

Impacts of Agricultural Trade Liberalisation on Households: The Case of Mexico

Table of Contents

Acknowledgements	i
Table of Contents	ii
List of Tables	vi
List of Figures	viii
1 Introduction	1
1.1 Problem Statement	1
1.2 Outline and Structure	3
2 Mexico's Agricultural Sector, Trade Policy and Economic Situation	5
2.1 Agricultural Production and Trade	5
2.1.1 Agricultural Production.....	6
2.1.2 Level of Technology Applied in Agriculture	9
2.1.3 Agricultural Trade	11
2.2 Economic Situation in Mexico	15
2.2.1 Poverty in Mexico	18
2.2.2 Inequality in Mexico	24
2.3 Mexican Households	25
2.3.1 Education.....	26
2.3.2 Changes in the Labour Market in Mexico.....	27
2.3.3 Informal Sector.....	29
2.3.4 Demographics.....	30
2.4 Bilateral and Multilateral Trade Agreements	31

3	Theoretical Basis: The Global Trade Analysis Project (GTAP) Model	37
3.1	Justification of Methodology	38
3.2	Graphical Overview of the Standard GTAP Model	39
3.2.1	Closed Economy without Government Interventions	39
3.2.2	Closed Economy with Taxes.....	40
3.2.3	Open Economy with Taxes	41
3.3	Equation System of the GTAP Model	42
3.3.1	Walras Law in CGE Models	43
3.3.2	Behavioural Equations in the GTAP model	45
3.3.2.1	<i>Price Equations</i>	45
3.3.2.2	<i>Producers</i>	48
3.3.2.3	<i>Regional Household and Final Demand</i>	51
3.3.2.4	<i>Global Investments</i>	58
3.3.2.5	<i>Global Transportation</i>	60
3.3.3	Macroeconomic Closure	61
3.4	Representation of Private Households in Other CGE Models	62
3.4.1	CGE Models and Household Analysis.....	62
3.4.2	CGE Models with Several Household Categories	63
3.4.3	Macro-Micro Simulation.....	68
3.4.4	Applications: Poverty Levels	71
3.4.5	Qualifications for Future Studies of CGE Models with Household Analysis	72
4	The Demand Behaviour of Household Deciles in Mexico	74
4.1	Income- and Expenditure Patterns of Households in Mexico	74
4.1.1	Household Income Sources	74
4.1.2	Households Expenditures	77
4.2	Model Specification for a Complete Household Demand System in Mexico	79
4.2.1	The Almost Ideal Demand System.....	80
4.2.2	Differences between AIDS and LA/AIDS	83
4.2.3	Data Sources for the LA/AIDS	83
4.2.4	Commodity Aggregation.....	89
4.3	A Complete Household Demand System in Mexico	90
4.3.1	Coefficients	92
4.3.2	Expenditure Elasticities.....	94
4.3.3	Uncompensated Own-price Elasticities	99

4.3.4	Uncompensated Cross-Price Elasticities	101
4.3.5	Compensated Cross-Price Elasticities	103
4.3.6	The LA/AIDS for Mexican Households	105
4.4	Development of the Household Module	106
4.4.1	Changes in Household's Expenditure Shares.....	111
4.4.2	Changes in Values of Consumption	112
4.4.3	Changes in Total Household Expenditure.....	113
5	Empirical Analysis	114
5.1	GTAP Data Base.....	114
5.2	Construction of an Input Output Table for Mexico.....	117
5.2.1	Construction of an Input Output Table for Mexico.....	119
5.2.2	Source Data	122
5.2.3	Empirical Application	123
5.2.4	Mapping between the Mexican Classification and the GTAP Concordance.....	125
5.2.5	Final Remarks on the IOT for Mexico	125
5.3	Data of Household Deciles in the Extended GTAP Framework.....	126
5.4	Sectoral and Regional Aggregation of the GTAP Data Base	129
5.5	Scenarios of the Empirical Analysis	132
5.6	Results	135
5.6.1	Trade Effects	136
5.6.1.1	<i>Decomposition of FTAs</i>	<i>139</i>
5.6.1.2	<i>Changes in Export Destinations.....</i>	<i>141</i>
5.6.1.3	<i>Changes in Exported Commodities</i>	<i>143</i>
5.6.2	Changes of Prices and Quantities of the Representative Private Household in Mexico	150
5.6.3	Changes in Household Expenditures Shares	153
5.6.3.1	<i>Changes in Expenditure Shares</i>	<i>153</i>
5.6.3.2	<i>Changes in Expenditure Shares by Deciles.....</i>	<i>157</i>
5.6.3.3	<i>Changes in Expenditure Shares by Commodities</i>	<i>163</i>
5.6.4	Welfare	169
5.7	Sensitivity Analysis.....	171
5.8	Qualifications	178

