A poverty module of the MIRAGE model of the world economy

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Very preliminary draft – do not quote

Abstract

The objective of this paper is to develop a poverty module of the MIRAGE model of the world economy. A new version of this model will be developed and progressively enriched with disaggregation of households into 50-500 strata (depending on the economic characteristics of the developing country and the quality of household survey) in some developing countries. In these countries, the model will disaggregate the representative household into up to 50-500 households by country, characterized by exogenous criteria like geographic place of residence, qualification and gender of the household's head, (private vs. public or agriculture vs. industry vs. services) sector of activity… The sources of income and consumption structure will strictly reflect disaggregated statistical information coming from households' surveys. The new model will also better capture the behavior of the public agent in terms of revenues collected and in terms of expenditures. This new version of MIRAGE will allow studying the impact of various policy shocks and identifying which households are expected to win, which households are expected to lose and why, while taking into account the reaction of households to these shocks. This version will be dynamic and will model the long term evolution of the various strata of households. It will be possible for example to introduce endogenous changes in the composition of strata (for example rural/urban migration thanks to an augmentation of the non agricultural/agricultural unskilled labor remunerations ratio or augmentation of highly qualified strata thanks to an augmentation of the skilled labor/unskilled labor remunerations ratio…) and/or transfers between households belonging to different strata (for example transfers from urban households to rural households).

Keywords: CGE modeling, poverty, trade liberalization, households survey

JEL classification: F11, F17, O19

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1 Introduction

Poverty in developing countries can be directly impacted (either negatively or positively) by international shocks at the worldwide level, such as climate change, financial crises, volatility of world food prices, major trade agreements, large domestic policies in rich countries (e.g. agricultural domestic support, biofuel mandates…). It is therefore important to develop a consistent and detailed modeling instrument that allows understanding how poverty in developing countries reacts to these different shocks. This instrument has to be economically consistent, it has to tackle the economic mechanisms that lead to international transmission of major shocks and it has to provide a detailed representation of the characteristics of poverty in developing countries. Even when multiregional general equilibrium models allow analyzing the impact at a macro level, the effects on poverty are not fully captured.

Reviewing the various methodologies for estimating the poverty impact of trade liberalization, Hertel and Reimer (2002) makes a distinction between four methodologies:

i) Cross country regression analysis
ii) Partial equilibrium and /or cost of living approaches
iii) General equilibrium analysis
iv) Micro-macro synthesis which links a model with micro-level data.

As already underlined by Winters et al. (2003) the channels of trade on poverty are : a) price and availability of goods ; b) factor prices, income and employment : c) government transfers ; d) incentives for investment and innovation that affects long term growth ; e) external shocks and in particular changes in terms of trade ; f) short run risks and adjustements costs.

The evolution of factor prices, income and employment is of highest importance thanks to strong specialization of individuals in terms of source of revenue while utilization of revenue, across commodities and savings is much more diversified and also thanks to an amplification effect, theoretically proven, but not clearly proven from an empirical point of view.

Based on cross country analysis Dollar and Kray have recently shown that globalizers have a higher rate of growth than non-globalizers. Based on econometrics results obtained through this method are more general than results obtained through a Computable General Equilibrium (CGE) analysis, but it cannot offer a counterfactual analysis and provide results on the impact of a policy shocks on numerous economic variables.

The cost of analysis approaches are simple but they underestimate the potential effects as they focus on consumption effects.

CGE analysis are undertaken either under a representative agent hypothesis (the average income and total income are endogenous while the moments of the distribution are exogenous), or under a microsimulation. Under such approaches a full household survey can be included in the model and the

behaviour of many agents is analyzed (Cogneau and Robillard). But this kind of approach is costly in terms of data and results are difficult to synthetize.

Top-down approaches are based on CGE models of which results are implemented in a household survey. This is a very practical option but it is not completely satisfactory as it does not account for the reaction of agents to price variations.

The objective of this paper is to develop a poverty module of the MIRAGE model of the world economy in an integrated framework with a bottom-up approach. A new version of this model is developed and it will progressively enriched with disaggregation of households into 50-500 strata (depending on the economic characteristics of the developing country and the quality of household survey) in some developing countries. Herein we develop a model with households disaggregation starting with three developing countries: Uruguay, Malawi and Nepal. In these countries, the model disaggregates the representative household into up to 50-500 households by country, characterized by exogenous criteria like geographic place of residence, qualification and gender of the household's head, (private vs. public or agriculture vs. industry vs. services) sector of activity… The sources of income and consumption structure strictly reflect disaggregated statistical information coming from households' surveys (see the right box on next Figure 1). Moreover, the new model better captures the behavior of the public agent in terms of revenues collected and in terms of expenditures.

This new version of MIRAGE allows studying the impact of various policy shocks and identifying which households are expected to win, which households are expected to lose and why, while taking into account the reaction of households to these shocks.

