



ASOCIACION ARGENTINA
DE ECONOMIA POLITICA

ANALES | ASOCIACION ARGENTINA DE ECONOMIA POLITICA

XLVII Reunión Anual

Noviembre de 2012

ISSN 1852-0022

ISBN 978-987-28590-0-8

ASSESSING THE MEASUREMENT OF THE
MIDDLE CLASS: ARGENTINA 1991-2006

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Assessing the Measurement of the Middle Class: Argentina 1991-2006¹

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Abstract: In spite of its social and political relevance, economic studies of the middle class are scarce, mostly due to the conceptual and methodological difficulties in agreeing on a notion that allows empirical researchers to measure it, make valid comparisons or track its temporal evolution. Using data from Argentina, this study aims at assessing the performance of several practical notions on income based middle class. The dramatic changes suffered by the income distribution of this country during the last twenty years provide a suitable setting for this kind of analysis.

Resumen: A pesar de su relevancia social y política, son escasos los estudios económicos sobre la clase media, debido en gran parte a las dificultades conceptuales y metodológicas que impiden acuerdos mínimos necesarios que permitan a los investigadores empíricos realizar mediciones, hacer comparaciones válidas o analizar su evolución en el tiempo. Usando datos sobre Argentina, este estudio tiene por objetivo evaluar la *performance* de varias nociones prácticas de clase media basadas en el ingreso. Los cambios dramáticos sufridos por la distribución del ingreso de este país durante los últimos veinte años proveen un escenario adecuado para este tipo de análisis.

JEL classification: D3, I3, D6

Keywords: middle class, distribution, Argentina

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1. Introduction

Middle class studies have regained relevance in the academic research agenda during the past few years. Recent studies like Ravallion (2010), Atkinson (2011) and Duflo (2010) are indicative of the fact that the traditional focus on poverty-related issues of income inequality is shifting to this specific segment of the income distribution. The middle class as a group has occupied a relevant place in the political science or sociology literature. In the economic literature, the motivation for this kind of studies relies mostly on the importance assigned to the middle class in the political process. Larger middle classes do not only yield an improvement in the distribution of income but also play a crucial role in terms of reducing polarization within the society, thus diminishing potential sources of conflict. Some authors (like Birdsall *et al.*, 2000), point to the importance of their political support and economic participation in terms of the sustainability of market-oriented growth and poverty reduction in the long term.

In spite of this general agreement on the importance of middle classes in the political, social and economic processes, the economic academic community is far from having reached a minimum consensus on some operational and conceptual definitions that allow for the measurement of this segment of the income distribution. The issue is critical since differences in conceptualizations and definitions may point to different –and even contradictory- conclusions in terms not only of the size and well-being of the middle class but of its trend across time as well as inter-country comparisons.

This lack of agreement seems to be driven by the same conceptual concerns that affect the empirical literature on the measurement of poverty. Even in the simplified case of income based poverty, identification requires agreement on an either relative (like a quantile) or absolute threshold (an exogenous poverty line) below which individuals are rendered as poor. The vast literature on the advantages and shortcomings of alternative poverty measures is illustrative on these difficulties. Lack of conceptual or operational agreement on a particular definition of the poor may lead to diverging characterizations of poverty in a country. Armed with slightly different operational definitions of the poor, two objective observers may lead to dramatic different conclusions regarding the temporal evolution of poverty or inter-country comparisons. Indeed, Szekely *et al.* (2000) show that the poverty rate in Latin America ranges 12.7 to 65.8 based on alternative definitions and methodologies, *with exactly the same data.*

All these concerns seem to be exacerbated for the case of the middle class, since its operational definition now requires agreeing on an *upper bound*, above which lie the rich, or those rich enough to be considered out of the middle class. Furthermore, the particular dynamics defined by the combination of the lower and upper thresholds chosen (whether absolute, relative or both) open the door to the existence of composition effects, an issue that does not affect poverty analysis.

Strikingly, the literature on the middle class is almost inexistent, as compared to that in closely related topics like poverty or income inequality, which received considerable theoretical and empirical attention, especially for Latin America, a region widely known for its dramatic levels in these dimensions. In particular, the literature on poverty has relied on several conceptual and practical arguments to deal with this wide array of methodological possibilities. A major step forward is provided by the literature on the invariance of poverty measurements to alternative shapes of the distribution of income, who concludes that measures built to satisfy a basic group of axioms should remain invariant to a wide range of distributions of income. A second, related but less formalized argument, is that in many cases the goal is not to measure the level of poverty but its *evolution* over time. Hence, it might be the case that though suggesting markedly different levels of poverty for a certain region, the evolution depicted by these alternative measures coincide. A similar concern holds for the problem of measuring inequality. For example, Gasparini and Sosa Escudero (2001) show that for the case of Argentina, alternative measures of inequality suggest the same temporal evolution between 1991 and 1994, but lead to alternative perceptions of this evolution during the period 1994-1998.

Given this lack of agreement, it seems natural to explore the reliability of currently available characterizations of the middle class aimed at providing a sensible representation of its *temporal evolution*. In one extreme, all measures of the middle class might differ in their levels but reveal the same temporal behavior, so in spite of being unable to provide consistent measures of the level (size or performance) of the middle class for a particular point in time, they are useful to quantify its evolution. On the other extreme case, each measure suggests different levels and patterns, being a reflection of alternative conceptualizations of the importance and evolution of the middle class.

In order to isolate the key issue of this paper, we focus on the temporal evolution of the middle class for one particular country: Argentina. This case is important not only because middle class issues are especially sensitive in this case² but most importantly for our

² Argentina remained an exception to the rest of Latin America by growing a large middle class during the second half of the 20th century. Nevertheless, this middle class is claimed to have shrunk during recent decades. See

purposes because it provides an exceptional setting for any income distribution analysis. Argentina diverges from the relative stability that characterizes the income distribution across countries, in which changes in this sense can only be evaluated by assessing significantly long periods. This country's moving distribution allows for a careful analysis of changes of the middle class in the last decades. In Argentina, the assessment of changes in the income distribution is less like "watching the grass grow", as Aaron (1978) described the phenomenon, and more like "hearing the grass grow" as asserted by Sosa Escudero and Petralia (2010).

The analysis performed aims at contributing to the existent literature with a rigorous empirical analysis of the consequences of adopting different income-based measures of the middle class. Disentangling the potential differences across measures may be revealing of the analysts' social preferences. Furthermore, focusing on Argentina will also allow for a thorough descriptive analysis of the middle class phenomenon in that country as well.

The rest of the article is organized in the following way: the following section describes the welfare indicator to be used as well as the measures of the middle class that are reviewed and the aggregation indicators chosen. Section 3 focuses on the dataset while section 4 presents the main empirical results. The last two sections conclude and point towards future research.

2. Measuring the Middle Class

As already stated, the analysis of the middle class in economic terms mirrors many of the difficulties that the poverty literature has dealt with. Thus, it seems wise to replicate the procedures upon which this literature has agreed on³. The same fundamental steps are to be followed: (i) the definition of a wellbeing indicator; (ii) the identification of the middle class among the total population; (iii) the construction of an index of the middle class using the available information.⁴ Each of these steps involves the definition of conceptual and methodological issues which are discussed below.

(i) Welfare indicator

New York Times, 11/12/2011, "What Latin America can teach us" and La Nación, 04/07/2004 "Crisis y Clase Media: cuando poco queda en pie".

