost of supplies, letting the Sector being adjusted by quantities. This implies, in the final analysis, that the index of use of the installed capacity is determined endogenously.

The other sectors are modeled as sectors in perfect competition. They minimize costs, given the stock of capital and existing land. This way, not only the sectoral price is adjusted, to produce the balance, but also the remuneration to the capital is flexible, to guarantee full use of the stock of available capital.

d. Factor Market

As to productive factors, the model considers five of them: capital, land, unskilled salaried work, unskilled independent work and skilled work. The supply of the different types of work is exogenous, but the factor market foreclosures are different: the unskilled wage labor market is "rigid price". Unemployment is endogenous.

On the other hand, the non-salaried-non-skilled labor market has a "flexible price". Every supplier going to that market is used.

TABLE 1: Sectors of the model, nomenclature and correspondence to National Accounts

Sectors	Name	Code National Accounts
Farmers intensive exportables	AGTE	030303, 040001, 050101, 020299, 020302, 020399, 020601, 021099, 050102
Potential exportable farmers	AGNE	010001, 010002, 020301, 020501, 020502, 020503, 020700, 020800, 021102
Importable Farming	AGIM	020101, 020102, 020103, 020199, 020401, 020403, 021101, 040003, 020104, 020202, 020499, 020599, 020699, 020901.
Non-tradable agricultural products	AGNT	020201, 020204, 020205, 020207, 020303, 020999, 021103, 030102, 030302, 030201, 030202, 030301, 040004, 040002, 050200.
Cattle raising	AGGB	30101
Other agricultural products and services	AGAA	021001, 021002, 021099, 021104, 021199, 030304, 040005, 050300.
Mining	MINE	06,08,09
Petroleum	PETR	7
Meat and fish	INCP	10
Animal and vegetable oils and fats	INAG	11
Dairy products	INPL	12
Mill products, starches and their products	INMA	13
Coffee and threshing products	INCT	14
Sugar and panela	INAP	15
Cocoa, chocolate and confectionery	INCC	16
Food products n.c.p	INPA	17
Drinks	INBE	18
Tobacco Products	INTA	19
Light industry and intermediate	INLI	20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30
Capital goods industry	INBC	31, 32, 33, 34, 35
Other industries	INOT	36, 37
Electricity gas and water	EGYA	38, 39, 40
Construction and civil works	CONS	41, 42
Trade and repair of vehicles	COME	43, 44
Hotels, bars and restaurants	HOTE	45
Transport, storage and telecommunications	TCOM	46, 47, 48, 49, 50
Financial intermediation	FINA	51
Real estate activities, rental business	INMO	52, 53
Public administration and defense	SERP	54
Community, social and personal services	SERV	55, 56, 57, 58, 59, 60, 61

Source: Authors' elaboration

The qualified labor market is also flexible, but it has a frictional, exogenous unemployment rate. Capital is sectorally immobile. Price is adjusted in perfect competition sectors, to equalize its marginal product with its price, while, in monopolistic competition markets, compensation is residual, and depends on the relationship between the sale price (fixed by the application of a mark-up to costs) and the payment made to labor and intermediate inputs. And at the same time, land is immobile sectorally, having to adjust, accordingly, by price.

In the model's recursive version, the dynamics of capital and land have differential treatment: capital is adjusted by depreciation and accumulation of new investment. The land, on the other hand, is reallocated among sectors period by period, serving signs of profitability in their current uses

e. Interinstitutional Flows

The model considers 23 institutions: 20 types of households (one urban and one rural for every income decile); companies, government and rest of the world. The factor income is distributed as follows: compensation for labor goes to households, after discounting contributions to social security, which are shared between public (the government) and private security (companies). Net compensation of contributions goes to households, according to their factor availability, and to the quality of labor and to the management capacity in networks of the types of households, which determine the effective remuneration that each type of household obtains from a certain type of work.

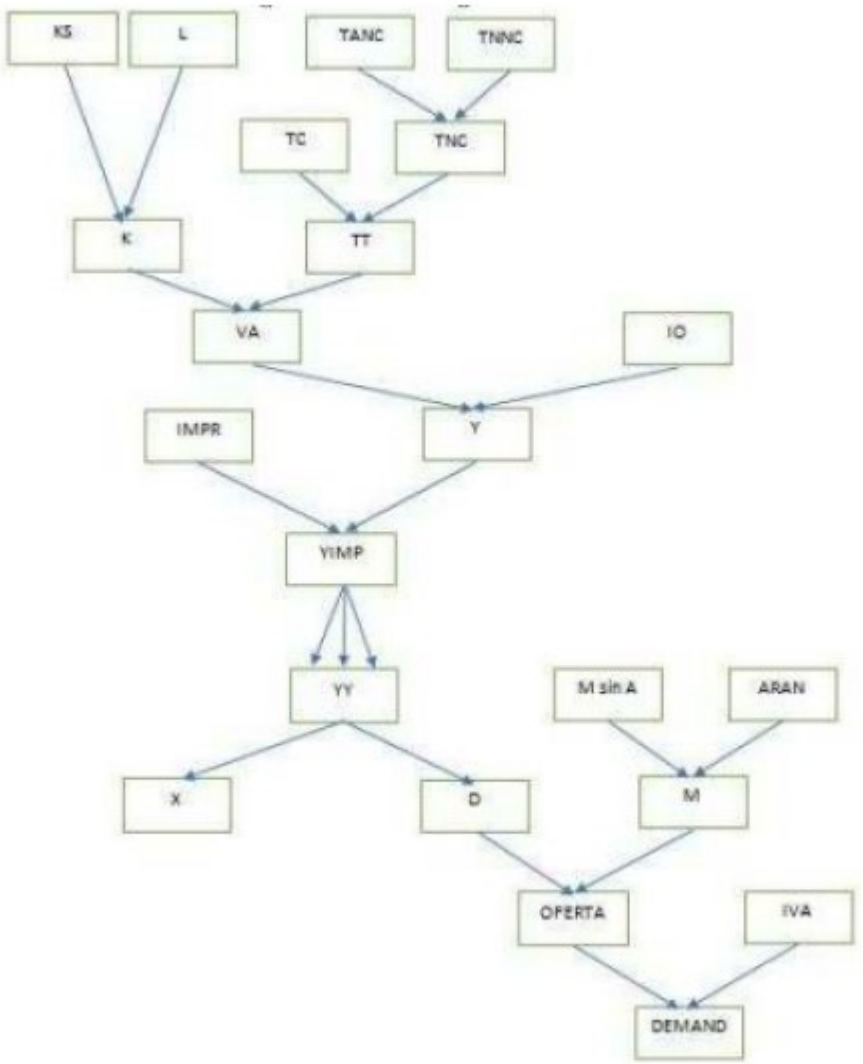
Compensation to the capital and land are distributed among households, companies and government, in fixed proportions, reflecting the property rights they hold over those assets. Special treatment is given to oil revenues, a considerable part of which goes to the government sector. Once the process of assigning factor rents has been completed, primary and secondary income distribution is addressed.

Companies pay interest (deductible income) to other institutions, and provide social security services to households. Once those expenses are discounted, the companies pay income taxes at an exogenously determined rate. Remaining income is allocated to distribution of dividends, or to reserves for future investment, in what constitutes the savings of the companies. Households receive interest, which together with their net factorial income constitute the taxable base for the liquidation of their income tax. They receive social security benefits (both public and private) and save a fixed proportion of their available income.

The government receives tax revenues (sectoral taxes, VAT, import taxes and direct taxes), social security contributions, dividends from the oil sector and other capital income. Given that income, it defines its spending plan (including social security benefits, in proportion to contributions received, and interest payments, according to its indebtedness level, thus residually, defining its savings. In the

dynamic recursive mode, the balance of its operation affects indebtedness level, which is adjusted to cover the deficit, or to take advantage of the resulting surplus.

Figure 1 : General structure of the model



Source: Authors' elaboration

The "Rest of the world" receives factor income from companies, transfers remittances to households and receives interest from public debt. The closing of the balance of payments is given by prices: the exchange rate is adjusted, given a total capital flow, which summarizes the flows of the capital balance.

f. Demand Modeling

Demand modeling proceeds as follows: households, which receive net labor income, differentiated according to the quality and type of work, and their network management capacity; compensation to capital; capital income, dividends and transfers (among themselves, from abroad or from the government); and social security benefits, they must pay taxes at a default rate. From their available income a fixed proportion is allocated to savings, residually determining the resources devoted to consumption. These are allocated, in a first level, to food consumption (agricultural or industrial), to consumption of other industrial goods, or to consumption of services, through the Almost Ideal Demand System, of Deaton & Muellbauer (1980).

