POSSIBILITIES AND PERSPECTIVES OF INTEGRATING HOUSEHOLD ANALYSIS IN CGE MODELS: THE CASE OF MEXICO

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Abstract

This paper offers a possibility of bringing household analysis into Computable General Equilibrium (CGE) modelling. In this research, the CGE model developed by the Global Trade Analysis Project (GTAP) is extended. The extended GTAP model splits private consumption into ten different household categories according to observed expenditure patterns for Mexico. The extended model is used to simulate possible effects on Mexican household categories which are carried out under three different trade liberalization scenarios.

Keywords

Trade liberalization, Mexico, poverty alleviation, household analysis, GTAP.

1   Introduction

The complexity of trade liberalization and household analysis hampers the assessment of their interdependencies through a general equilibrium model. As pointed out by WINTERS and MCCULLOCH (2004:74), there are several factors originating poverty in individual households, and even within defined groups there are huge differences in the economic circumstances of individual households. Furthermore, WINTERS and MCCULLOCH (2004:89) examine the response of households to different market adjustments. They consider the effect of liberalization on price changes as an important pathway through which trade liberalization affects the households.

A common used methodology for household analysis is known as general equilibrium simulation with post-simulation analysis. This approach uses computable general equilibrium (CGE) models in the first step of the model. In this first step, the model simulates the effects of trade scenarios on prices of commodities. The new prices obtained from the CGE model are then introduced into a second model, a micro model. In the second step the effects on income-expenditure patterns of households are simulated. In this step, it is quite common to use a national household survey to obtain income-expenditure patterns. In the paper, the

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Global Trade Analysis Project (GTAP) model is used to simulate the effects of trade liberalization on Mexican households. For this purpose the GTAP is used to generate the price changes in commodities and afterwards a GTAP model application developed previously by BROCKMEIER, 1994 is extended and applied to register changes in household expenditures among ten categories. The GTAP model application developed by BROCKMEIER creates a Social Account Matrix (SAM) framework from the GTAP data base.

The main objective of this paper is to analyze the effects of trade liberalization on expenditure patterns of ten different household categories in Mexico.

This paper has the following structure: section 2 cites some basic linkages between trade liberalization and household analysis, Section 3 describes the most important features of trade liberalization, poverty, and household structure in Mexico. Section 4 presents the theoretical framework, characteristics and some basic features of the GTAP and a SAM model, and the scenarios formulated. Section 5 presents the results and their analysis, and the sensitivity of the results to different assumptions. Finally, section 6 summarizes the main conclusions drawn from the results.

2   Trade liberalization and Household Analysis

Trade liberalization consists of reduction or removal of trade barriers. This phenomenon creates changes in national economic structures due to changes in prices of commodities. Some observed effects of trade liberalization at the national level include market rearrangement such as expansion of some markets and contraction of others. At the household level, it comprises changes in consumption patterns and in income sources. Changes in consumption patterns are caused by modifications in demand and supply of commodities, whereas changes in income sources are caused by changes in demand and supply of production factors. Household analysis provides information about different variables such as consumption behavior, income sources and accessibility to markets. These factors are either set up or influenced by policy, such as: prices, transfers, and provision of schools and clinics at the level of the individual household, and others (DEATON, 1997:185).

The adaptation process of national economies to these changes is determined among other factors by national trade policy, economic stability and competitiveness. This adaptation process is particularly difficult to establish if one of these factors is inconsistent or nonexistent, deriving negative impacts for the national economy and being reflected in poverty intensification at household level (e.g. DEININGER and OLINTO, 2000:1-28). The above authors show that for many households in Zambia a major constraint to improvements in

agricultural productivity following external trade liberalization was the absence of key productive assets.

In some studies these features have been coupled to an economic model in order to predict the effects of trade liberalization on household behavior. One representative research that follows this approach was developed by LEVINSOHN, BERRY, and FRIEDMAN (1999:1-34), who examined how the Indonesian economic crisis affected poor households in that country. The authors combined 1993 consumption data of 58100 households from the Socio Economic Indonesian Survey, along with price changes due to the crisis in 1997-1998, to compute household-specific cost-of-living changes. The salient findings show that very low income households were not insulated from the international shocks, and in fact they tend to be hurt the most. Regardless of being urban or rural, households at lower expenditure levels experience larger cost-of-living increases. Additionally, the impacts of the crisis on the consumer price are greater for urban than for rural areas, and greatest overall for the urban poor.

