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Abstract

Economic downturns give rise to unexpected employment shocks that can reshape the distribution of population income, and hence produce a "middle-class squeeze". However, there is limited empirical evidence testing the latter. This paper aims at testing the 'middle-class squeeze' hypothesis drawing from unique data from the Luxembourg Income Study (LIS) for several years, including the period of the Great Recession, and the Integrated Values Study (IVS) obtained by merging data from the World Value Survey (WVS) and the European Values Study (EVS). We examine the association between changes in unemployment in a recession drawing upon a heterogeneous set of both income and middle-class definitions as well as an extensive list of controls and different recession periods. Our findings suggest no robust evidence that recessions produce a middle-class squeeze, though they increase the share of the population regarding itself as 'middle class'. The effect is heterogeneous to the baseline unemployment at the time of a recession, country spending on social protection and middle-class measurements and definitions. However, when we restrict our analysis to the recent Great Recession, we do find some evidence of a 'middle-class squeeze'.

JEL-Codes: F220, I300, J640.

Keywords: middle-class size, economic recessions, employment shocks, income distribution.

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1. Introduction

There is ample agreement in the literature that a large middle-class size is a protective feature against socioeconomic and political instability. For instance, support for democracy is more likely to endure in countries with a relatively large middle-class size (Barro, 1999). Similarly, countries with a larger middle class are more likely to boost innovation, entrepreneurship and productivity (Acemoglu and Zilibotti, 1997) by stimulating human capital accumulation (Alesina and Perotti, 1996, Doepke and Zilibotti, 2005) and upward mobility (Easterly, 2001)[2] alongside reducing so-called 'latent class conflicts'(Thurow, 1984). Some evidence has suggested the idea of a 'flattening out' of the middle class (Kroll, 2011), but so far the evidence is scarce, let alone the identification of its underlying mechanisms. Among the potentially exogenous determinants, macroeconomic conditions top the list (Pressman, 2007), and more generally, unexpected 'economic shocks' affecting households incomes such as unemployment shocks, which can be argued to lead to a so-called 'middle-class squeeze'. The latter has received limited consideration in the academic literature, this in contrast to the more than occasional attention received from the media.

This paper examines the effect of an (unexpected) employment shock (an employment change during a recession) on both the share of income of the middle class and the size of the middle class. We examine an employment shock in a recession as well as the effect of specific recessions (e.g., the Great Recession), and whether the so-called 'middle-class squeeze' is heterogeneous to the specific middle-class measure, and/or country investments on social protections institutions. We consider different measures of middle-class size and sources of income. A recessionary period is defined as at least two consecutive quarters of negative quarter-on-quarter growth in seasonally

[2]However, this might differ between developed and developing countries. Banerjee and Duflo (2008) finds that what characterizes the middle class in developing countries setting is primary having stable employment.

adjusted real GDP (Keegan et al., 2013). Likewise, we distinguish the effect of genuine recessionary periods from the rest. The Great Recession, which was triggered in 2007 by the US subprime mortgage crisis, was the worst global recession since World War II. It started in December 2007 in the U.S. and ended there in June 2009; however, only during 2009, the world economy was in a state of global recession in the sense that a decline in World GDP per capita was observed. The Great Recession led to a sharp decline in international trade, a rapid rise in unemployment in many countries, and slumping prices for many commodities. To measure fluctuations in unemployment directly associated with the Great Recession we follow Keegan al. (2013) and quantify the unemployment change in the recessionary period, 2007- 2009.

We consider that in western countries, the income effects of economic shocks can be accommodated both via wage bargaining and labor regulations and, especially, through redistributive social transfers and social protection interventions (e.g, unemployment subsidies, social benefits and subsidized public services) (Dallinguer, 2013). Similarly, we consider that the effect of an economic recession is likely to depend on the duration and depth of recessions. That is, whilst short lasting recessions might have negligible effects and can be easily accommodated by credit mechanisms that counteract liquidity constraints, such credit mechanisms might not persist when recessions are long lasting. However, some recessions give rise to specific policy interventions such as austerity cuts (e.g., the Great Recession) to reduce the size of the public deficit. Hence, the magnitude of the hypothetical squeeze of the middle classes after a recession largely depends on both the nature of a recession as well as the institutions in place to accommodate its impact.

In documenting the effect of a recession on the size of the middle class we need to reach some consensus about its measurement. Broadly speaking, middle-class measures are divided between those grounded on income or consumption measures (e.g., defined by an income cut-off point relative to a poverty measure, or to the income distribution in a given population) and those based on

broader social definitions (e.g., occupation status and class and income self-perception). Both definitions capture different features of what we mean by 'middle class' (Atkinson and Brandolini, 2011). Unsurprisingly, sociological definitions are generally more stable measures of occupational or self-perceived status, whilst income based definitions are typically time varying and heterogeneous by income category (e.g., labor income, disposable income etc).

In this paper, we hypothesize that a recession with a deep and lasting effect might indeed exert an influence on middle-class size irrespective of different definitions. We take advantage of a long list of income and social definition of middle-class measures and definitions, and we draw upon different definitions of middle class size employing data from the Luxembourg Income Study (LIS) as well as data jointly drawn from the World Value Survey (longitudinal files covering Waves 1 to 6 for the 1981-2014 period) and European Values Study (longitudinal files covering waves 1 to 4 for the period 1981 – 2008) referred henceforth as integrated Values Study (IVS).[3]

We do not find evidence of a 'middle-class squeeze' resulting from an unexpected employment shock, namely an economic recession interacted with the unemployment rate, with the exception of an effect for the recent 'Great Recession' on labor income. The effect is robust to alternative specifications controlling for the depth and duration of the recessions. Nonetheless, the effect is heterogeneous across income based middle-class definitions. Importantly, we find a larger share of the population regarding itself as a middle class after a recession.

The paper is structured as follows. The next section reports a summary background discussion on middle class and recession measurement respectively. Section three contains a description of the data and methods employed. Section four reports the study's results and a final section concludes.

[3] More detail on how the measures from the IVS have been constructed in the Data section of the paper.

2. Measuring the size of the Middle Class

The middle class is not an obvious category, with a straightforward meaning. It is a multi-dimensional concept that can be identified from individual based consumption, income and wealth data. However, there is no consensus on its definition (Casehll, 2007). The US Census Bureau publishes figures breaking down the income distribution into quintiles, and defines the middle class' based on choosing a set of more or less central quintiles. However, it is possible to employ a number of different definitions.

2.1 Income-based approaches: (i) inequality and (ii) size

We can summarize income based approaches in two main categories: (i) inequality-based and (ii) size-based measures (Atkinson and Brandolini, 2013).

2.1.1 Inequality-based measures

Middle class's inequality measures are based on fixing first a middle section of the income distribution as one qualifying the middle class and then estimating the share of total income owned by the predefined section. In this paper, we use two main definitions. We measure the percent income owned by the population (i) in the 3^{rd} quintile (ii) in the 2^{nd} to 4^{th} quintile of the income distribution. In doing so we follow, for example, Easterly (2001), who considers the income share of the three middle quintiles (leaving out the poorest 20% and the richest 20%). Alternatively, Solimano (2008) defines a broader middle class comprising individuals belonging to deciles 3 to 9.

2.1.2 Size-based measures

Size-based measures basically invert the methodology outlined above by fixing first a threshold around an average or median statistic of the population and then, estimating the percentage population contained within the pre-determined threshold. By following Atkinson and Brandolini

(2013) we refer to middle class' size as the percentage of the population that falls within the 75 and 125 percent of median income thresholds. We also adopt an alternative version, where we use, respectively, 60% and 250% as lower and upper bounds.

In developing countries, the middle class can be defined in terms of income cut off points. Ravallion (2009) proposed expenditure thresholds per capita for measuring the developing world's middle class. He argued that the relevant threshold should range between households with per capita consumption at or above $2 a day per person (which is the median poverty line for 70 developing countries) and households at or below $13 a day per person. Birdsall (2007) defined the middle class as those who consume above $10 per day (PPP) but whose expenditure lay below the ninetieth percentile of the income distribution in their own country. Keeping the lower threshold too high also tends to underestimate the size of the middle class in developing regions, such as the measures proposed by Ferreira (2013) in which lower the threshold was $10 per capita per day. One of the limitations of the definitions based on specific income thresholds lies in that they cannot be generalized. The exception is Kharas (2013), who defines a threshold ranging between 10 and 100US$. Particularly problematic is the threshold, as when it's too high it underestimates the size of the middle class. However, in any event, the choice of a threshold is arbitrary.

More generally, income based definitions of middle-class size can draw on absolute values ranging between a lower and upper-income threshold, being the lower income thresholds the poverty line. Lopez-Calva and Ortiz-Juarez (2011), drawing on a vulnerability to poverty approach, define the middle class as households facing a very low risk of falling into poverty over time. Alternatively, relative definitions are based on the number of individuals above or below a certain quintile of income, typically excluding the lowest and highest quintile (Easterly, 2001) which gives rise to the so-called "middle 60 per cent" (Atkinson and Brandolini, 2011). One of the problems with absolute

class definitions is that a stable class would be sensitive to a year to year income volatility which might affect size over time. Atkinson and Brandolini (2011) show that different definitions of the middle class can significantly alter the middle-class size of different countries. In addition, they show that, although accounting for wealth can make a non-negligible difference, wealth based measures are problematic as they exclude a considerable share of the middle class that is typical, 'asset poor'. Finally, by using the deciles breakdown of income shares available from the Luxembourg Income Study (LIS), we also run similar tests by only including the income share of the middle 3rd quintile.[4]Another more commonly applied relative measure includes individuals whose expenditure lies between 75 and 125 per cent of the society's median per capita income[5].