At a second level, allocations by groups are distributed in fixed proportions between the components of each of the corresponding baskets.

Intermediate demand, on the other hand, arises from fixed coefficients, defined in the Input-Output matrix. Public expenditure is fixed exogenously, and is distributed in fixed proportions among different types of goods; investment is determined endogenously (given the total availability of savings in the economy), and inventories are determined as a fixed proportion of branch production.

The macro closure of the model's current version corresponds to what literature refers to as a model "guided by savings", with flexible exchange rate and public savings and residual companies. The resulting model incorporates 2258 equations and variables, satisfies Walras Law, and produces output tables consistent with the Colombian National Accounts of the calibration year, in this case, 2014.

g. Agricultural protection

The model considers two types of trade protection: the tariff, which is reflected in the tariffs imposed on imports; and non-tariff, which is reflected in non-tariff barriers. The first can be altered, by changing the tariff rate, which is calibrated from the information of the social accounting matrix.

As to the second, it is approached from the concept of "ad-valorem equivalent tariff" (AVE). In order to calculate this equivalent tariff, the restriction degree to imports applied in each of the model's sectors must be estimated. In the calibration of the model, the equivalent tariff that would make optimal the restricted level of imports for the importer is determined according to the methodology described in it.

Simulations about variation in the restrictions can be carried out through the equivalent tariff: eliminating restrictions is equivalent to making that tariff equivalent to zero.

h. Impact of the restrictions

Effects of tariff and para-tariff protection can be analyzed from two perspectives: on one hand, from the perspective of its impact on the allocation of resources in the economy ("allocative" efficiency); on the other, from the perspective of the impact on consumer welfare.

When imports of a specific sector are restricted, a "distortion" is generated in the allocation of resources: resources from efficient allocations are shifted to inefficient allocations, generating inter-sectoral impacts through production chains. The protection of a sector means that some productive resources, which would have been used in other sectors obeying the basic price signals in the economy, move to the protected sector, due to the price distortion implicit in the protection. In other words: the restriction determines a “distortion price" (equivalent to the import price affected by the AVE), before whose signal the resources are re-allocated to uses that, in the absence of distortion, would not have been considered by the producers and by the owners of the resource.

The "distortion" has a short or long term effect, according to the type of resources being considered in the analysis: if some productive resources are considered immobile, then the evaluation will be short-term. If even the immobile resources are reallocated, the evaluation will be long-term. In the short term, work is reallocated between sectors; in the long-term, land (and capital, correspondingly), are also reallocated, taking into account adjustments to profitability implied by short-term allocation.

Regardless of the discussion of the convenience or not of this reallocation, the distortions described affect the "allocative efficiency" in the economy. But they also affect consumer welfare, because they directly or indirectly affect the price at which they can access goods they consume.

To this end, it is necessary to develop welfare assessments measuring "equivalent variation" (or "compensated variation") of the restriction.

For the calculation of AVE of the model sectors, we have started from the detailed estimates of said tariff by Kee, Nicita and Olarreaga (2009), weighted by the effective participations observed in Colombia in the 2011-2015 period. The AVE used in the model corresponds to said period average.

To simulate the elimination of these restrictions (or their reduction), it is sufficient to eliminate (or reduce) the value of AVE. The impact is evaluated by analyzing the resulting GDP and the "equivalent variation" that would have produced, in the homes considered, the same level of utility that occurs with the elimination of restrictions.

In a first exercise, the impact of AVE elimination is analyzed considering only the short-term effects, that is, changes in the allocation of the work resource. Results of comparative statics are reported as "short-term effects" (ALTCP).

Once these impacts are generated, changes in land allocation are evaluated using the portfolio model described in Annex 8.1, and the amount of capital is adjusted to make it consistent with the new allocation. Reallocation of immobile resources produces new effects on efficiency and well-being, which are added to the short-term effects and are reported as "long-term effects" (ALTLP).

Looking to make the result "robust", exercises incorporate stochastic simulations, in which elasticities of the model substitution are generated from random variables that are lognormal, with the parameters presented in Table 2. Results are reported in Section D.

IV. Model Calibration.

a. Social Accounting Matrix

To prepare the Social Accounting Matrix (SAM), the supply and use tables (COU) of the National Accounts system and the Integrated Economic Accounts (CEI) chart of the same system were available. The first ones describe the composition of the offer, by type of economic activity; the production matrix; the import matrix; the intermediate consumption matrix and the composition of the final demand, while the CEI table details flows among institutions involved in the economy

Table 2: Elasticities of substitution of the model

Variable	Description	Replacement of elasticity		Lognormal distribution parameters	
		average elasticity	standard deviation	mu	sigma
∑	Replacement elasticity work aggregation	0,90	0,045	-0,11	0,05
σ V	Replacement elasticity work aggregation - capital	0,90	0,045	-0,11	0,05
σ MV	Import substitution elasticity raw materials	1,20	0,480	-0,11	0,39
σ MK	Replacement elasticity imports capital goods	0,80	0,320	-0,30	0,39
σ MC	Import substitution elasticity consumer goods	2,00	0,800	0,62	0,39
σ C	Elasticity of CET boundary substitution	-1,50	0,075	0,40	0,05
σ X	Elasticity of substitution export demand	1,50	0,600	0,33	0,39
σ TN	Elasticity of substitution between informal and formal work	1,20	0,060	0,18	0,05
σ KL	Capital substitution elasticity - land	0,70	0,035	-0,36	0,05

Source: Authors' elaboration

Subsequently, the six-digit Supply Utilization Balances (BOU) and the agricultural census were used as a mechanism for reallocating land for each farming sector. Finally, the salary and consumption compensation of the households was obtained from the 2014 Integrated Large Household Survey.

Table 3 describes information sources used in the construction of the Social Accounting Matrix, where MU denotes the use matrix, MO the supply matrix, CEI

the Integrated Economic Accounts and, GEIH the Large integrated household survey. The entire sectoral group was reallocated for land use based on the 2014 agricultural census.

Resulting basic accounting matrix is summarized in Table 4.

Table 3: Sources of information Matrix of Social Accounting

	Agricultural activities (C1)	Other activities (C2)	Products (C3)	Factors (C4)	Households (C5)	Government (C6)	Companies (C7)	Rest of the world (C8)	Investment and savings (C9)
Agricultural activities (V1)									
Other activities (V2)			MO						
Products (V3)	MU				MU	MU	MU	MU	MU
Factors (V4)	MU								
Households (V5)				CEI + GEIG					
Government (V6)	MU	MO		CEI		CEI + GEIG			
Companies (V7)				CEI					
Rest of the world (V8)		MO							
Investment and savings (V9)					GEIH	CEI	CEI	CEI	CEI

Source: Authors' elaboration

Table 4: Social Accounting Matrix. 2014p. Billions of pesos.

		ACTIVITY				PRODUCTS				FACTORS				INSTITUTIONS					
		AGR	MIN	IND	SERV	AGR	MIN	IND	SERV	LAB	CAP	IMP	ARAN	HOG	FIRM	GOB	RM	AHOR	TOTAL
ACTIVITY	AGR					72,3	0,0	4,2	0,0										**76,5**
	MIN					0,0	86,3	0,2	1,0										**87,5**
	IND					0,0	0,2	517,4	14,1										**531,7**
	SERV					0,0	0,0	2,1	658,9										**661,0**
PRODUCTS	AGR	3,9		33,2	5,1									27,0		0,0	4,7	3,7	**77,7**
	MIN	0,0	6,6	17,5	0,0									0,0		0,0	62,7	0,0	**86,8**
	IND	12,9	3,8	160,2	88,2									195,6		4,5	41,9	189,8	**696,9**
	SERV	15,8	13,4	140,3	162,1									239,0		131,3	5,8	5,4	**713,0**
FACTORS	LAB	25,5	9,2	81,1	284,8														**400,7**
	CAP	18,2	53,7	94,4	112,0														**278,3**
	IMP	0,1	0,9	5,1	8,8	0,0	0,1	33,9	24,8					11,3	43,8				**128,7**
	ARAN					0,2	0,0	4,8	0,0										**5,0**
INSTITUTIONS	HOG									335,6	48,2								**530,0**
	FIRM									20,2	223,2								**243,4**
	GOB									44,8	7,0	128,7	5,0						**218,7**
	RM					5,2	0,3	134,2	14,3										**180,8**
	AHOR																		**198,9**
	TOT	**76,5**	**87,5**	**531,7**	**661,0**	**77,7**	**86,8**	**696,9**	**713,0**	**400,7**	**278,3**	**128,7**	**5,0**	**530,0**	**243,4**	**218,7**	**180,8**	**198,9**	

Source: Authors' elaboration

b. Farming Sector Disaggregation

Based on SAM, the farming sectors are reclassified, whose essential indicators are summarized in Table 5. As shown in this table, the greatest export dynamics are observed in sectors known as "intensive exports" and "potential exports", with a

ratio of exports to total production of 33.4% and 6%, respectively. Other activities have coefficients below 2% for 2014

As to the dynamics of imports, the ratio of external purchases in the total supply was established. The importable farming sector includes the largest flow of purchases from the rest of the world, followed by the farming services sector and potential exports with a participation of 37%, 12%, and 5%, respectively.