3.   Mexico's Situation

Poverty and Inequality in Mexico

Mexico counts as a medium-development-country and the highest developed in this category, due to the relatively high income levels (UNDP, 2004:8). Nevertheless, Mexico still has a high incidence of rural poverty (DE JANVRY and SADOULET, 2000:16). In 2003, the Technical Committee for the Poverty Measurement indicates that 56.9% of the Mexican households are classified as poor. Incidence of rural poverty is significantly higher than the incidence of urban poverty, caused by the low wages in agricultural sectors compared to the higher wages in manufacture sector. This phenomenon creates the migration of social labor to urban areas.

Poverty in Mexico continues being a serious issue, and is closely linked to high levels of social inequality. Several studies prove that Mexico also has one of the World's largest inequalities in distribution of human welfare (UNDP, 2004:63). According to National Accounts (INEGI, 2004), Mexico had a Gini coefficient of 0.46 in 2004. In an international report published by UNDP, Mexico is listed as one of the most unequal 20 countries included in the report (UNDP 2004). In 2004 the richest 10% of the Mexican households earned 36.5% of the national income, while the poorest 10% of the households earned only 1.6% of the total national income (INEGI, 2005).

Characteristics of Mexican Households

Table 1 lists the household survey data of the main income sources for Mexico. The data come from the Mexican Statistical Agency (INEGI) and are published in the National

Employment Survey (INEGI, 2005) and the National Household Income and Expenditures (INEGI, 2004).

Those households which represent the lowest income are enclosed in the decile I. Households with the highest income are enclosed in the decile X. At national level, wages are regarded as the most important source of income for all deciles. Also, 76% of the total households get 54% of the national income through wages (Table 1). This group is followed by family business (e.g. agricultural profits, fishery, manufacture, trade, services, and others), which in total accounts for 14% of national income. Furthermore, by summing up the total income of the first six household categories, it accounts only for 26.8% of the national income, the next three deciles stand for 37.6% and the decile X with the highest income, namely 35.6% of the entire income in Mexico by 2004 (table 1).

Non-monetary income sources (e.g. auto-consumption, payment in kind, barter, imputed rent) in all household categories stand for 16.7% of the total national income. Mexican households present a highly income diversity. In the same household decile individual households may present the same amount of income but having different income sources.

Table 1 Income composition in Mexico[a] (%)