This version is dynamic and will model the long term evolution of the various strata of households. It will be possible for example to introduce endogenous changes in the composition of strata (for example rural/urban migration thanks to an augmentation of the non agricultural/agricultural unskilled labor remunerations ratio or augmentation of highly qualified strata thanks to an augmentation of the skilled labor/unskilled labor remunerations ratio…) and/or transfers between households belonging to different strata (for example transfers from urban households to rural households).

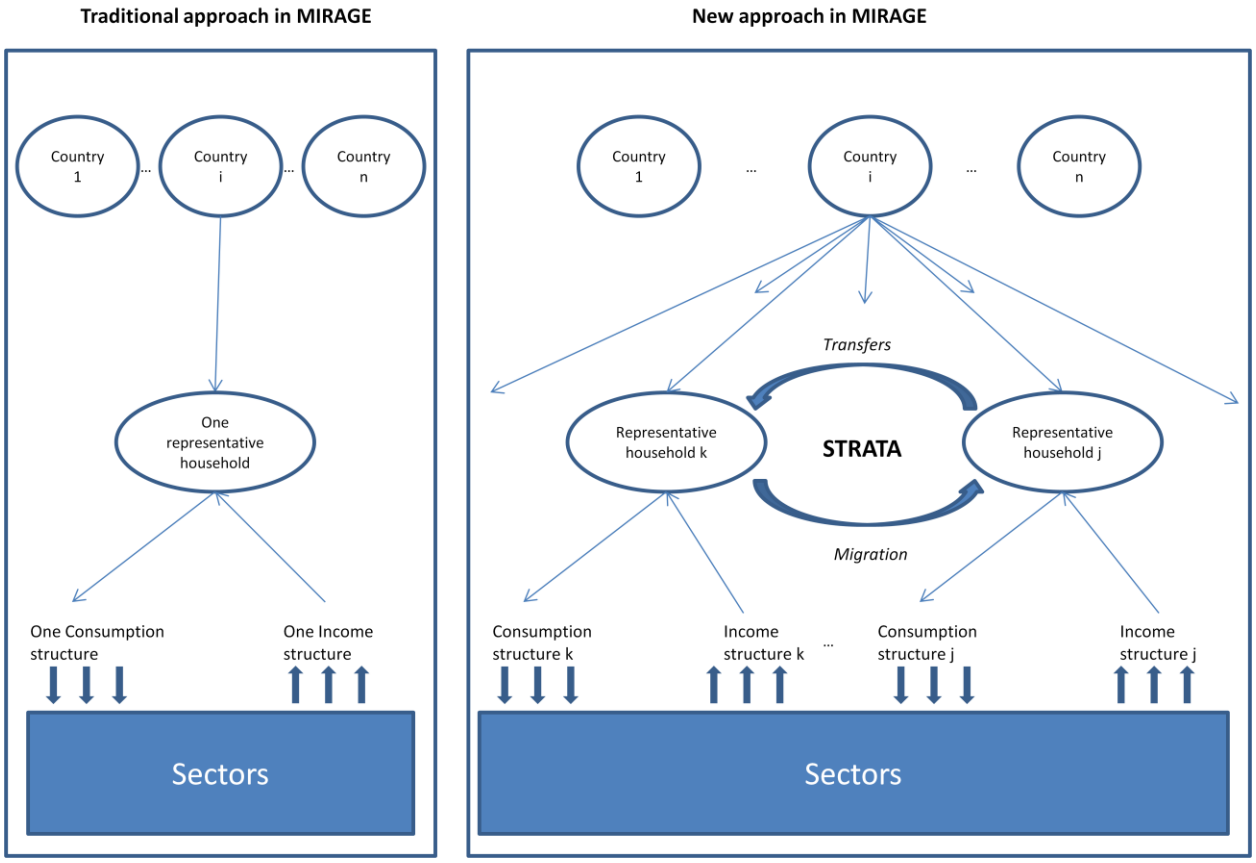
A systematic procedure is developed to reconcile disaggregated statistical information coming from households' surveys and the GTAP database. This allows a large flexibility in order to add countries to the scope of study. Interestingly, we do not limit this procedure to disaggregate GTAP data but also to enhance them on specific issues (VA split…).

This new version of MIRAGE will allow studying the impact of various policy shocks and identifying which households are expected to win, which households are expected to lose and why, while tacking the reaction of households to these shocks. This will represent a considerable improvement of the MIRAGE model. This version will be dynamic and will model the long term evolution of the various strata of households.

This is a long term project and this paper will provide a first step in this process. In this first step, we will simulate full trade liberalization. As various studies have already evaluated the potential impact of full

trade liberalization on poverty, this exercise will allow comparing these first results to results from past studies.