2.2 Sociological Approaches

One can define the middle class drawing on sociologically based definitions which typically refer to either occupational structure (Goldthrope 1987) or self-reported class and income groupings. However, the former are more stable over time, whilst the latter are more likely to vary, if individuals update their perceptions with information on their actual income. Ferreira et al. (2003) adopted a more subjective approach, based on self-reported class membership, and derived the lower threshold based on the lowest income level at which most people regarded themselves as belonging to the middle class. Interestingly, the lowest income threshold to which most people identified themselves as middle class in their study was similar to the results obtained by Lopez-Calva and Ortiz-Juarez (2011) using the probability of vulnerability to poverty approach (around $10 per day

[4] The alternative strategy would be fixing first the income deciles as middle class' definition, and looking at the percentage of the population within the income pre-established brackets. This is done, for example, by Pressman (2007) who adopts a uniform definition of middle class (i.e. households receiving between 75% and 125% of median household income, adjusted for family composition), to study the income evolution overtime in several countries and by using the LIS database as well.

[5] Alternatively, one could first fix the income brackets and then calculate the percentage population within the income bracket defined as middle class. However, this second definition has an important drawback. It can be argued that people living the income bracket defined as middle class are in fact moving upwards instead downward the ladder so that observing a shrinking middle cannot be easily interpreted as being something desirable or not. Our approach is less exposed to this type of criticism as we measure the income share owned by a predefined segment of the population defined as middle class.

per capita). However, the self-reported class structure is influenced by the perceived income distribution in the country which might be culture specific, and hence limits its use for cross country comparisons. Belonging to the middle class is an appealing idea individuals wish to belong to and might be tempted to classify themselves as such in the presence of welfare states that provide access to public health and education alongside housing and secure retirement as well as labor market regulations. We use the IVS individual survey data to build country-level measures of middle-class self-perception.

Overall, and despite the large literature on middle-class size and its socioeconomic effects, the evidence evaluating the effect that, recessions more generally, and Great Recession, in particular, had on middle-class size is skinny. This paper attempts to fill this gap, especially considering the unusual depth of the recessions cycle started in 2007, unique since II World War in developed countries. Our results suggest two main findings. First, recessions have a negative, but rarely significant, direct effect on our measures of middle class' size. Second, the effect of the Great Recession was large and significant, suggesting the unparalleled nature of the latest Great recession in squeezing middle class' wealth in the Western world.

3. Data and Empirical Strategy

This section describes the data and the methodology employed. Our dependent variable considers a number of different definitions of middle-class size.

3.1 Middle-class measures from LIS data

We exploit inequality and size-based middle-class measures by using income distributions from the Luxembourg Income Study (LIS) household database, referring to the 1980-2013 period. Our sample draws initially from 197 micro-data sets, but we include only countries with more than 5 LIS

datasets. The sample size is then extended to 405 country-level observations by applying linear interpolations for missing observations between years of a given country. Details on the middle class and income measures used are given in the three following subsections.

3.1.1 LIS: inequality-based measures of middle class

We constructed middle-class definitions based on whether individuals' incomes fall (i) between the 2nd and 4th quintile (2to4) or (ii) within the 3rd quintile of the income distribution (3). For simplicity, we refer to these measures as being inequality-based. More specifically, we measure middle class as the percentage of income within the second to fourth quintile of the population's income distribution. Similarly, we measure middle class' inequality using only the income shares within the sole 3rd quintile of the income distribution. Threshold is chosen referring to previous literature mentioned in the introductory section of the paper.

3.1.2 LIS: size-based measures of middle class

Second, we measure middle-class size in term of the proportion of the observations (population weighted) of the sample within predetermined income brackets. In particular, we determine the income bracket using median income as a reference. In doing so, we produce a “small-size” (S) measure when referring toa commonly used middle-class measure as the percentage of population contained in the threshold between 75% and 125% of the median income, and a “big-size” (B) middle class’s measure reporting the percentage the population weighted share of the sample falling within 60% and 250% of the median income value as lower/upper bounds with poverty and affluence. Although upper bounds are more difficult to identify, the lower bounds used as 75 or 60% of the median find quite a common agreement as threshold points between middle class and poverty threshold (Atkinson and Brandolini, 2013).

3.1.3 LIS: variations of (i) inequality and (ii) size-based measures according to income types

Given the importance of measuring the effects of different sources of income, we take advantage of the quality of data provided by LIS. LIS enables us to use different types of measures of income. In building our inequality and size-based measures, we employ different measures of *income types*. Indeed, each middle class measure is defined in several definitions of income, depending on the type of income we want to take into account.

In particular, we use three measures of income types. Throughout the paper and in variables ‘names:

- DHI stands for Disposable Household Income
- HIL refers to measures based only on Labor Income;
- MI defines Market Income.

We followed the LIS guidelines to build such measures. To avoid confusion, we left the same name in the variables we use as they appear in LIS. Labor income (HIL) is directly available from LIS, and it is in fact labelled *hil*. Market income (MI) is derived as: *market income (mi) = factor income (hic + hill) + hit* where *hic* means income from capital, and *help* are private transfers. These last two are instead directly available from LIS. Disposable income (dhi) is computed as *dhi = market income (hil + hic+ hitp) + hitsi + hitsu -hxit + hitsa),* where *hitsi* are transfers from social insurance, *hitsu* are transfers from universal benefits; *hitsa* represent transfers for social assistance, and finally *hxit* are tax payments.

Second, we define the variables depending income measured at the household level, per household component by dividing by household size, or by counting only partially household's size as a normalizing factor, where we used a factor of 0.5.We give here three examples on how to read our variables:

- *Raw* means total household income, and it is the measure of income directly obtained when not utilizing the additional information available from household's size. It can be disposable, labor, or market-based.
- *Eq* means equivalised income, obtained by dividing the RAW measured by the household's number of members raised to the power of 0.5 (equivalising factor). This is, as we know, the most common factor used, though other factors between the (0,1) interval can be used. In this way household's size is controlled as a protective factor of a member's income.

- *Pc* stands for per capita and means the average, or per-member income of the household. Another way to look at this measure is as an equivalised version where the equalizing factor chosen is 1.

Finally, all measures are obtained by applying top-bottom coding (> 0 and <= 10 times the median value of the distribution) to the income data and using the observations' appropriate population weights to report to one country's population in adherence with the LIS guidelines. It is worth noting, pension payments are excluded in all measures. We also draw age breakdowns, which are not reported for space reasons and do not add much evidence to the one reported in the paper.

3.2 IVS and WVS: Measures of self-location in income deciles and class self-perception

Another source of micro data allowing to build middle-class measures are the World Value Survey (WVS), the European Values Study (EVS) and the data set obtained by appending the two sources and called the Integrated Values Study (IVS).The first variable employed, available both from the WVS and EVS, is variable X047 "Scales of Incomes" asking the respondent to self classify herself into a deciles-scale from one (lowest step) to ten (highest). In this way, and taking into account the problems stemming from self-classification, we compute the percentage of respondents by a country that self-classify into the 3rd quintile or into the 2nd to 4th quintile. This measure thus is consistent with a subjective size-based measure of middle class, though we had to adopt a different methodology than in LIS because we do not have measures of median income in this case. In doing this we obtain 307 measures for countries and different years, interpolating the missing ones according to the LIS sample, and building 405 country-year observations.

A second strategy has been by utilizing variable X045, "Social Class Subjective" a variable spanning from value 1 "Belonging to the upper class" to 5 "Lower Class". In this case, we build two

measures of the middle class. The first takes into account only the percentage of respondents self-classifying as “Upper Middle Class”, and another summing the percentages of those self-classifying both as “Upper Middle Class” and “Lower Middle Class”. Here we ended up with only 207 country aggregates because this question is available in WVS but not in EVS, and again, reported to the 405 observations sample through linear interpolation.

3.3 Measures of Recession

The identification of a recession is computed from quarterly growth-rates of seasonally adjusted GDP from the OECD dataset to create the recession and recession’s derived variables. In particular, rates are calculated by following the GPSA method, i.e., the quarter-to-quarter growth-rate method.

Following the official definition, a recession is identified from a dummy variable which equals to 1 if country *i* in year *j* experienced two or more consecutive quarters of negative growth. From the recession variable, we computed categorical variables for:

- *Depth (DE)*: this was first calculated as the absolute value of the average negative growth rate of the recessive wave. This variable was then codified in three categories depending on the growth rate being between 0 and 2.5, 2.5 and 5, and above 5.
- *Duration (DU):* this measures the number of consecutive quarters of negative growth. This variable was then codified in five categories depending on the growth rate belonging to the intervals (0,1], (1,4], (4,7], (7,10] and strictly above10 quarters.

We also created a dummy variable Great Recession (GR), a dummy capturing the period 2006-

2008 as the onset of the Great Recession. This variable, interacted with the recession dummy, helps in singling out all recessions happened at the onset of the Great Recession and testing for a specific effect of those recessions with respect of recessions falling outside of the period 2006-2008.

3.4 Other control variables

Also from the OECD database, we use the unemployment rates (U) and run regressions that interact the unemployment rate with recessions (R).We control also for per capita GDP (PcGDP) and demographic characteristics as population(POP), percentage of the female population(F), percentage of labor force owning a secondary and tertiary degree with respect to the overall population (EDU), and age dependency ratio (ADR).

[Insert Table 1 – Descriptive Statistics - about here]

4. Empirical Strategy

We draw on the country and year specific variation in middle-class size as our baseline linear specification which makes up a panel of OECD countries.

