MEASUREMENT AND CHARACTERIZATION OF THE MIDDLE CLASS IN LATIN AMERICA[1]

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Abstract

The present research aims to compare and improve the measurement and, therefore, the definition of what "middle class" represents, for a group of countries in Latin America, namely Colombia, Mexico, Peru, Brazil and Ecuador, using a methodology based on the expenditure of households, compared to the most common approach that uses income as a referent variable. It looks for a definition of middle class according to particularities inherent to Latin American social composition, and develops a characterization of the sample countries, according to the World Bank GDP (PPP-2010) classification. Additionally, some findings about wealth distribution are pinpointed using GINI measurements.

For the proposed measurements, this study uses household survey data collected with similar objectives and techniques in each of the sample countries in order to quantify and qualify middle classes. Once defined, the measurements will help governments of the region to re-focus or improve the design and implementation of their social programs and policies that aim to reduce economic opportunity gaps.

Keywords: Middle class, Latin America, Inequality, Income, Expenditure

JEL Cathegories: C12, C81, D12, D31, I32, O54

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Economic research is a powerful tool, empowering decision makers with sound judgments of what works and developing solutions to the most pertinent issues societies face and want changed. One of these issues is inequality and what little effect recent policies have had in expanding that middle class that is correlated with economic growth and economic well-being. What looked like a normal distribution when plotting income against population is not so normal when using expenditure as a referent variable. What will be the implications when, after defining and measuring the middle class, we see that our societies have become more unequal? It is crucial therefore, to build a reliable measurement that can support the implementation of programs and policies with high technical and theoretical backups.

One way to support the government's needs to reach its goals is providing studies that better understand the way its society is composed in order to develop the appropriate programs. Given the inequality of the Latin-American societies, the construction of an appropriate definition and measure of the middle class plays a very important role in determining the proper direction of the social policies aiming to achieve the expected impact on welfare distribution.

Hence, there is a lot of research in the area of income distribution and many aspects to consider for reaching sound policy recommendations. Through our investigation, we want to analyze the composition of the middle class in some of the Latin-American countries, in such a way that we can develop the following results: i. Seek for a definition of the middle class according to the particularities of the Latin-American social composition, beyond the international definition of daily average income; ii. Improve the existing measurement methodologies to find a suitable one for the Latin-American context; iii. Examine the measurements not only from the income perspective, but also from the consumption and possession point of view; and, iv. Compare the size of the middle class and its correlation with inequality in the countries selected for the study.

The actual state of the research on the measurement of the middle class has been focused mainly on the magnitude of their income, and it goes along with the standard way of constructing economic stratums. One particularity of the literature on this topic is the income limits when defining poverty lines; these lines determine the size of each class, and were constructed using methodologies that are common in the literature. Nevertheless, these methodologies not always adjust to the particularities of certain contexts, and give place to unreliable magnitudes of class size.

Another issue that needs to be considered when studying the middle class definition and its size is the variables used to determine it. Commonly, researches classify the population by their income, and it will determine the stratum where they belong, but there are some alternative ways to perform such classification. In this sense, few studies explore measures as consumption levels, or possession of goods, opening space for new alternative research. In line with these matters, there is a lack of comparative exercises using methodologies that suit better to the unique characteristics of the Latin-American countries.

After considering these elements, we propose a different reference measurement to characterize the middle class in Latin America; this implies the use of consumption and possession levels of the population of the countries under study, in comparison with the standard measurements that focuses on income levels. Therefore, we can enrich the analysis of the composition of the middle class with several comparisons, and its consequent implications in terms of usefulness for policy designs, according to the context under the scope.

Once the middle class is defined and characterized, in a suitable and pertinent way, according to the features of Latin American, the governments will be able to re-focus or improve designs and implementations of their social programs and policies that aim to reduce the economic gaps in order to reach a distribution level as the proposed referent.

Aiming to achieve the proposed analysis the document is organized as follows: the first section summarizes several of the previous research on middle class measurement and its relation to this study. The second section describes the data sets used to construct the variables for each of the countries in the sample. In the third one a comparison of eight different measurements used worldwide to classify the middle class and provide a scope for policy focus is presented. The fourth section goes further in computing GINI measurements per country and per class, trying to capture population differences depending on the middle class measurement method. Finally, section five proposes some concluding remarks and opens space for new research based on the findings.

1. Literature Review

The problem of Income inequality and the concentration of wealth in Latin America raises a pressing concern and brings into scrutiny the policies that where created to counteract this issue. Characterizing and defining the size of the middle class in these countries is the first step to be taken. In regions where countries have a large middle class, there is evidence of lower levels of inequality and bigger social benefits as (Banerjee and Duflo 2008) and (Hertova, Lopez-Calva, and Ortiz 2009) state. Benefits that arise from a better distribution are creating the right signals and incentives that make people believe that mobilization between the classes is a reality and that hard work pays off. Greater mobilization up and down leads towards economic development and political stability, especially in developing countries, according to (Torche and Lopez-Calva 2012). Thus, we would like to find a comparable measurement of the middle class for Latin America countries that have a household survey collected with similar guidelines and techniques.

The data to for our research comes principally from the Income and Expenditure Surveys of each of the countries in the sample (Colombia, Mexico, Peru, Brazil and Ecuador). These surveys are quite useful because: i. They are nationally representative; ii. It is possible to analyze

and make inferences for different periods of time; iii. These sources also collect complete information about the household composition because they measure the principal socio-demographic variables, such as gender, age, education, size of the household, among others; and, iv. They provide data about income and household expenditure.

In order to make our results comparable within the countries under study, we need to: i) homogenize the interest variables, ii) adjusted the variables measured in per-capita terms to the size of the house-hold, and, iii) transform the variables into PPP (Purchasing Power Parity) terms, according to the availability of the data for each country. The adjustments in the monetary variables are done using equivalent scales according to the size of the households, this kind of treatment is necessary given the scale economies inside each household. For instant, consumption of an individual with more than 18 years is different from consumption of a child, or the income contribution is not equivalent between children and adults. Following the recommendations from the European Union, in terms of income, a child requires 50% of the head of the household income, while an adult requires the 75% of that income. In this scenario, we are going to implement different techniques, which are more suitable to the economic structure of the sample countries (Lasso 2002), in order to compute equivalent scales. Thus, we expect a better measurement of the relevant variables in per-capita terms.

Several diverse studies use different methodologies to measure the middle class. In one group, we can find research by (Easterly 2001), (Brandolini 2010) and (Fajardo and Lora 2010), that define the middle class in terms of the income distribution of households. The former ones take households between the second and the eighth deciles, while latter ones consider the middle class as households who have per-capita income between 50% and 150% of the average income. On a second group, (Banerjee and Dufflo 2008) define the middle class as the households that have an average daily income between 2 and 6 US dollars, or conversely, as those households

that have an average per-capita expenditure between 6 and 10 US dollars. In the same line, (Ravallion 2009) considers the middle class as households with a per-capita income between two and 13 US dollars in PPP terms of 2005. Finally, a third group, including authors as (Eisenhauer 2008) and (Saxena 2010), defines the middle class using the poverty line of each country or of a group of countries, as lower limit, and two or three times the poverty line as upper limit.