Figure 1. A new approach to tackling distributional impacts of trade shocks.



2 The poverty module

2.1 The public agent

Until now, the MIRAGE model is based on a representative agent who receives income from production activities and also tax receipts (taxes on consumption, taxes on imports, taxes on production and taxes on exports). He spends a constant share of its income (epa(r) ; r for country r) in savings which finances investment while the rest of income is spent on final consumption (BUDC(r)).

This representative agent has CES – LES preferences on all goods and these preferences define his demand for each good (C(i,r); i for good i). Therefore C(i,r) represents private and public final consumption.

The budget closure implies that this representative agent can be in deficit or in surplus and thus can be financed by or finance the rest of the world but this deficit/surplus is constant as a share of world GDP (which allows for some flexibility even if it is limited).

Figure 2. The representative agent in the traditional version of MIRAGE.

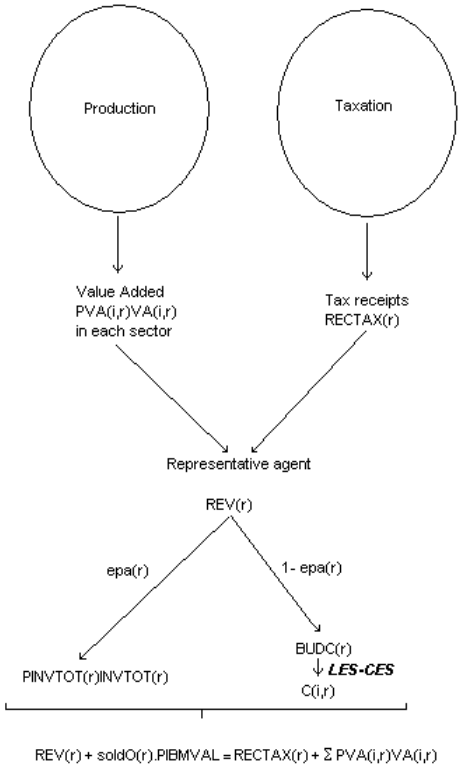


Figure 2 illustrates these assumptions.

In this new version of MIRAGE we differentiate a public agent from a private agent. While the latter receives income from production activities, the former receive income from taxation (RECTAX(r)).

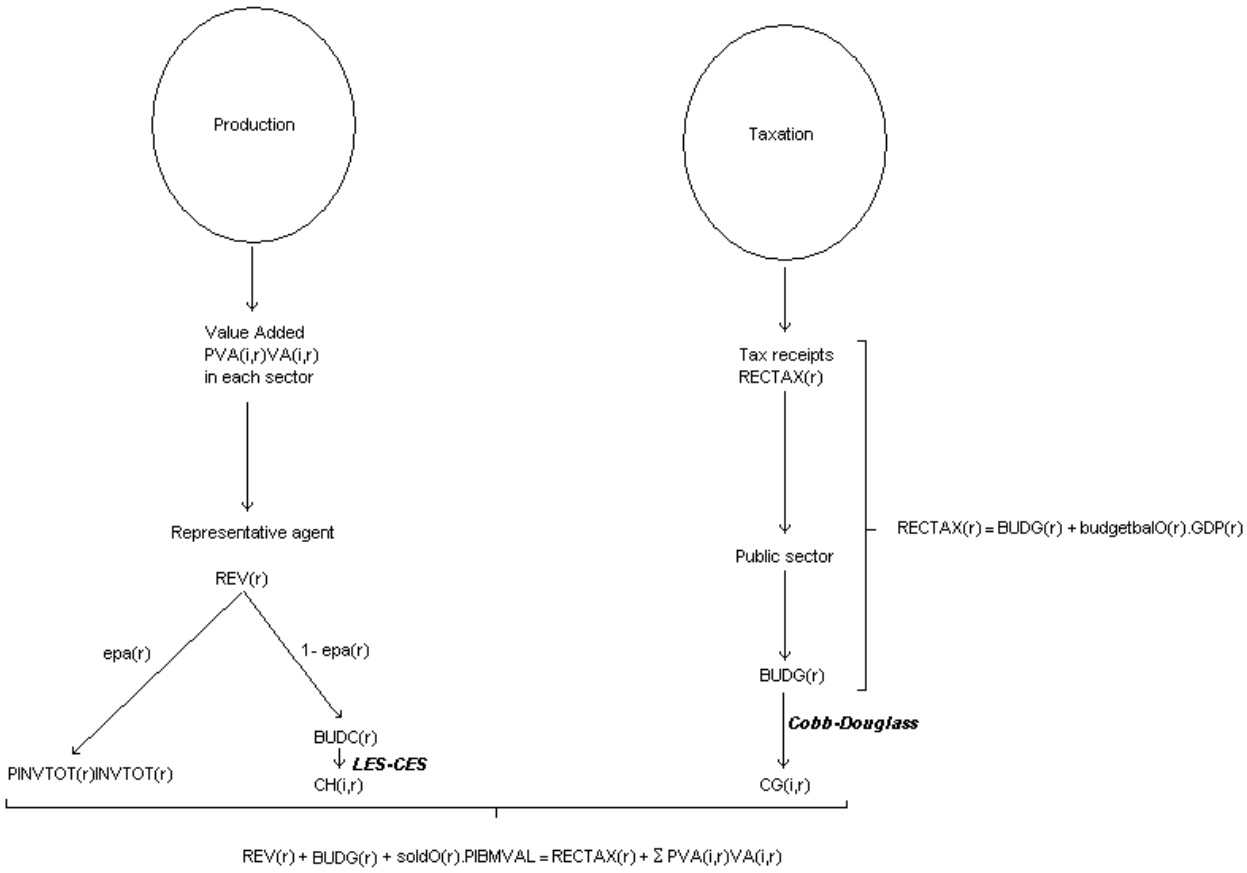
The private agent has still CES – LES preferences on all goods but now these preferences define private final demand for each good (CH(i,r); i for good i).