4.1 Baseline estimates

In our baseline model the independent variable(s) is (are)MC_{it}^{j}defined as middle class' measure j in country i at time t and regressed on unemployment rate U_{it}, on the recession dummy R_{it}, and on their interaction $U \times R$. Equations 1.1 to 1.3 show, respectively, the use of the recession dummy (equal to 1 if there has been at least one recessive quarter during the year), and of the categorical variable measuring duration (variable DU in specification 1.2) and depth (variable DE in specification 1.2) of the recession whose definitions have been provided before in the text.

$$MC_{it}^{j} = \beta_0 + \beta_1 U_{it} + \beta_2 R_{it} + \beta_3 (U \times R)_{it} + \boldsymbol{\Phi' X_{it}} + \mu_i + \tau_t + \varepsilon_{it} \quad 1.1$$

$$MC_{it}^{j} = \beta_0 + \beta_1 U_{it} + \beta_2 DU_{it} + \beta_3 (U \times DU)_{it} + \boldsymbol{\Phi' X_{it}} + \mu_i + \tau_t + \varepsilon_{it} \quad 1.2$$

$$MC_{it}^{j} = \beta_0 + \beta_1 U_{it} + \beta_2 DE_{t} + \beta_3 (U \times DE)_{it} + \boldsymbol{\Phi' X_{it}} + \mu_i + \tau_t + \varepsilon_{it} \quad 1.3$$

The term $\boldsymbol{\Phi' X_{it}}$ includes the control variables as described as well in the previous section; finally, μ_i and τ_t are, respectively, country and year dummies. Throughout the paper we use robust standard error estimation.

[Insert Table 2 – Beaslienes - about here]

Table 2 reports the results for specifications 1.1 to 1.3, where we use different definitions of middle class and income from the LIS data. For space reasons, we omit the reporting of the coefficient obtained for the control variables. We first consider the definition of middle class as the percentage of income within the 2nd to 4th quintile of its distribution. In particular, the panel A reports a set of nine results where the first three columns draw on the raw definition of disposable household income (DHIRaw) the following three on equivalised income (DHIEq), and the remaining on per-capita income (DHIPc) respectively. As in column (1), the estimated coefficient of unemployment *U* on the middle class' size is -0.16 (significant at the 1% level) indicates that a one percentage point increase in unemployment is associated with a reduction of -0.16% of income accruing to the middle class. Estimates for the recession dummy *R* and the interaction variable obtained by interacting recessions with unemployment rate, variable $U \times R$, are instead not significant. We thus find that, while recessions do not seem to be significantly associated with middle class size, when shifting from the raw definition of disposable household income to the equivalised (column 2) and the per-capita (column 2 ones), we still obtain a negative and 1% significant negative association between unemployment and middle class. It is important to note that

the size for the equivalised version is reduced (from 0.16 to 0.09) and instead magnified when using the per-capita version (from 0.16 to 0.19). Another important difference between the regression in column (1) and those in columns 2 and 3 is that the interaction $U \times R$ becomes larger and significant at 5% level in column 2 and 1% level in column (3). In particular, the estimated coefficient of 0.02 in column 1 increases to 0.06 in column 2 and 0.16 in column 3. One way to read this positive interaction is that the negative effect of unemployment on middle class' tends to be weaker in years when recessions hit, likely for the more or less automatic enactment of social stabilizers. Table 3 explores this possible mechanism further by making use of social protection spending data.

Columns 3 to 6 consider labor income (HIL) instead of disposable. Here, and perhaps confirming intuition, we record a strikingly stronger and highly significant negative association of unemployment on middle class', size which goes, respectively, from -0.16 to -0.6 for the raw definition of income, -.0.09 to -0.61 for the equivalised version, and -0.19 to -0.51 when average household's member income is considered. The last three columns report the same set of specifications when market income (MI) is considered. The result is an almost equivalent reversal of what found when using labor income definition in that, we assist to an estimates' shift from -0.60 to 0.62 for raw measures, -0.61 to 0.62 for the specification using the equivalised measure of income, and -0.51 to 0.53 when the per-capita definition is used. Results in panel A seems to be qualitatively equivalent and robust in panel B (columns 10 to 18), where we shift from a definition of percentage income within the 2nd to 4th quintile to one considering only the percentage in the 3rd quintile of the income distribution. However, in this case, the negative association of unemployment seem to be weaker in size when considering disposable and labor incomes, as well as for the smaller and positive association with market income.

The panel C reports 6 specifications (columns 19 to 24) where the middle class is measured as

the percentage of the population that falls in two different income brackets, which have been decided by following the previous literature. Again, for space reasons, we show only the results for the equivalised version of household income. Column 19, for example, reports the results obtained when using the equivalised definition of disposable household income DHI by recurring to the large definition of middle class. To remember the definition, 'large' indicates that we set the bracket as one counting the population percentage between 60% and 250% of the median income of the distribution. In contrast, 'small' indicates a smaller bracket, between 75% and 125%, of the same median. For this panel results are quite different from those obtained in panels A and B. First of all unemployment seems to have a positive effect on the percentage of people in the pre-designed brackets. This is especially evident and highly significant when considering column 19, where the positive association between U and the DHIEq (Large) definition of middle class is 0.6 (1% significant). This indicates that one more percentage point of unemployment is associated to a increase of 0.6% persons in the middle class. The only exception to this common trend is column 22, where unemployment is negatively associated with HILEq (Small). Overall the results obtained when utilizing this definition of middle class' size seem to be less convincing, both for lack of significance and consistency of the results across several specifications. Part of the reason can be based on the fact that, when the percentage of the sample within a predefined income bracket is utilized, there maybe counterbalancing effects as people being in the middle-class falling far below the medianand thus outside the bracket, are accompanied by people falling at the same time from the upper class to the middle, resulting in an undecided effect on the percentage.

We finally turn to panel D of Table 2, showing results obtained when using middle class' measures from the joint use of the World Value Survey and European Values Study, referred to also as the Integrated Values Studies (IVS). As explained before in the data section, we have two different measures. One (MCPerc and MCperc2) is constructed by looking at how respondents

classify themselves as belonging to an upper class, upper middle-class, middle-class, lower middle-class, and working class. For robustness, we report two different measures, one including lower-middle class and one excluding respondents who self-located into a lower-middle class outside the calculation of the percentage respondents self-locating into the middle class. Another measure MCSLS3 and MCSL2to4 recurs to self-location in income deciles and computing the percentage respondents into the derived quintiles. Results are similar to the ones obtained when using the income percentages definitions, with negative association of U and positive association of the interaction $U \times R$[6].

4.2 The Effect of the Great Recession

We then consider the middle class' effects experienced by countries within the onsetting wave of the Great Recession. That is, we created a dummy variable equal to one for the years between 2006 and 2008 (extreme years included) to capture the differential effects of those recessions occurred at the onset of the Great Recession (GR). This is then captured by creating an interaction variable$GR \times R$.

We also extend to the full set of double interactions by including the interaction $GR \times U$, capturing the differential effect of unemployment at the onset of the Great Recession. The new specification that we test is shown in equation 3 below. As we did for the baselines, all regressions are also run by using the categorical variables measuring depth (DE) and duration (DU) of recessions. As in the baselines, we do not report the results obtained by using duration and depth, which are consistent with what found when using the simple recessive dummy. For space reasons this time we also only report the results using the equivalised measures of income, referring again the

[6]However, the interpretation of these results cannot be the same in that the middle-class measures obtained by using the IVS data count the percentage respondents identifying themselves as middle class, and are thus more conceptually similar to a measure of middles class' size based on percentage population within a predetermined income bracket.

reader to the full set of results which we make available and not for publication in a related appendix to this paper.

$$MC_{it} = \beta_0 + \beta_1 U_{it} + \beta_2 R_{it} + \beta_3 (U \times R)_{it} + \beta_4 (GR \times U) + \beta_5 (GR \times R) + \boldsymbol{\Phi}' \boldsymbol{X} + \mu_i + \tau_t + \varepsilon_{it} \quad 3$$

[Insert Table 3about here]

The results in Table 3, panels A and B show that most of the dynamics estimated in Table 2 in terms of unemployment effects on the size of middle class measured as income shares within predermined quintiles of the income distribution are similar in size, sign, and significance. However, there is a relevant novelty when introducing the full set of double interactions which is now possible. This is true in particular when referring to labor income and to equation 6 in panel A and the twin estimate considering only income shares in the third quintile in panel B. Here we see that, while the estimates referring to recessions alone still do not present a significant association, the coefficients estimated for the interaction variable $GR \times R$ and $GR \times U$ show a significant and negative association. The results regarding the first of the two interactions as to be interpreted as if, while recessions in general do not seem to be negatively associated with middle class sizes, those picked by the specific period referred to the onset of the great recession, present indeed a negative and significant association, and relevant economic significance, being the coefficients quite large especially when considering middle class as income shares within the second to fourth quintile of the income distribution. Here the coefficient (equation 6 in panel A of Table 3) of -4.19 (significant at 10% level) shows that a recession occurred between 2006 and 2008 is associated, on average, to a -4.2% shrinking in middle class size. There is a change between equation 6 in panel A and the one in panel B in that t he latter shows a smaller effect of -1.6 (10% significant) but in our opinion still

relevant negative association. Also, referring to equation 6 in panel B, the estimated coefficient for the interaction variable $GR \times U$ is negative and significant at 5% level. In particular, this indicates that, while confirming the negative association of unemployment with measures of middle class, this tends to be quite larger when focusing on unemployment rates during the onset of the Great Recession. Overall results are more significant when considering labor income (HIL) instead of disposable household income (DHI). However, also in this second case, sizes and signs are consistent and comparable. This also shows that the association between unemployment and recession is particularly negative during the years referred to as the Great Recession, and such evidence is stronger for labor income than disposable income. Our evidence seems to match a general view that the Great Recession has seen a shrinking of the middle class, while showing that this was not true for recessions in general, at least for the full 1992-2013 period, the one covered by our data. Support instead for the role of unemployment seems to be more consistent all through the different models run with and without GR interactions, showing again, however, that its association has been stronger during the 2006-2008 period.

We then rerun similar regressions when using a measure of the size of the middle class (panels C1 and C2), and self-reported collocations from the IVS data (panel D).