		HOUSEHOLDS DECILES									
	TOTAL	I	II	III	IV	V	VI	VII	VIII	IX	X
WAGES INCOME	54 (76)	0.48 (4.80)	1.24 (6.40)	2.04 (7.57)	2.78 (7.99)	3.43 (8.04)	3.99 (7.99)	5.25 (8.30)	6.81 (8.49)	9.80 (8.80)	18.37 (8.21)
MANUFACTURE PROFIT	0.84 (4)	0.03 (0.71)	0.05 (0.59)	0.05 (0.46)	0.09 (0.48)	0.07 (0.41)	0.09 (0.42)	0.14 (0.47)	0.08 (0.28)	0.13 (0.37)	0.12 (0.19)
TRADE PROFIT	3 (12)	0.05 (0.85)	0.10 (1.16)	0.18 (1.21)	0.15 (1.29)	0.24 (1.36)	0.26 (1.39)	0.29 (1.27)	0.42 (1.33)	0.38 (1.08)	0.60 (0.87)
SERVICES PROFIT	3 (12)	0.05 (0.84)	0.12 (1.24)	0.17 (1.15)	0.22 (1.14)	0.26 (1.20)	0.36 (1.28)	0.43 (1.46)	0.45 (1.28)	0.50 (1.10)	0.68 (0.82)
AGRICULTURAL PROFIT	1 (6)	0.06 (2.22)	0.04 (0.96)	0.05 (0.75)	0.04 (0.54)	0.03 (0.44)	0.10 (0.57)	0.03 (0.29)	0.08 (0.26)	0.05 (0.19)	0.16 (0.11)
FISHERY PROFIT	1 (4)	0.016 (0.80)	0.02 (0.51)	0.06 (0.56)	0.04 (0.34)	0.04(2.7)	0.07 (0.40)	0.07 (0.26)	0.08 (0.27)	0.14 (0.27)	0.16 (0.12)
OTHER PROFITS	6 (7)	0.02 (0.67)	0.03 (0.61)	0.05 (0.45)	0.06 (0.33)	0.12 (0.42)	0.21 (0.60)	0.28 (0.61)	0.32 (0.62)	0.96 (1.22)	3.84 (1.74)
RENTAL INCOME	4 (5)	0.01 (0.25)	0.03 (0.37)	0.03 (0.36)	0.02 (0.20)	0.02 (0.28)	0.06 (0.37)	0.05 (0.33)	0.12 (0.51)	0.27 (0.92)	3.04 (1.70)
RETIREMENT	4 (11)	0.08 (0.58)	0.12 (0.75)	0.13 (0.75)	0.17 (1.02)	0.20 (1.03)	0.25 (1.11)	0.35 (1.30)	0.50 (1.70)	0.75 (1.56)	1.98 (1.88)
SUBSIDIES	1 (19)	0.15 (4.58)	0.13 (3.08)	0.12 (2.43)	0.10 (1.98)	0.11 (1.69)	0.13 (1.64)	0.00 (1.20)	0.13 (1.10)	0.1 (0.98)	0.14 (0.56)
TRANSFERS	2 (15)	0.0 1(2.2)	0.17 (2.20)	0.13 (1.56)	0.15 (1.61)	0.16 (1.37)	0.21 (1.56)	0.24 (1.44)	0.27 (1.30)	0.26 (1.08)	0.48 (1.00)
ABROAD REMITTANCES	1 (5)	0.03 (0.38)	0.10 (0.67)	0.09 (0.57)	0.12 (0.61)	0.15 (0.72)	0.18 (0.77)	0.17 (0.55)	0.30 (0.71)	0.16 (0.42)	0.34 (0.18)
OTHER INCOME SOURCES	0.04 (0.28)	0.16 (0.02)	0.11 (0.02)	0.09 (0.01)	0.07 (0.02)	0.06 (0.03)	0.06 (0.03)	0.04 (0.03)	0.04 (0.05)	0.03 (0.01)	0.02 (0.07)

AUTOCONSUMPTION	0.7 (0.18)	0.05 (2.45)	0.04 (1.43)	0.03 (1.18)	0.04 (1.12)	0.05 (1.21)	0.07 (1.50)	0.05 (1.04)	0.08 (1.16)	0.10 (1.18)	0.18 (0.81)
PAYMENT IN KIND	2 (13)	0.004 (0.15)	0.02 (0.54)	0.04 (0.78)	0.05 (1.05)	0.06 (1.19)	0.09 (1.56)	0.13 (1.68)	0.19 (2.23)	0.28 (2.23)	0.75 (2.16)
BARTER	4 (62)	0.19 (6.95)	0.25 (6.80)	0.25 (6.46)	0.30 (6.24)	0.29 (6.21)	0.36 (6.13)	0.43 (6.41)	0.53 (6.14)	0.58 (5.93)	1.14 (5.43)
IMPUTED RENT	12 (84)	0.27 (8.40)	0.41 (8.41)	0.48 (8.11)	0.60 (8.19)	0.72 (8.09)	0.89 (8.39)	1.14 (8.58)	1.30 (8.53)	1.81 (8.65)	4.76 (8.70)

[a] first value is percent of national total income, (% of total households). *Source: INEGI 2005, own calculations.*

Trade Liberalization and Mexico.

Mexico is distinguished from developing countries by its open trade policy implemented in the last decades. In 1990, Mexico signed the North American Free Trade Agreement (NAFTA) with Canada and the USA, which became effective in 1994. Thereafter, Mexico has entered into new Free Trade Agreements (FTAs) with Chile, the EU, Israel, Japan, Singapore, Nicaragua, and the Northern Triangle (El Salvador, Guatemala, and Honduras). At present, Mexico has signed more than 30 FTAs (WTO, 2002).