Following our description of the measurement of the middle class above, it is possible to notice that the majority of recent research is focused on income variable as the main variable to determine the size of the middle class. This approach undermines the problem of income underestimation, which is a reality in most of the income surveys worldwide, as well as the large dispersion attached to income measurements. In this scenario, the main objective of our research is to measure the middle class using a different approach that takes the expenditure as the main variable.

The expenditure, according to literature on survey data analysis, is a more reliable variable because the incentives of households to underestimate it are fewer, compared to income (for instance, a family that has access to government subsidies is likely to declare less income that the real one they perceive, if they are trying to keep the subsidies as high as possible). Moreover, expenditure should have a less variable distribution with respect to the mean; therefore, we can define the middle class in relation to the distribution of per-capita expenditure of the household.

We will use several definitions of middle class in relation to the expenditure variable aiming to perform a sensibility analysis, in such a way that we can clarify the incidence of changes in the definition of the class in the expected results of our research. It is worth mentioning that our definitions are ad hoc conceptions of the issue under scope, measurement of the middle class, which is a recurring topic in studies on the same topic. Nevertheless, we want to

contribute with an overview and comparison of the existing measurements from income and expenditure angles, as well as with an insight view of the distribution of income within the middle class itself. The idea behind this fact comes from recent social facts that might suggest an inequality behavior within the middle class itself, proposing a vulnerable position for lowest stratum of the middle class in the countries of the sample.

With the proposed definitions of the middle class, our research will perform an analysis of characterization of this population, based in gender differentiation, age, education level, occupation and size of the household, among other features. This characterization will equip us with appropriate tools to find patterns or behaviors that stand out in the Latin American countries, which are inherent to particularities of the region. From these findings we can develop policy recommendations to improve design and coverage of the policies directed to the middle class.

2. Data Description

As it has been stated, the countries selected for the present research are Colombia, Mexico, Peru, Brazil and Ecuador. We want to have a sample of countries that is representative from the Latin American context about their economic development, social composition, unemployment levels, role of genders in society, education levels and opportunities, among other features that respond to special regional particularities. These similarities give us the possibility to comparable measurements, and analyze within group distributions inherent to the idiosyncratic Latin American behavior, which is not captured by the majority of the standard middle class known measurements.

2.1 Database

The data used in constructing the variables that support our analysis are extracted from the Income and Expenditure Surveys of the countries under study. These surveys are national representative; moreover, they are built in such a way that the information gathered about

composition, distribution and changes in household income and expenditure becomes their main objective. Thus, we can enunciate now the surveys used for each country:

- Brazil: Family Budget Survey 2008-2009 (Pesquisa de Orcamentos Familiares 2008-2009, in Portuguese), that contains 61:707 observations (60.355.099 households).
- Colombia: National survey of income and expenditure 2006-2007 (Encuesta Nacional de Ingresos y Gastos 2006-2007, in Spanish), that contains 35:719 observations (11.143.858 households).
- Ecuador: National Survey of Income and Expenditure in Rural and Urban Areas 2003-2004 (Encuesta Nacional de Ingresos y Gastos de Hogares Urbanos y Rurales 2003-2004, in Spanish), that contains 11:263 observations (1.862.174 households).
- Mexico: National Household Survey of Income and Expenditure 2010 (Encuesta Nacional de Ingresos y Gastos en los Hogares 2010. in Spanish), that contains 27:620 observations (29.045.631 households).
- Peru: National Household Survey 2011, (Encuesta Nacional de Hogares 2011, in Spanish), that contains 24:806 observations (7.526.346 households).

In order to develop a middle class characterization, we select demographic variables of household heads (gender, age, education, occupation), household composition variables (size of the household, number of occupied members, number of children younger than 12 years old, number of members older than 60 years and number of members older than 18 years), and monetary variables (total monthly income and expenditure of the household). These last ones were standardized to PPP dollars of 2010 in order to facilitate comparison analysis of the presented databases.

It is also worth mentioning that standardization is a key point because the surveys were

collected in different periods along the countries of the sample (See Appendix A.1 for detailed information). Additionally, monetary variables are adjusted to family composition according to the equivalent scale established by the OECD [1], as it is going to be explained in more detail in section 3.2.

2.1.2. Descriptive Statistics. *Households Demographics*: Following with the analysis of the database according to Figures 1, the average size of a representative household for the countries in the sample is between 3 and 4 members. Household heads are concentrated between 20 and 60 years old, on average, and around 70% of them are male. On the education side, 35% of household heads have attended primary education and 30% have secondary studies; just 20%, on average, have reached tertiary formation. Unemployment[2] of household heads is about 15% when taking all five countries of the sample together, however, in Colombia and Mexico it is as high as 25%.

When going into detail about household composition, Figures 2, it is possible to observe that, at most, two members of the household are employed, while about 35% of households have more than one person older than 18 years old, supporting the high unemployment rates described before. Concerning children, on average, 50% have at least one child and just 10% of the sample claims to have three or more children. Finally, for the elderly, only an average of 30% of the studied households claim to have one or more members older than 60 years.

Monetary Variables: table 1 summarizes monetary variables of the harmonized database. The country with the highest level of per capita income is Brazil with median income of 579 dollars PPP (2010), followed by Mexico, Peru, Ecuador and Colombia. It is worth mentioning that Ecuador was dollarized during the year of the survey (2004), thus, there can be errors derived from changes in the accounting system. In terms of per capita expenses, Peru reports the highest value, Brazil and Mexico come after and Colombia and Ecuador are the last two positions.

Table 1. Monetary Statistics

Country	Household		Per Capita Income*		Per Capita Expense*	
	Sample	Expanded Sample	Median	Mean	Median	Mean
Brazil	61.707	60,355,099	579	1011	391	721
Colombia	35.719	11,143,858	415	703	305	499
Ecuador	11.263	1,862,174	445	1002	256	405
Mexico	27.620	29,045,631	485	725	345	547
Peru	24.806	7,526,346	481	667	419	506

Source: Authors calculation using Income and Expenses National Surveys
Note: *Income and Expenses measured in PPP dollars of 2010.

When it comes to observed income and expenses distribution, Figures 3 depicts the accumulation of them. Most of the population for all the countries in the sample lies below $1000 Dollars (PPP-2010); roughly, Brazil and Ecuador report such average income. These graphs also give some ideas about the inequality of income distribution, which is far from displaying a normal behavior, and backing up the already known disparity of the Latin American societies.