6	Summary and Conclusions	180
6.1	Summary	180
6.2	Conclusions	185
7	References	189
8	Appendices	206
	Appendix A. Abbreviations, and Elements of the GTAP model.....	206
	Appendix B. Derivation of the LA/AIDS Elasticities	214
	Appendix C. Parameters of the LA/AIDS for Household Deciles in Mexico.....	218
	Appendix D. Expenditure/Income Elasticities for Ten Households in Mexico	228
	Appendix E. Uncompensated Own-price Elasticities for Household Deciles in Mexico ..	229
	Appendix F. Marshallian and Hicksian Demand Elasticities for Household Deciles in Mexico.....	230
	Appendix G. Changes In Budget Share of Commodity i Consumed By Household h in Region r with Respect to Prices and Total Household Expenditure.	240
	Appendix H. Mexican Classification and Its Matching in the GTAP Data Base (GSC 2)	242
	Appendix I. Program to Integrate the Household Module into GTAP.....	248
	Appendix J. Description of the Trade Negotiations Underlying the Simulated Scenarios	250

List of Tables

Table 2-1 Share of total surface and total value of agricultural production by crops (2003) (%)	8
Table 2-2 Main horticultural and fruit crops produced in Mexico (2003).....	9
Table 2-3 Economic importance of agricultural and food products for Mexico and other regions (1980-2005).....	13
Table 2-4 Agricultural and food balance stock in Mexico ^a (2007) (Mio tonnes)	14
Table 2-5 Regional composition of GDP in Mexico (2004).....	16
Table 2-6 Share of population living under poverty (1996-2005) (%).....	20
Table 2-7 Composition of poverty in Mexico (1989-2004) (%).....	22
Table 2-8 Member composition of households in Mexico (2004) (%).....	23
Table 2-9 Relationship between regional economic differences and children school attendance.....	27
Table 2-10 Changes in the labour market observed in Mexican households (1984-2005).....	28
Table 2-11 Classification of activities from the informal sector	30
Table 2-12 Changes in the demographic characteristics observed in Mexican households	31
Table 2-13 Free-trade agreements (FTAs) signed by Mexico (1993-2006)	35
Table 4-1 Income distribution per household decile in Mexico (%)	76
Table 4-2 Consumption patterns household decile in Mexico (%).....	78
Table 4-3 Data sources for a complete household demand system in Mexico	84
Table 4-4 Geographical and demographic household linkages (2004).....	89
Table 4-5 Sector aggregation and its concordance with the Mexican ENIGH survey	90
Table 4-6 Preference of commodities by deciles in Mexico according to BETA _{ih} estimates.....	93
Table 4-7 Classification of commodities by household decile in Mexico according to their expenditure elasticities	97
Table 4-8 Complementarity and substitutability relationships in decile I according to uncompensated cross-price elasticities.....	102
Table 4-9 Complementarity and substitutability relationships in decile X according to uncompensated cross-price elasticities.....	103
Table 4-10 Complementarity and substitutability relationships in decile I according to compensated cross-price elasticities.....	104
Table 4-11 Complementarity and substitutability relationships in decile X according to compensated cross-price elasticities.....	105
Table 5-1 Input Output Matrix pre-commodity-tax usage values according to GTAP criteria.....	121
Table 5-2 Data sources from the INEGI for the construction of an IOT for Mexico	122
Table 5-3 Matrix of pre-commodity-tax usage values (UF).....	124
Table 5-4 Matrix of post-commodity-tax usage values (UP)	124
Table 5-5 New variables and parameters in the GTAP extension	127

Table 5-6 Country aggregation used by the simulation of scenarios.....	130
Table 5-7 Commodity aggregation of the GTAP data base.....	131
Table 5-8 Overview of scenario FTAs final Ad Valorem tariffs on agricultural imports (%)	133
Table 5-9 Overview of scenarios	134
Table 5-10 Percent changes in bilateral trade	142
Table 5-11 Changes in international export values of commodities.....	144
Table 5-12 Changes in agricultural trade balance of commodities (USD Mio)	147
Table 5-13 Changes in private consumption price for composite commodities in Mexico (%).....	151
Table 5-14 Percent changes in expenditure shares of Mexican households under scenarios	156
Table 5-15 Changes in welfare under different liberalisation conditions (USD Mio).....	170
Table 5-16 Sensitivity analysis of welfare changes in Mexico for three simulations (USD Mio)	174
Table 5-17 Sensitivity analysis of changes in household expenditures in Mexico (FTAs) (%).....	175
Table 5-18 Sensitivity analysis of changes in household expenditures in Mexico (DDA) (%)	176
Table J-1 Products set aside from the NAFTA	250
Table J-2 Percentage of duties lowering by category in food commodities in framework of the NAFTA.....	251
Table J-3 Products excluded from negotiations between the EU and Mexico	252
Table J-4 Schedule of percent cuts in frame of the EU-Mexico FTA in food commodities	253
Table J-5 Classification of representative products to be liberalised	254
Table J-6 Exceptions from trade liberalisation between Japan and Mexico	256
Table J-7 Classification of representative products to be liberalised (%)	256
Table J-8 Elements of the Falconer proposal for the Market Access for the WTO Negotiations	258