4.3 Social Protection and Unemployment Protection

Results already reported in Table 2 show that one possible mechanism through which recessions and unemployment affect the middle class' size is through the effect of social protection institutions as we describe in the introduction. To account for potential mediating factors from social protection institution, we draw upon data on social spending and finally turn to our last set of results extending the baseline model with another set of double interactions. Specifically, Table 4 runs a similar battery of tests showing two additional covariates obtained by interacting both the recession treatment (or similarly the categorical variables measuring the duration of the recession) with a social

security dummy created from the distribution of total social/unemployment spending as percentage of GDP, and available from the OECD database. Equations 2.1 and 2.2 below show the specification of the model obtained by adding the $SP50$ or $UP50$ dummies, and the two additional interaction effects derived from interacting social spending with both unemployment and recession (as before also done for duration and depth), $(SP50 \times U)_{it}$ and $(SP50 \times R)_{it}$.

$$MC_{it}^{j} = \beta_0 + \beta_1 U_{it} + \beta_2 R_{it} + \beta_3 (UxR) + \beta_4 SP50_{it} + +\beta_5 (SP50 \times R)_{it} + \beta_6 (SP50xU)_{it} + \boldsymbol{\Phi}'\boldsymbol{X} + \mu_i + \tau_t + \varepsilon_{it} \quad 2.1$$

$$MC_{it}^{j} = \beta_0 + \beta_1 U_{it} + \beta_2 R_{it} + \beta_3 (UxR) + \beta_4 UP50_{it} + +\beta_5 (UP50 \times R)_{it} + \beta_6 (UP50xU)_{it} + \boldsymbol{\Phi}'\boldsymbol{X} + \mu_i + \tau_t + \varepsilon_{it} \quad 2.2$$

We recall here that the dummy $SP50_{it}$ is set equal to one if the percentage of social spending as percentage of a country's GDP in a specific year is at or above the median value in the overall distribution and the same is done when considering unemployment spending (variable $UP50_{it}$).

[Insert Table 4 about here]

Once again we limit the display of the results to equivalised measures and considering only the recessive dummy. The most interesting results stem from panel A2 of table 4, where the unemployment protection dummy is used. First of all the large, highly significant and negative association of the unemployment dummy can be read as if societies with shares of income (both disposable and labor) concentrated in the middle need less unemployment protection spending. Perhaps the most interesting finding here is the large and positive association found regarding the $U \times UP50$ dummies, showing that the negative association between unemployment and middle class' measures found throughout the paper, is mitigated by unemployment spending, giving some

evidence of the protective effect of social spending (unemployment spending in particular) on middle class' size.

5. Conclusion

This paper examines the effect of an employment shock on the size of the middle class drawing on different set of definitions and measures. Specifically, we draw from both income and self-perceived measures of the middle class. Our findings suggest that throughout all our models, middle-class definitions and specifications, we do not find a statistically significant squeezing effect of an unemployment shock during a recession. We only find an effect of a middle class' size squeeze based on labor income shares during the onset of the Great Recession (from 2006 to 2008). We also find some evidence that the squeezing is mitigated if recessions hit when unemployment was already relatively large, or when countries are relatively high social welfare spenders. Importantly, we find that unemployment shocks during recession increase the share of the population that defines itself as 'middle class'.

Our results show that the effect is sensitive to the same definition used. Our interpretation of the effects is that that recessions exert diverse and often opposite effects across the income distribution driving people from middle class to the lower income groups while at the same time driving people of higher income class to the middle, with the overall effect of having a stable percentage of people in the predefined income class. Our results, although do not directly proving this effect, are consistent with this explanation. Furthermore, the self-reported social class might well be an inertial and less adaptive concept, and individuals might not update their perception immediately after an

employment shock that reduces their income. The effect appears to be partially mediated by the effect of social protection institutions, and it was particularly larger during the great recession and when using unemployment protection instead of measures of social protection at large.

The paper has important implications for policy making, as they suggest that if governments wish to attain other desirable policy objectives such as innovation, democratic stability and human capital accumulation, which are typically associated with middle class' size, only income losses resulting from the Great Recession, which were accompanied by welfare spending cuts were a cause of concern on labour income losses. Another important result for policy processes is that mechanisms of income protections and social policy interventions can be argued to attain its goals of protecting individuals against unexpected unemployment shocks, and hence ensuring societal socio-economic stability remains over time. Further studies might want to explore more e in depth why recessions that can be connected with the waves of the Great Recession, seemed to shows the squeezing effect in terms of unemployment shock that is not found on average.

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Table1. Descriptive Statistics

Variable Definition	Variable Label	N	Mean	SD	Min	Max	Source
Middle-Class Measures							
Income based	Label						
q2to4 Dhi(Equivalised)	DHIEq2to4	405	59.43	2.640	50.17	66.52	LIS
q2to4 Hil (Equivalised)	HILEq2to4	405	57.42	6.830	10.98	63.59	LIS
q3 Dhi(Equivalised)	DHIEq3	405	19.68	1.250	15.07	23.79	LIS
q3Hil (Equivalised)	HILEq3	405	19.06	2.430	3.630	23.02	LIS
Small Size DhiEq.(Disposable Income)	DHIEq (Small)	405	38.18	6.880	16.11	51.32	LIS
Small Size Hil Eq. (Labor Income)	HILEq (Small)	405	29.10	3.520	17.81	37.01	LIS
Big Size Dhi Eq.(Disposable Income)	DHIEq (Large)	405	76.65	9.780	37.27	90.67	LIS
Big Size Hil Eq. (Labor Income)	HILEq (Large)	405	66.81	7.690	35.96	84.31	LIS
Non-income based							
Midclass Perception	MCPerc	405	76.85	15.54	32.02	89.61	WVS
Midclass Perception (2)	MCPerc2	405	55.03	16.09	20.88	68.70	WVS
Midlcass Self-Loc. in 3rd Quintile	MCSL3	405	26.47	14.95	0.980	64.21	IVS
Midlcass Self-Loc. in 2^{nd} to 4^{th} Quintile	MCSL2to4	405	68.96	17.96	15.05	96.71	IVS
Recession Measures							
Recession (R)	R	405	0.200	0.400	0	1	OECD
Duration	DU	405	0.300	0.690	0	4	OECD
Depth	DE	405	0.210	0.430	0	2	OECD
Unemployment	U	405	8.130	4.040	1.9	24.8	OECD
Great Recession	GR	405	0.160	0.370	0	1	OECD
Controls							
GDP PC	GDP	405	10.42	0.350	9.420	11.41	OECD
Female (%)	F	405	50.99	0.530	49.85	52.52	OECD
Population	POP	405	9.440	1.320	5.970	12.56	OECD
Age Dependency Ratio	ADR	405	22.77	3.520	15.60	31.53	OECD
Education	EDU	405	74.57	12.58	31.60	94.40	WB-WDI
Social Protection (SP)	SP	404	0.780	0.410	0	1	OECD
Unemployment Protection (UP)	UP	405	0.590	0.490	0	1	OECD

Notes on sources: LIS - Luxembourg Income Study - http://www.lisdatacenter.org/.IVS - Integrated Values Survey: obtained by appending observations from the European Values Study (EVS) and the World Values Survey (WVS); EVS - http://www.europeanvaluesstudy.eu/; WVS - http://www.worldvaluessurvey.org/.OECD - Organization for Economic Co-operation and Development - http://stats.oecd.org/**.** CPDS - Comparative Political Data Set - http://www.cpds-data.org/.WDI - World Bank's World Development Indicators - http://data.worldbank.org/data-catalog/world-development-indicators.

Table 2. Baseline results

(A) Inequality. Middle Class and % Income within 2nd to 4th quintile of the income distribution. From LIS database.

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Depvars	DHIRaw	DHIEq	DHIPc	HILRaw	HILEq	HILPc	MIRaw	MIEq	MIPc
U	-0.16***	-0.09**	-0.19***	-0.60***	-0.61***	-0.51***	0.62***	0.62**	0.53**
	(0.04)	(0.04)	(0.04)	(0.19)	(0.17)	(0.16)	(0.21)	(0.24)	(0.21)
R	0.24	-0.11	-0.82	-1.46	-1.79	-2.28*	0.16	1.33	0.73
	(0.54)	(0.40)	(0.50)	(1.55)	(1.43)	(1.35)	(1.91)	(2.26)	(2.05)
U x R	0.02	0.09**	0.16***	0.06	0.09	0.13	-0.05	-0.12	-0.05
	(0.05)	(0.04)	(0.05)	(0.17)	(0.15)	(0.14)	(0.17)	(0.20)	(0.18)
R-squared	0.82	0.78	0.70	0.50	0.52	0.48	0.53	0.47	0.50

(B) Inequality. Middle Class and % Income within 3rd quintile of the income distribution. From LIS database.

	(10)	(11)	(12)	(13)	(14)	(15)	(16)	(17)	(18)
	DHIRaw	DHIEq	DHIPc	HILRaw	HILEq	HILPc	MIRaw	MIEq	MIPc
U	-0.06***	-0.07***	-0.05**	-0.23***	-0.22***	-0.19***	0.19***	0.21**	0.18**
	(0.02)	(0.02)	(0.02)	(0.07)	(0.06)	(0.05)	(0.07)	(0.08)	(0.07)
R	0.05	-0.26	-0.15	-0.54	-0.68	-0.77	0.23	0.83	0.74
	(0.31)	(0.23)	(0.24)	(0.61)	(0.55)	(0.49)	(0.63)	(0.86)	(0.82)
U x R	0.02	0.06**	0.03	0.04	0.06	0.06	-0.03	-0.04	-0.03
	(0.03)	(0.03)	(0.02)	(0.07)	(0.06)	(0.05)	(0.06)	(0.07)	(0.07)
R-squared	0.78	0.77	0.73	0.52	0.52	0.54	0.62	0.51	0.55

(C) Size. Middle Class and % population between 75% and 125% of median income (small), and 60%-250% (large). From LIS database.