The public agent has Cobb Douglass preferences which implies that the share of public consumption of sector i (CG(i,r)) in total public expenditures (BUDG(r)) is constant in value. Finally the consumption tax on public expenses is the same as for the private consumption (taxcc(i,r)). The public agent can spend more (public deficit) or less (public surplus) than tax receipts but this difference remains constant in proportion of country r's GDP.

C(i,r) represents total final consumption with C(i,r)= CG(i,r)+ CH(i,r).

Figure 3 illustrates these new assumptions.

Figure 3. The representative agent in the new version of MIRAGE.



Therefore we get the following equations (with traditional MRAGE annotations – see Decreux and Valin, 2007):

$$PC(i,r)CG(i,r) = \alpha\_g(i,r)BUDG(r) \quad (1)$$

$$C(i,r) = CH(i,r) + CG(i,r) \quad (2)$$

$$CH(i,r) - cmin(i,r) = a\_C(i,r)AUX(r)\left(\frac{P(r)}{PC(i,r)}\right)^{\sigma\_C} \quad (3)$$

$$P(r)AUX(r) = \sum_i PC(i,r)\,(CH(i,r) - cmin(i,r)) \quad (4)$$

$$BUDC(i,r) = \sum_i PC(i,r)CH(i,r) \quad (5)$$

$$RECTAX(r) = BUDG(r) + budgbalO(r).\left[\sum_i PVA(i,r)\,VA(i,r)\right] \quad (6)$$

$$REV(r) + BUDG(r) + soldO(r)PIBMVAL = RECTAX(r) + \sum_i PVA(i,r)\,VA(i,r) \quad (7)$$

Equation (1) describes the Cobb-Douglass allocation of public expenses with $\sum_i \alpha\_g(i,r) = 1$. Equation (2) computes total final consumption. Equation (3) describes the LES-CES allocation of private final consumption. Equation (4) calculates the price associated to private utility. Equation (5) describes the

private consumer's budget. Equation (6) is the budget closure of public agent. Finally equation (7) describes the macroeconomic closure for country r.
It is noteworthy that from equations (1) to (6), it is possible to draw equation (7) with the help of other (unchanged) equations of MIRAGE : therefore Walras's law is still respected.

2.2 Households' behavior

Instead of having a single household by country, we define a subset rh(r) of countries r where households are disaggregated into nh(rh) strata; for example there are 95 strata in Uruguay distinguished by geographical location of residence, main source of income of the household, education of main income earner of the household and gender of main income earner of the household .

Let us call $CHh_{hh,i,r}$ the final consumption of commodity i per household in stratum hh in country r , $cminh_{hh,i,r}$ the parameter measuring minimal consumption of commodity i per household in stratum hh in country r , $AUXh_{hh,r}$ the utility of the representative household of stratum hh in country r, $PUh_{hh,r}$is the shadow price of utility of the representative household of stratum hh in country r. As the utility functional form of all households from different strata are CES-LES, we have :

$$CHh_{hh,i,r} - \ cmin_{hh,i,r} = ah\_C_{hh,i,r} AUXh_{hh,r} \left(\frac{PUh_{hh,r}}{PC_{i,r}}\right)^{\sigma\_C(r)} \quad (8)$$

$$PUh_{hh,r} AUXh_{hh,r} = \sum_i PC_{i,r}\left(CHh_{hh,i,r} - \ cmin_{hh,i,r}\right) \quad (9)$$

$$BUDCh_{hh,r} = \sum_i PC_{i,r} CHh_{hh,i,r} \quad (10)$$

In a country rh with households disaggregation total final demand for commodity i is:

$$\sum_{hh} Pop\_hh_{hh,r} CHh_{hh,i,r} + CG_{i,r} = \ C_{i,r} \quad (11)$$

with $Pop\_hh_{hh,r}$ the stratum hh's population. In country r household hh receives transfers $TRANSFh_{hh,r}$ from governments that we hold constant relatively to Gross Domestic Product :

$$\frac{TRANSFh_{hh,r}}{TRANSFhO_{hh,r}} = \frac{\sum_i PVA_{i,r} VA_{i,r}}{\sum_i PVAO_{i,r} VAO_{i,r}} \quad (12)$$

where $TRANSFhO_{hh,r}$ is initial government's tranfer to representative household of stratum hh (of course this hypothesis can be modified and various indexation of transfers can be assumed).

In a country with disaggregation of households the government's budget becomes :

$$RECTAX_r + \sum_{hh} ITO_{hh,r} Pop\_hh_{hh,r}\left(REVh_{hh,r} + TRANSFh_{hh,r}\right) = budgbal_r \sum_i PVA_{i,r} VA_{i,r} + BUDG_r + \sum_{hh} Pop\_hh_{hh,r} TRANSFh_{hh,r} \quad (13)$$

Where $ITO_{hh,r}$ is the (constant) income tax applied on stratum h's households.

In a country with disaggregation of households the total revenue of households is :

$$REV_{rh} = \sum_{hh} Pop\_hh_{hh,rh}\left(1 - ITO_{hh,rh}\right)\left(REVh_{hh,rh} + TRANSFh_{hh,rh}\right) \quad (14)$$

In a country rh, if $epah_{hh,rh}$is the saving rate of household hh, the final consumption budget of an household hh is:

$$BUDCh_{hh,rh} = \left(1 - epah_{hh,rh}\right)\left(1 - ITO_{hh,rh}\right)\left(REVh_{hh,rh} + TRANSFh_{hh,rh}\right)$$

And the total budget for households' final consumption is:

$$BUDC_r = \sum_{hh} Pop\_hh_{hh,r} BUDCh_{hh,r} \quad (15)$$

In a country with disaggregation of households the investment-savings equilibrium is:

$$\sum_{hh} epah_{hh}\, Pop\_hh_{hh,r}\left(1 - ITO_{hh,rh}\right)\left(REVh_{hh,rh} + TRANSFh_{hh,rh}\right) = \sum_{i,s} PINVTOT_s INV_{i,r,s} \quad (16)$$

with $INV_{i,r,s}$ the investment by country r in sector I of country s and $PINVTOT_s$ a composite price of this investment.

2.3 The dynamics of inter-strata households' migration

3 The data

This section is aimed at presenting how disaggregation of households has been carried out in this poverty module of the MIRAGE model. If the SAM is to be used to explore issues related to income distribution then the household account is to be broken down into a number of relatively homogeneous household groups reflecting the socioeconomic characteristics of the country or region under consideration (Decaluwe et al, 1999). According to these authors, there are many different criteria to disaggregate households in a SAM: location (e.g. rural vs. urban); asset ownership (particularly land ownership in the rural areas and human capital in urban areas); characteristics of the head or main earner, distinguishing by main employment status, main occupation, main branch of industry and educational attainment, sex, main language, race (tribal) kinship.

3.1 Disaggregation of Uruguayan households

For the Uruguayan case, some of these criteria are adequate and some not. For example, race and main language are not relevant variables. In spite of being an agriculture exporting country, rural population is very scarce, and is not composed by small farmers as in other agriculture oriented countries. Therefore, the criteria used to decompose Uruguayan household are the following:

1) Geographical location and population of cities. Half the population in Uruguay lives in the capital city, Montevideo. One of the most relevant features of a household's geographical location is whether it lives in Montevideo or the rest of the country (which called "Interior"). For example, poverty lines are different for Montevideo and Interior. Another important characteristic, from population living in urban areas in the rest of the country, is if they live in cities with more or less than 5,000 inhabitants. Finally, the rural/urban division is important, especially for the rest of the country.

2) Main source of income of the household. For Uruguayan households, there are four main income sources: dependant labor, autonomous labor, capital (property) and transfers.
3) Education of main income earner of the household. Three skill levels by years of schooling are relevant for Uruguay (considering the characteristics of the Uruguayan labor market): up to 8 years of schooling (unfinished basic education), between 9 and 11 years of schooling (finished basic education), and 12 or more years of schooling (complete secondary education and university studies).
4) Sex of main income earner of the household. Labor market in Uruguay is segmented by gender, and there is evidence of gender discrimination (lower wages, glass ceiling, segregation).