³ Sociological approaches to the middle class are certainly longstanding and relevant. They are usually based on alternative conceptualizations of the middle class, such as occupational structure. Although recognizing the fundamental importance of such analysis, in light of the aim of the present study we will only focus on income-based characterizations of the middle class.

⁴ The identification of the latter two problems in the poverty literature is due to Sen (1976).

In light of our purposes – that is, assessing different measures of the middle class– the first of the exposed problems will not be explored in detail. We will base our analysis on a simple and reproducible income measure. Even though the copious literature on multidimensional welfare points towards the limitations of income to characterize wellbeing, income is still vastly used as a practical proxy to quantify welfare and its related notions like poverty or inequality. In light of the alarming scarcity of studies on the middle class, we will focus on income to concentrate the analysis on the comparison of alternative measures of the middle class. Certainly, extending the comparison to alternative and likely multivariate conceptions is a relevant topic for further study that exceeds the scope of this paper.

With this simple income welfare indicator in hand, we can turn to an extended discussion of the second and third steps involved in middle class analysis: the definition of a criteria for belonging to the middle class and the construction of some measure of wellbeing for those that satisfy that criteria.

(ii) Identification

In terms of the identification of the middle class, a number of different economic definitions have been advanced, mostly mirroring the evolution of poverty analysis. Cruces *et al.* (2010) synthesize the different criteria adopted such as they are used in the applied literature and following the seminal classification proposed by Foster and Wolfson (2010). Broadly speaking, middle class economic definitions can be grouped into five categories: central tendency, absolute, relative, mixed strategies and polarization definitions. We make a brief description of them, referring to Cruces *et al* (2010) for further discussion.

Central tendency (CT) measures have been the pioneering criteria used in middle class studies. They were originally designed to assess the claimed decline of the middle class in the US and other developed countries as from the '80s. These definitions classified as middle class those individuals whose income fell within some range involving the median, being typically symmetrical around it. Although the lower and upper bound have been set in several ways in different contexts, the literature seems to have converged to the interval from 75% to 125% of the median, as proposed by an influential early paper by Thurrow (1987).

Ravallion (2009) points to the risk of applying definitions suitable for rich countries to those in the developing world. He proposes the extension of absolute poverty lines, setting u\$2 (PPP) as the lower bound and u\$13 (PPP) as the upper bound. The lower bound builds on the theoretical development of absolute poverty lines: it is based on nutritional requirements and non-food needs, reflecting the median of poverty lines in 70 developing countries. The upper bound is the US poverty line, which ensures that no one considered “poor” in the US could

be classified as rich in developing countries. Banerjee and Duflo (2008) establish a similar measure, ranging from u\$2 (PPP) to u\$10 (PPP).⁵ Quite recently, and following studies focused on vulnerability to poverty (López-Calva and Ortiz-Juarez, 2011), new (higher) thresholds have been proposed. For instance, Loayza et al. (2012) set the lower threshold at u\$10 a day, following the idea that the behavior of those individuals lying close to the poverty line, whether classified as poor or middle class, may not differ. The authors avoid establishing a richness line arguing that it might lead to artificially small middle classes in rich countries. Instead, the forthcoming regional Flagship Report of the World Bank for Latin American and the Caribbean define U\$50 (PPP) a day as the upper middle class threshold, while keeping the U\$10 a day as the poverty line.

Several relative measures have been proposed in the literature as well, based on quantiles of the income distribution, typically leaving out the lowest and highest deciles or quintiles. The idea guiding this kind of partition is that the first two deciles are classified as poor by most of the above mentioned absolute measures and that the upper two deciles are capturing the long tail of the income distribution. Barro and Easterly (2001) propose classifying as middle class those who lie between the 3rd and 8th decile of the distribution.

Additionally, mixed strategies have been advanced in the literature. For instance, Sosa Escudero and Petralia (2010), propose the application of an absolute measure for the poverty line and a relative notion in the richness line. In particular, they use the national poverty line as a bottom bound and the 90th percentile as the upper threshold. The middle class are trivially the mirror of the poor leaving out those included in the farthest right part of the distribution. In line with this hybrid definition of the middle class, Birdsall (2010) establishes u\$10 a day as the lower bound on the grounds that, even though admittedly ad-hoc, it ensures the minimum income to ensure economic security and thus leaving space for the individual to exercise political rights. The upper limit is set at the 95th percentile arguing that in this way the portion of the population whose income most likely comes from sources other than productive labor (such as inherited wealth, past or current economic rents, etc) is excluded from the middle class.

Polarization measures can also be found in the literature, such as in Cruces *et al.* (2010). These definitions focus on identifying groups that are distant from each other but that have a similar internal composition.⁶

⁵ The authors actually define two alternative segments as well, U\$4-U\$10 and U\$6-U\$10.

⁶ Other endogenous measures based on cluster and principal components analysis as well as subjective and multidimensional measures of the middle class have been advanced but are not considered in this work in light of the aim at hand.

MIDDLE CLASS MEASURES				
Type	Definition	Specifics	References	Accronyms
Absolute	Based on absolute thresholds.	2 to 10 USD (PPP)	Banerjee y Duflo (2007)	BD
		2 to 13 USD (PPP)	Ravallion (2009)	RA
		10 to 50 USD (PPP)	Forthcoming LAC Flagship Report (The World Bank)	FL
Relative	Based on quantiles of the income distribution.	3rd to 8th decile	Barro (1999); Easterly (2001)	BE
Mixed Strategies	Based on absolute and relative thresholds.	Lower bound: official poverty line Upper bound: 90 th percentile	Sosa Escudero and Petralia (2010)	SP
		Lower bound: 10 USD (PPP) Upper Bound: 95 th percentile	Birdsall (2010)	BIR
Central Tendency	Based on measures of central tendency.	75% to 125% of median income	Thurrow (1987)	CT
Polarization	Based on polarization measures.		Cruces et al. (2010)	PLZ

As expected, all of these measures present advantages and shortcomings. CT measures have been criticized on the grounds of being suitable for rich countries but not for developing ones. Ravallion (2009) asserts that it is questionable to center a middle class measure around the median since it most probably reflects a lower bound for developing countries. Furthermore, it is impossible for any measure to evade some degree of arbitrariness. Absolute lines are more explicitly discretionary and thus harder to justify. The poverty literature is certainly not short of this type of criticisms, which are even more severe in the middle class analysis: poverty lines may have a straightforward interpretation as they are based on survival needs (although this is highly debated as well), but how are richness lines to be constructed? Some kind of agreement in this sense seems to be farther yet. Relative measures do not only suffer from the arbitrariness problem as well (which quintiles or deciles are to be called “middle class”?) but also are of no use in measuring the trend of the middle class across time: by definition, the middle class always represents the same proportion of the population. The mixed strategy mentioned seems to avoid some of these problems:

although some degree of arbitrariness is maintained, the definition of the richness line is only implicit and even though a relative notion is applied to defining the rich, the size of the middle class is allowed to move across time. Furthermore, the SP measure avoids another problem posed by all the other ones: the double classification of the poor. Those classified as poor by following the national poverty line are classified as poor by the SP measure as well. Instead, central tendency, absolute and relative definitions may incur in a misclassification: those considered poor by the national poverty line may be classified as middle class also. Polarization measures may suffer from this problem as well.

(iii) Aggregation

The third step in middle class measurement is the construction of an index that reflects some feature of the middle class using the information provided in the previous stage. In this study we will focus in three different criteria for assessing the wellbeing of the middle class: its *size*, its *mean income* and its *share of income*.