	(19) DHIEq (Large)	(20) DHIEq (Small)	(21) HILEq (Large)	(22) HILEq (Small)	(23) MIEq (Large)	(24) MIEq (Small)
U	0.62***	0.13	0.27*	-0.18***	0.38**	0.07
	(0.16)	(0.09)	(0.15)	(0.05)	(0.19)	(0.13)
R	1.71	0.66	2.34*	0.56	1.88	1.55
	(1.62)	(0.87)	(1.37)	(0.42)	(1.78)	(1.29)
U x R	-0.25*	-0.04	-0.31**	-0.04	-0.16	-0.05
	(0.15)	(0.08)	(0.14)	(0.05)	(0.19)	(0.13)
R-squared	0.67	0.77	0.56	0.81	0.49	0.62

(D) Middle-Class Perception and self-reported size: From WVS and IVS.

	(1)	(2)	(3)	(4)
	MCPerc.	MCPerc2	MCSL3	MCSL2to4
U	-0.31*	-0.34*	-0.49**	-1.05***
	(0.17)	(0.20)	(0.21)	(0.35)
R	-3.70*	-5.77**	-3.70**	-2.29
	(2.15)	(2.79)	(1.83)	(2.38)
U x R	0.54*	0.81**	0.67***	0.64**
	(0.30)	(0.37)	(0.21)	(0.29)
Observations	405	405	405	405
R-squared	0.94	0.92	0.85	0.77

Notes: Sample size = 405. DHI = Disposable Household Income, HIL = Labor Income; MI = Market Income. Raw = Raw measure; Eq = Equivalised measure (factor used 0.5). Pc = Per capita Measure. U = Unemployment rate; R = recession dummy. All controls, country and year dummies included. Controls are: We control also for per capita GDP, demographic characteristics (population POP, the percentage of female population F, the percentage of labor force owning a secondary and tertiary degree with respect to the overall population EDU, age dependency ratio ADR). MC Perc and MC perc 2 are measures of middle-class perceptions. MC perc 2 differs from MC Perc because the category "Lower Middle Class" from var X045 of WVS is not considered. MC Size 3 and MC Size 2 to 4 are measures of the percentage of respondents self-locating in middle class according to self-reported income deciles in WVS and EVS (IVS). Robust standard errors in parenthesis. *p < 0.1; **p < 0.05; ***p < 0.01.

Table 3. The Effect of the Great Recession

(A) Inequality. Middle Class and % Income within 2nd to 4th quintile of the income distribution. In all cases, equivalised (Eq) measures are reported.

	1	2	3	4	5	6
	DHI2to4	DHI2to4	DHI2to4	HIL2to4	HIL2to4	HIL2to4
U	-0.07*	-0.07*	-0.10**	-0.58***	-0.60***	-0.60***
	(0.04)	(0.04)	(0.04)	(0.16)	(0.16)	(0.17)
R	0.71***	0.72***	0.03	-0.14	-0.12	-0.18
	(0.26)	(0.26)	(0.45)	(0.76)	(0.76)	(1.38)
U x R			0.08*			0.01
			(0.04)			(0.16)
GR x R	-0.60	-0.60	-0.35	-4.23*	-4.21*	-4.19*
	(0.54)	(0.53)	(0.54)	(2.46)	(2.42)	(2.50)
GR x U		-0.16**	-0.16**		-0.42*	-0.42*
		(0.07)	(0.07)		(0.23)	(0.23)
R-squared	0.78	0.78	0.79	0.52	0.52	0.52

(B) Inequality. Middle Class and % Income within 3rd quintile of the income distribution. In all cases, equivalised (Eq) measures are reported.

	1	2	3	4	5	6
	DHI3	DHI3	DHI3	HIL3	HIL3	HIL3
U	-0.05**	-0.05**	-0.07***	-0.20***	-0.20***	-0.21***
	(0.02)	(0.02)	(0.02)	(0.06)	(0.06)	(0.06)
R	0.31**	0.31**	-0.19	0.20	0.21	-0.07
	(0.14)	(0.14)	(0.26)	(0.30)	(0.30)	(0.55)
U x R			0.06**			0.03
			(0.03)			(0.06)
GR x R	-0.35	-0.35	-0.17	-1.70**	-1.69**	-1.60*f
	(0.28)	(0.28)	(0.28)	(0.84)	(0.83)	(0.85)
GR x U		-0.06*	-0.06*		-0.16**	-0.16**
		(0.03)	(0.03)		(0.08)	(0.08)
R-squared	0.76	0.77	0.77	0.53	0.53	0.53

Notes: Sample size = 405. DHI = Disposable Household Income, HIL = Labor Income; MI = Market Income. Raw = Raw measure; Eq = Equivalised measure (factor used 0.5). Pc = Percapita Measure. U = Unemployment rate; R = recession dummy. All controls, country and year dummies included. Controls are per capita GDP (PCGDP), and other demographic characteristics (population POP, the percentage of female population F, the percentage of labor force owning a secondary and tertiary degree with respect to the overall population EDU, age dependency ratio ADR). MCPerc and MCperc2 are measures of middle-class perceptions. MCperc2 differs from MCPerc because the category "Lower Middle Class" from var X045 of WVS is not considered. MCSL3 and MCSL2to4 are measures of the percentage of respondents self-locating in middle class according to self-reported income deciles in WVS and EVS (IVS). Robust standard errors in parenthesis. *p < 0.1; **p < 0.05; ***p < 0.01.

Table 3 (continued). Great Recession Effects – MC Size and Perception

(C1) Size. Middle Class and % population between 75% and 125% of median income (small), and 60%-250% (large) Disposable Household Income (DHI) and Labor Household Income (HIL). Equivalised measures used.

C1	1	2	3	4	5	6
	Size - DHI (Equivalised)					
SIZE	Large	Large	Large	Small	Small	Small
U	0.55***	0.54***	0.60***	0.11	0.10	0.11
	(0.15)	(0.15)	(0.16)	(0.08)	(0.08)	(0.09)
R	-1.02	-1.01	0.59	0.15	0.16	0.39
	(1.14)	(1.14)	(1.97)	(0.65)	(0.65)	(1.09)
GR x R	3.51**	3.52**	2.95	0.79	0.81	0.73
	(1.62)	(1.64)	(1.80)	(0.91)	(0.91)	(1.01)
U x GR		-0.17	-0.17		-0.27**	-0.27**
		(0.22)	(0.22)		(0.13)	(0.13)
U x R			-0.19			-0.03
			(0.16)			(0.09)
R-squared	0.67	0.67	0.67	0.77	0.77	0.77
(C2)	1	2	3	4	5	6
	Size - HIL (Equivalised)					
SIZE	Large	Large	Large	Small	Small	Small
U	0.18	0.16	0.25*	-0.20***	-0.20***	-0.19***
	(0.14)	(0.14)	(0.15)	(0.05)	(0.05)	(0.05)
R	-0.65	-0.63	1.75	0.25	0.25	0.58
	(1.01)	(1.01)	(1.67)	(0.33)	(0.33)	(0.50)
GR x R	2.37	2.39	1.55	0.08	0.09	-0.03
	(1.58)	(1.57)	(1.68)	(0.63)	(0.62)	(0.64)
U x GR		-0.28	-0.27		-0.04	-0.03
		(0.19)	(0.20)		(0.08)	(0.08)
U x R			-0.28*			-0.04
			(0.15)			(0.05)
R-squared	0.56	0.56	0.56	0.81	0.81	0.81

(D) Middle-Class Perception and self-reported size From WVS and IVS

(D)	(3)	(6)	(9)	(12)
VARIABLES	MCPerc	MCPerc2	MCSL3	MCSL2to4
U	-0.30*	-0.32*	-0.50**	-1.10***
	(0.17)	(0.19)	(0.22)	(0.36)
R	-3.58	-6.27*	-4.31**	-4.13
	(2.45)	(3.23)	(2.18)	(2.71)
GR x R	-0.32	1.27	1.60	4.86
	(1.22)	(1.64)	(1.87)	(3.12)
U x GR	0.29	0.49*	-0.11	-0.57
	(0.21)	(0.27)	(0.22)	(0.45)
U x R	0.53*	0.83**	0.71***	0.74**
	(0.31)	(0.39)	(0.22)	(0.29)
R-squared	0.94	0.93	0.85	0.77

Notes: DHI = Disposable Household Income, HIL = Labor Income.. U = Unemployment rate; R = recession dummy; GR = Great Recession Dummy. SP = Social protection dummy (=1 if country in top 50%). UP = Unemployment protection dummy (1 if country in the top 50%). All controls, country and year dummies included. DHI = Disposable Household Income, HIL = Labor Income.. U = Unemployment rate; R = recession dummy; GR = Great Recession Dummy. SP = Social protection dummy (=1 if country in top 50%). UP = Unemployment protection dummy (1 if country in the top 50%). All controls, country and year dummies included. Robust standard errors in parenthesis.

Table 4. The Effect official(SP50) And Unemployment Protection (UP50) on "Inequality" based measures of the middle class.