It is important to highlight that productive linkages generate another type of relationship among farming sectors and agro-industrial activities, which have high import/export ratios. This is particularly noticeable in the case of exports in the agro-industrial coffee and threshing sectors, and cocoa and chocolate, which present high export coefficients and integration with farming sectors. And in the case of imports, in oil and fat sectors, and other food products, with high import ratios and also highly integrated with farming sectors.

Table 5: Indicators of the agricultural sectors 2014 (In billions of pesos)

	Prices	Potential exports	Intensive exports	Importables	Cattle raising	Others (agricultural services, etc.)	Non-tradable
Production	At basic prices	8,300	11,783	6,766	6,455	960	25,650
	For own final use	625	499	947	-	-	2,009
	Market	7,675	11,284	5,819	6,455	960	23,641
Net Taxes	Total	17	- 268	87	81	-	39
Imports	CIF basic prices	650	12	4,295	-	150	140
	Taxes and fees, excluding VAT	5	-	135	-	-	11
Margins	Total	4,750	482	1,478	226	151	5,287
	Commerce	4,745	482	1,171	226	151	5,284
	Transport	5	-	307	-	-	3
Non-deductible Value Added Tax (VAT)		-	-	42	-	13	-
Total Offer - Buyer Prices		13,722	12,009	12,803	6,762	1,274	31,127
Intermediate Consumption	At buyer's prices	3,578	6,715	9,807	5,886	824	15,415
Final Household Consumption Expenditure	At buyer's prices	9,649	644	1,782	-	450	14,514
Government Final Consumption Expenditure	At buyer prices	-	-	9	-	-	14
Gross Formation of Fixed Capital	At buyer's prices	-	431	815	233	-	953
Variation of existences	At buyer's prices	6	283	279	535	-	190
Exports	At buyer's price	489	3,936	111	108	-	41
Indicators	Exports / Production	5.89%	33.40%	1.64%	1.67%	0.00%	0.20%
	Imports / Total offer	4.77%	0.10%	34.60%	0.00%	11.77%	0.50%
	% Intermediate consumption	26.07%	55.92%	76.60%	87.05%	64.68%	49.50%
	% margins on production plus import	53.04%	4.09%	13.20%	3.50%	13.60%	20.50%

Source: Authors' elaboration, DANE.

c. Information on Employment and Compensations

Information on employment and salary compensation was obtained from the Grand Integrated Household Survey (GEIH) for 2014, provided by the National

Administrative Department of Statistics (DANE). In information on employment and labor remuneration, households were disaggregated by rural and urban areas.

Taking into account that a large part of the employment in the rural areas is family and day laborers, employment was broken down into salaried and independent, qualified and unskilled workers.

For disaggregating employment to the classification of the economic sectors of National Accounts to two digits, the International Standard Industrial Classification, Revision 3 Adapted for Colombia (ISIC Rev 3 A.C.) was used. However, for disaggregating employment in the 6 agricultural sectors of the model, the use of DANE correlates was required between the ISIC Rev 3 A.C and the National Accounts in six digits.

From GEIH 2014, we found that 21.5% of employment is in the rural sector and the remaining 78.5% in the urban sector. A large percentage of rural employment is poorly qualified, only 15.6% of wage earners are in rural areas, while 27% of all independent employees are in that area (Table 6).

In terms of employment by economic sectors, 16.3% of total employment is in the farming sector, and only 2.9% in the agro-industrial sector. Of the remaining 80.8%, it is highlighted that sectors related to the exploitation of mines and oil extraction only demand 1% of the national employment, that is, industrial sectors (excluding agroindustry) and services generate 79.8% of the jobs in the country. The sector with the highest demand at the national and urban levels is related to vehicle trade and repair, followed by community, social and personal services (see Table 7).

Table 6: Employment participation by areas and types of work

	Participation by areas			Participation by types of work		
	total	urban	rural	total	urban	rural
Employees	48.20%	51.90%	35.00%	100.00%	84.40%	15.60%
Qualified	30.90%	21.30%	3.20%			
Without Qualifications	17.40%	30.60%	31.80%			
Independents	51.80%	48.10%	65.00%	100.00%	73.00%	27.00%
Qualified	9.10%	11.00%	2.20%			
Without Qualifications	42.60%	37.10%	62.80%			
total employment	100%	100%	100%	100%	78.50%	21.50%

Source: Authors' elaboration,GEIH.

61.7% of rural employment is generated in farming branches, especially the intensive export sectors and the production of non-tradables, which contribute 17.7% and 14% of employment, respectively (See Table 7). Concentration of

independent rural employment is even higher in the farming sectors (65.3%), while only 55.1% of salaried employment occurs in these sectors (Table 8).

On the other hand, urban employment focuses mainly on industrial and service sectors: only 7% of people employed in urban areas work in the farming and agro-industrial sector. Non-farming sectors generating the most employment are the trade and repair of vehicles and communal, social and personal services with 24% and 19.3%, respectively.

In contrast, sectors demanding less employment are those related to mining, oil extraction and power, gas and water supply (see Table 7).

It is worth noting that many of the productive branches generating little employment are those with the highest average salary. In the first place, the oil extraction sector, which only demands 0.3% of total employment, is the one with the best average income for all areas (national, urban and rural). In addition, power, gas and water supply sector, which employs 0.6% of workers, has the fourth best average salary nationwide (See Table 9). In general, compensation for urban work is 2.4 times the one for rural labor. Thus, there are great disparities in the compensation to work, both between productive branches, and between urban and rural areas.

Table 7: Total sector employment by sub-sectors

Sector	Total	Urban	Rural
Agricultural sector	16.30%	3.80%	61.70%
Potential exports	2.00%	0.50%	7.30%
Intensive exports	4.60%	1.10%	17.70%
Importables	1.30%	0.30%	4.60%
Non-tradable	3.70%	0.90%	14.00%
Cattle raising	2.40%	0.40%	10.00%
Others (agricultural services, etc.)	2.30%	0.60%	8.10%
Agroindustrial Sector	2.90%	3.20%	2.00%
Meat and fish	0.20%	0.30%	0.10%
Animal and vegetable oils and fats	0.20%	0.20%	0.10%
Dairy products	0.40%	0.30%	0.40%
Mill products, starches and their products	1.20%	1.40%	0.50%
Coffee and threshing products	0.20%	0.10%	0.40%
Sugar and panela	0.20%	0.20%	0.10%
Cocoa, chocolate and confectionery	0.20%	0.20%	0.10%
Foodstuffs n.c.p.	0.40%	0.50%	0.30%
Drinks	0.00%	0.00%	0.00%
Tobacco products	80.80%	93.00%	36.30%
Other sectors	0.70%	0.40%	1.90%
Exploitation of mines and quarries	0.30%	0.30%	0.10%
Extraction of crude oil and natural gas	5.90%	6.70%	3.00%
Light and intermediate manufacturing industries	2.60%	3.10%	0.80%
Capital goods manufacturing industries	0.60%	0.70%	0.30%
Other manufacturing industries	0.60%	0.60%	0.30%
Electricity supply gas, water	6.10%	6.80%	3.50%
Construction of buildings and civil works	20.60%	24.00%	8.30%
Trade and repair of vehicles	6.60%	7.30%	4.20%
Hotels, bars and restaurants	8.30%	9.70%	3.50%
Transport and telecommunications	1.30%	1.70%	0.10%
Financial intermediation	7.30%	8.80%	1.60%
Real estate, business and rental activities	3.10%	3.70%	0.70%
Public administration and defense; compulsory social security	16.80%	19.30%	7.70%
Community, social and personal services	100.00%	100.00%	100.00%
Total			

Source: Authors' elaboration,GEIH.