Data. In order to disaggregate Uruguayan household we used the Income and Expenditure Survey (IES) 2005-2006 carried out by the Statistics National Institute (INE). This survey is representative of the entire population of Uruguay and includes information of income (all member of the household), personal characteristics and income of all members of the household and detailed information about expenditures of the household. The INE also carries out yearly a Continuous Household Survey. However, until 2005 the survey is not representative of the entire population (rural population is excluded from the sample), and it does not include information on expenditures.

Following the criteria previously discussed, we performed 4 levels of disaggregation:

1) First, we divided the sample in five groups: i) Montevideo urban; ii) Montevideo rural; iii) Rest of the country urban cities with more than 5,000 inhabitants; iv) Rest of the Country urban cities with less than 5,000 inhabitants; v) Rest of the Country rural.
2) Then, we divided each of those groups in four groups according to main source of household income: dependant labor (employed workers), autonomous labor (self-employed), capital (rents) and transfers (pensions, social security, etc).
3) Third, we consider the education of main income earner of the household. As explained, we considered three skill levels according to years of schooling: unskilled (8 or less years of schooling); medium-skilled (between 9 and 11 years of schooling) and skilled (12 or more years of schooling).
4) Finally, we considered the sex of the main income earner of the household.

Applying these four levels, we came up with 109 household groups. Some groups weight more in total population (table 1). The household type that weights more is the households located in Montevideo (urban areas), with labor as main income source and with medium skilled male main income earner (5.15% of population). At the opposite side, rural household located in the rest of the country, with capital as main income and unskilled female as main income earner represent only 0.01% of population. Some groups are not represented at all in the survey sample, as for example skilled female headed households located in rural areas in Montevideo with labor as main income.

As it was expected, households with highest mean monthly income are located in Montevideo urban, are skilled male headed and their main source of income is capital. On the other extreme, household with lowest income are in Montevideo in rural areas, are unskilled female headed households and their main source of income is self-employed income.

Table 1. Final disaggregation of households in Uruguay and some of their socio-economic characteristics

Household	Percent of total households	Mean monthly income (current US dollar)	Mean monthly per capita income (current US dollar)	Poor	Mean share of food in total expenditure of the household	Mean saving rate
Montevideo urban labor income medium skilled male headed	5.15	990	338	N	0.24	0.23
RoC rural labor income unskilled male headed	4.86	537	213	N	0.32	0.23
RoC urban (big cities) labor income medium skilled male headed	4.76	711	226	N	0.27	0.16
RoC urban (big cities) transfers income unskilled female headed	4.03	274	160	N	0.29	0.17
RoC urban (big cities) labor income unskilled male headed	3.85	539	166	N	0.30	0.20
RoC rural self-employed income unskilled male headed	3.61	660	241	N	0.31	0.12
Montevideo urban transfers income unskilled female headed	3.30	377	246	N	0.27	0.16
RoC urban (big cities) transfers income unskilled male headed	3.23	367	170	N	0.32	0.15
RoC urban (small cities) labor income unskilled male headed	3.17	482	145	N	0.32	0.21
Montevideo urban labor income skilled female headed	3.04	1,367	617	N	0.15	0.19
RoC urban (small cities) transfers income unskilled female headed	3.02	241	145	N	0.31	0.13
Montevideo urban labor income skilled male headed	3.00	2,029	697	N	0.14	0.26
Montevideo urban transfers income medium skilled female headed	2.87	593	378	N	0.21	0.15
Montevideo urban labor income medium skilled female headed	2.77	818	329	N	0.22	0.14
Montevideo urban transfers income unskilled male headed	2.49	482	229	N	0.29	0.15
RoC urban (small cities) transfers income unskilled male headed	2.40	338	166	N	0.33	0.14
RoC urban (small cities) labor income medium skilled male headed	2.33	631	191	N	0.29	0.10
RoC urban (big cities) labor income medium skilled female headed	1.93	624	239	N	0.25	0.12
RoC urban (big cities) self-employed income medium skilled male headed	1.91	711	255	N	0.26	0.07
Montevideo urban labor income unskilled male headed	1.81	591	201	N	0.30	0.22
Montevideo urban transfers income medium skilled male headed	1.72	846	390	N	0.20	0.06
Montevideo urban transfers income skilled female headed	1.68	967	601	N	0.15	0.11
Montevideo urban self-employed income medium skilled male headed	1.66	1,381	444	N	0.22	0.19
RoC rural transfers income unskilled male headed	1.58	298	160	N	0.34	0.14
RoC urban (big cities) transfers income medium skilled female headed	1.52	382	202	N	0.27	0.16
RoC rural labor income medium skilled male headed	1.51	662	256	N	0.27	0.19
RoC rural self-employed income medium skilled male headed	1.46	1,197	422	N	0.23	0.11
RoC urban (big cities) self-employed income unskilled male headed	1.34	460	157	N	0.32	0.12
Montevideo urban labor income unskilled female headed	1.24	449	198	N	0.30	0.18
RoC urban (small cities) self-employed income unskilled male headed	1.24	377	144	N	0.32	0.10