Panels A1 and A2"Inequality". Middle Class and % Income within 2nd to 4th quintile of the income distribution. Equivalised measures used throughout. Panels B1 and B2"Inequality". Middle Class and % Income within the 3rd quintile of the income distribution. Equivalised measures used throughout

Social Protection

(A1)	1	2	3	4
VARIABLES	DHIEq	HILEq	DHIEq	HILEq
QUINTILES	2to4	2to4	3	3
U	-0.15**	-0.56***	-0.07**	-0.22***
	(0.07)	(0.19)	(0.03)	(0.07)
SP50	-0.18	1.85	0.14	0.72
	(0.62)	(2.06)	(0.31)	(0.75)
U x SP50	0.05	-0.08	0.00	-0.01
	(0.07)	(0.22)	(0.03)	(0.08)
R	-0.30	-5.23***	-0.75*	-1.45**
	(0.69)	(1.98)	(0.43)	(0.71)
U x R	0.08*	0.12	0.07**	0.07
	(0.04)	(0.16)	(0.03)	(0.06)
SP50 x R	0.22	3.43**	0.49	0.75
	(0.65)	(1.52)	(0.41)	(0.56)
R-squared	0.78	0.53	0.77	0.53

Unemployment Protection

(A2)	5	6	7	8
VARIABLES	DHIEq	HILEq	DHIEq	HILEq
QUINTILES	2to4	2to4	Q3	Q3
U	-0.21***	-0.78***	-0.10***	-0.30***
	(0.05)	(0.19)	(0.02)	(0.07)
UP50	-1.56***	-5.90***	-0.48**	-2.29***
	(0.42)	(1.55)	(0.21)	(0.55)
U x UP50	0.18***	0.40**	0.05**	0.17***
	(0.05)	(0.17)	(0.02)	(0.06)
R	0.48	-2.32	-0.04	-0.78
	(0.42)	(1.74)	(0.24)	(0.65)
U x R	0.06	-0.05	0.06**	0.01
	(0.04)	(0.16)	(0.03)	(0.06)
UP50 x R	-0.57	2.70	-0.28	0.90
	(0.37)	(1.76)	(0.19)	(0.62)
R-squared	0.79	0.54	0.77	0.54

Notes: DHI = Disposable Household Income, HIL = Labor Income. U = Unemployment rate; R = recession dummy; GR = Great Recession Dummy. SP = Social protection dummy (=1 if country in top 50%). UP = Unemployment protection dummy (1 if country in the top 50%). All controls, country and year dummies included. Robust standard errors in parenthesis.DHI = Disposable Household Income, HIL = Labor Income.. U = Unemployment rate; R = recession dummy; GR = Great Recession Dummy. SP = Social protection dummy (=1 if country in top 50%). UP = Unemployment protection dummy (1 if country in the top 50%). All controls, country and year dummies included. Robust standard errors in parenthesis.

Table 4 (continued) The Effect of Social (SP50) And Unemployment Protection (UP50)

Panel (C1) Size. Middle Class and % population between 75% and 125% of median income (small), and 60%-250% (large)**.** Disposable Household Incomes. Panel (C2) Size. Middle Class and % population between 75% and 125% of median income (small), and 60%-250% (large)

Social Protection

(C1)	(1)	(2)	(3)	(4)
VARIABLES	DHIEq Large	DHIEq Small	HILEq Large	HILEq Small
U	0.72***	-0.15	0.55***	-0.21***
	(0.23)	(0.12)	(0.21)	(0.07)
SP50	3.94*	0.51	2.03	-0.53
	(2.25)	(1.11)	(1.93)	(0.68)
U x SP50	-0.18	0.28**	-0.33*	0.03
	(0.21)	(0.12)	(0.20)	(0.08)
R	4.32**	2.18*	4.87**	1.58**
	(1.94)	(1.17)	(2.03)	(0.71)
U x R	-0.22	-0.07	-0.28**	-0.05
	(0.15)	(0.08)	(0.14)	(0.05)
SP50 x R	-3.19*	-1.56	-3.00*	-1.01*
	(1.62)	(1.00)	(1.64)	(0.57)
R-squared	0.68	0.78	0.56	0.81

Unemployment Protection

(C2)	(5)	(6)	(7)	(8)
VARIABLES	DHI - Eq Large	DHI - Eq Small	HIL – All Large	HIL – Eq Small
U	0.30**	-0.14	0.15	-0.24***
	(0.15)	(0.09)	(0.16)	(0.06)
UP50	-4.40***	-4.07***	-0.81	-0.78
	(1.47)	(0.79)	(1.41)	(0.53)
U x UP50	0.51***	0.44***	0.16	0.09
	(0.16)	(0.09)	(0.15)	(0.06)
R	2.98*	1.70*	2.43*	0.59
	(1.62)	(0.88)	(1.45)	(0.51)
U x R	-0.35**	-0.13	-0.36**	-0.06
	(0.17)	(0.09)	(0.15)	(0.05)
UP50 x R	-0.81	-0.59	0.40	0.28
	(1.41)	(0.83)	(1.40)	(0.52)
R-squared	0.68	0.78	0.56	0.81

Notes: DHI = Disposable Household Income, HIL = Labor Income. U = Unemployment rate; R = recession dummy; GR = Great Recession Dummy. SP = Social protection dummy (=1 if country in top 50%). UP = Unemployment protection dummy (1 if country in the top 50%). All controls, country and year dummies included. Robust standard errors in parenthesis. DHI = Disposable Household Income, HIL = Labor Income. U = Unemployment rate; R = recession dummy; GR = Great Recession Dummy. SP = Social protection dummy (=1 if country in top 50%). UP = Unemployment protection dummy (1 if country in the top 50%). All controls, country and year dummies included. Robust standard errors in parenthesis.

Table 4(Cont.) The Effect of Social (SP50) And Unemployment Protection (UP50)
(A) Middle-Class Perception. (B) Middle Class Based on Self-Reported Income Quintiles

Social Protection				
(D1)	(1)	(2)	(3)	(4)
VARIABLES	MCPerc	MCPerc2	MCSL3	MCSL2to4
U	0.69**	0.51**	-0.96**	-1.81**
	(0.28)	(0.23)	(0.45)	(0.80)
SP50	7.37***	6.53***	-4.42	-10.29
	(2.17)	(2.19)	(3.63)	(6.48)
U x SP50	-1.19***	-1.03***	0.58	1.00
	(0.28)	(0.27)	(0.40)	(0.66)
R	-8.77***	-12.72***	-0.04	6.94
	(3.02)	(3.90)	(3.56)	(6.38)
U x R	0.70**	0.96***	0.58***	0.45*
	(0.29)	(0.37)	(0.21)	(0.26)
SP50 x R	4.15**	6.20***	-3.19	-8.30
	(1.78)	(2.14)	(3.38)	(6.56)
R-squared	0.94	0.93	0.86	0.77

Unemployment Protection				
(D2)	(5)	(6)	(7)	(8)
VARIABLES	MCPerc	MCPerc2	MCSL3	MCSL2to4
U	-0.10	-0.13	-0.63**	-1.16**
	(0.18)	(0.18)	(0.29)	(0.54)
UP50	1.08	2.51	-6.13**	-7.73**
	(1.56)	(1.92)	(2.67)	(3.77)
U x UP50	-0.28	-0.32	0.36	0.39
	(0.18)	(0.22)	(0.27)	(0.44)
R	-3.32	-5.19*	-1.46	-0.35
	(2.22)	(2.83)	(1.97)	(2.73)
U x R	0.66*	0.94**	0.68***	0.63**
	(0.33)	(0.42)	(0.21)	(0.26)
UP50 x R	-1.83*	-2.46*	-3.40**	-2.63
	(1.00)	(1.40)	(1.73)	(2.54)

Notes: DHI = Disposable Household Income, HIL = Labor Income.. U = Unemployment rate; R = recession dummy; GR = Great Recession Dummy. SP = Social protection dummy (=1 if country in top 50%). UP = unemployment protection dummy (1 if country in the top 50%). All controls, country and year dummies included. Robust standard errors in parenthesis. DHI = Disposable Household Income, HIL = Labor Income.. U = Unemployment rate; R = recession dummy; GR = Great Recession Dummy. SP = Social protection dummy (=1 if country in top 50%). UP = unemployment protection dummy (1 if country in the top 50%). All controls, country and year dummies included. Robust standard errors in parenthesis.

Appendix Not For Publication

A1. Types of income measures from LIS Household Datasets

MC measure	income type	income version	equalization	weight		All-ages		a65 (<=65)		a16-40
income share	labor income (hil)	raw	---	w=hpopwgt	%%%	mcHil1_j	%	mcHil2_j	%	mcHil3_j
income share		equivalised	/(nhhmem^0.5)	w=hpopwgt*nhhmem	%%%	mcHil4_j	%	mcHil5_j	%	mcHil6_j
income share		per capita	/nhhmem	w=hpopwgt*nhhmem	%%%	mcHil7_j	%	mcHil8_j	%	mcHil9_j
income share	market income (mi = hic + hil + hitp)	raw	---	w=hpopwgt	%%%	mcMi1_j	%	mcMi2_j	%	mcMi3_j
income share		equivalised	/(nhhmem^0.5)	w=hpopwgt*nhhmem	%%%	mcMi4_j	%	mcMi5_j	%	mcMi6_j
income share		per capita	/nhhmem	w=hpopwgt*nhhmem	%%%	mcMi7_j	%	mcMi8_j	%	mcMi9_j
income share	disposable income (dhi= factor (hil + hic)+ hitp + hitsi + hitsu -hxit + hitsa))	raw	---	w=hpopwgt	%%%	mcDhi1_j	%	mcDhi2_j	%	mcDhi3_j
income share		equivalised	/(nhhmem^0.5)	w=hpopwgt*nhhmem	%%%	mcDhi4_j	%	mcDhi5_j	%	mcDhi6_j
income share		per capita	/nhhmem	w=hpopwgt*nhhmem	%%%	mcDhi7_j	%	mcDhi8_j	%	mcDhi9_j
income share	disposable income net of transfers for social assistance (siti = dhi - hitsa)	raw	---	w=hpopwgt	%%%	mcSiti1_j	%	mcSiti2_j	%	mcSiti3_j
income share		equivalised	/(nhhmem^0.5)	w=hpopwgt*nhhmem	%%%	mcSiti4_j	%	mcSiti5_j	%	mcSiti6_j
income share		per capita	/nhhmem	w=hpopwgt*nhhmem	%%%	mcSiti7_j	%	mcSiti8_j	%	mcSiti9_j

Additional Measures For each of the 36 distributions:

MC size small % pop within: '75% - median income - 125%

MC size big % pop within: '60% - median income - 250%

Mean To Median Ratio

Gini Index

Notes:

-all Data From LIS household Database; top bottom coded > 0 and <= 10 times median value of the distribution

-pension payments excluded

-“j” refers to decile >>> this constraint middle-class definitions that use deciles, i.e. middle class as between 25th and 75th percentile would not be possible.