The *size* of the middle class refers to the proportion of individuals classified as belonging to the “middle class”⁷ according to each of the measures under analysis. Although a very intuitive concept, two caveats should be borne in mind. Firstly, this will be an irrelevant criterion for relative measures since by definition the size of the middle class is fixed across time. Secondly, this criterion might not be as straightforward as it is in poverty analysis. The shrinking of the size of the poor is univocally a sign of improvement, and the opposite is true as well. Instead, for certain definitions of the middle class, an enlargement or a decrease of its size may not be good or bad sign in themselves: it depends on whether the phenomenon is produced by people falling from richness into the middle class or by improving their condition from previous poverty.

The second criterion for evaluating welfare is its mean income. That is, the evolution of the mean income of those classified as middle class by each measure is followed across time. In this second criterion the focus is set not on what proportion of the population is defined as middle class but rather how those that are classified as such fared during the past two decades. It might be the case that while the size remained stable (which would lead to the conclusion that the middle class wellbeing did not increase) its mean income increased, yielding a positive assessment of the evolution of the middle class wellbeing. Naturally, this indicator becomes relevant for relative measures which can show variability. Conversely, absolute measures may not provide significant information when following this criterion, since the mean income for these measures is rather exogenously fixed.

⁷ This would be an extension of what is known in the poverty literature as “headcount index”.

Finally, the income share of the middle class will be used as an indicator to assess the evolution of its welfare. That is, the income share of those classified as middle class relative to the income of the total population. Once again, it could be the case that both the size and the mean income of the middle class remain unaltered across time while its income share may show some variation. While the first two indicators would lead to the conclusion that the middle class' welfare did not improve, the later would point to a positive assessment.

3. The data

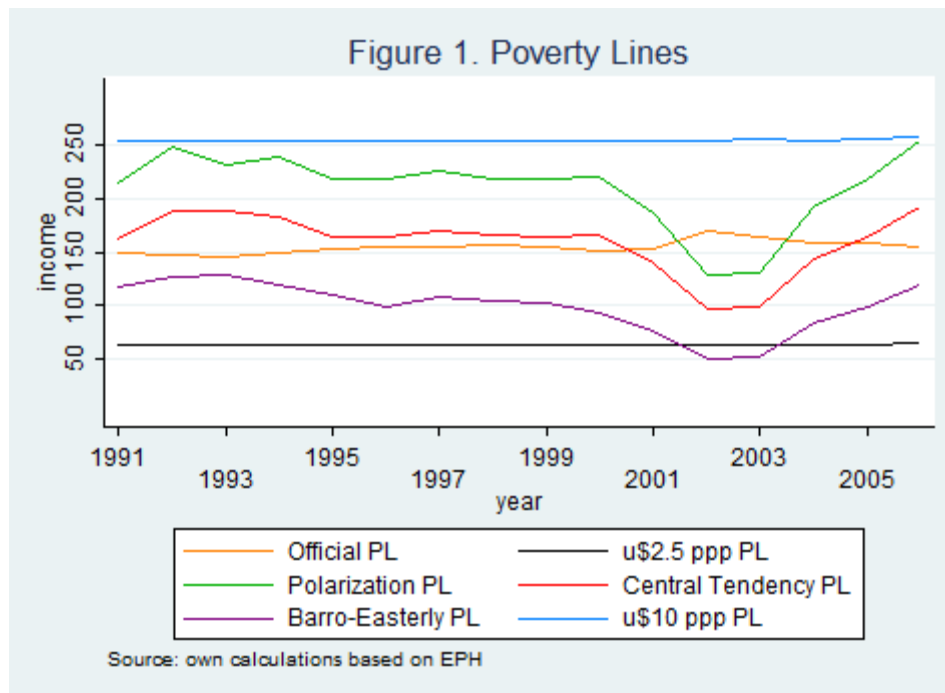
The income micro data used comes from the *Encuesta Permanente de Hogares* (EPH), which covers labor as well as self-employment income and monetary transfers. In particular, the analysis will be based on data for Greater Buenos Aires (GBA), rather than for the country as a whole. Questioning regarding the representative nature of the data may rapidly arise. Gasparini and Cruces (2009), however, show that the evolution of aggregate distribution figures remains virtually unaltered to the inclusion of all regions.

The income definition used throughout this analysis is per capita income, deflated by the official price consumer index. Taking into account the fact that the focus is set on measuring trends rather than levels, no further adjustments have been made (such as equivalence scales or underreporting adjustments for instance).

4. Empirical results

a. Lower and Upper Thresholds

A thorough understanding of the middle class' measures evolution requires having in mind the lower and upper thresholds established in each of the definitions (implicit in some of them), as well as their relative evolution. Figure 1 shows the poverty lines for all the measures under consideration, expressed in Argentine pesos (deflated to 2005):



As expected, two types of lines can be observed in the figure: stable and more volatile thresholds. The first group includes absolute poverty lines (whether the official one or the u\$2 or u\$10 a day) while the second group is made up of time varying lines, such as relative or those derived from polarization or central tendency measures. A first striking fact is that the official poverty line lies above most of the other thresholds at some point, in some cases across the whole period (u\$2, the poverty line for RA and BD, and the implicit poverty threshold in BE), yet for others for some sub-period between 2002 and 2004 (implicit lines in PLZ and CT). This feature is of particular relevance. In those cases in which some threshold lies below the official one, a double classification problem will occur: individuals deemed poor by the national definition will be counted as part of the middle class. Note that for the case of BD and RA measures this double classification is present along the whole period. In contrast, only three out of the eight measures under evaluation do not incur in this double classification problem: SP, BIR and FL. The SP case is trivial since its lower threshold is defined as the official poverty line. BIR and FL lower threshold lies above the national poverty line across the whole period.

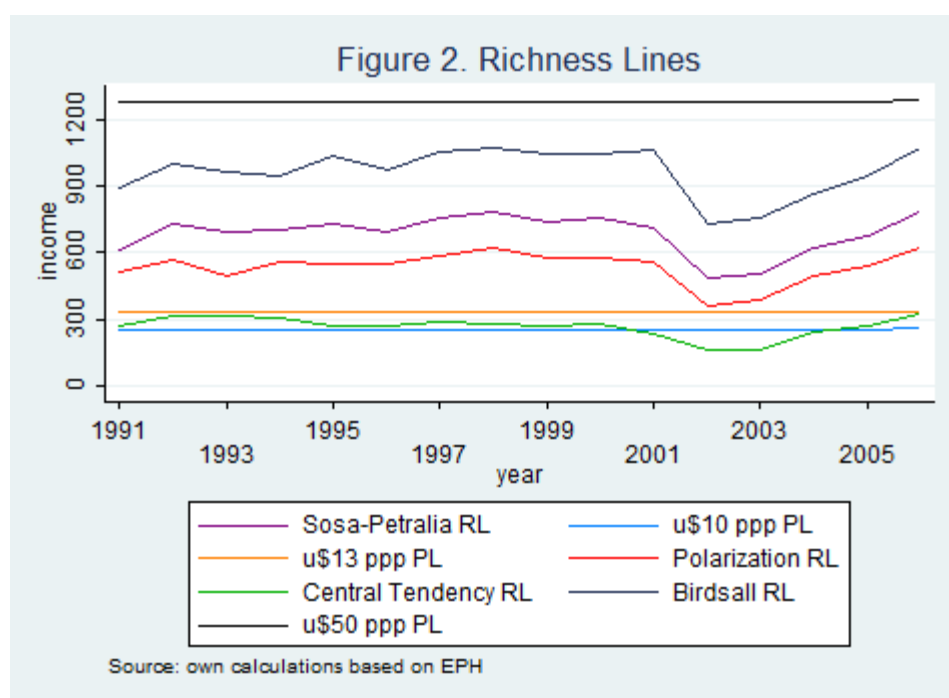


Figure 2 shows the upper bounds for all measures. Here again the difference between absolute and other kinds of thresholds results clear: trivially the former are stable across time in contrast to the latter. In terms of their evolution during the period they follow a simpler path than the lower thresholds: except for the CT and BD measures, none of them intersect. The u\$50 a day limit imposed in the WB's Flagship Report represents the highest threshold, followed by BIR, SP and PLZ measures. The lowest measures are represented by the u\$10 and u\$13 a day and the CT one. Notice that the "richness" line established by BD coincides with the poverty line in the BIR and FL definition.