Table 8: Salaried and independent rural sector employment

Sector	Total	Urban	Rural
Agricultural sector	61.70%	55.10%	65.30%
Potential exports	7.30%	5.00%	8.50%
Intensive exports	17.70%	16.90%	18.00%
Importables	4.60%	3.00%	5.50%
Non-tradable	14.00%	12.30%	15.00%
Cattle raising	10.00%	16.70%	6.40%
Others (agricultural services, etc.)	8.10%	1.20%	11.90%
Agroindustrial Sector	2.00%	2.60%	1.70%
Meat and fish	0.10%	0.20%	0.10%
Animal and vegetable oils and fats	0.10%	0.00%	0.20%
Dairy products	0.40%	0.40%	0.40%
Mill products, starches and their products	0.50%	0.60%	0.50%
Coffee and threshing products	0.00%	0.00%	0.00%
Sugar and panela	0.40%	0.90%	0.10%
Cocoa, chocolate and confectionery	0.10%	0.10%	0.10%
Foodstuffs n.c.p.	0.10%	0.10%	0.00%
Drinks	0.30%	0.10%	0.30%
Tobacco products	0.00%	0.00%	0.00%
Other sectors	36.30%	42.30%	33.00%
Exploitation of mines and quarries	1.90%	2.40%	1.70%
Extraction of crude oil and natural gas	0.10%	0.40%	0.00%
Light and intermediate manufacturing industries	3.00%	2.20%	3.40%
Capital goods manufacturing industries	0.80%	1.20%	0.60%
Other manufacturing industries	0.30%	0.10%	0.50%
Electricity supply gas, water	0.30%	0.80%	0.00%
Construction of buildings and civil works	3.50%	5.40%	2.50%
Trade and repair of vehicles	8.30%	4.80%	10.20%
Hotels, bars and restaurants	4.20%	4.00%	4.30%
Transport and telecommunications	3.50%	2.10%	4.30%
Financial intermediation	0.10%	0.20%	0.00%
Real estate, business and rental activities	1.60%	1.90%	1.50%
Public administration and defense; compulsory social security	0.70%	1.40%	0.40%
Community, social and personal services	7.70%	15.50%	3.50%
Total	100.00%	100.00%	100.00%

Source: Authors' elaboration,GEIH.

TABLE 9 : Income per average sector worker in thousands of pesos

Economic sector	Urban				Rural				total	urban	rural	urban/rural
	Salaried		Independent		Salaried		Independent					
	Qualified	Unskilled	Qualified	Unskilled	Qualified	Unskilled	Qualified	Unskilled				
Agricultural sector	1572	693	1871	435	983	614	520	256	423	648	373	1.7
Potential exports	1207	616	1059	400	653	565	470	255	366	508	332	1.5
Intensive exports	1796	702	1570	469	877	533	735	261	421	707	358	2.0
Importables	1463	745	1761	430	1051	652	327	284	434	666	371	1.8
Non-tradable	1380	748	2144	429	995	651	347	238	430	701	368	1.9
Cattle raising	2307	563	2388	787	1266	683	680	266	572	963	521	1.9
Others (agricultural services, etc.)	1972	702	1456	344	1010	551	323	256	301	396	273	1.4
Agroindustrial Sector	1796	876	1028	952	1862	478	1181	554	1012	934	515	1.8
Meat and fish	2083	862	1037	542	1867	830	0	168	1008	1061	651	1.6
Animal and vegetable oils and fats	1683	892	1289	255	1445	648	185	44	758	873	146	6.0
Dairy products	1585	866	942	463	1230	811	179	199	817	956	422	2.3
Mill products, starches and their products	1299	769	972	519	1021	570	70	248	722	757	388	1.9
Coffee and threshing products	1822	1062	1413	788	867	0	0	0	1374	1385	867	1.6
Sugar and panela	3096	1334	2338	409	2383	950	0	418	1302	1610	1025	1.6
Cocoa, chocolate and confectionery	2010	987	463	535	550	636	0	45	1069	1151	288	4.0
Foodstuffs n.c.p.	1825	932	1260	287	1410	648	0	220	1148	1195	602	2.0
Drinks	2241	983	1332	166	2103	821	71	87	911	1012	247	4.1
Tobacco products	2112	1228	829	315	0	0	0	111	774	798	111	7.2
Other sectors	1589	932	1084	908	1454	464	1049	532	1183	804	507	1.6
Exploitation of mines and quarries	3487	1281	947	435	992	803	2803	285	947	1483	541	2.7
Extraction of crude oil and natural gas	4991	2176	4758	1850	1850	1584	0	0	3907	4215	1626	2.6
Light and intermediate manufacturing industries	2083	862	1037	542	1195	798	458	174	1002	1061	346	3.1
Capital goods manufacturing industries	1683	892	1289	255	1026	719	1038	553	1104	873	673	1.3
Other manufacturing industries	1585	866	942	463	0	430	43	145	470	956	156	6.1
Electricity supply gas, water	1299	769	972	519	1835	861	100	409	1806	757	925	0.8
Construction of buildings and civil works	1822	1062	1413	788	1183	696	1170	435	879	1385	609	2.3
Trade and repair of vehicles	3096	1334	2338	409	1075	584	532	269	720	1610	363	4.4
Hotels, bars and restaurants	2010	987	463	535	682	478	298	200	591	1151	303	3.8
Transport and telecommunications	1825	932	1260	287	1458	745	333	356	890	1195	456	2.6
Financial intermediation	2453	1003	2423	914	1641	843	2500	479	2107	2121	1133	1.9
Real estate, business and rental activities	2048	906	2069	478	1636	938	1684	217	1310	1340	705	1.9
Public administration and defense; compulsory social security	2611	1403	2159	1007	1803	1014	703	430	2092	2146	1095	2.0
Community, social and personal services	1909	680	1602	403	1577	541	624	223	1118	1168	662	1.8
Total	1989	809	1496	537	1413	634	652	260	904	1035	425	2.4

Source: Authors' elaboration,GEIH.

d. Distribution of Land among sectors.

Information on planted land for the 6 agricultural sectors was obtained from the third National Agricultural Census (CNA) conducted by the DANE in 2014.

According to information provided by the CNA, the total land area in the country is 111,452,998 hectares. Of these, 2.2% are in Non-Farming Production Units (UPNA), 2.5% in other uses, 56.7% in forests, and 38.6% are dedicated to farming.

Table 10: Use and participation of the total land in hectares

Distribution of the land	Total area in use (Ha)	Share%
Farming	43,024,740	38.60%
Grass	24,797,933	22.20%
Stubble	9,628,689	8.60%
Agricultural infrastructure	121,407	0.10%
Agricultural	8,476,711	7.60%
Crops	7,111,482	6.40%
Break	1,150,219	1.00%
Fallow	215,011	0.20%
Rest	68,428,258	61.40%
Natural forests	63,214,574	56.70%
No farming	2,459,663	2.20%
Other uses	275402100.00%	2.50%
Subtotal	111,452,998	100.00%

Source: Authors' elaboration, CNA,2014

43,024,740 hectares were allocated to farming sectors of the model with the presence of pastures, stubble, farming activities and infrastructure. The unbundling of the agricultural land only for the different sectors of the model was deduced considering the correlation between the 478 crops reported in the census, the Central Product Classification Version 1.0 Adapted for Colombia (CPC See 1.0 A.C.) and the National Accounts.

Pastures with the presence of animals, pastures without the presence of animals and stubble, are considered cattle areas, but not all of them are allocated to the cattle sector: 1,970,155 ha. (Determined from the proportion of cattle used for dairy purposes) and 872,989 ha (corresponding to units exclusively dedicated to breeding and production of buffalo, horses, sheep and goats) are classified as non-tradable sector land, which includes production of milk and livestock other than cattle.

Cattle land that is not reallocated to the non-tradable sector, it corresponds to the livestock sector of the model, and it is redistributed between land with livestock vocation (which also includes land dedicated to pens, piers and domestic fences), and land without cattle vocation, which corresponds to pastures without the

presence of animals and stubble. Land dedicated to sheds, swine plants, milking rooms and mangers, is classified in the non-tradable sector.

Table 11: Area and participation of land use and employment in the agricultural sectors

Sector	Area in land use (Ha)	% Land use	job	Worker per hectare
Potential exports	2.282.703	5,3%	420	0,18
Intensive exports	1.678.795	3,9%	999	0,60
Importables	3.069.017	7,1%	271	0,09
Non-tradable	4.293.777	7,1%	798	0,19
Cattle	31.632.358	73,5%		
Bovine cattle with vocation	12.090.152	28,1%	523	0,04
Cattle without vocation	19.542.206	45,4%		
Other agricultural services	68.090	0,2%	484.717	7,12
Total	43.024.740	100,0%	3.495.458	0,08

Source : Authors' elaboration, CNA,2014

On the other side, analyzing the work intensity per hectare, sectors generating less employment per land unit are bovine livestock and importable products. In the first case, an average of 4 workers per 100 hectares is used, which is due to the fact that livestock is extensive in land use and, in general, few people are in charge of large paddocks; and in the case of importable goods, on average, workers are employed per 100 hectares cultivated, due to the greater technological use that this sector requires and, therefore, to the lower demand for labor to harvest their products (corn, rice, soybeans, oilseed fruits, etc.) On the contrary, the intensive export sector, characterized by products such as coffee, bananas and flowers, are more labor-intensive and demand an average of 60 workers per 100 hectares cultivated.