The Mexican economy is about to face considerable challenges in the coming years. On the one hand, Mexico must adjust its economic structure to foster the competitiveness and be able to take advantage of the signed FTAs. On the other hand, these adjustments should try to minimize the relative negative effects on low-income households.

4.   Theoretical Framework

Standard GTAP-Model

The quantitative approach used in this study to estimate the effects of trade liberalization on household welfare relies on the comparative-static multi-regional GTAP model. The model possesses a structure that is able to simulate the connection among country economies, private, intermediate and government consumption, trade and services. Since the GTAP database is designed for broad country coverage, the standard model structure presents only one representative household per region. The model is based on the Constant Difference Elasticity (CDE) demand theory to handle private household preferences. Further features of the model include perfect competition in all markets as well as profit and utility maximizing behavior of producers and consumers. All policy interventions are represented by price wedges (HERTEL, 1997:49). The data used in this study is the GTAP database version 6.2. The database consists of bilateral trade, transport, and protection matrices representing 87 country/regional economic data with 14 out of the 87 countries as composite regions, e.g.

Rest of Southeast Asia or Sub-Saharan Africa. Moreover, 57 sectors are covered including 12 agricultural primary sectors and 8 food processing sectors. The remaining sectoral part comprises services, manufacturers and other primaries. Finally, the data base also contains 5 factors: natural resources, land, capital as well as unskilled and skilled labor.

Regional and Sectoral Aggregation

In order to keep calculations as simple as possible the data base is aggregated in 4 regions and 4 main sectors (see table 2). The aggregation contains four different regions, according to their economical status: OECD countries (except Mexico, Canada and the USA), rest of NAFTA (Canada and the USA), Mexico and rest of the world (ROW). Regarding sectors, these are selected according to their economic importance for Mexican households namely food, other primary activities, manufactures and services. This aggregation facilitates a convenient overview on the consumption structure of Mexican households. The regional aggregation provides a good picture of Mexico's main trading partners.

Table 2. Aggregation of the GTAP-Database Version 6.2

Sectoral Aggregation	
Cereals	Paddy rice, wheat, cereal grains nec; processed rice.
Meat	Animal products, fishing, Meat: cattle, sheep, goats, horses; Meat products nec
Dairy prod and oils	oilseeds, raw milk, Vegetable oils and fats; dairy products
Vegetables	Vegetables, crops nec.
Sugars	Sugar cane, sugar, food products nec.
Beverages and Tobacco	Beverages and tobacco
Energy	Oil, gas, electricity, gas manufacture
Other primaries	Cattle, sheep, goats, horses; Plant based fibbers, wool, forestry, coal, petroleum, minerals, textiles
Manufactures	Wearing apparel, leather, wood pdts., paper pdts., minerals, chemical rubber, electronic and machinery equipment, industrial products
Services	Public administration, defence, health, education, services nec, air transport, construction, construction, trade, communication financial services, business services
Regional Aggregation	
OECD	Austria, Belgium, Denmark, Finland, France, Germany, United Kingdom, Greece, Ireland, Italy, Luxembourg, Japan, Australia, NZ, Sweden, Switzerland, Netherlands, Portugal, Spain, Czech Republic, Poland, Hungary, Slovak Republic
Mexico	Mexico
ROW	Cyprus, Latvia, Lithuania, Slovenia, Malta, Estonia, African regions, rest of Latin-America, XSA, XSS, ROW.
Rest of NAFTA	Canada and USA

Model Extension

BROCKMEIER (1994) developed a new GTAP application which derives the Social Accounting Matrix (SAM) for a region from the GTAP data base. This innovative GTAP extension permits to visualize all economic issues involving transactions among sectors and agents (producers, government, private households) with a high level of accuracy. However, the SAM model contains a unique regional private household. In this study the SAM model is

extended by splitting the regional private household into 10 household categories according to expenditure patterns in Mexico. This model extension involves the implementation of a new set and also a new coefficient. The new set HHCA represents the expenditure patterns of Mexican households based on calculations from the National Household's Income and Expenditure Survey 2004 (INEGI, 2004). This set is a matricial arrangement containing the expenditure share coefficients observed for each household decile spent per sector. The new coefficient HH_CAT is introduced within the data base to obtain the value of expenditures made by each household category in the different economical sectors in Mexico. HH_CAT is calculated according to changes in values of expenditures by private households for each sector regarding the HHCA. The HH_CAT new values represent the new expenditure value for each household's representative category per sector in Mexico.