2.2.Measurement Methodologies Overview

We can now recapitulate diverse methodologies, as mentioned above, that will help this study to analyze different measurements of the middle class. There are several alternatives in terms of how to calculate the size of the middle class: i) Use lower and upper deciles to define the richest and the poorest and take the middle class as population inside those limits; ii) Set a particular lower and upper amount of PPP dollars as disposable income, and define the middle class as population that lies within the defined limits; iii) Using average income of the country, take a percentage value of that average to define lower and upper limits of the middle class; and, iv) Take a particular monthly income, reasonable for the sample countries, as the middle class income (author's proposal). Following the previous definitions, the methodologies to be compared in the present study can be summarized as follows:

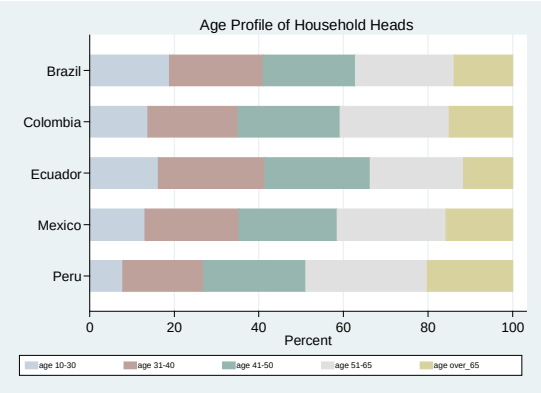
Table 2. Methodologies to Define the Middle Class

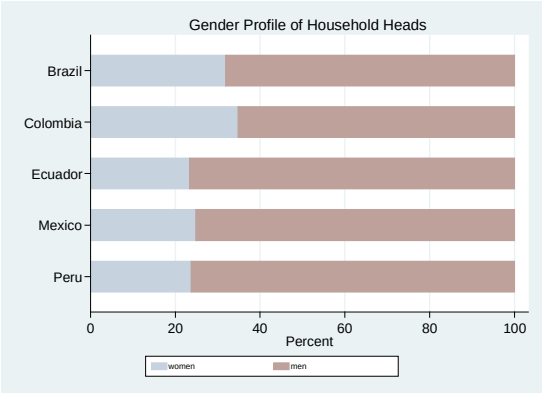
Methodology	Middle Class
Birsall	75% - 125%
OCDE	50% - 150%
Brandollini	60% - 167%
Grabka	70% - 150%
Solow	2 - 8 decile
Modified Solow	3 - 9.5 decile
PPP Based	2 - 20 USD per day
Daza-Cortés	400 - 2500 USD per month

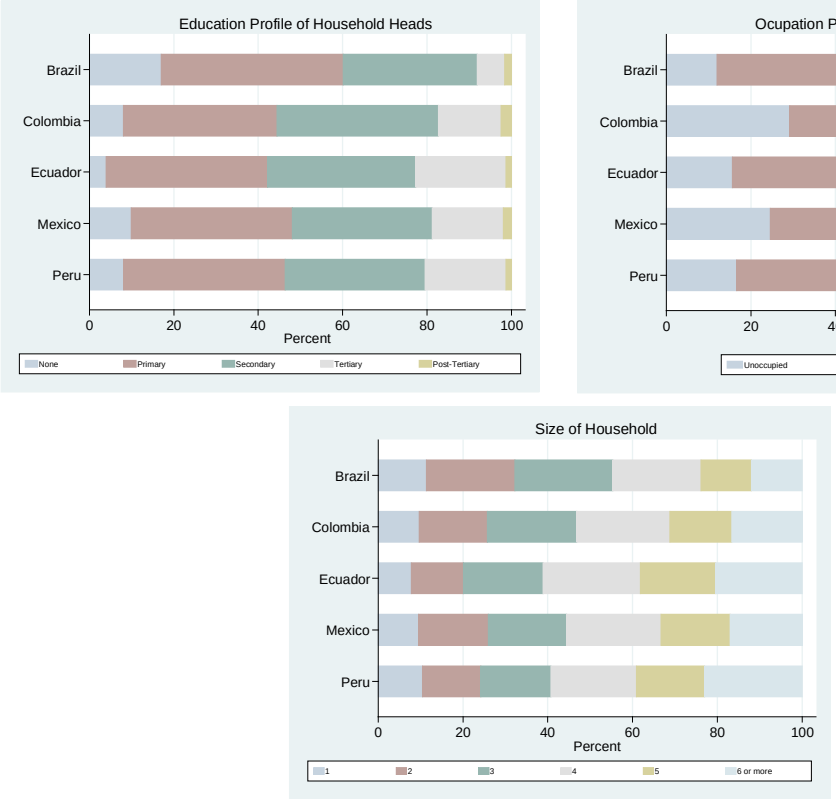
Source: Banerjee and Duflo 2008, Brandolini 2010 and Ravallion, M. 2009.

It is important to pinpoint here that, from the measurements on table 2, Modified Solow and Daza-Cortés are constructed based on our own analysis of the data and using as baseline the different definitions mentioned above. Now, with a set of measurements defined, we have an appropriate scenario to develop our proposed analysis showing the contrast and high sensibility of the data to each particular approach taken from table 2. Section 4 describes in detail the variability of the size of each economic class when imposing any of the methodologies, while Section 5 displays its effects in terms of computing distribution measurements as GINI estimates for the present case.

Figure 1. Demographics

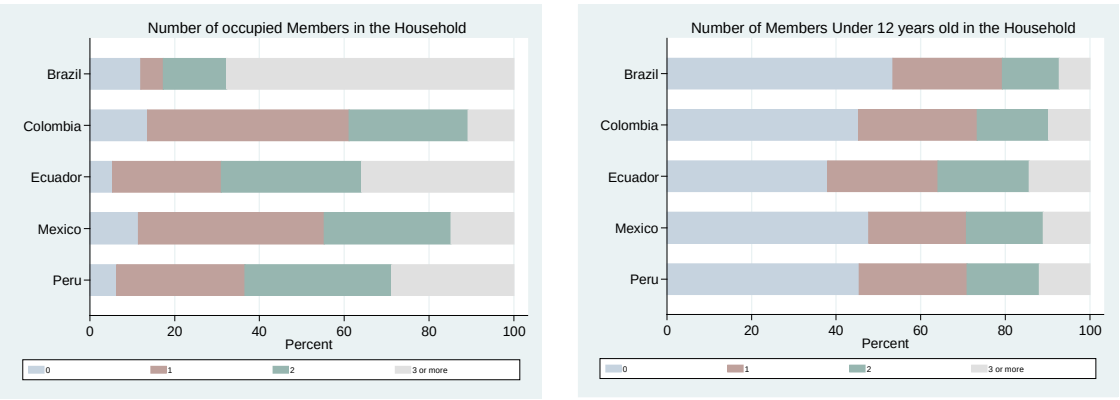


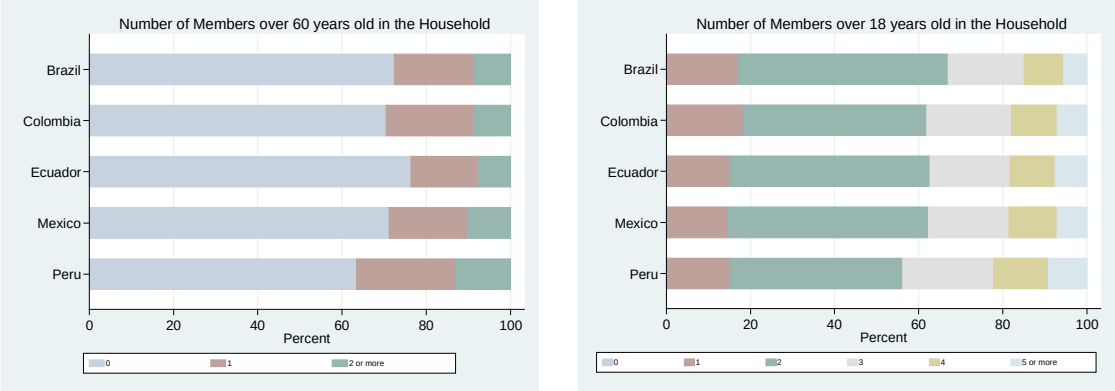




Source: Authors calculation using Income and Expenses National Surveys.