It is also relevant to analyze the joint effect of both thresholds for each measure. In particular, it is important to understand how the ranges defined by each measure compare to the rest. As previously noted, the different levels chosen for both limits will in all cases provide discrepancies in classification (i.e., an individual may be classified as belonging to the middle class by one definition while being poor (or rich) for another one). Despite these differences, for almost all of the measures some degree of agreement exists. That is, for some income range all of the definitions classify individuals in the same way, whether poor, rich or middle class. However, in two particular cases this does not occur. The first case corresponds to the BD and the FR and BIR measures. As noted previously, the higher limit imposed by the former (u\$10 a day) represents the lower limit of the FR and BIR measures. This means that for the whole period those classified as middle class by BD will be deemed poor by the other two definitions. The same applies to the CT definition, although only for a brief period:

between 2001 and 2004 all the individuals defined as middle class by the CT measure are considered poor by the FR and BIR measures.

With this clear understanding of the thresholds defined by each measure we now turn to assess the temporal evolution of the middle class. As mentioned above, three aspects will be analyzed: its *size*, its *mean income* and its *income share*.

b. The Size of the Middle Class

The most natural way to assess how the argentine middle class fared during the last decades is to follow its size across time. Though less intuitive than for poverty measurement, the proportion of people that are classified as middle class seems a good criterion to evaluate the ups and downs of this segment of the distribution.

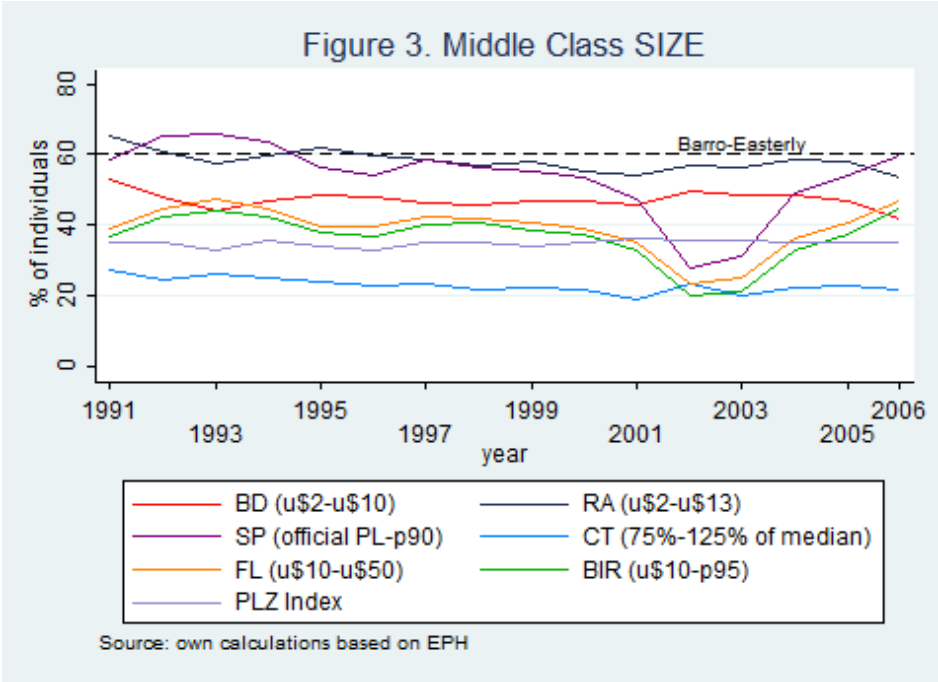
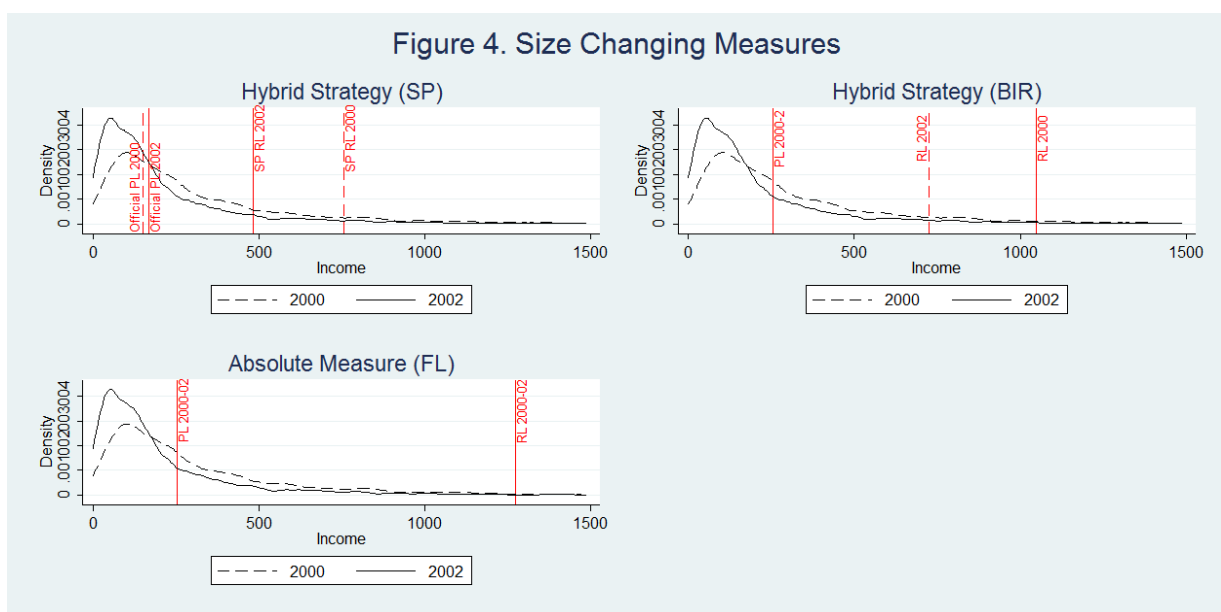


Figure 3 presents the headcount index for each of the measures described before, using the data from the EPH, from 1991 to 2006.⁸ Surprisingly enough, no signs of deterioration of the middle class can be found when comparing 1991 to 2006. Despite showing different levels and although some measures show some variation, for most of them the size in both ends of the period under study are almost the same.

⁸ As stated before, this type of index is not suitable for relative measures such as Barro and Easterly's, since by definition they comprise a fixed percentage of the population. Nevertheless, we have included it as a reference.