Table 12: Area and participation of land use in livestock

Distribution of the land	Total area (Ha)	Participation (%)
Stubble	9,628,689	28.00%
Pastures - without vocation	9,913,517	28.80%
Pastures - with vocation	14,884,416	43.20%
Pastures with vocation - Cattle Cattle	12,041,272	35.00%
Pastures with vocation - Female cattle for milking	1,970,155	5.70%
Pastures with vocation - Buffalos, equines, sheep, etc.	872,989	2.50%
Total Pastures and Stubble	**34,426,622**	**100.00%**

Source : Authors' elaboration, CNA,2014

e. Disaggregation by households

In order to determine the impact of different policies on households, 20 types of these were disaggregated, constructed by deciles according to the per capita income of the spending unit in rural and urban areas.

Income and labor market participation information for each type of households was calculated based on GEIH and the Monetary Poverty and Inequality Survey. Information on expenditures, consumption and payment of taxes from households was deduced from the Quality of Life Survey (ENCV).

All bases are administered by the DANE and are based on 2014. Now, given that the samples of the GEIH and the ENCV are different and not to have overestimated results and to be able to more accurately determine variables such as savings for each household, results of the ENCV were taken to per-capita terms and subsequently adjusted to the population of the GEIH. Results obtained follow the trend shown by previous surveys such as the 2007 Income and Expenditure Survey, which shows that the first 8 deciles of the population have negative savings. This condition is reduced to the first 4 deciles, which represents an improvement in household savings between 2007 and 2014 (See Table 13). Additionally, all the results of the surveys were adjusted to data provided by National Accounts to build the Social Accounting Matrix (SAM). Salaried and independent, qualified, unskilled employment, labor income, other income, consumption and taxes were determined for each type of household. Table 14 shows the share of labor income for qualified and unskilled salaried and independent workers, non-labor income and expenditure for the 20 types of households. The largest share in the income of rural households is in independent and salaried unskilled labor with 18.4% and 18.3% of the total, respectively, and the lowest participation is in qualified salaried employment with 2.8% of total income, due to insufficient qualification of the population located in rural areas, the few job opportunities and the high costs that those who wish to qualify have to assume.

In terms of the labor market, the highest unemployment rates are recorded throughout the first seven deciles of the urban area with average rates of 14.3%. However, there are alarming figures in qualified and unqualified employment for the first urban deciles. As shown in Table 15, decile (1) one presents an unemployment rate of 54.7% for those qualified, illustrating a difficult scenario in terms of social mobility even in the midst of educational improvements. It should be noted that the trends are maintained for the rural area.

V. Simulations.

Simulations carried out are reported below: the basic simulation seeks to determine the costs of protection, analyzing the impact of tariff and non-tariff restrictions on the economy. The analysis considers short and long term impacts, understanding the former as those impacts arising from the reallocation of work and intermediate inputs among sectors. Long-term impacts also include reallocations of land and capital among.

Second, the possible effects of market structures on the analysis of trade policies are analyzed. Specifically, changes are simulated in the market power of the entrepreneurs of the protected sectors, which are given through the mechanism of exposure to competition. The greater exposure to competition reduces the differentiation of the employer, increases the elasticity of substitution of their products, and consequently reduces the mark-up that can be applied to their production (thus decreasing unrecoverable losses of efficiency of society in its set). The effect is calculated, in terms of production and associated welfare variations.

The third exercise approaches the issue of the use of peace conditions to expand the farming frontier. The starting point is the reallocation of 20% of the lands that, being dedicated to cattle, are considered essentially farming land. This reallocation can be made in two ways: by pursuing strictly distributive objectives, and without ensuring efficiency conditions, which can have an impact on the production achieved; or implementing adequate measures to guarantee efficiency (through actions that allow incorporating capital into production processes, integrating production into international production chains, and facilitating the adoption of appropriate technologies).

Finally, the final exercise gathers elements of all simulations: it assesses the integral impact of public policies efficiently incorporating land into productive process, eliminating excessive protections for the farming and agro-industrial sectors, generating "competitive pressures" that reduce irrecoverable losses of efficiency, and transmitting adequate signals for the reallocation of resources in the long term.

Table 13: Number of households, population, income, expenses and savings by deciles - national total

Decil by income	Homes		Population		People per household	Income		Gastos		Save	
	Nro	%	Nro	%		Per household	Per capita	Per household	Per capita	Per household	Per capita
1	1,360,827	10	5,791,178	13	4.26	304,333	71,513	769,002	180,702	- 464,669	- 109,189
2	1,359,003	10	5,709,752	12.3	4.2	616,004	146,618	800,750	190,590	- 184,746	- 43,972
3	1,364,931	10	5,405,242	11.7	3.96	840,554	212,257	936,560	236,500	- 96,006	- 24,243
4	1,355,333	10	5,043,447	10.9	3.72	1,046,615	281,258	1,268,042	340,763	- 221,427	- 59,504
5	1,359,497	10	4,833,620	10.4	3.56	1,283,258	360,927	1,199,119	337,262	84,139	23,665
6	1,365,391	10	4,643,917	10	3.4	1,566,625	460,615	1,418,519	417,069	148,106	43,546
7	1,354,487	10	4,316,085	9.3	3.19	1,897,123	595,361	1,619,997	508,393	277,126	86,968
8	1,359,752	10	3,806,839	8.2	2.8	2,208,835	788,966	1,965,448	702,032	243,387	86,934
9	1,359,865	10	3,603,123	7.8	2.65	3,038,847	1,146,900	2,369,727	894,366	669,120	252,535
10	1,359,893	10	3,142,546	6.8	2.31	6,699,968	2,899,318	5,037,734	2,180,009	1,662,234	719,309
Total	**13,598,979**	**100**	**46,295,749**	**100**	**3.4**	**1,949,963**	**572,785**	**1,738,275**	**510,603**	**211,688**	**62,181**

Source : Authors' elaboration , GEIH, ENCV, 214

Table 14: Total income and expenditure share for the 20 types of households

Zone	Decil	Labor income				Other income	Expenses		
		Salaried		Independent			household consumption	contributions to social security	taxes
		Not qualified	Qualified	Not qualified	Qualified				
Urban	U1	0.5	0	1.8	0.1	1	3.5	0.2	1.3
	U2	2.4	0.1	4.9	0.4	1.9	3.5	0.9	1
	U3	5.3	0.5	6.7	0.8	2.6	4.4	2.2	1.7
	U4	7.6	1.1	8.1	1.4	3.5	6.5	3.3	2.3
	U5	10.5	2.2	8.9	2.5	4.5	6.2	5	2.8
	U6	12.5	4.2	9.7	3.7	5.9	7.7	6.8	4.7
	U7	13.4	6.9	10.1	5.6	8.1	9	8.8	6
	U8	12.9	10.1	10.5	8.6	10.2	11	10.8	8.8
	U9	10.4	18.3	11.1	17.2	15.9	13.3	15.5	12.7
	U10	6.2	53.6	9.9	57.3	37.9	27.8	38.7	54.7
Rural	R1	0.7	0	2.9	0	1.2	0.9	0.2	0.4
	R2	2.1	0	3.8	0.1	1.2	1.1	0.7	0.4
	R3	2.9	0.1	2.9	0.1	0.9	1	1	0.5
	R4	2.8	0.1	2.3	0.1	0.8	0.8	1	0.7
	R5	2.6	0.2	1.7	0.1	0.7	0.8	1	0.4
	R6	2.3	0.3	1.4	0.2	0.7	0.5	0.9	0.3
	R7	1.8	0.3	1.1	0.2	0.5	0.4	0.8	0.3
	R8	1.6	0.4	0.9	0.1	0.6	0.3	0.7	0.3
	R9	1	0.5	0.8	0.5	0.8	0.3	0.7	0.4
	R10	0.4	0.9	0.5	0.9	1.1	0.8	0.7	0.4