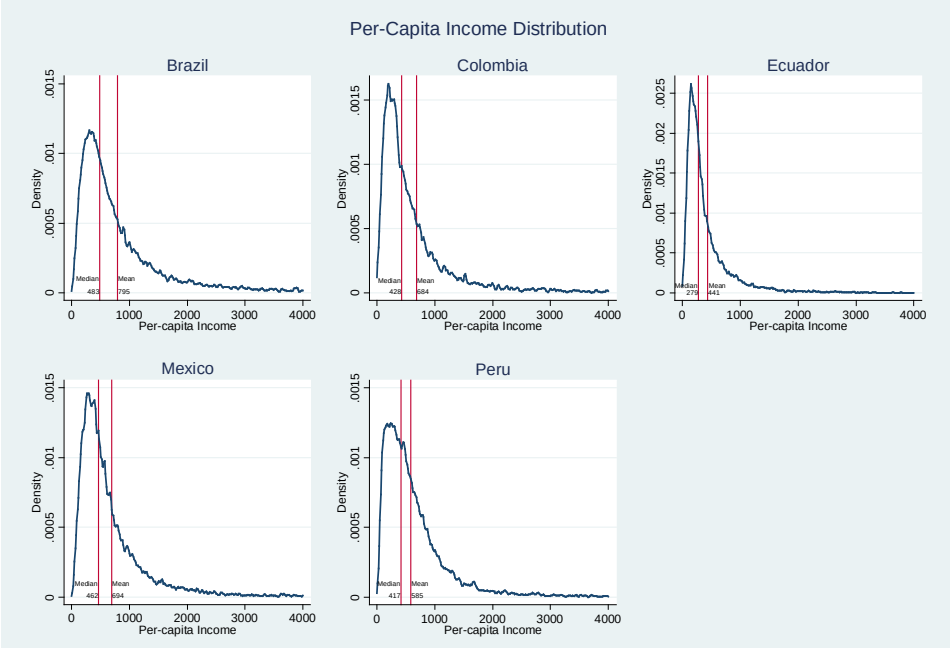
Figure 2. Household Composition

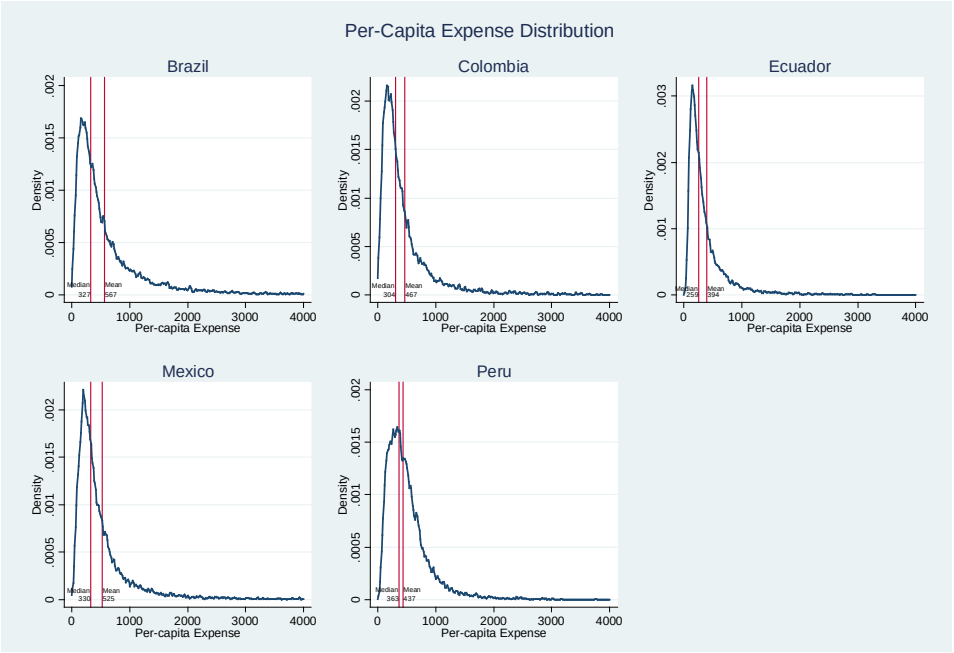




Source: Authors calculation using Income and Expenses National Surveys.

Figure 3. Per Capita Income and Expenses Distribution





Source: Authors calculation using Income and Expenses National Surveys.

3. Measurement of the Middle Class

After recognizing particularities of the database, as well as different tools to classify the middle class that are widely used, it is possible to present a comparative set of measurements and how they influence the magnitude of population included in the Latin American middle class. In presenting the comparison, each country will be analyzed separately for the two types of variables, income and expenses.

4.1. Measurement by Income

The classical way of analyzing middle class measurements is related to income perceived by the households. Tables 3 compare the classification of the middle class according to the eight different methodologies described in the previous section4. As can be seen, PPP Based measurement identifies 0% poor population for all countries, a relative small middle class around 25%, and a considerable rich class, about 70%,for all countries but Ecuador. The special behavior of Ecuador might be due to dollarization implemented during the year of the survey, as explained before. Nonetheless, it is highly unreal to believe that is no poor population in these

countries, and that the rich class is larger than 50%. Thus, this measurement is not able to capture the dynamics of Latin America social composition.

Only Modified Solow and Daza-Cortés identified a middle class of more than 50% of the population, sometimes larger in particular countries, as Peru, when it collects 70% of the population. These two measurements go in favor of smaller rich and poor classes; this result goes much more along with the intuitive classification of economic stratums in the countries of the sample. Finally, the other five measurements display similar results to PPP Based, underestimating poor and middle class in favor of an unreal rich class for the region.

Table 3. Middle Class Size for Sample Countries by Income

	Middle Class Size in Brazil							
	Birsall	OECD	Brandollini	Grabka	Solow	Modified Solow	PPP Based	Daza-Cortes
Poor	10%	4%	6%	9%	4%	11%	0%	8%
Middle Class	13%	25%	27%	21%	39%	68%	18%	56%
Rich	77%	71%	67%	71%	57%	21%	82%	36%
	Middle Class Size in Colombia							
Poor	10%	4%	6%	9%	4%	11%	0%	15%
Middle Class	13%	25%	27%	20%	39%	68%	27%	59%
Rich	77%	71%	67%	71%	57%	21%	73%	26%
	Middle Class Size in Ecuador							
Poor	11%	4%	6%	9%	5%	13%	0%	31%
Middle Class	16%	29%	30%	24%	41%	68%	46%	57%
Rich	74%	67%	63%	67%	54%	19%	54%	11%
	Middle Class Size in Mexico							
Poor	11%	4%	6%	9%	5%	14%	0%	14%
Middle Class	18%	33%	35%	27%	43%	68%	28%	68%
Rich	71%	63%	59%	63%	52%	18%	72%	19%
	Middle Class Size in Peru							
Poor	11%	5%	7%	10%	4%	13%	0%	14%

Middle Class	17%	32%	36%	27%	46%	70%	29%	71%
Rich	71%	63%	57%	63%	50%	17%	71%	15%

Source: Authors calculations using Income and Expenses National Surveys

4.2. Measurement by Expenses

On the side of expenditure, the behavior of measurements is similar to the ones presented before for income cases. Nevertheless, the estimates of the size of the middle class are larger than the ones computed by income. PPP Based in this case collects more than 40% of the population in the middle class, except for Brazil, but the zero poor class persists for all countries. As before, Daza-Cortés and Modified Solow are the ones that estimate a larger middle class, as large as 70% for both measurements in Peru, and around 60% for all other cases.