Furthermore, the size of the middle class remains pretty stable across the period. Even during the terrible crisis of 2001, five out of the eight measures under revision remain virtually unaltered. Only the SP, FL and BIR measures show a deterioration-recovery pattern during the 2001-04 period. This divergence is indeed interesting since disentangling the reasons for these differences might be revealing in terms of the social analysts' preferences. The natural questions that emerge are: what is driving these –apparently- contradictory results? Are the different measures conveying opposite information? Or are they actually measuring different things? In any case, which of them is most suitable for assessing the course of the Argentine middle class' size? The drastic changes in the Argentine income distribution occurred in the period 2000-04 present a unique opportunity to give a thorough answer to these questions.

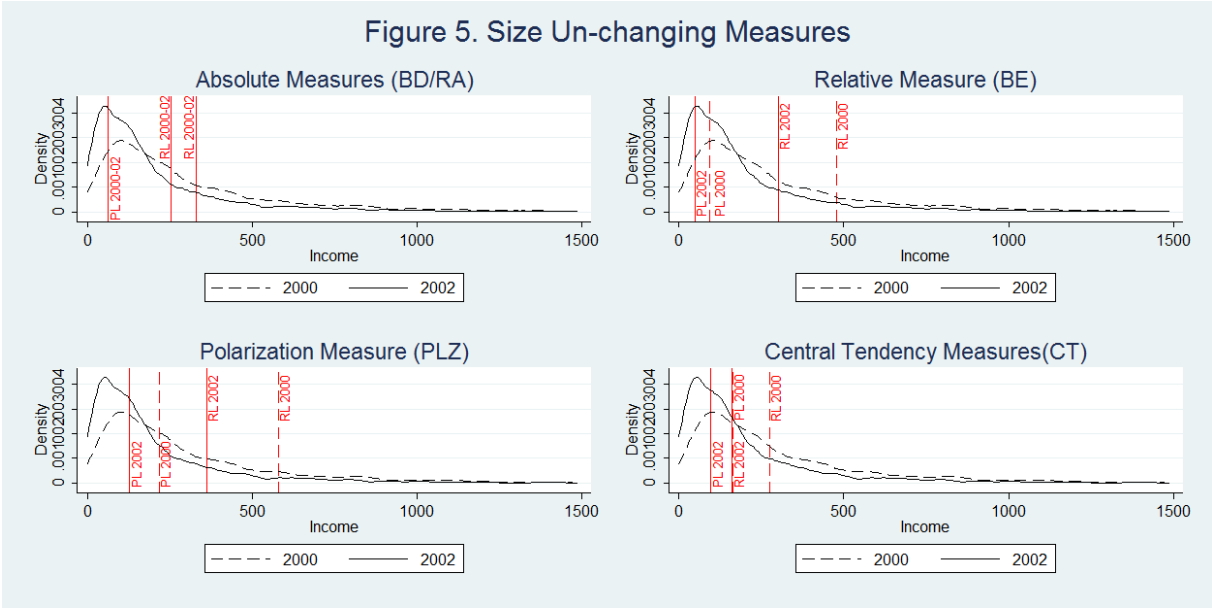


The basis of the deterioration-recovery pattern shown by SP, FL and BIR measures during the 2001-04 period resides in two different features of these definitions. On the one hand, the absolute nature of these definitions' lower thresholds imply that the poverty lines remain high during this period (see Figure 1). The official poverty line even shows a slight peak during the period. As can be seen in Figure 4 these high thresholds combined with an income distribution that shifts to the left during the crisis implies that many middle class families fall into poverty. This reclassification of families into poverty, however, is not enough to explain the middle class size contraction. Indeed, a composition effect could be in place: the loss of middle class families falling into poverty could be compensated by an increase derived from previously "rich" families falling into the middle class.

Therefore, the particular definition of the upper threshold for these measures is also a relevant factor in explaining the variation of the middle class size during the 2001-04 period. At this point it is worth recalling that while SP and BIR measures follow a hybrid strategy by

combining an absolute lower threshold with a relative upper one (90th and 95th percentiles respectively), the FR measure follows the traditional absolute approach by defining u\$50 a day as its upper limit. It is thus quiet trivial to note why the SP and BIR do not suffer from a composition effect: by construction both measures leave a percentage of the richest individuals out of the middle class. That is not the case, however, for the FL measure, since it is fixed by definition. Nevertheless, Figure 4 shows why this is not relevant: the upper threshold lies far to the right of the income distribution and in a rather flat region. The 1.7 percentage points decrease of the ‘rich’ was not enough to compensate for the 17 percentage points increase in poverty.

Conversely, PLZ, CT, RA and BD measures show no variation (or even a slight increase) during the 2000-04 period, as it is appreciated in Figure 3. It is important to recall that these four measures differ in their definition of the thresholds: while RA and BD rely on absolute (fixed) lines, PLZ and CT are more of a relative nature, since their dependence upon features of the income distribution makes them change when it shifts. Therefore, although both groups of measures show –a surprising- stability across the 2001-04 period, the reasons underlying this behavior differs.

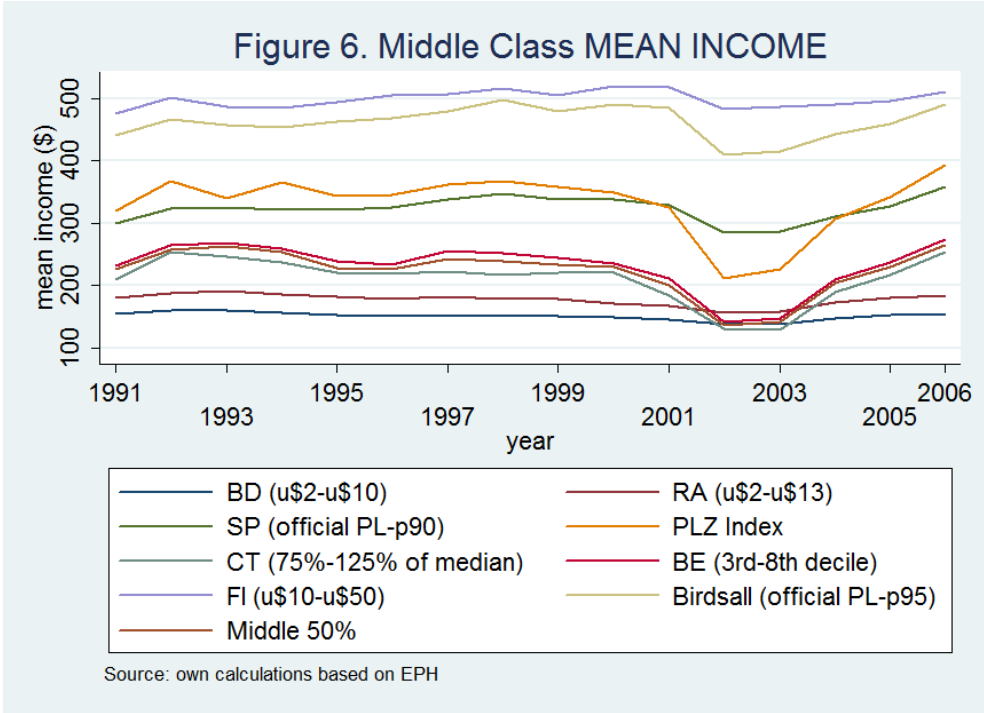


PLZ and CT measures’ stability is based on their relative definition of both thresholds. Indeed, it can be observed in Figures 1 and 2 that both the poverty and richness lines fall during the period. Figure 5 shows how this mimics the shift of the income distribution to the left, leaving the size of the middle class virtually unaltered. The extreme case for this source of stability of the size of the middle class is represented by the BE measure: by construction, the upper and lower thresholds mimic the movements of the income distribution so as to keep its size unaltered at 60%.