Source: Source : Authors' elaboration , GEIH, ENCV, 214

Table 15: Labor market of the 20 types of homes

Zone	Decil	Global Participation Rate			Unemployment rate			Occupancy rate		
		Not qualified	Qualified	Total	Not qualified	Qualified	Total	Not qualified	Qualified	Total
Urban	U1	47.9	63	48.7	25.9	54.7	28	35.5	28.5	35.1
	U2	53.9	71.3	55	15.2	32.5	16.7	45.7	48.1	45.8
	U3	58	73.1	59.4	13	25.6	14.3	50.5	54.4	50.9
	U4	61.2	75.4	62.9	11.4	23.5	13.1	54.3	57.7	54.7
	U5	63.6	78.7	66	9.6	16.7	10.9	57.6	65.6	58.8
	U6	65.1	81.4	68.5	7.8	13.5	9.2	60.1	70.4	62.2
	U7	65.4	85.3	70.7	6.7	10.9	8	61	76	65
	U8	65.9	85.6	72.6	5.3	8.1	6.4	62.4	78.7	67.9
	U9	60	85.1	71.9	4.2	6.5	5.4	57.6	79.6	68
	U10	49	83.3	72.6	3.7	3.9	3.9	47.3	80	69.7
Rural	R1	46.7	60.2	46.8	8.1	36	8.4	42.9	38.5	42.9
	R2	54.1	68.5	54.3	5.8	23.2	6.2	50.9	52.6	51
	R3	59.2	75	59.6	5	24.7	5.6	56.2	56.5	56.3
	R4	63.8	81	64.5	3.5	18.5	4.2	61.5	66	61.7
	R5	66.4	80.1	67.2	4.1	14.4	4.8	63.7	68.5	64
	R6	70.6	86.9	72	2.3	8.5	2.9	69	79.5	69.9
	R7	77	81.8	77.6	2.6	7.5	3.1	75	75.7	75.1
	R8	77.5	83.8	78.4	3.5	8.9	4.3	74.8	76.4	75.1
	R9	70.3	84.5	73.7	2.4	2.3	2.4	68.6	82.5	71.9
	R10	64.7	84.3	75.1	4.2	5.2	4.8	62	79.9	71.5

Source: Authors' elaboration, GEIH, ENCV, 214

It should be noted that, although the exercises include some dynamic effects (associated, for example, with reallocation of fixed resources and changes in the "competitive pressure" faced by the sectors), their results are essentially ascribed to the "comparative static" approach, and in that sense, they should be considered as partial results. There are other types of effects that escape this approach: those associated with the dynamics of the structural transformations an economy can experience, when it generates the right incentives for innovation, entrepreneurship and, therefore, reaches higher levels of complexity. That's what literature calls "creative destruction", according to Schumpeter, the essential characteristic of capitalism. However, in any case, bias in the results is upward: policies of trade liberalization described are generally a powerful driver of this creative destruction, so that their effects exceed, generally by far, those the analysis of comparative statics can detect

a. Cost of protection

The first simulation seeks to evaluate the cost of protection. The methodology consists of eliminating tariff and non-tariff barriers of the farming and agro-industrial sectors, and evaluating the impact this elimination would have on the GDP and on well-being. The cost of protection is interpreted as gains in product or in well-being that are not perceived as a result of restrictions. By eliminating tariff and non-tariff barriers, GDP increases by 0.84% in the short term, and 1.11% in the long term. Stochastic simulation (which generates different values of the elasticities of substitution of the model) limits these effects between 0.62% and 1.26%, in the short term, and between 0.83% and 1.54% in the long term. On the other hand, effects of well-being in the short term vary between 2.0% of income for the lowest

urban decile and 0.5% of income for the highest rural decile, and between 2.5% and 0.7% in the long term. The results are summarized in Tables 16, 17 and 18.

Table 16: Effects on the GDP of the elimination of barriers (first simulation)

GDP - DEMAND. THOUSANDS OF MILLION PESOS				
	With Migration		Without Migration	
	Var% short term	Var% Long term	Var% short term	Var% Long term
Consumption	1,15%	1,50%	1,17%	1,52%
Public spending	0,00%	0,00%	0,00%	0,00%
Investment	1,11%	1,39%	1,09%	1,36%
Exports	1,84%	2,10%	1,83%	2,09%
Imports	2,10%	2,40%	2,11%	2,40%
Total GDP	0,84%	1,11%	0,85%	1,11%
MINIMUM GDP	0,62%	0,85%	0,60%	0,84%
MAXIMUM GDP	1,26%	1,54%	1,60%	1,96%

Source: Authors' elaboration, CGE EAFIT model.

Table 17: Effects by economic sectors of the elimination of barriers

GDP BY ACTIVITIES. THOUSANDS OF MILLION PESOS					
	base year (2014)	short term	Longt term	Var % ST	Var % LP
AGRICULTURAL ACTIVITIES	43.774,0	42.812,7	43.038,7	-2,20%	-1,68%
Potential exporters	6.516,2	6.433,4	6.510,3	-1,27%	-0,09%
Expo-intensive	10.677,5	10.865,7	11.061,4	1,76%	3,59%
Importables	4.522,6	3.819,0	3.607,7	-15,56%	-20,23%
Non-tradable	13.274,1	13.268,7	13.370,9	-0,04%	0,73%
Cattle raising	5.642,2	5.521,5	5.564,1	-2,14%	-1,38%
Other activities	3.141,4	2.904,4	2.924,4	-7,55%	-6,91%
MINING ACTIVITIES	62.896,0	63.247,5	63.295,3	0,56%	0,63%
INDUSTRIAL ACTIVITIES	83.831,0	84.983,6	85.351,6	1,37%	1,81%
Meat and fish	2.153,0	2.089,3	2.108,2	-2,96%	-2,08%
Oils and fats	1.114,0	988,2	983,5	-11,30%	-11,71%
Dairy products	1.356,0	1.310,1	1.320,6	-3,39%	-2,61%
Mill products	4.649,0	4.150,3	4.157,2	-10,73%	-10,58%
Coffee and threshing	773,0	775,0	784,6	0,26%	1,50%
Sugar and brown sugar	1.014,0	1.031,5	1.039,2	1,72%	2,49%
Cocoa and chocolate	602,0	603,7	608,3	0,28%	1,04%
Other food products	1.631,0	1.338,4	1.348,1	-17,94%	-17,35%
drinks	6.146,0	6.125,4	6.165,1	-0,34%	0,31%
Tobacco	263,0	234,9	235,7	-10,68%	-10,39%
Rest industry	64.130,0	66.336,9	66.601,1	3,44%	3,85%
OTHER ACTIVITIES	488.462,0	492.628,4	493.773,2	0,85%	1,09%
VALUE ADDED	678.963.0	683.672.2	685.458.7	0.69%	0.96%

Source: Authors' elaboration, CGE EAFIT model.

Table 18: Equivalent variation, in pesos and as a percentage of disposable income per capita - Basic scenario.

Home	Equivalent variation (pesos)		% Incomes	
	Short Term	Long Term	Short Term	Long Term
U1	34.854	42.655	2,0%	2,5%
U2	51.09	65.458	1,6%	2,0%
U3	65.293	84.502	1,5%	1,9%
U4	73.574	96.088	1,3%	1,7%
U5	91.764	119.036	1,3%	1,7%
U6	104.054	135.541	1,2%	1,5%
U7	132.602	172.311	1,2%	1,5%
U8	157.105	206.29	1,1%	1,4%
U9	222.253	284.485	1,1%	1,4%
U10	485.062	621.839	0,8%	1,0%
R1	30.156	40.522	1,7%	2,3%
R2	44.141	59.388	1,3%	1,8%
R3	57.779	79.185	1,2%	1,7%
R4	69.218	93.2	1,2%	1,6%
R5	77.462	103.853	1,1%	1,4%
R6	94.579	125.557	1,0%	1,4%
R7	121.241	161.004	1,0%	1,4%
R8	163.309	213.263	1,0%	1,3%
R9	176.354	227.662	0,9%	1,2%
R10	243.272	321.134	0,5%	0,6%

Source: Authors' elaboration, CGE EAFIT model.

Conclusions are clear: tariff and non-tariff protection entail significant costs for society, which are paid in terms of lower production and welfare losses. In general, eventual protection elimination would affect all protected sectors, with the exception of the expo-intensive sector, which would capture resources released in other sectors. As to impact on welfare, it depends essentially on the reduction of food cost. This reduction (above 2%) affects especially low deciles (urban and rural from 1 to 6), which spend, on average, 34% of their spending on food.

However, it is possible that some costs are justified, either by the need to protect the consumer, or by the effects of long-term public policies that justify some transitory protection. In fact, it is observed that protection is not exclusive to Colombia, and that other countries in the region also apply restrictions, although in general, to a lesser extent than Colombia.