Table 4. Middle Class Size for Sample Countries by Expenditure

	Birsall	OECD	Brandollini	Grabka	Solow	Modified Solow	PPP Based	Daza-Cortes
Middle Class Size in Brazil								
Poor	9%	4%	6%	8%	3%	10%	0%	16%
Middle Class	12%	22%	23%	18%	37%	68%	27%	58%
Rich	79%	74%	71%	74%	59%	22%	73%	27%
Middle Class Size in Colombia								
Poor	10%	4%	6%	9%	4%	12%	0%	26%
Middle Class	14%	27%	28%	22%	40%	67%	41%	58%
Rich	76%	69%	65%	69%	56%	21%	59%	16%
Middle Class Size in Ecuador								
Poor	12%	4%	7%	10%	5%	14%	0%	38%
Middle Class	17%	33%	34%	27%	42%	67%	54%	54%
Rich	71%	64%	59%	64%	52%	18%	46%	8%
Middle Class Size in Mexico								
Poor	11%	4%	6%	9%	5%	13%	0%	24%
Middle Class	16%	30%	32%	25%	41%	66%	40%	59%
Rich	73%	66%	62%	66%	54%	20%	60%	17%
Middle Class Size in Peru								

Poor	13%	5%	8%	11%	6%	18%	0%	23%
Middle Class	25%	45%	49%	38%	51%	71%	47%	75%
Rich	62%	50%	43%	50%	43%	11%	53%	2%

Source: Authors calculations using Income and Expenses National Surveys

Income versus Expenses

Observing the subtle changes between income and expenditure, we decided to perform a test to analyze if the estimated class sizes under income and expenses data, for all the methodologies compared, are statistically different from each other. Thus, we proposed a test a two sample unpaired test, with unequal variances in which we want to test the following hypothesis:

$$H_0 = \bar{X}_{Inc} - \bar{X}_{Exp} = 0 \qquad (1)$$

$$H_0 = \bar{X}_{Inc} - \bar{X}_{Exp} \neq 0 \qquad (2)$$

where $H_0 = 0$ implies that the mean of income and expenses measurements of the middle class are equal, against $H_1 \neq 0$ where they are different. The appropriate *t*-Statistic for this particular case is defined by:

$$t = \frac{\bar{X}_{Inc} - \bar{X}_{Exp}}{S_{\bar{X}_{Inc}} - S_{\bar{X}_{Exp}}} \qquad (3)$$

Which is distributed as *t*-Student under H_0.

After observing the results of the test, it is possible to conclude that there is not statistical evidence to hold that income measurements are statistically different from expenses measurements, this results holds for all the countries in the sample at a 95% significance level. Hence, one important thing that can be concluded, up to this point, is that the type of measurement is not a key point to focus, but the definition of the measurement itself, as we have been analyzing in the previous section. Table 5 displays the results of the test for the middle class, while Annex A.2 contains the results for poor and rich class measurements.

Table 5. T-Test Middle Class

	Birsall	OECD	Brandollini	Grabka	Solow	Mod. Solow	PPP Based	Daza-Cortes
Brasil								
t-stat	56.38	66.46	67.66	65.23	62.98	48.93	41.23	54.63
Std. Err.	2.62	1.95	2.24	2.41	2.45	6.41	1.42	4.40
P-Value	0	0	0	0	0	0	0	0
IC:low	142.78	125.8	147.72	152.98	149.89	301.3	55.89	232.25
IC:up	153.07	133.44	156.53	162.46	159.52	326.44	61.47	249.54
Colombia								
t-stat	31.25	34.16	38.36	37.57	43.92	54.57	19.23	57.18
Std. Err.	2.51	2.00	2.28	2.36	2.27	5.00	1.71	5.08
P-Value	0	0	0	0	0	0	0	0
IC:low	73.61	64.53	83.11	84.17	95.3	263.16	29.54	280.68
IC:up	83.46	72.38	92.06	93.44	104.21	282.77	36.24	300.6
Ecuador								
t-stat	8.56	5.02	6.95	6.89	8.07	10.54	5.07	9.92
Std. Err.	1.92	2.15	2.39	2.63	2.48	5.79	2.26	10.84
P-Value	0	0	0	0	0	0	0	0
IC:low	12.7	6.61	11.94	12.99	15.19	49.74	7.05	86.33
IC:up	20.24	15.06	21.33	23.31	24.92	72.45	15.93	128.85
Mexico								
t-stat	42.40	43.13	46.93	43.04	48.86	37.60	31.29	37.97
Std. Err.	2.70	2.34	2.56	2.83	2.59	6.05	1.83	5.91
P-Value	0	0	0	0	0	0	0	0
IC:low	109.38	96.56	115.4	116.54	121.82	215.73	53.94	212.94
IC:up	119.98	105.75	125.45	127.66	132	239.46	61.14	236.12
Peru								
t-stat	23.41	22.55	30.52	30.16	29.52	49.87	0.49	49.97
Std. Err.	2.15	1.97	2.14	2.13	2.20	4.13	1.71	4.34
P-Value	0	0	0	0	0	0	0	0
IC:low	46.23	40.64	61.15	60.17	60.81	198.21	-2.5	208.45
IC:up	54.68	48.38	69.54	68.54	69.45	214.42	4.21	225.47

Source: Authors calculations using Income and Expenses National Surveys

4. Distribution of Income within the Identified Middle Class

The exercise of measuring the middle class, using the methodologies described in the previous section, proposes an appropriate scenario to develop within characterizations of it for

the countries in the sample. Thus, in this section we present a descriptive analysis of the middle class, starting with a distribution analysis and using national GINI[2] measurements for income and expenses. Our goal is, once again, to make a comparison of results within the middle class by methodology, and highlight possible implications in terms of public policy formulation.

In table 6 is possible to observe subtle differences in GINI measurements by income and expenses, with the only exception of Peru where there is a big difference when GINI is computed using expenses as supporting variable.

Table 6. GINI measurements

Country	GINI by Income	GINI by Expenses
Brazil	0.52	0.55
Colombia	0.52	0.51
Ecuador	0.49	0.46
Mexico	0.46	0.49
Peru	0.46	0.36

Source: Authors calculations using Income and Expenses National Surveys

5.1. Analysis by Countries

The differences between income and expenditure GINI measurements are not significant (See Appendix A.3). They display similar results along methodologies per country, with lowest GINIs for measurements related to a percentage of average income, as Birsall, OECD, Brandollini and Grabka; and with higher results for Modified Solow followed by PPP-Based and Daza-Cortés. Nevertheless, as it was stated in tables 3 and 4, Birsall considers quite small middle classes for all countries, limiting the variability of the distribution with respect to the reference variables, income and expenditure. In contrast, Modified-Solow and Daza-Cortés collect larger

[2] According to the OECD definition the GINI index measures the extent to which the distribution of income (or, in some cases, consumption expenditure) among individuals or households within an economy deviates from a perfectly equal distribution. The GINI index measures the area between the Lorenz curve and the hypothetical line of absolute equality, expressed as a percentage of the maximum area under the line. A GINI index of zero represents perfect equality and 100, perfect inequality. (See http://stats.oecd.org/glossary/detail.asp?ID=4842)

middle classes, and their estimated GINI measurements are closer to national referents.