Montevideo urban self-employed income skilled male headed	1.19	2,033	807	N	0.14	0.07
Montevideo urban transfers income skilled male headed	1.01	1,300	614	N	0.17	0.12
RoC rural transfers income unskilled female headed	0.98	279	164	N	0.30	-0.05
RoC urban (big cities) labor income skilled female headed	0.95	1,100	352	N	0.20	0.11
RoC urban (big cities) labor income unskilled female headed	0.95	463	155	N	0.32	0.17
RoC urban (big cities) transfers income medium skilled male headed	0.87	440	214	N	0.27	0.24
RoC urban (small cities) self-employed income medium skilled male headed	0.80	562	210	N	0.29	-0.03
RoC urban (small cities) transfers income medium skilled female headed	0.78	287	177	N	0.26	0.14
Montevideo urban self-employed income unskilled male headed	0.77	432	149	Poor	0.39	0.11
RoC urban (big cities) labor income skilled male headed	0.75	1,316	517	N	0.20	0.17
RoC urban (small cities) labor income medium skilled female headed	0.70	504	188	N	0.31	0.09
RoC urban (small cities) labor income unskilled female headed	0.68	425	160	N	0.30	0.20
Montevideo urban self-employed income medium skilled female headed	0.65	749	306	N	0.24	0.05
RoC rural self-employed income unskilled female headed	0.51	536	256	N	0.34	0.25
RoC urban (small cities) transfers income medium skilled male headed	0.50	404	184	N	0.28	0.14
Montevideo urban self-employed income skilled female headed	0.47	1,627	616	N	0.12	0.11
RoC urban (big cities) self-employed income medium skilled female headed	0.47	432	197	N	0.27	0.22
RoC urban (small cities) self-employed income medium skilled female headed	0.40	681	242	N	0.31	0.16
RoC urban (big cities) self-employed income skilled male headed	0.36	1,363	441	N	0.19	0.00
RoC urban (big cities) transfers income skilled female headed	0.36	715	430	N	0.22	0.20
RoC urban (big cities) self-employed income unskilled female headed	0.36	619	218	N	0.25	0.32
RoC rural labor income unskilled female headed	0.34	420	174	N	0.38	0.21
RoC urban (small cities) labor income skilled female headed	0.31	925	333	N	0.21	0.14
RoC urban (big cities) self-employed income skilled female headed	0.31	916	425	N	0.16	-0.08
Montevideo rural labor income unskilled male headed	0.30	539	110	Poor	0.31	0.23
RoC urban (small cities) self-employed income unskilled female headed	0.28	457	182	N	0.27	0.10
Montevideo urban self-employed income unskilled female headed	0.28	395	160	N	0.31	0.12
Montevideo urban capital income medium skilled female headed	0.26	1,438	908	N	0.15	0.29
RoC rural labor income medium skilled female headed	0.24	617	203	N	0.29	0.12
RoC rural self-employed income skilled male headed	0.21	1,605	803	N	0.15	0.25
RoC urban (big cities) transfers income skilled male headed	0.21	1,238	547	N	0.19	0.12
RoC rural labor income skilled male headed	0.21	1,177	444	N	0.23	0.31
Montevideo urban capital income skilled female headed	0.20	1,152	787	N	0.10	-0.07
Montevideo urban capital income unskilled male headed	0.18	1,029	506	N	0.15	0.28
RoC urban (small cities) labor income skilled male headed	0.17	902	323	N	0.18	0.17
RoC rural self-employed income medium skilled female headed	0.16	1,099	539	N	0.19	0.15
RoC urban (big cities) capital income medium skilled female headed	0.16	703	307	N	0.21	0.01
Montevideo rural labor income medium skilled male headed	0.16	595	229	N	0.25	0.12
Montevideo urban capital income medium skilled male headed	0.14	1,327	786	N	0.16	0.11
RoC rural labor income skilled female headed	0.14	863	268	N	0.15	-0.23
RoC rural transfers income medium skilled male headed	0.14	855	320	N	0.29	0.25