Table 19: Non-Tariff Protection - Tariff Equivalent

Country	All sectors	Farming	Manufactures
Chile	7.20%	22.30%	5.90%
Peru	9.30%	25.70%	5.20%
Mexico	15.20%	28.30%	13.80%
Argentina	9.20%	9.60%	9.10%
Brazil	21.70%	24.70%	21.50%
Average	12.50%	22.10%	11.10%
Colombia	**20.50%**	**39.00%**	**18.7**

Table 19 shows the calculation of the tariff equivalent of this protection for some countries in the region. The last simulation deals with an alternative scenario of reduction of tariff and non-tariff protection, in conjunction with other policies and alternative effects of trade policies.

b. Market Power

Now, what would be the impacts of the elimination of tariff and non-tariff barriers, if, in addition to the reallocation effect already analyzed, it would also have welfare impacts, through the reduction of market power of the oligopolistic sectors and irrecoverable losses of efficiency? Outputs are summarized in Tables 20 and 21. The exercise replicates the elimination of tariff and non-tariff barriers, in an imperfect competition model in which elimination of protection negatively impacts the mark-up of sectors that, being in monopolistic competition, fail to receive protection. In particular, it is assumed that "exposure to competition" reduces by 30% the mark-up of those sectors in the long-term scenario.

In that case, the impact of protection elimination leads to 1.46% GDP increase (in a range between 1.14% and 1.92%, in the stochastic exercise).

Table 20: Elimination of barriers with Mark-up reduction

GDP - DEMAND. THOUSANDS OF MILLION PESOS					
	base year (2014)	With Migration		Without Migration	
		Var% short term	Var% Long term	Var% short term	Var% Long term
Consumption	461.690,0	467.003,7	471.048,2	1,15%	2,03%
Public spending	135.832,0	135.832,0	135.832,0	0,00%	0,00%
Investment	198.896,0	201.105,3	202.205,7	1,11%	1,66%
Exports	115.085,0	117.197,0	117.602,1	1,84%	2,19%
Imports	153.997,0	157.236,9	158.145,2	2,10%	2,69%
Total GDP	757.506,0	763.901,1	768.542,7	0,84%	1,46%
MINIMUM GDP		762.207,5	766.123,9	0,62%	1,14%
MAXIMUM GDP		767.028,6	772.029,1	1,26%	1,92%

Source: Authors' elaboration, CGE EAFIT model.

Table 21: Effects by economic sectors of the elimination of barriers with reduction of Mark-up

	GDP BY ACTIVITIES. THOUSANDS OF MILLION PESOS				
	base year (2014)	short term	Longt term	Var % ST	Var % LP
AGRICULTURAL ACTIVITIES	43.774,0	42.812,7	43.501,3	-2,20%	-0,62%
Potential exporters	6.516,2	6.433,4	6.572,1	-1,27%	0,86%
Expo-intensive	10.677,5	10.865,7	11.125,2	1,76%	4,19%
Importables	4.522,6	3.819,0	3.658,4	-15,56%	-19,11%
Non-tradable	13.274,1	13.268,7	13.523,9	-0,04%	1,88%
Cattle raising	5.642,2	5.521,5	5.618,8	-2,14%	-0,42%
Other activities	3.141,4	2.904,4	3.002,9	-7,55%	-4,41%
MINING ACTIVITIES	62.896,0	63.247,5	63.328,9	0,56%	0,69%
INDUSTRIAL ACTIVITIES	83.831,0	84.983,6	85.873,4	1,37%	2,44%
Meat and fish	2.153,0	2.089,3	2.132,9	-2,96%	-0,93%
Oils and fats	1.114,0	988,2	1.026,2	-11,30%	-7,89%
Dairy products	1.356,0	1.310,1	1.339,8	-3,39%	-1,20%
Mill products	4.649,0	4.150,3	4.270,3	-10,73%	-8,15%
Coffee and threshing	773,0	775,0	795,0	0,26%	2,84%
Sugar and brown sugar	1.014,0	1.031,5	1.049,3	1,72%	3,48%
Cocoa and chocolate	602,0	603,7	620,6	0,28%	3,10%
Other food products	1.631,0	1.338,4	1.412,0	-17,94%	-13,43%
drinks	6.146,0	6.125,4	6.226,3	-0,34%	1,31%
Tobacco	263,0	234,9	240,4	-10,68%	-8,58%
Rest industry	64.130,0	66.336,9	66.760,6	3,44%	4,10%
OTHER ACTIVITIES	488.462,0	492.628,4	495.172,1	0,85%	1,37%
VALUE ADDED	678.963,0	683.672,2	687.875,7	0,69%	1,31%

Source: Authors' elaboration, CGE EAFIT model.

In terms of welfare effects, they represent 3.4% of the factor income of the lowest urban decile:

Table 22: Equivalent variation. Elimination of barriers with Mark-up reduction

Home	quivalent variation (pesos		% Incomes	
	Short Term	Long Term	Short Term	Long Term
U1	34.854	58.471	2,0%	3,4%
U2	51.09	93.176	1,6%	2,9%
U3	65.293	120.145	1,5%	2,7%
U4	73.574	136.222	1,3%	2,4%
U5	91.764	165.819	1,3%	2,4%
U6	104.054	189.508	1,2%	2,2%
U7	132.602	234.556	1,2%	2,1%
U8	157.105	279.392	1,1%	1,9%
U9	222.253	372.928	1,1%	1,8%
U10	485.062	790.705	0,8%	1,2%
R1	30.156	59.145	1,7%	3,3%
R2	44.141	87.604	1,3%	2,6%
R3	57.779	114.427	1,2%	2,5%
R4	69.218	136.205	1,2%	2,3%
R5	77.462	151.392	1,1%	2,1%
R6	94.579	181.63	1,0%	2,0%
R7	121.241	228.705	1,0%	1,9%
R8	163.309	296.832	1,0%	1,9%
R9	176.354	321.292	0,9%	1,6%
R10	243.272	440.435	0,5%	0,9%

Source: Authors' elaboration, CGE EAFIT model.

c. Expanding the agricultural frontier

The following simulation addresses the issue of land reallocation among productive uses. Specifically, it seeks to promote the productive farming use of 20% of the land that, being dedicated to livestock, is not, however, land with cattle vocation.

The following simulation addresses the issue of land reallocation among productive uses. Specifically, it seeks to promote the productive agricultural use of 20% of the land that, being dedicated to livestock, is not, however, land with cattle vocation.

The question that seeks to be solved in the simulation is: how important are the new productive uses that are given to the reallocated land, and how those uses can limit the impact of the measure on agricultural production and on GDP.

The simulation compares two scenarios: the first (which can be called "traditional allocation"), in which the reallocated land is allocated, in equal parts, to the non-tradable sector and the importable products sector, on the understanding that, in absence of decided public actions, which guide the supply to external markets,

these sectors would be the only options available to the recipients of the land. The second (which could be called "efficient allocation"), reallocates the land according to the efficient allocation model, and includes, consequently, productive uses associated with traditional or potential exports, which surely require that capital be provided at the same time for farming. The difference between both scenarios is that, in the second, access to productive technologies is guaranteed, with the necessary capital and the relevant marketing networks, to ensure efficient placement of the new harvested products.

The "traditional scenario" produces meager results, as shown in Table 23 and 24: the single allocation of land does not have an important effect on the country's production. Limited domestic demand and low productivity make the effects limited. Inclusion of modern sectors (associated with exports) and provision of productive capital substantially raise the results achieved

Table 23: Alternative scenarios. Expansion of the agricultural frontier

GDP - DEMAND. THOUSANDS OF MILLION PESOS					
	base year (2014)	With Migration		Without Migration	
		traditional	efficient	Var% trad	Var%eff
Consumption	461.690,0	463.171,5	474.332,2	0,32%	2,74%
Public spending	135.832,0	135.832,0	135.832,0	0,00%	0,00%
Investment	198.896,0	199.361,0	203.236,9	0,23%	2,18%
Exports	115.085,0	115.133,6	116.283,3	0,04%	1,04%
Imports	153.997,0	154.287,5	156.740,7	0,19%	1,78%
Total GDP	757.506,0	759.210,6	772.943,6	0,23%	2,04%

Source: Authors' elaboration, CGE EAFIT model.