RA and BD measures' stability, however, cannot be explained by this argument since both their upper and lower thresholds are fixed. In this case, the aforementioned composition effect is in place: while the distribution moves to the left, many middle class families fall into poverty while many rich families become middle class. For instance, RA shows a decrease in the rich class from 30% to 17% between 2001 and 2002, as well as an increase in poverty from 16% to 26% for the same period. This leaves room for only a small –and noticeably positive- variation in the size of the middle class of about 3 percentage points (54 to 57 per cent).

c. The Mean Income of the Middle Class

Taking the mean income as an indicator of the middle class rather than its size allows for drawing conclusions on the middle class welfare during the period under analysis, rather than of its size⁹. That is, the middle class may show no signs of deterioration between 1991 and 2006 in terms of the number of individuals classified as such but their welfare may have changed.



It is surprising, however, that the evolution of the middle class mean income seems to convey a very similar message to the one revealed by its size. In fact, as it was true for the size of the middle class, Figure 6 shows no sign of deterioration of its mean income across the period under analysis. When comparing both ends, the middle class' mean income

⁹ Trivially, analyzing the middle class' mean income rather than its size allows for relative measures such as BE to vary.

seems to have either remained stable (RA, BD) or have slightly increased (for all the rest) although for all measures levels differ. Furthermore, when looking at the middle class' mean income almost all measures seem to convey a surprisingly similar pattern across the period. For all of them, the 90's seem to have been a rather stable period for the middle class income. From 2001 to 2004, while largely differing in levels the same decay and rapid recovery pattern is detected by almost all measures: the only two that remain stable during these years are RA and BD. Once again, this divergence provides a good opportunity to study the different social preferences behind the measures.

For some measures (SP, BIR, FL) the middle class not only shows a decay-recovery pattern in terms of size but also in terms of its mean. This follows a clear logic in the case of BIR and SP: by definition, the upper thresholds move left when the income distribution does so, shrinking the middle class mean income. The FL case is different: both thresholds are fixed. In this case, the decrease of the middle class mean income in 2002 relies upon the shift to the left of the income distribution.

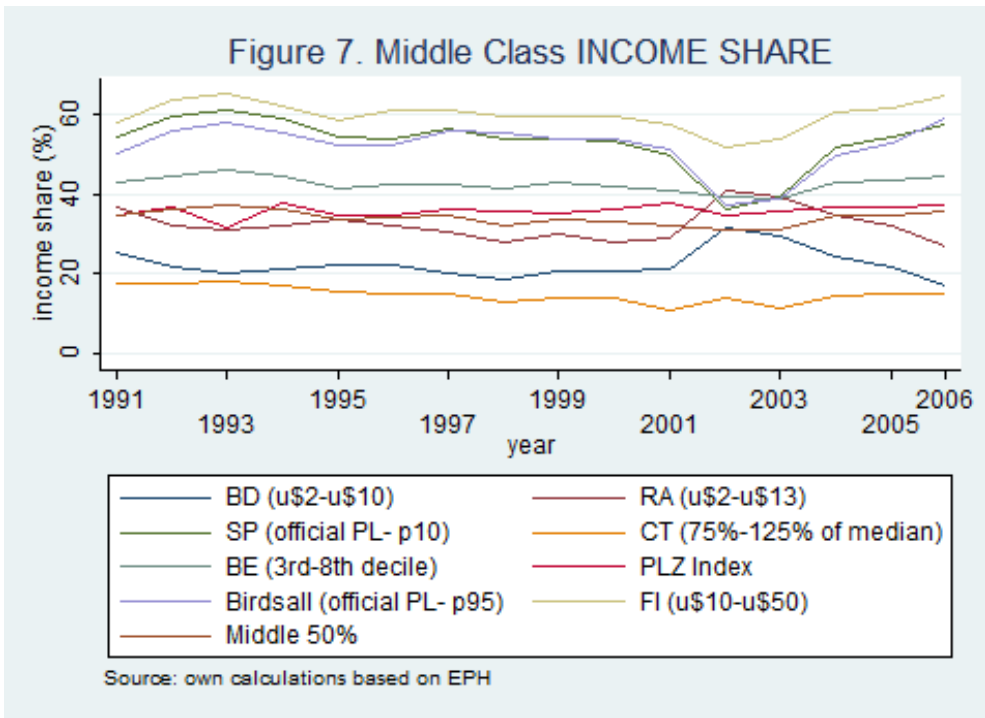
Yet for other measures (BE, PLZ, CT) although the size of the middle class remained unaltered across the period, its mean income suffered drastic changes. This is trivial in the case of BE (the measure is designed so as to reflect changes in the middle class welfare rather than of its size which is, by definition, fixed), but not so for the PLZ and CT measures. The logic behind these changes is, however, the same: while the size of the middle class is the same, the thresholds are reduced during the critical period, which results in a poorer middle class. This can be clearly observed in Figure 5. A surprising feature of these measures is the similarity, both in their path and in levels, of PLZ and SP measures on the one hand and CT and BE measures on the other, as shown in Figure 6.

Two of the measures (BD, RA), instead, conclude that not only did the middle class size remained stable through the crisis, but also its *mean income*. This apparent stability arises from two sources: the fixed nature of the thresholds and the composition effect noted in the previous section. Both features determine a narrow window for changes in the mean income. As stated before, the FL measure, although defined by fixed thresholds as well, does reflect a downward movement during the crisis. In this case, the high upper bound implies that the left shift of the income distribution is not compensated in any way: both the size and the mean income decline during the crisis.

As it was the case in terms of the middle class' size, Figure 6 also shows that a measure defining the middle class as the "middle 50%" of the income distribution does a very good job in summarizing all of the other ones.

d. The Income Share of the Middle Class

In contrast to the absolute measures of the middle class wellbeing conveyed by both the size and the mean income, the income share gives us information on the relative status of the middle class, as compared to the rest of the individuals in the economy (i.e., the rich and the poor). Indeed, we concluded from both indicators that the Argentinean middle class seemed to occupy the same place in 2006 than in 1991. Nevertheless, this could be compatible with a deterioration regarding the other “classes” (the poor and the “rich”): for instance, the middle class’ mean income may have remained stable in absolute terms but it may have dropped (or increased) when compared to the other groups. The income share of the middle class is revealing of this feature of its well-being which allows us to make a more complete description of the path followed by the argentine middle class.



The first striking feature of the previous figure is that measures seem to disagree much more in their assessment of the middle class welfare than they did when we looked at its size and its mean income. Three types of measures can be distinguished. On the one hand, BE, PLZ and CT measures show a very stable course of the middle class’ income share (although of course, differing in levels). It not only seems that the income share in 2006 was the same as in 1991, but also that it remained pretty stable across the whole period. On the other hand, SP, FL and BIR measures show improvements: the 2006 income share of the middle class appears to be higher than the one it held in 1991 (despite differing not only in levels but also on the size of the improvement). All three measures show as well a sharp decay-recovery

pattern during the crisis. Finally, RA and BD measures are the only ones to convey a pessimistic message: the middle class' income share has diminished in 2006 regards that in 1991. Furthermore, and most surprisingly, they show an improvement and decay of the income share of the middle class during the 2001-4 period.