Scenarios

The designed scenarios try to pursue the possible future trade liberalization changes that Mexico would undergo in the coming years. Table 3 contains the condensed information of these scenarios.

Table 3 Description of simulation scenarios

Shocks	Scenarios description		
	Scenario Imp-Exp	**Scenario Imp**	**Scenario Exp**
Imports tariffs	80% reduction all regions	80% reduction all regions	---
Export subsidies	80% reduction all regions	---	80% reduction all regions

5. Results

The results present possible effects on Mexican households when liberalizing international markets under the above mentioned circumstances. The effect on prices is assumed to be homogeneous for all household categories. The effect of prices on households presents different dimensions, depending on the household position on the market. For households who are net sellers, an increase in prices lead to an increase in their revenues, while a decrease in prices reduces their revenues. An inversely similar effect is observed on households which are net buyers. In Mexico, self-employment together with family businesses (14%) is the second income category after wages (INEGI, 2005).

5.1 Prices and demand

Change in prices brought about by full liberalization depends mainly on the extent of protection in the base line. As part of the NAFTA agreements, Mexico partially cut tariffs on agricultural products. The average tariff changed from 12 to 6 % by 2000.

Table 4 presents the percentage changes in price and demand commodities for the simulation scenarios. In scenarios *Imp-Exp* and *Imp*, prices decrease for all sectors except energy. In the case of scenario *Exp* prices also fall but in a lower extent compared with the other two scenarios; the exception in this case are the sectors of vegetables, dairy products and cereals, whose prices increase.

Turning our attention to the effects on household demand, scenario *Exp* shows reduction of demand across all considered sectors. Scenarios *Imp-Exp* and *Imp*, as in the case of prices, reveal the same trend; for these two scenarios demand would rise for all sectors but it would drop for energy and services. Among food commodities, the sector of vegetables and crops presents the higher decrease in price, however, the highest rise in demand is observed on cereals and dairy products.

The main trend for food commodities shows decreases in prices under all considered scenarios, and increasing demand under scenarios *Imp-Exp* and *Imp* (Table 4). Price and demanded quantities of food commodities are of great importance for poor households due to the high relative shares of expenditures assigned for their consumption, e.g., for the first decile food represents more than 50% of expenditures. Yet even, the energy sector reveals the highest rise in prices.

Table 4 Percentage changes in private consumption prices and private household demand for commodities in Mexico.

Sector	Scenario Imp-Exp		Scenario Imp		Scenario Exp	
	% change in price	% change in demand	% change in price	% change in demand	% change in price	% change in demand
Cereals	-4.33	0.61	-4.41	0.71	0.02	-0.08
Meat	-1.67	0.01	-1.53	0.08	-0.16	-0.06
Dairy products	-4.33	0.83	-5.15	1.2	0.4	-0.22
Vegetables	-2.07	0.11	-2.18	0.21	0.04	-0.09
Sugars	-2.6	0.28	-2.51	0.37	-0.12	-0.07
bev. tob and food prod.	-2.12	0.14	-1.98	0.21	-0.16	-0.06
Energy	0.56	-1	0.81	-0.94	-0.17	-0.08
Other prim	-2.49	0.29	-2.27	0.34	-0.24	-0.04
Manufactures	-2.66	0.37	-2.48	0.43	-0.19	-0.06
Services	-1.25	-0.2	-1	-0.15	-0.24	-0.05

Source: own calculations

5.2 Effects on Labor Wage

The effects of trade liberalization on labor wages are an important factor in the analysis of household income. By 2002, wages accounted for more than the half of total household income for 77% of Mexican households. Table 5 indicates the share of labor per household category for Mexico. Poor households depend more strongly on unskilled labor than they do on skilled labor, e.g., for decile I, 97.7% of income earned as labor wages corresponds to unskilled labor versus 2.3% for skilled wages. In contrast, more wealthy households have a major dependency on skilled labor income, e.g., for decile X, 73.6% of income earned as labor wages corresponds to skilled labor versus 26.4% for unskilled labor. Any drastic change in unskilled labor will be perceived more intensively by poor households than changes affecting skilled labor.