The lower values compared to the national measurements are not surprising given the fact that we are taking only population belonging to certain income/expenditure ranges. Nevertheless, the situation changes when we analyze GINI measurements for the extremes of the distribution, namely low and high-income populations. Tables 7 to 11 compare GINI behavior for low, middle and high classes for the five countries in the sample; comparing these results with the size of the classes defined in table 3 it is possible to observe, in general, that, as more population is included in the class, GINI measurement is higher.

Therefore, the big question comes from the population around the limits of the three de ned classes here, how easy is for them to improve their conditions to move from one class to the next one, and how likely is that they will stay in that position over time. That becomes a key challenge in terms of class measurement and inequality trends because of its implications in terms of policy design and implementation.

Table 7. GINI Measurements by Income for Brazil

	Poor Class							
	Birsall	OECD	Brandollini	Grabka	Solow	Mod. Solow	PPP Based	Daza-Cortés
GINI	0.22	0.20	0.21	0.22	0.20	0.23	0.16	0.22
Mean Income	266.49	189.03	221.07	252.31	188.49	282.58	42.99	248.90
Size	10%	4%	6%	9%	4%	11%	0%	8%
	Middle Class							
GINI	0.08	0.17	0.16	0.12	0.23	0.33	0.24	0.28
Mean Income	566.26	530.15	596.27	601.91	638.71	1,175.98	342.42	928.94
Size	13%	25%	27%	21%	39%	68%	18%	56%
	Rich Class							
GINI	0.38	0.37	0.35	0.37	0.33	0.20	0.40	0.26
Mean Income	1,897.34	2,144.97	2,317.71	2,144.97	2,839.53	6,854.15	1,680.77	4,624.66
Size	77%	71%	67%	71%	57%	21%	82%	36%

Source: Authors calculations using Income and Expenses National Surveys

Table 8: GINI Measurements by Income for Colombia

	Birsall	OECD	Brandollini	Grabka	Solow	Mod. Solow	PPP Based	Daza-Cortes
Poor Class								
GINI	0.24	0.22	0.23	0.23	0.22	0.24	0.25	0.25
Mean Income	186.53	132.63	153.69	175.18	125.07	193.66	36.48	222.20
Size	10%	4%	6%	9%	4%	11%	0%	15%
Middle Class								
GINI	0.09	0.17	0.17	0.13	0.24	0.32	0.27	0.27
Mean Income	408.38	384.74	433.91	436.02	458.73	835.53	302.26	871.29
Size	13%	25%	27%	20%	39%	68%	27%	59%
Rich Class								
GINI	0.38	0.36	0.36	0.36	0.33	0.24	0.37	0.25
Mean Income	1,337.52	1,511.80	1,635.59	1,511.80	2,011.62	4,924.13	1,465.77	4,314.13
Size	77%	71%	67%	71%	57%	21%	73%	26%

Source: Authors calculations using Income and Expenses National Surveys

Table 9. GINI Measurements by Income for Ecuador

	Birsall	OECD	Brandollini	Grabka	Solow	Mod. Solow	PPP Based	Daza-Cortés
Poor Class								
GINI	0.20	0.19	0.19	0.20	0.19	0.21	0.20	0.26
Mean Income	133.15	94.44	111.44	125.99	100.14	143.84	39.86	207.15
Size	0,11	0,04	0,06	0,09	0,05	0,13	0	0,31
Middle Class								
GINI	0.08	0.17	0.16	0.12	0.21	0.30	0.28	0.26
Mean Income	270.39	252.74	283.75	285.96	303.35	527.65	262.70	797.18
Size	0,16	0,29	0,3	0,24	0,41	0,68	0,46	0,57
Rich Class								
GINI	0.35	0.34	0.33	0.34	0.31	0.23	0.30	0.22
Mean Income	837.10	944.41	1,017.07	944.41	1,206.80	2,836.93	1,223.85	3,890.75
Size	74%	67%	63%	67%	54%	19%	54%	11%

Source: Authors calculations using Income and Expenses National Surveys

Table 10. GINI Measurements by Income for Mexico

	Poor Class							
	Birsall	OECD	Brandollini	Grabka	Solow	Mod. Solow	PPP Based	Daza-Cortés
GINI	0.20	0.18	0.19	0.20	0.19	0.21	0.14	0.21
Mean Income	234.10	164.69	194.39	221.17	177.48	255.29	45.20	253.11
Size	0,11	0,04	0,06	0,09	0,05	0,14	0	0,14
	Middle Class							
GINI	0.08	0.17	0.16	0.12	0.20	0.27	0.23	0.27
Mean Income	474.06	448.47	500.62	504.45	522.62	862.43	340.98	852.73
Size	0,18	0,33	0,35	0,27	0,43	0,68	0,28	0,68
	Rich Class							
GINI	0.33	0.32	0.31	0.32	0.30	0.24	0.33	0.24
Mean Income	1,341.05	1,529.51	1,653.18	1,529.51	1,880.42	4,387.63	1,330.86	4,288.12
Size	71%	63%	59%	63%	52%	18%	72%	19%

Source: Authors calculations using Income and Expenses National Surveys

Table 11. GINI Measurements by Income for Peru

	Poor Class							
	Birsall	OECD	Brandollini	Grabka	Solow	Mod. Solow	PPP Based	Daza-Cortés
GINI	0.25	0.22	0.23	0.24	0.21	0.25	0.16	0.25
Mean Income	207.39	147.52	172.26	196.41	138.25	221.32	43.51	226.11
Size	0,11	0,05	0,07	0,1	0,04	0,13	0	0,14
	Middle Class							
GINI	0.08	0.17	0.16	0.12	0.21	0.25	0.27	0.25
Mean Income	473.77	454.49	512.02	509.64	507.30	818.80	320.11	839.08
Size	0,17	0,32	0,36	0,27	0,46	0,7	0,29	0,71
	Rich Class							
GINI	0.30	0.29	0.28	0.29	0.27	0.21	0.30	0.21
Mean Income	1,218.68	1,380.46	1,503.52	1,380.46	1,674.15	3,720.25	1,218.20	3,937.85
Size	71%	63%	57%	63%	50%	17%	71%	15%

Source: Authors calculations using Income and Expenses National Surveys

5. Concluding Remarks

The present comparative review shed light into several interesting issues that need to be taken into account by policy makers when designing programs directed towards the middle class. Even though we did not find dramatic results, as it was initially expected, in terms of income and expenses based measurements, we can pinpoint the following statements based on our findings:

- Class measurements are totally ad hoc definitions that can be used according to political views and needs depending on government interest.
- None of the methodologies displays better results compared to the others; thus, there is still place for research in terms of how to measure the socio-economic classes in countries with high inequality as those of Latin America.
- As Latin America presents a challenge in terms of measurements of inequality and poverty, any research on these lines can contribute not only to the region but also to other regions, in the framework of a south research community where it is possible to find similarities in the idiosyncratic composition of the countries.
- The design of efficient public policies are a key issue when defining the beneficiaries of them. In these regards, technicians from public bodies should think in ways to improve the ways programs are focused, it should include the development of their own measurements based on the particularities in each country.

Thinking further, in the same line of research, there are many interesting questions that can be explored within the different class measurements and how to improve public policy designs. We can highlight topics on gender inequality, education gaps (also related to gender differences), labor mobility among classes and paths that individuals can take to change their economic conditions depending on their particular features. Such topics will be part of new

research in the coming future.