-other definitions as the distance from median income might or might not be possible given the decile

-age only in the individual datasets: household contains the age of the youngest member

-all measures top-bottom coded

-age based on var "ageymem" which is the age of the youngest household member

A2. Full List of Datasets Available as of December 2016

country	LIS_dataset	country	LIS_dataset	country	LIS_dataset	country	LIS_dataset
Belgium	be85h	Mexico	mx00h	Germany	de84h	Spain	es13h
Belgium	be88h	Mexico	mx02h	Germany	de89h	Sweden	se67h
Belgium	be92h	Mexico	mx04h	Germany	de94h	Sweden	se75h
Belgium	be97h	Mexico	mx08h	Germany	de00h	Sweden	se81h
Belgium	be00h	Mexico	mx10h	Germany	de04h	Sweden	se87h
Belgium	be95h	Mexico	mx12h	Germany	de07h	Sweden	se92h
Brazil	br06h	Netherlands	nl83h	Germany	de10h	Sweden	se95h
Brazil	br09h	Netherlands	nl87h	Germany	de13h	Sweden	se00h
Brazil	br11h	Netherlands	nl90h	Greece	gr95h	Sweden	se05h
Brazil	br13h	Netherlands	nl93h	Greece	gr00h	Switzerland	ch82h
Canada	ca71h	Netherlands	nl99h	Greece	gr04h	Switzerland	ch92h
Canada	ca75h	Netherlands	nl04h	Greece	gr07h	Switzerland	ch00h
Canada	ca81h	Netherlands	nl07h	Greece	gr10h	Switzerland	ch02h
Canada	ca87h	Netherlands	nl10h	Guatemala	gt06h	Switzerland	ch04h
Canada	ca91h	Netherlands	nl13h	Hungary	hu91h	Taiwan	tw81h
Canada	ca94h	Norway	no79h	Hungary	hu94h	Taiwan	tw86h
Canada	ca94h	Norway	no86h	Hungary	hu99h	Taiwan	tw91h
Canada	ca98h	Norway	no91h	Hungary	hu05h	Taiwan	tw95h
Canada	ca00h	Norway	no95h	Hungary	hu07h	Taiwan	tw97h
Canada	ca04h	Norway	no00h	Hungary	hu09h	Taiwan	tw00h
Canada	ca07h	Norway	no04h	Hungary	hu12h	Taiwan	tw05h
Canada	ca10h	Norway	no07h	Iceland	is04h	Taiwan	tw07h
China	cn02h	Norway	no10h	Iceland	is07h	Taiwan	tw10h
Colombia	co04h	Norway	no13h	Iceland	is10h	Taiwan	tw13h
Colombia	co07h	Panama	pa07h	India	in04h	United	uk69h
Colombia	co10h	Panama	pa10h	India	in11h	United	uk74h
Colombia	co13h	Panama	pa13h	Ireland	ie87h	United	uk79h
Czech	cz92h	Paraguay	py10h	Ireland	ie94h	United	uk86h
Czech	cz96h	Paraguay	py13h	Ireland	ie95h	United	uk91h
Czech	cz02h	Norway	no10h	Ireland	ie96h	United	uk95h
Czech	cz04h	Norway	no13h	Ireland	ie00h	United	uk94h
Czech	cz07h	Peru	pe07h	Ireland	ie04h	United	uk99h
Czech	cz10h	Peru	pe04h	Ireland	ie07h	United	uk04h
Czech	cz13h	Peru	pe10h	Ireland	ie10h	United	uk07h
Denmark	dk87h	Peru	pe13h	Israel	il79h	United	uk10h
Denmark	dk92h	Poland	pl86h	Israel	il86h	United	uk13h
Denmark	dk95h	Poland	pl92h	Israel	il92h	United	us74h
Denmark	dk00h	Poland	pl95h	Israel	il97h	United	us79h
Denmark	dk04h	Poland	pl99h	Israel	il01h	United	us86h
Denmark	dk07h	Poland	pl04h	Israel	il05h	United	us91h
Denmark	dk10h	Poland	pl07h	Israel	il07h	United	us94h

country	LIS_dataset	country	LIS_dataset	country	LIS_dataset	country	LIS_dataset
Dominican	do07h	Poland	pl10h	Israel	il10h	United	us97h
Egypt	eg12h	Poland	pl13h	Israel	il12h	United	us00h
Estonia	ee00h	Romania	ro95h	Italy	it86h	United	us04h
Estonia	ee04h	Romania	ro97h	Italy	it87h	United	us07h
Estonia	ee07h	Slovak	sk92h	Italy	it89h	United	us10h
Estonia	ee10h	Slovak	sk96h	Italy	it91h	United	us13h
France	fr78h	Slovak	sk04h	Italy	it93h	Uruguay	uy04h
France	fr84h	Slovak	sk07h	Italy	it95h	Uruguay	uy07h
France	fr89h	Slovak	sk10h	Italy	it98h	Uruguay	uy10h
France	fr94h	Slovenia	si97h	Italy	it00h	Uruguay	uy13h
France	fr00h	Slovenia	si99h	Italy	it04h	Australia	au81h
France	fr05h	Slovenia	si04h	Italy	it08h	Australia	au85h
France	fr10h	Slovenia	si07h	Italy	it10h	Australia	au89h
Finland	fi87h	Slovenia	si10h	Japan	jp08h	Australia	au95h
Finland	fi91h	Slovenia	si12h	Luxembourg	lu85h	Australia	au01h
Finland	fi95h	South	za08h	Luxembourg	lu91h	Australia	au03h
Finland	fi00h	South	za10h	Luxembourg	lu94h	Australia	au08h
Finland	fi04h	South	za12h	Luxembourg	lu97h	Australia	au10h
Finland	fi07h	South	kr06h	Luxembourg	lu00h	Austria	at87h
Finland	fi10h	Spain	es80h	Luxembourg	lu04h	Austria	at94h
Finland	fi13h	Spain	es85h	Luxembourg	lu07h	Austria	at95h
Georgia	ge10h	Spain	es90h	Luxembourg	lu10h	Austria	at97h
Georgia	ge13h	Spain	es95h	Luxembourg	lu13h	Austria	at00h
Germany	de73h	Spain	es00h	Mexico	mx84h	Austria	at04h
Germany	de78h	Spain	es04h	Mexico	mx89h	Russia	ru00h
Germany	de81h	Spain	es07h	Mexico	mx92h	Russia	ru04h
Germany	de83h	Spain	es10h	Mexico	mx94h	Russia	ru07h
				Mexico	mx96h	Russia	ru10h
				Mexico	mx98h	Russia	ru13h