In all simulations, the projections suggest a decrease in labor value either as skilled or unskilled labor. Unskilled labor would comparatively worse off than skilled labor. As most of the labor coming from poor households which is categorized as unskilled, the effects of trade liberalization on wages would affect comparatively more poor households than wealthy households. These decreases in the two differentials certainly increase earnings inequality and they probably increase the inequality of the distribution of household income as well.

Table 5 Composition of income obtained from labor per decile (%).

DECILE	LABOR	
	SKILLED	UNSKILLED
TOTAL	**42.85**	**57.15**
I	2.30	97.70
II	6.16	93.84
III	9.47	90.53
IV	12.14	87.86
V	13.70	86.30
VI	18.98	81.02
VII	22.03	77.97
VII	31.51	68.49
IX	42.59	57.41
X	73.60	26.40

Source: own calculations, INEGI 2004.

Table 6 explains the effects of trade liberalization on wages. A direct effect of trade liberalization is the decrease in wages of both unskilled and skilled labor. However, wages for unskilled labor fall more than wages for skilled labor in all scenarios. In Scenario *Imp-Exp,* wages of skilled labor wages drop -1.02% against -1.23% for unskilled labor. In Scenario *Imp*, skilled labor also decrease by -0.74% against -0.98% for unskilled labor. In scenario *Exp* unskilled labor wages falls - 0.25% and for skilled labor drop by -0.27%.

Labor in Mexico is worse off in the three simulation scenarios. However, unskilled labor decreases more drastically than skilled labor.

Table 6 Percentage changes in wages labor as effects of trade liberalization in Mexico.

	Scenario Imp-Exp	Scenario Imp	Scenario Exp
Unskilled	-1.23	-0.98	-0.25
Skilled	-1.02	-0.74	-0.27

Source: Own calculations

5.3 Household Expenditures

We turn now to the expenditure patterns. Table 7 synthesizes the effects of trade liberalization on household expenditures per decile. Scenario *Imp-Exp* and *Imp* leads to a reduction in households' demand compared with the base line. In contrast, scenario *Exp* shows in some sectors constant demand, yet in other household expenditure slightly increase. Simulations show that food commodities, beverages and tobacco continue being the most important commodities in the total budget of the three poorer households.

Household's expenditure would slightly decline under *Imp-Exp* and *Imp* scenarios, yet, it must be again emphasized that income effect has not been already introduced.

Table 7 Results of trade liberalization simulations for three different scenarios

Base line scenario

Sector	I	II	III	IV	V	VI	VII	VIII	IX	X
Cereals	140	172	192	217	230	236	249	240	270	249
Meat	1188	1818	2176	2509	2701	3033	3238	3595	4111	4731
Dairy products	234	361	425	485	524	590	620	638	728	844
Vegetables	255	310	365	420	412	493	478	497	542	631
Sugars	1929	2020	2709	2500	2800	2967	3167	3743	4821	5805
bev. tob and food prod.	786	771	985	1044	1205	1298	1624	2003	2583	4774
Energy	34	58	74	89	98	117	131	161	193	348
Other prim	148	229	322	417	513	625	772	1005	1412	3118
Manufactures	1749	2886	3695	4370	4914	5707	6467	7804	9301	15313
Services	3054	4827	6512	8009	10202	13259	17245	22961	36989	97153

Scenario Imp-Exp (80% reduction in import tariffs, 80% reduction in export subsidies)