References

Banerjee, A., and E. Dufflo. 2008. “What is Middle Class about the Middle Classes around the World.” *Journal of Economic Perspectives* Spring 2008:3-28.

Brandolini, A. 2010. “On the Identification of the Middle-Class.” *Document presented at the conference Inequality and the Status of the Middle Class: Lessons from the Luxembourg Income Study*.

Easterly, W. 2001. “The Middle Class Consensus and Economic Development.” *Journal of Economic Growth* No. 6 (December): 317-35.

Eisenhauer, J.G. 2008. “An Economic Definition of the Middle Class.” *Forum for Social Economics* No. 37 (August): 103-113.

Fajardo, J., and E. Lora. 2010. “Understanding the Latin American Middle Classes: Reality and Perception.” *Mimeo, Inter-American Development Bank, Research Department.*

Hertova, D., L.F. Lopez-Calva, and E. Ortiz. 2009. “The Middle Class in Mexico and Chile: A Review of Measures.” *Working Paper Regional Bureau for Latin America and the Caribbean UNDP*.

Lasso, F. 2002. “Scale Economies in the Households and Poverty.” *Archivos de Economía*, National Planning Department of Colombia.

Ravallion, M. 2009. “The Developing World's Bulging (but Vulnerable) Middle Class.” *World Development*, vol. No. 38 (January).

Saxena, R. 2010. “The Middle Class in India, Issues and Opportunities.” *Deutsche Bank Research*, February.

Torche, F., and L.F. Lopez-Calva. 2012. \Stability and Vulnerability of the Latin American

Middle Class." *WIDER Working Paper, UNU-WIDER*, November.

A. Appendixes

A.1. Variables Description

Variable	Description
Gender	Gender of household head:
	0: Woman.
	1: Man.
Age	Age of household head (10 years old to 100 years old).
Education	Education of Household head:
	1: None.
	2: Primary.
	3: Secondary.
	4: Tertiary
	5: Post-Tertiary.
Household Size	Number of household members:
	1: One member.
	2: Two members.
	3: Three members.
	4: Four members.
	5: Five members.
	6: 6 or more members.
Children	Number of members under 12 years old:
	1: One member.
	2: Two members.
	3: Three or more members.
Elderly	Number of members over 60 years old:
	1: One member.
	2: Two or more members.
Older	Number of members over 18 years old:
	1: One member.
	2: Two members.
	3: Three members.
	4: Four members.

	5: Five or more members.
Pc_Income	Adjust per-capita income.
Pc_Expenses	Adjust per-capita expense.

A.2. T-Tests

Table 12. T-test Low Class

	Birsall	OECD	Brandollini	Grabka	Solow	Mod. Solow	PPP Based	Daza-Cortes
Brazil								
t-stat	20.38	-3.39	6.14	16.76	-3.53	25.52	-12.28	15.75
Std. Err.	1.36	1.47	1.40	1.35	1.47	1.35	8.06	1.35
P-Value	0	0	0	0	0	0	0	0
IC:low	25.2	-7.9	5.87	20	-8.12	32.01	-114.99	18.65
IC:up	30.56	-2.12	11.38	25.29	-2.3	37.33	-83.3	23.95
Colombia								
t-stat	-15.75	-28.27	-24.02	-18.40	-28.93	-13.73	-20.92	-5.45
Std. Err.	1.70	2.15	1.86	1.75	2.25	1.69	7.32	1.65
P-Value	0	0	0	0	0	0	0	0
IC:low	-30.2	-65.25	-48.52	-35.68	-69.6	-26.68	-167.52	-12.27
IC:up	-23.52	-56.79	-41.2	-28.81	-60.77	-20.01	-138.78	-5.79
Ecuador								
t-stat	-12.95	-17.80	-16.46	-14.46	-17.39	-11.09	-9.81	-0.04
Std. Err.	1.36	1.68	1.49	1.39	1.61	1.36	6.19	1.91
P-Value	0	0	0	0	0	0	0	0
IC:low	-20.3	-33.28	-27.55	-22.95	-31.26	-17.81	-72.98	-3.84
IC:up	-14.96	-26.68	-21.69	-17.47	-24.93	-12.46	-48.61	3.67
Mexico								
t-stat	8.49	-7.11	-0.52	5.72	-4.20	13.72	-5.20	13.26
Std. Err.	1.78	2.14	1.86	1.73	2.01	1.73	18.43	1.73
P-Value	0	0	0	0	0	0	0	0
IC:low	11.68	-19.48	-4.62	6.52	-12.45	20.47	-132.26	19.67
IC:up	18.7	-11.06	2.67	13.32	-4.54	27.29	-59.65	26.49
Peru								
t-stat	-20.29	-31.38	-26.97	-22.43	-32.85	-17.72	-14.65	-17.02
Std. Err.	1.44	1.37	1.38	1.43	1.39	1.48	4.51	1.49
P-Value	0	0	0	0	0	0	0	0
IC:low	-32.18	-45.98	-40.19	-34.91	-48.52	-29.17	-75.04	-28.38
IC:up	-26.51	-40.57	-34.74	-29.3	-43.06	-23.36	-57.29	-22.52

Source: Authors calculations using Income and Expenses National Surveys

Table 13. T-test Rich Class

	Birsall	OECD	Brandollini	Grabka	Solow	Mod. Solow	PPP Based	Daza-Cortes
Brazil								
t-stat	39.04	37.42	36.57	37.42	34.80	27.20	40.38	30.54
Std. Err.	14.69	17.79	20.00	17.79	27.19	109.12	12.16	57.75
P-Value	0	0	0	0	0	0	0	0
IC:low	544.85	631.04	692.48	631.04	893.23	2754.89	467.47	1650.89
IC:up	602.44	700.79	770.91	700.79	999.84	3182.88	515.16	1877.34
Colombia								
t-stat	40.70	39.90	39.36	39.90	37.06	22.00	40.04	24.51
Std. Err.	12.60	15.00	16.84	15.00	23.04	113.13	14.31	87.08
P-Value	0	0	0	0	0	0	0	0
IC:low	488.2	569.45	629.91	569.45	809.16	2267.34	545.02	1964.3
IC:up	537.6	628.28	695.93	628.28	899.51	2711.11	601.12	2305.84
Ecuador								
t-stat	8.00	8.00	7.94	8.00	7.57	5.15	7.51	4.62
Std. Err.	15.43	18.23	20.37	18.23	26.51	116.06	27.13	212.56
P-Value	0	0	0	0	0	0	0.00	0
IC:low	93.36	110.26	121.95	110.26	148.98	370.55	150.76	563.85
IC:up	153.88	181.77	201.85	181.77	252.95	826.36	257.14	1400.75
Mexico								
t-stat	21.98	20.58	19.52	20.58	17.78	9.54	22.07	9.71
Std. Err.	16.74	20.51	23.36	20.51	29.23	138.73	16.53	131.19
P-Value	0	0	0	0	0	0	0	0
IC:low	335.36	382.07	410.36	382.07	462.7	1052.05	332.64	1017.08
IC:up	401.01	462.49	501.96	462.49	577.32	1596.32	397.46	1531.76
Peru								
t-stat	38.80	38.14	37.37	38.14	36.12	25.68	38.80	25.01
Std. Err.	11.75	14.81	17.38	14.81	21.29	100.63	11.74	112.49
P-Value	0	0	0	0	0	0	0	0
IC:low	433.15	536.09	615.51	536.09	727.42	2386.93	432.81	2593.19
IC:up	479.24	594.18	683.65	594.18	810.92	2782.16	478.86	3035.11