RoC urban (small cities) self-employed income skilled male headed	0.14	739	261	N	0.22	-0.04
RoC rural transfers income medium skilled female headed	0.14	514	224	N	0.24	0.16
Montevideo rural transfers income unskilled male headed	0.14	443	178	N	0.28	0.22
Montevideo rural self-employed income medium skilled male headed	0.13	833	163	N	0.30	0.18
RoC urban (small cities) transfers income skilled male headed	0.11	905	413	N	0.29	0.24
RoC urban (big cities) capital income unskilled male headed	0.11	641	316	N	0.15	0.14
RoC urban (small cities) transfers income skilled female headed	0.11	402	286	N	0.28	0.13
RoC rural capital income unskilled male headed	0.10	1,460	794	N	0.24	0.65
Montevideo urban capital income unskilled female headed	0.10	1,128	364	N	0.23	0.33
Montevideo rural labor income medium skilled female headed	0.10	625	231	N	0.27	0.13
Montevideo rural self-employed income unskilled male headed	0.10	390	110	Poor	0.40	0.01
RoC urban (big cities) capital income medium skilled male headed	0.09	1,093	415	N	0.15	0.38
RoC urban (small cities) capital income medium skilled male headed	0.09	975	287	N	0.19	-0.14
Montevideo rural transfers income medium skilled male headed	0.09	455	188	N	0.29	0.07
Montevideo rural transfers income unskilled female headed	0.09	437	162	N	0.27	0.02
Montevideo urban capital income skilled male headed	0.07	4,141	1,670	N	0.08	0.25
RoC rural capital income medium skilled male headed	0.07	2,015	848	N	0.17	0.37
RoC urban (small cities) capital income unskilled male headed	0.07	1,263	380	N	0.31	0.38
RoC rural self-employed income skilled female headed	0.07	1,160	336	N	0.18	0.09
RoC urban (big cities) capital income unskilled female headed	0.07	467	346	N	0.16	0.30
Montevideo rural labor income unskilled female headed	0.07	300	101	Poor	0.32	0.10
RoC rural transfers income skilled male headed	0.06	616	308	N	0.19	0.34
RoC urban (small cities) self-employed income skilled female headed	0.06	582	154	N	0.27	0.00
RoC rural capital income skilled male headed	0.04	1,592	839	N	0.11	0.20
RoC urban (big cities) capital income skilled female headed	0.04	1,213	424	N	0.18	0.34
RoC urban (small cities) capital income unskilled female headed	0.04	572	476	N	0.12	-0.09
RoC urban (small cities) capital income skilled female headed	0.04	485	485	N	0.21	0.11
RoC urban (small cities) capital income skilled male headed	0.03	1,813	1,283	N	0.11	0.21
RoC rural capital income medium skilled female headed	0.03	1,618	1,216	N	0.04	-0.02
Montevideo rural transfers income medium skilled female headed	0.03	555	277	N	0.44	0.11
RoC rural transfers income skilled female headed	0.03	284	211	N	0.41	-0.15
Montevideo rural self-employed income unskilled female headed	0.03	101	100	Poor	0.18	-1.92
Montevideo rural labor income skilled male headed	0.01	828	166	N	0.34	0.39
RoC urban (big cities) capital income skilled male headed	0.01	335	167	N	0.04	0.83
Montevideo rural self-employed income medium skilled female headed	0.01	314	157	N	0.44	0.25
Montevideo rural capital income unskilled female headed	0.01	312	312	N	0.12	0.37
Montevideo rural capital income medium skilled male headed	0.01	229	76	Poor	0.22	0.12
RoC rural capital income unskilled female headed	0.01	150	75	Poor	0.15	-2.57

(Source: Income and Expenditure Survey ; IES –INE and authors'calculation)

3.2 The 2003 households' survey from Nepal

3.3 The 2005 households' survey from Malawi

4 Full trade liberalization and impact on poverty

5 Conclusion

6 References

Bouët A., Decreux, Y., Fontagné, L., Jean, S., and D. Laborde, 2008, Assessing Applied Protection across the World, *Review of International Economics*, 16(5), 850-863.

Bouët A., 2008, *The Expected Benefits from Trade Liberalization - Opening the Black box of Global Trade Modeling*, Washington DC, IFPRI Food Policy Review 8.

Boumellassa H., D. Laborde, and C. Mitaritonna, 2009, "A consistent picture of the protection across the world in 2004: MAcMapHS6 version 2". AgFoodTrade Working paper and IFPRI Discussion paper.

Decaluwé, Bernard, A. Patry, Luc Savard, and Eric Thorbecke, 1999. "Poverty Analysis within a General Equilibrium Framework," Working Paper No. 99-09, African Economic Research Consortium

Decreux Y. and H. Valin, 2007, MIRAGE, Updated Version of the Model for Trade Policy Analysis: Focus on Agriculture and Dynamics, CEPII Working Paper, 15, October.

Harrison A., 2005. Globalization and Poverty, NBER.

Narayanan, B.G., and T.L. Walmsley, eds., 2008, *Global Trade, Assistance, and Production: The GTAP 7 Data Base*, Center for Global Trade Analysis, Purdue University.

Hertel T., and J.J., Reimer, 2002. Estimating the Poverty Impacts of Trade Liberalization GTAP Working Paper n. 20.

Winters, L.A., McCulloch, N., and McKay A., 2004. Trade liberalization and poverty : the Evidence so far, Journal of Economic Literature, vol. XLII, March, 72-115.