Sector	I	II	III	IV	V	VI	VII	VIII	IX	X
Cereals	132	162	181	204	216	222	235	226	254	235
Meat	1174	1796	2150	2479	2668	2996	3199	3552	4062	4675
Dairy products	224	345	406	464	501	564	593	610	696	807
Vegetables	250	304	358	412	404	484	469	487	531	618
Sugars	1886	1976	2649	2445	2739	2903	3098	3661	4716	5678
bev. tob and food prod.	771	756	967	1024	1183	1273	1593	1965	2535	4684
Energy	33	58	74	89	97	117	130	161	192	346
Other prim	143	221	311	403	495	603	745	970	1363	3010
Manufactures	1686	2782	3562	4212	4737	5501	6234	7522	8965	14761
Services	3014	4763	6425	7903	10067	13083	17016	22657	36499	95866

Scenario Imp (80% reduction in import tariffs)

Sector	I	II	III	IV	V	VI	VII	VIII	IX	X
Cereals	132	162	181	204	216	222	234	226	254	234
Meat	1176	1800	2154	2483	2673	3002	3205	3559	4069	4683
Dairy products	221	340	400	457	494	556	584	601	686	795
Vegetables	250	304	358	412	404	484	469	487	531	618
Sugars	1890	1980	2654	2449	2744	2907	3103	3667	4724	5688
bev. tob and food prod.	773	758	969	1026	1185	1276	1597	1969	2540	4694

Sector	I	II	III	IV	V	VI	VII	VIII	IX	X
Energy	34	58	74	89	98	117	131	161	193	347
Other prim	143	221	311	404	496	604	746	972	1365	3016
Manufactures	1689	2787	3569	4221	4746	5512	6246	7537	8983	14790
Services	3023	4777	6445	7927	10098	13123	17068	22725	36609	96154

Scenario Exp (80% reduction in export subsidies)

Sector	I	II	III	IV	V	VI	VII	VIII	IX	X
Cereals	140	172	192	217	230	236	249	240	270	249
Meat	1195	1828	2188	2523	2716	3049	3256	3615	4134	4758
Dairy products	240	369	435	497	536	604	635	653	745	863
Vegetables	255	310	365	421	413	494	479	498	543	632
Sugars	1929	2021	2709	2500	2800	2968	3168	3743	4822	5806
bev. tob and food prod.	785	770	985	1043	1205	1297	1623	2001	2581	4770
Energy	33	58	74	89	98	117	131	161	193	347
Other prim	148	229	321	417	512	624	771	1004	1410	3115
Manufactures	1750	2887	3697	4372	4917	5710	6470	7808	9306	15322
Services	3049	4818	6500	7994	10184	13234	17213	22919	36920	96973

Source: Own calculations

Summary

In this paper, a new methodology is developed to simulate changes in the expenditure distribution of Mexican household categories with the help of a previously developed GTAP application (BROCKMEIER, 2003).

As part of the NAFTA agreements (the main trading partner for Mexico), Mexico have already removed tariffs in most of sectors. Thus, the effect of elimination of import tariffs (scenario *Imp*) in these sectors leads to slight effects on the factors discussed in this paper. The main effects would be observed in the agricultural sector in which most of the products are still greatly protected in developed countries. The high cut in agricultural protection would generate a higher relative drop in prices. This, in turn, reduces the relative returns to factors used intensively in the agricultural sector: unskilled labor and land. The further effects are reduction in prices, which favors the increase of commodities' demand. Nevertheless, expenditure would tend to decrease slightly.

Alternatively, the effect of elimination of export subsidies (scenario *Exp*) has low effects on Mexican households. Contrary to the standard expectation for impacts of trade liberalization, prices in local market in Mexico would not increase for all commodities. One reason is that in Mexico, a few sectors receive export subsidies. In other words, the reduction of worldwide support for exports would not cause substantial effects on household welfare regarding consumption side. International market prices would increase, especially in agricultural products, which across developed countries are highly protected and at the same time consumed in developing countries. This fact is observed as a rise in local prices in cereals, vegetables and dairy products. The remaining sectors would reveal a decline in local prices.

In all simulations, the projections suggest a decrease in labor value either as skilled or unskilled labor. Unskilled labor would comparatively worse off than skilled labor. As most of the labor coming from poor households which is categorized as unskilled, the effects of trade liberalization on wages would affect comparatively more poor households than wealthy households. These decreases in the two differentials certainly increase earnings inequality and they probably increase the inequality of the distribution of household income as well.

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