What are these differences revealing? Are they conveying contradictory messages or are they simply measuring different things? Which of them are most suitable for understanding the Argentine middle class' course over the past years?

SP and BIR depict an almost indistinguishable path. Indeed, both measures reflect the same changes: the income share of the middle class drops in favor of the poor (whose income share increases 14 percentage points from 2000 to 2002) and slightly in favor of the rich (3 percentage points increase in both measures). This derives from the fixed poverty thresholds which imply a large displacement of previously middle class individuals into poverty, increasing the poor's income share.

Even though the FL measure follows a similar path to SP and BIR, it is different in two ways: its level is higher and, most importantly, the shrinkage and recovery of the middle class income share during the crisis is not so profound. The difference is that this measure has a fixed upper threshold: some of the so called "rich" by SP and BIR (see Figure 4) are falling into the FL's middle class compensating the income share that is lost to the poor.

RA and BD measures act as a mirror to these measures. In fact, they reveal an improvement of the income share during the crisis rather than shrinkage. Although surprising at first, this is totally consistent with the conclusions of the precedent paragraphs. The misclassification problem is at work: a large portion of individuals classified as middle class by RA and BD are defined as poor by SP while *all* of them are deemed poor by BIR and FL measures. Then, if for SP, BIR and FL the income share of the middle class was decaying in 2002 in favor of the poor, it is only natural that RA and BD show an increase during the period. Indeed, the income share of the RA/BD middle class is increasing in detriment of the rich class (which would largely be the middle class for the other measures).

CT, PLZ and BE follow a rather stable pattern, resembling their assessment of the middle class size. The same logic is operating: the relative thresholds are mimicking the income's distribution shift to the left, leaving the income share of the three groups virtually unaltered.

Trivially, once again, the crude "middle 50%" definition of the middle class represents a rather good summary of all other measures: it is found right in the middle of all of them.

e. Performance of Middle Class Measures

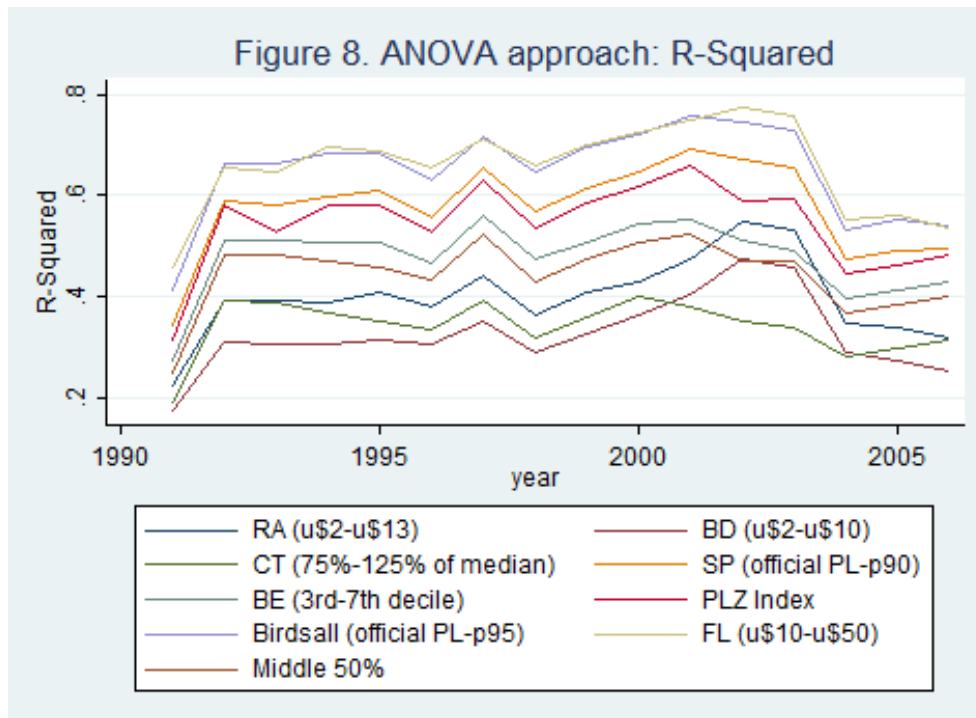
A further step in exploring the reliability of currently available characterizations of the middle class in providing a sensible representation of its temporal evolution is needed. In particular: up to which point they are able to identify the middle class as a group statistically different from the rest? In fact, it seems natural that for analysis about income groups to make sense, they should be clearly distinguishable in the first place.

In this section we follow an ANOVA approach which allows the assessment of the different measures in terms of their capacity to identify statistically different groups. We depart from the null hypothesis that there is only one group contrasting this with the idea that there is at least more than one.

Implicitly, all of the measures under revision define a “poor” and a “rich” group. We thus define the so called “poor” as the base category and run regressions where income is the dependent variable and two dummy variables represent the other two groups (i.e., the “rich” and the “middle class”). This is repeated for each measure, for each year:

$$income_i = \beta_0 + \beta_1 MiddleClass_i + \beta_2 RichClass_i + u_i$$

The R^2 of these regressions yields information on the portion of the income variability that is explained by the partition into groups as defined by the different measures. In particular, an R^2 of 1 would imply that there are only three levels of income and that it is possible to perfectly predict an individual's income from his/her classification in a certain group. Conversely, an R^2 equal to 0 would lead to the conclusion that the chosen partition is not relevant at all to explain the variations in income, that is, that there is only one group.



On the one hand, some of the conclusions that can be extracted from Figure 8 seem to be confirmatory of the previous analysis. In particular, SP, FL and BIR are the measures that retain the highest R^2 across the whole period. This is consistent with the fact that these measures are the only ones that perform reasonably well during the 2001-02 crisis: for all of the indicators taken (size, mean income and income share) these measures follow a decay-recovery pattern during this period. As expected too, BD, RA and CT are the lowest performing measures, that is, they are the ones that do worst at identifying groups that differ from each other. The three measures had already demonstrated to be inadequate measures for the Argentinean middle class. BA/RD set too low thresholds thus including many individuals that are classified as poor by the other measures which lead to almost invariant results in all dimensions and even an improvement of the middle class income share during the crisis. CT's thresholds implied a way too narrow middle class, which only showed some sign of decay-recovery pattern in terms of mean income. It is surprising, however, that the PLZ measure does not perform at the top: the measure is designed so as to identify groups that retain the highest degrees of polarization, that is, of separation among groups. Once again, the "middle 50%" stands as a good summary of all measures.

The ANOVA analysis performed is implicitly pointing to the distance existing among the groups. It is possible then to think of the R^2 as an "alienation" measure: the higher the R^2 , the more separated are groups among them. In this sense Figure 8 leads to a surprising conclusion: alienation among groups seems to have increased during the 90's with a peak during crisis. Separation among groups seems to have decreased since then but the

alienation levels have not returned to those in 1991: for all measures, the R^2 is higher in 2006 compared to 1991.

This is certainly a novel feature of the Argentinean middle class in 2006: although in many dimensions it stands in similar levels to those in 1991 (size, mean income and income share), the deterioration in terms of alienation is evident.

5. Conclusion

In spite of the importance gained in the academic research agenda during the last years, middle class measurement is far from having reached the minimum conceptual and methodological agreement that characterizes contemporary poverty studies. The challenges posed by the need to establish an upper threshold –necessarily more arbitrary- as well as the particular dynamics generated by the combination of thresholds chosen render the issue all the more thorny.