List of Figures

Figure 2-1 Value of the agricultural production in Mexico (2003)	7
Figure 2-2 Geographic zones in Mexico	18
Figure 3-1 Closed economy without government interventions.....	40
Figure 3-2 Closed economy with taxes	41
Figure 3-3 Open economy with taxes.....	42
Figure 3-4 Graphic representation of production in GTAP.....	49
Figure 3-5 Graphic representation of final demand in GTAP	52
Figure 4-1 Monthly consumption per deciles in Mexico (2005).....	79
Figure 4-2 Matching food expenditures and geographical position of household deciles	87
Figure 4-3 Expenditure elasticities for food groups in Mexico and for Mexican households.....	94
Figure 4-4 Uncompensated own-price elasticities for food groups in Mexico and for Mexican households	100
Figure 5-1 General Format of an IOT	118
Figure 5-2 Sequential implementation of scenarios	135
Figure 5-3 Percent changes of exports by regions under three different simulations.....	137
Figure 5-4 Disaggregation of effects in scenario FTAs regarding changes in global exports.....	140
Figure 5-5 Changes in expenditure shares of decile II in Mexico under three scenarios	159
Figure 5-6 Changes in expenditure share of decile IV in Mexico under three scenarios	160
Figure 5-7 Changes expenditure shares of decile VI in Mexico under three scenarios.....	162
Figure 5-8 Changes in expenditure shares of in decile VIII in Mexico under three scenarios.....	163
Figure 5-9 Change in expenditure share of cereals across deciles under three scenarios.....	165
Figure 5-10 Change in expenditure share of vegetables across deciles under three scenarios.....	166
Figure 5-11 Change in expenditure share of dairy products across deciles under three scenarios.....	168
Figure 5-12 Change in expenditure share of meat across deciles under three scenarios.....	169

1 Introduction

1.1 Problem Statement

The current economic development in Mexico raises questions of growing concern among Mexican policy makers regarding the effects of agricultural trade policies on income and the distribution of welfare. It is important to analyse how upcoming agricultural trade agreements and national policies will affect households in Mexico. The effects of agricultural trade liberalisation on Mexican households are important, particularly when considering that in Mexico a third of households depend mostly upon the agricultural sector (INEGI, 2005a). This dependency is manifold and difficult to identify for agricultural wage earners, self consumers, net consumers and net producers. Households engaged in agricultural activities and self-consumption are not influenced directly by fluctuations in commodity market prices as households with different income sources are (RUBIO and SOLOAGA, 2004). However, for low-income households who do not produce but consume agricultural products, the price changes severely affect their budget expenditures (RUBIO and SOLOAGA, 2004). Households consuming and supplying in local markets represent a third case. Accordingly, the effects of fluctuations are variable and depend on other household characteristics. Some of these preferences will be investigated in household demand analysis.

Thus, the importance of identifying the impact of agricultural trade liberalisation on different household types is a critical issue, which must be accounted for in the design of trade policies, either to implement preventive measures within trade agreements such as the setting of sensitive products or to implement national strategies to support disadvantaged households.

It is also of particular interest to investigate to what extent agricultural trade liberalisation will promote or hinder the alleviation of poverty at the household level. Since nearly one third of the Mexican population is considered to be extremely poor, this question is especially important in Mexico (COMITÉ TÉCNICO PARA LA MEDICIÓN DE LA POBREZA, 2005). No upcoming economic policy should ignore the effects on this segment of the population in the final trade negotiations. Furthermore, there is a need for approaches that reliably forecast the effects of trade liberalisation on household expenditure patterns.

The study of the effects of trade liberalisation on different household types has not yet been completely explored. Research is either focused on the effects of trade liberalisation on macroeconomic factors or on the effects of domestic macroeconomic changes on different household types. However, research on the related effects of trade liberalisation on household expenditures and income levels is rather scarce. A key reason for this is the lack of