Table 24: Sector effects. Expansion of the agricultural frontier

GDP BY ACTIVITIES. THOUSANDS OF MILLION PESOS					
	base year (2014)	traditional	efficient	Var % trad	Var % eff
AGRICULTURAL ACTIVITIES	43.774,0	44.133,4	46.773,4	0,82%	6,85%
Potential exporters	6.516,2	6.545,3	7.004,9	0,45%	7,50%
Expo-intensive	10.677,5	10.692,9	11.444,2	0,14%	7,18%
Importables	4.522,6	4.707,8	5.136,8	4,09%	13,58%
Non-tradable	13.274,1	13.356,4	13.980,4	0,62%	5,32%
Cattle raising	5.642,2	5.673,0	5.916,9	0,55%	4,87%
Other activities	3.141,4	3.158,0	3.290,2	0,53%	4,74%
MINING ACTIVITIES	62.896,0	62.921,9	63.163,3	0,04%	0,42%
INDUSTRIAL ACTIVITIES	83.831,0	84.080,4	86.203,3	0,30%	2,83%
Meat and fish	2.153,0	2.167,0	2.274,2	0,65%	5,63%
Oils and fats	1.114,0	1.126,2	1.178,4	1,10%	5,78%
Dairy products	1.356,0	1.364,9	1.430,6	0,65%	5,51%
Mill products	4.649,0	4.688,5	4.916,9	0,85%	5,76%
Coffee and threshing	773,0	773,2	809,7	0,03%	4,74%
Sugar and brown sugar	1.014,0	1.019,2	1.064,5	0,51%	4,98%
Cocoa and chocolate	602,0	604,6	631,6	0,43%	4,91%
Other food products	1.631,0	1.639,8	1.710,1	0,54%	4,85%
drinks	6.146,0	6.178,7	6.434,3	0,53%	4,69%
Tobacco	263,0	263,5	268,0	0,18%	1,89%
Rest industry	64.130,0	64.254,7	65.484,9	0,19%	2,11%
OTHER ACTIVITIES	488.462,0	489.423,3	497.047,1	0,20%	1,76%
VALUE ADDED	678.963,0	680.558,9	693.187,1	0,24%	2,09%

Source: Authors' elaboration, CGE EAFIT model.

d. An integral public policy scenario

In this scenario the effects considered in the previous simulations are summarized: reallocation of land is analyzed, dedicating 20% of the area used inefficiently in livestock to agricultural production. It is assumed that this reallocation is accompanied by effective state actions to facilitate this rearrangement, in such a way that the necessary capital for productive development is provided, and

elements of infrastructure, marketing networks and technological support that allow developing productive sectors are facilitated.

In the short-term scenario, protection is also limited to agricultural and agro-industrial sectors, seeking to generate efficiency signals that facilitate access to new markets, while maintaining minimum levels of protection, both tariff and non-tariff. In fact, the tariff is reduced to equal the industrial goods tariff average (which, in the basic calibration is 3.36%); and non-tariff barriers are reduced to the average level of non-tariff protection in the referent countries of the region (11.1%, see Table 19).

In the long-term scenario, allocation of land is optimized through the portfolio model, and the impact that reduction of barriers would have on the sectors in monopolistic competition is considered. It is assumed, in particular, that sectors to which protection is reduced experience greater competitive pressures, and that their mark-up is reduced by 30%. Results are summarized in Tables 25, 26 and 27.

The exercise gives a clear idea of the potential for growth and welfare associated with public policies that facilitate reallocation of productive resources and generate, through appropriate signals, the right incentives to develop competitive productive sectors in the international arena.

Table 25: Effects on the GDP of the integral scenario

GDP - DEMAND. THOUSANDS OF MILLION PESOS					
	base year	With Migration		Without Migration	
	(2014)	traditional	efficient	Var% trad	Var%eff
Consumption	461.690,0	477.969,2	480.225,5	3,53%	4,01%
Public spending	135.832,0	135.832,0	135.832,0	0,00%	0,00%
Investment	198.896,0	204.918,6	205.413,9	3,03%	3,28%
Exports	115.085,0	117.705,2	118.069,7	2,28%	2,59%
Imports	153.997,0	158.525,1	159.029,3	2,94%	3,27%
Total GDP	757.506,0	777.899,9	780.511,7	2,69%	3,04%

Source: Authors' elaboration, CGE EAFIT model.

Table 26: Sector effects of the integral scenario

GDP BY ACTIVITIES. THOUSANDS OF MILLION PESOS	base year (2014)	traditional	efficient	Var % trad	Var % eff
AGRICULTURAL ACTIVITIES	43.774,0	44.133,4	46773,4	0,82%	6,85%
Potential exporters	6.516,2	6.545,3	7004,9	0,45%	7,50%
Expo-intensive	10.677,5	10.692,9	11444,2	0,14%	7,18%
Importables	4.522,6	4.707,8	5136,8	4,09%	13,58%
Non-tradable	13.274,1	13.356,4	13980,4	0,62%	5,32%
Cattle raising	5.642,2	5.673,0	5916,9	0,55%	4,87%
Other activities	3.141,4	3.158,0	3290,2	0,53%	4,74%
MINING ACTIVITIES	62.896,0	62.921,9	63163,3	0,04%	0,42%
INDUSTRIAL ACTIVITIES	83.831,0	84.080,4	86203,3	0,30%	2,83%
Meat and fish	2.153,0	2.167,0	2274,2	0,65%	5,63%
Oils and fats	1.114,0	1.126,2	1178,4	1,10%	5,78%
Dairy products	1.356,0	1.364,9	1430,6	0,65%	5,51%
Mill products	4.649,0	4.688,5	4916,9	0,85%	5,76%
Coffee and threshing	773,0	773,2	809,7	0,03%	4,74%
Sugar and brown sugar	1.014,0	1.019,2	1064,5	0,51%	4,98%
Cocoa and chocolate	602,0	604,6	631,6	0,43%	4,91%
Other food products	1.631,0	1.639,8	1710,1	0,54%	4,85%
drinks	6.146,0	6.178,7	6434,3	0,53%	4,69%
Tobacco	263,0	263,5	268,0	0,18%	1,89%
Rest industry	64.130,0	64.254,7	65484,9	0,19%	2,11%
OTHER ACTIVITIES	488462,0	489423,3	497047,1	0,20%	1,76%
VALUE ADDED	678963,0	680558,9	693187,1	0,24%	2,09%

Source: Authors' elaboration, CGE EAFIT model.

Table 27: Equivalent variation. Comprehensive scenario

Home	Equivalent variation (pesos)		% Incomes		% Expense	
	Short Term	Long Term	Short Term	Long Term	Short Term	Long Term
U1	83.351	97.229	4,8%	5,6%	1,7%	1,9%
U2	145.631	170.141	4,6%	5,3%	3,5%	4,1%
U3	193.201	224.599	4,4%	5,1%	3,9%	4,5%
U4	225.729	260.815	4,1%	4,7%	3,5%	4,0%
U5	276.880	317.570	3,9%	4,5%	3,8%	4,4%
U6	321.158	368.123	3,7%	4,2%	3,7%	4,2%
U7	403.083	457.117	3,6%	4,1%	3,9%	4,4%
U8	497.974	561.398	3,4%	3,9%	3,7%	4,1%
U9	644.749	722.681	3,1%	3,5%	3,6%	4,0%
U10	1.422.088	1.569.449	2,2%	2,5%	3,4%	3,7%

Source: Authors' elaboration, CGE EAFIT model.

VI. Conclusions

Tariff and non-tariff protection have important costs for society. Allocation of resources to non-efficient uses diminishes the potential that society has for generating wealth, affecting the welfare of citizens and favoring, instead, the particular interests of those who benefit from protection at the expense of society as a whole.

Simulations carried out indicate that this cost can represent up to 1.5% of GDP, affecting poorest households up to 3.6% of their income, when considering the effects of "allocative efficiency" and the unrecoverable efficiency losses associated with the power of the protected sectors market. Of course, not every protection is inconvenient: existence of asymmetries of information in consumer markets, featuring negative externality in the discovery of markets and existence of incomplete markets, can justify in some cases the existence of tariff and non-tariff measures, limited in time. Therefore, simulation exercises incorporate partial adjustments in protection, marginally reducing tariffs, and adjusting non-tariff protection to levels observed in comparable countries in the region. The results of the simulations indicate that these adjustments are convenient, especially as the country prepares to boost agricultural production, taking advantage of the benefits arising from the peace process.

Adjustments as to tariff protection, in conjunction with careful policies to boost productivity in the agricultural sector (through actions that allow reallocating land use, improving the infrastructure of the sector, generating access to technologies and modes of efficient production, creating and strengthening adequate marketing networks, integrated into international value chains, and accessing to resources for R&D of new products, new processes and new technologies, competitive in foreign markets) should allow additional 3% GDP growth, with welfare gains equivalent to 6% of the income of the poorest households.

Thus, implementation of public policies promoting efficiency, the rational use of resources and limiting anti-competitive behaviors becomes the fundamental tool for the transformation of society, seeking to improve the welfare of citizens, reducing poverty, and generating greater equity, through generating new productive opportunities.

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