Although this wide state of disarray may imply different characterizations of the middle class at a given point in time, the different measures may be consistent when assessing the middle class evolution across time. Conversely, if different patterns arise, they may be revealing of diverse social preference of the analysts. An assessment of the temporal evolution of the middle class seems then an appropriate way to evaluate the different conceptualizations.

The multiple dimensions of the problem at hand require a particular setting that permits to isolate the principal issue in the paper. In particular, only income based measures were selected and were evaluated for just one country. Argentina was chosen since its permanent changes in the income distribution allow for assessing the temporal evolution even for not so long periods.

Eight measures were revised, such as they are used in the applied literature. This included absolute measures (RA, BD, FL), relative (BE, PLZ, CT) and hybrid strategies (SP, BIR). For each of these measures, the evolution of the middle class' size, its mean income and its income share were computed.

The analysis yields certainly interesting conclusions both in terms of an assessment of the middle class measures as well as providing empirical evidence of the course fared by the argentine middle class.

Regarding the former, SP, BIR and FL measures seem to be the most adequate conceptualizations of the middle class for a country such as Argentina. They convey a consistent picture of its evolution across critical periods such as the 2001-02 crisis, in all of the dimensions evaluated. Furthermore, they are the ones that perform best in the ANOVA analysis, that is, they are better at identifying the middle class as a separate group from the rest. It is surprising that although differing in levels, these measures follow the same pattern across the period. The different thresholds chosen certainly explain the diversity of levels, but it is not obvious that patterns should be similar, since they are based on alternative conceptions. A preliminary conclusion points to the fact that possibly what is important in defining the middle class is establishing an absolute poverty line and an upper threshold that, whether absolute or relative, is set in the thin portion of the income distribution.¹⁰ It is also important to note that of the three only the SP measure is compatible with a local definition of the poor. In fact, FL and BIR measures are not even compatible with international notions of poverty (they set the lower threshold at u\$10 PPP, when usual practice defines u\$1 or u\$2 as poverty lines). FL and BIR measures leave a portion of individuals “unclassified”: they are not poor (either by national or international standards) nor middle class. Furthermore, the markedly high upper thresholds set by BIR and FL (leaving only the richest 5% out of the middle class for the former and even less than that for the latter – see Figure 2) question to which extent the range contained by these measures are to be defined as “middle class”.

PLZ and BE measures, although based on different approaches, yield similar results in all dimensions. Nevertheless the patterns depicted by them are not consistent with the ones reflected by the previous three measures in all dimensions. In terms of size and income share, they differ for the period of 2001-04. In particular, they reveal a stable pattern which does not seem plausible considering the dramatic crisis the country went through in those years. Another preliminary conclusion arises: following relative approaches on both thresholds implies that the lines mimic the movements of the income distribution across time, impinging either the size or the income share to reveal the actual welfare of the middle class. It should be noted, however, that in terms of mean income, they are totally consistent with the three measures mentioned in the previous paragraph.

Three of the measures seem to be inadequate for analyzing the Argentine middle class in the 1991-2006 period: CT, BD and RA. All three perform quite low in the ANOVA analysis. The former reveals too narrow a middle class in all dimensions: *size*, *mean income* and *income share*. Furthermore, following a relative approach on both thresholds, it depicts the same

¹⁰ A relative upper threshold, however, presents a further advantage: the size of the middle class becomes a more straightforward indicator of its wellbeing since an increase can only be the result of an improvement in the income of the poor.

inconsistencies of BE and PLZ measures: it shows a totally stable picture of the *size* and *income share* of the middle class during the crisis, while allowing for a decay-recovery pattern only in terms of its *mean income*. It seems then that Ravallion's cautionary note should not be overlooked: importing measures from rich countries may not be suitable for developing ones. Regarding BD and RA measures, they are inconsistent with the first three measures in all dimensions. In this case, the reason underlying the inconsistencies relies on the fact that both thresholds are at the same time fixed and too low. This implies that both lines are set in a very dense area of the income distribution. Being fixed, movements in the income distribution imply large composition effects which prevents from revealing the actual welfare of the middle class in any dimension. Furthermore, these measures deeply suffer from the misclassification problem: they are capturing a lot of individuals regarded as poor by all other measures. Consequently, they are more probably reflecting changes in the welfare of the – not so- poor than of the middle class. Therefore, an extended version of Ravallion's advice seems to apply: measures should be tailored to the country of interest, rather than importing ones that are suitable for other contexts. Careful assessment of where the thresholds are to stand as well as the approach to be used is fundamental to ensure that the identified group is indeed compatible with a reasonable notion of the middle class. Otherwise, it is possible that the conclusions drawn actually refer to other groups, such as the poor or the rich.

Finally, the “middle 50%” measure, crude and simple as it seems, reveals a good summary of the middle class course during the period. Although not consistent with the decay-recovery pattern of the 2000-01 crisis in terms of size and income share, it still delivers a good account of the temporal evolution of the middle class in all dimensions. Even in terms of the ANOVA analysis it performs around the middle.

The analysis performed also sheds some light on the course followed by the Argentine middle class during 1991-2006. The popular view claims that the middle class' wellbeing has deteriorated across the period: is this compatible with a temporal assessment based on income definitions of the middle class?

Disregarding CT, RA and BD measures due to their lack of adequacy to the Argentinean context, the remaining measures depict a quite consistent panorama across all dimensions. In particular it is rather surprising to note that there are no signs of deterioration of the Argentinean middle class during the period under analysis. All measures indicate that the Argentine middle class in 2006 either had the same levels than fifteen years earlier or that it even enjoyed improved levels, in terms of size, mean income and income share.

Furthermore, all measures show the same stable path during the 90's, in all three dimensions. This stability, however, was broken in the period 2001-2004, which shows a clear decline-recovery pattern dimensions corresponding to the terrible crisis Argentina went through in 2001-02. For some measures this decay and rapid recuperation is present in every dimension (SP, FL, BIR) yet for others (BE, PLZ) it is clear in the course of the middle class' mean income, while for the reasons exposed in the corresponding sections they reveal a stable pattern in terms of size and income share.

It is true, however, that the conclusions drawn regarding the fortune of the middle class during 1991-2006 could be only reflecting the economic cycle, and not changes particular to that group¹¹. In that context, the results shown by the ANOVA analysis are rather surprising, and maybe more consistent with the popular view: the alienation levels of the middle class seem to have increased across the period, with a peak during the crisis, but by 2006 they had not returned to 1991's levels.

6. Further research

The present study aimed at assessing several income-based measures of the middle class, while providing some stylized facts of the fortune this group fared in Argentina during 1991-2006. Future analysis should focus on robustness while extensions to subjective and/or multidimensional measures would be most interesting: identifying middle class through income alone may be too 'slippery'-even more than for the poor. Other dimensions, such as the role of property and occupational structure proposed by Atkinson and Brandolini (2011) may be particularly interesting to examine.

Finally, the development of an axiomatic approach to defining an index for measuring the middle class, such as the one defined by Sen (1976) for poverty is certainly needed. It would help to disentangle the identification problem (i.e., the measures under revision) from the aggregation issue (i.e., the dimensions used to evaluate the measures) without having to resort to the assessment of the temporal evolution of the middle class. Even if some of the axioms applied to the poverty indexes may be suitable, many of them will need to be tailored to the particular characteristics of the middle class.

¹¹ In this sense, only the income share of the middle class is indicative of its standing within the total population, which shows a picture similar to the one presented by the size and mean income indicators.

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