Source: Authors calculations using Income and Expenses National Surveys

A.3. GINI Measurements

Table 14. GINI Measurements by Expenses for Brazil

Poor Class

	Birsall	OECD	Brandollini	Grabka	Solow	Mod. Solow	PPP Based	Daza-Cortes
GINI	0.24	0.22	0.23	0.24	0.22	0.25	0.22	0.27
Mean Income	170.98	122.41	142.90	162.06	113.49	178.14	38.75	215.53
Middle Class								
GINI	0.08	0.17	0.16	0.12	0.25	0.34	0.28	0.28
Mean Income	383.87	359.40	404.66	408.97	439.11	835.03	291.78	899.85
Rich Class								
GINI	0.40	0.38	0.37	0.38	0.34	0.24	0.38	0.26
Mean Income	1,365.37	1,532.00	1,638.68	1,532.00	2,086.01	5,198.12	1,550.67	4,491.46

Source: Authors calculations using Income and Expenses National Surveys

Table 15. GINI Measurements by Expenses for Colombia

Poor Class								
	Birsall	OECD	Brandollini	Grabka	Solow	Mod. Solow	PPP Based	Daza-Cortes
GINI	0.24	0.22	0.23	0.23	0.22	0.24	0.25	0.27
Mean Income	136.95	95.83	113.57	129.26	95.11	146.76	36.64	206.98
Middle Class								
GINI	0.09	0.17	0.16	0.12	0.22	0.31	0.29	0.27
Mean Income	296.81	280.83	315.70	317.16	333.03	590.49	275.00	806.56
Rich Class								
GINI	0.37	0.36	0.35	0.36	0.33	0.24	0.33	0.22
Mean Income	948.74	1,077.98	1,164.12	1,077.98	1,403.75	3,474.40	1,324.21	4,088.35

Source: Authors calculations using Income and Expenses National Surveys

Table 16. GINI Measurements by Expenses for Ecuador

Poor Class								
	Birsall	OECD	Brandollini	Grabka	Solow	Mod. Solow	PPP Based	Daza-Cortes
GINI	0.16	0.13	0.14	0.15	0.14	0.17	0.13	0.24
Mean Income	133.31	97.42	113.00	126.57	107.15	142.35	46.45	208.81
Middle Class								

GINI	0.08	0.17	0.16	0.12	0.20	0.28	0.28	0.26
Mean Income	251.81	234.36	263.18	266.73	276.80	463.03	253.38	766.35
Rich Class								
GINI	0.34	0.33	0.32	0.33	0.30	0.23	0.29	0.23
Mean Income	730.75	835.52	905.23	835.52	1,030.46	2,424.92	1,162.07	3,883.46

Source: Authors calculations using Income and Expenses National Surveys

Table 17. GINI Measurements by Expenses for Mexico

Poor Class								
	Birsall	OECD	Brandollini	Grabka	Solow	Mod. Solow	PPP Based	Daza-Cortes
GINI	0.20	0.19	0.19	0.20	0.19	0.21	0.20	0.23
Mean Income	166.96	115.96	138.54	158.37	126.28	181.19	41.15	229.18
Middle Class								
GINI	0.08	0.17	0.16	0.12	0.20	0.29	0.26	0.27
Mean Income	335.95	316.32	355.01	358.30	373.89	636.36	295.96	800.09
Rich Class								
GINI	0.37	0.35	0.35	0.35	0.33	0.26	0.34	0.25
Mean Income	1,026.07	1,172.80	1,274.70	1,172.80	1,484.69	3,710.08	1,318.50	4,302.36

Source: Authors calculations using Income and Expenses National Surveys

Table 18. GINI Measurements by Expenses for Peru

Poor Class								
	Birsall	OECD	Brandollini	Grabka	Solow	Mod. Solow	PPP Based	Daza-Cortes
GINI	0.20	0.17	0.19	0.20	0.18	0.21	0.14	0.22
Mean Income	200.85	143.03	166.36	190.09	153.33	222.30	45.66	246.51
Middle Class								
GINI	0.08	0.17	0.16	0.12	0.17	0.20	0.24	0.23
Mean Income	413.59	399.64	444.77	509.64	433.34	630.75	333.51	725.30
Rich Class								
GINI	0.21	0.20	0.19	0.20	0.19	0.14	0.20	0.10

Mean Income	867.49	986.54	1,074.66	986.54	1,078.17	1,934.38	953.63	3,079.41

Source: Authors calculations using Income and Expenses National Surveys

Table 19: GINI Measurements by Income

Middle Class Size in Brazil								
	Birsall	OECD	Brandollini	Grabka	Solow	Mod. Solow	PPP Based	Daza-Cortes
GINI	0.08	0.17	0.16	0.12	0.23	0.33	0.24	0.28
Mean Income	566.26	530.15	596.27	601.91	638.71	1,175.98	342.42	928.94
Middle Class Size in Colombia								
GINI	0.09	0.17	0.17	0.13	0.24	0.32	0.27	0.27
Mean Income	408.38	384.74	433.91	436.02	458.73	835.53	302.26	871.29
Middle Class Size in Ecuador								
GINI	0.08	0.17	0.16	0.12	0.21	0.30	0.28	0.26
Mean Income	270.39	252.74	283.75	285.96	303.35	527.65	262.70	797.18
Middle Class Size in Mexico								
GINI	0.08	0.17	0.16	0.12	0.20	0.27	0.23	0.27
Mean Income	474.06	448.47	500.62	504.45	522.62	862.43	340.98	852.73
Middle Class Size in Peru								
GINI	0.08	0.17	0.16	0.12	0.21	0.25	0.27	0.25
Mean Income	473.77	454.49	512.02	509.64	507.30	818.80	320.11	839.08

Source: Authors calculations using Income and Expenses National Surveys

Table 20: GINI Measurements by Expenditure

Middle Class Size in Brazil								
	Birsall	OECD	Brandollini	Grabka	Solow	Mod. Solow	PPP Based	Daza-Cortes
GINI	0.08	0.17	0.16	0.12	0.25	0.34	0.28	0.28
Mean Expenditure	383.87	359.40	404.66	408.97	439.11	835.03	291.78	899.85
Middle Class Size in Colombia								
GINI	0.09	0.17	0.16	0.12	0.22	0.31	0.29	0.27

Mean Expenditure	296.81	280.83	315.70	317.16	333.03	590.49	275.00	806.56
Middle Class Size in Ecuador								
GINI	0.08	0.17	0.16	0.12	0.20	0.28	0.28	0.26
Mean Expenditure	251.81	234.36	263.18	266.73	276.80	463.03	253.38	766.35
Middle Class Size in Mexico								
GINI	0.08	0.17	0.16	0.12	0.20	0.29	0.26	0.27
Mean Expenditure	335.95	316.32	355.01	358.30	373.89	636.36	295.96	800.09
Middle Class Size in Peru								
GINI	0.08	0.17	0.16	0.12	0.17	0.20	0.24	0.23
Mean Expenditure	413.59	399.64	444.77	509.64	433.34	630.75	333.51	725.30

Source: Authors calculations using Income and Expenses National Surveys