Stata Code Submission to LIS

```
    *clear all
set more off
*******************************************************************************
*use it04ih, clear
*use $it04h, clear
capture rename hil Hil
capture rename dhi Dhi
capture gen Mi = Hil + hic + hitp
capture gen Siti = Dhi - hitsa
capture sum Dhi Hil Mi Siti hic hitp hitsa

local vars "Dhi Hil Mi Siti"
foreach i of local vars  {

preserve
        capture quietly sum `i', detail
        capture replace `i' = r(p50)*10 if `i' > r(p50)*10 //topbottom coding
        capture keep if `i' > 0                         //topbottom coding

        capture quietly sum `i' [weight=hpopwgt], detail
        capture gen sz`i'1s = 1 if  `i' >= r(p50)*0.75 & `i' <= r(p50)*1.25
        capture replace sz`i'1s = 0  if sz`i'1s ==.
        capture quietly sum sz`i'1s
        capture replace sz`i'1s = r(mean)

        capture quietly sum `i' [weight=hpopwgt], detail
        capture gen sz`i'1b = 1 if `i' >= r(p50)*0.60 & `i' <= r(p50)*2.50
        capture replace sz`i'1b = 0  if sz`i'1b ==.
        capture quietly sum sz`i'1b
        capture replace sz`i'1b = r(mean)

        capture quietly sum `i' [weight=hpopwgt], detail
        capture gen MeMd`i'1 = r(mean)/r(p50)

        capture ineqdec0 `i' [w=hpopwgt]
        capture gen g`i'1 = r(gini)
        capture xtile v = `i' [weight=hpopwgt], nq(10)
        capture bys v: egen sv = sum(v)
        capture egen tv = sum(v)
        capture gen mc`i'1 = sv/tv

        capture noisily tab mc`i'1
        capture noisily tab sz`i'1s
        capture noisily tab sz`i'1b
        capture noisily tab MeMd`i'1
capture noisily tab g`i'1
restore
preserve
        capture keep if ageymem <= 65
        capture quietly sum `i', detail
        capture replace `i' = r(p50)*10 if `i' > r(p50)*10
        capture keep if `i' > 0
        capture quietly sum `i' [weight=hpopwgt], detail
        capture gen sz`i'2s = 1 if  `i' >= r(p50)*0.75 & `i' <= r(p50)*1.25
        capture replace sz`i'2s = 0  if sz`i'2s ==.
        capture quietly sum sz`i'2s
        capture replace sz`i'2s = r(mean)

        capture quietly sum `i' [weight=hpopwgt], detail
        capture gen sz`i'2b = 1 if `i' >= r(p50)*0.60 & `i' <= r(p50)*2.50
        capture replace sz`i'2b = 0  if sz`i'2b ==.
        capture quietly sum sz`i'2b
        capture replace sz`i'2b = r(mean)

        capture quietly sum `i' [weight=hpopwgt], detail
        capture gen MeMd`i'2 = r(mean)/r(p50)

        capture ineqdec0 `i' [w=hpopwgt]
        capture gen g`i'2 = r(gini)

        capture xtile v = `i' [weight=hpopwgt], nq(10)
        capture bys v: egen sv = sum(v)
        capture egen tv = sum(v)
        capture gen mc`i'2 = sv/tv

        capture noisily tab mc`i'2
        capture noisily tab sz`i'2s
        capture noisily tab sz`i'2b
        capture noisily tab MeMd`i'2
        capture noisily tab g`i'2
restore

preserve
        capture keep if ageymem >= 16 & ageymem <= 40
        capture quietly sum `i', detail
        capture replace `i' = r(p50)*10 if `i' > r(p50)*10
        capture keep if `i' > 0

        capture quietly sum `i' [weight=hpopwgt], detail
        capture gen sz`i'3s = 1 if  `i' >= r(p50)*0.75 & `i' <= r(p50)*1.25
        capture replace sz`i'3s = 0  if sz`i'3s ==.
        capture quietly sum sz`i'3s
        capture replace sz`i'3s = r(mean)

        capture quietly sum `i' [weight=hpopwgt], detail
        capture gen sz`i'3b = 1 if `i' >= r(p50)*0.60 & `i' <= r(p50)*2.50
        capture replace sz`i'3b = 0  if sz`i'3b ==.
        capture quietly sum sz`i'3b
        capture replace sz`i'3b = r(mean)

        capture quietly sum `i' [weight=hpopwgt], detail
        capture gen MeMd`i'3 = r(mean)/r(p50)
```

```
        capture ineqdec0 `i' [w=hpopwgt]
        capture gen g`i'3 = r(gini)

        capture xtile v = `i' [weight=hpopwgt], nq(10)
        capture bys v: egen sv = sum(v)
        capture egen tv = sum(v)
        capture gen mc`i'3 = sv/tv

        capture noisily tab mc`i'3
        capture noisily tab sz`i'3s
        capture noisily tab sz`i'3b
        capture noisily tab MeMd`i'3
        capture noisily tab g`i'3
restore

preserve
        capture quietly sum `i', detail
        capture replace `i' = r(p50)*10 if `i' > r(p50)*10
        capture keep if `i' > 0
        capture replace `i' = `i'/(nhhmem^0.5) //equivalize counting household size

        capture quietly sum `i' [weight=hpopwgt*nhhmem], detail
        capture gen sz`i'4s = 1 if  `i' >= r(p50)*0.75 & `i' <= r(p50)*1.25
        capture replace sz`i'4s = 0  if sz`i'4s ==.
        capture quietly sum sz`i'4s
        capture replace sz`i'4s = r(mean)

        capture quietly sum `i' [weight=hpopwgt*nhhmem], detail
        capture gen sz`i'4b = 1 if `i' >= r(p50)*0.60 & `i' <= r(p50)*2.50
        capture replace sz`i'4b = 0  if sz`i'4b ==.
        capture quietly sum sz`i'4b
        capture replace sz`i'4b = r(mean)

        capture quietly sum `i' [weight=hpopwgt*nhhmem], detail
        capture gen MeMd`i'4 = r(mean)/r(p50)

        capture quietly ineqdec0 `i' [w=hpopwgt*nhhmem]
        capture gen g`i'4 = r(gini)

        capture xtile v = `i' [weight=hpopwgt*nhhmem], nq(10)
        capture bys v: egen sv = sum(v)
        capture egen tv = sum(v)
        capture gen mc`i'4 = sv/tv

        capture noisily tab mc`i'4
        capture noisily tab sz`i'4s
        capture noisily tab sz`i'4b
        capture noisily tab MeMd`i'4
        capture noisily tab g`i'4
restore

preserve
        capture keep if ageymem <= 65
        capture quietly sum `i', detail
        capture replace `i' = r(p50)*10 if `i' > r(p50)*10
        capture keep if `i' > 0
        capture replace `i' = `i'/(nhhmem^0.5)

        capture quietly sum `i' [weight=hpopwgt*nhhmem], detail
        capture gen sz`i'5s = 1 if  `i' >= r(p50)*0.75 & `i' <= r(p50)*1.25
        capture replace sz`i'5s = 0  if sz`i'5s ==.
        capture quietly sum sz`i'5s
        capture replace sz`i'5s = r(mean)

        capture quietly sum `i' [weight=hpopwgt*nhhmem], detail
        capture gen sz`i'5b = 1 if `i' >= r(p50)*0.60 & `i' <= r(p50)*2.50
        capture replace sz`i'5b = 0  if sz`i'5b ==.
        capture quietly sum sz`i'5b
        capture replace sz`i'5b = r(mean)

        capture quietly sum `i' [weight=hpopwgt*nhhmem], detail
        capture gen MeMd`i'5 = r(mean)/r(p50)

        capture quietly ineqdec0 `i' [w=hpopwgt*nhhmem]
        capture gen g`i'5 = r(gini)

        capture xtile v = `i' [weight=hpopwgt*nhhmem], nq(10)
        capture bys v: egen sv = sum(v)
        capture egen tv = sum(v)
        capture gen mc`i'5 = sv/tv

        capture noisily tab mc`i'5
        capture noisily tab sz`i'5s
        capture noisily tab sz`i'5b
        capture noisily tab MeMd`i'5
        capture noisily tab g`i'5
restore

preserve
        capture keep if ageymem >= 16 & ageymem <=40
        capture quietly sum `i', detail
        capture replace `i' = r(p50)*10 if `i' > r(p50)*10
        capture keep if `i' > 0
        capture replace `i' = `i'/(nhhmem^0.5)

        capture quietly sum `i' [weight=hpopwgt*nhhmem], detail
        capture gen sz`i'6s = 1 if  `i' >= r(p50)*0.75 & `i' <= r(p50)*1.25
        capture replace sz`i'6s = 0  if sz`i'6s ==.
        capture quietly sum sz`i'6s
        capture replace sz`i'6s = r(mean)

        capture quietly sum `i' [weight=hpopwgt*nhhmem], detail
        capture gen sz`i'6b = 1 if `i' >= r(p50)*0.60 & `i' <= r(p50)*2.50
        capture replace sz`i'6b = 0  if sz`i'6b ==.
        capture quietly sum sz`i'6b
        capture replace sz`i'6b = r(mean)

        capture quietly sum `i' [weight=hpopwgt*nhhmem], detail
```

```
        capture gen MeMd`i'6 = r(mean)/r(p50)

        capture quietly ineqdec0 `i' [w=hpopwgt*nhhmem]
        capture gen g`i'6 = r(gini)

        capture xtile v = `i' [weight=hpopwgt*nhhmem], nq(10)
        capture bys v: egen sv = sum(v)
        capture egen tv = sum(v)
        capture gen mc`i'6 = sv/tv

        capture noisily tab mc`i'6
        capture noisily tab sz`i'6s
        capture noisily tab sz`i'6b
        capture noisily tab MeMd`i'6
        capture noisily tab g`i'6
restore

*******************************************************************************
preserve
        capture quietly sum `i', detail
        capture replace `i' = r(p50)*10 if `i' > r(p50)*10
        capture keep if `i' > 0
        capture replace `i' = `i'/(nhhmem) //equivalize fully counting household size

        capture quietly sum `i' [weight=hpopwgt*nhhmem], detail
        capture gen sz`i'7s = 1 if  `i' >= r(p50)*0.75 & `i' <= r(p50)*1.25
        capture replace sz`i'7s = 0  if sz`i'7s ==.
        capture quietly sum sz`i'7s
        capture replace sz`i'7s = r(mean)

        capture quietly sum `i' [weight=hpopwgt*nhhmem], detail
        capture gen sz`i'7b = 1 if `i' >= r(p50)*0.60 & `i' <= r(p50)*2.50
        capture replace sz`i'7b = 0  if sz`i'7b ==.
        capture quietly sum sz`i'7b
        capture replace sz`i'7b = r(mean)

        capture quietly sum `i' [weight=hpopwgt*nhhmem], detail
        capture gen MeMd`i'7 = r(mean)/r(p50)

        capture quietly ineqdec0 `i' [w=hpopwgt*nhhmem]
        capture gen g`i'7 = r(gini)

        capture xtile v = `i' [weight=hpopwgt*nhhmem], nq(10)
        capture bys v: egen sv = sum(v)
        capture egen tv = sum(v)
        capture gen mc`i'7 = sv/tv

        capture noisily tab mc`i'7
        capture noisily tab sz`i'7s
        capture noisily tab sz`i'7b
        capture noisily tab MeMd`i'7
        capture noisily tab g`i'7
restore
```

```
preserve
        capture keep if ageymem <= 65
        capture quietly sum `i', detail
        capture replace `i' = r(p50)*10 if `i' > r(p50)*10
        capture keep if `i' > 0
        capture replace `i' = `i'/(nhhmem)

        capture quietly sum `i' [weight=hpopwgt*nhhmem], detail
        capture gen sz`i'8s = 1 if  `i' >= r(p50)*0.75 & `i' <= r(p50)*1.25
        capture replace sz`i'8s = 0  if sz`i'8s ==.
        capture quietly sum sz`i'8s
        capture replace sz`i'8s = r(mean)

        capture quietly sum `i' [weight=hpopwgt*nhhmem], detail
        capture gen sz`i'8b = 1 if `i' >= r(p50)*0.60 & `i' <= r(p50)*2.50
        capture replace sz`i'8b = 0  if sz`i'8b ==.
        capture quietly sum sz`i'8b
        capture replace sz`i'8b = r(mean)

        capture quietly sum `i' [weight=hpopwgt*nhhmem], detail
        capture gen MeMd`i'8 = r(mean)/r(p50)

        capture quietly ineqdec0 `i' [w=hpopwgt*nhhmem]
        capture gen g`i'8 = r(gini)

        capture xtile v = `i' [weight=hpopwgt*nhhmem], nq(10)
        capture bys v: egen sv = sum(v)
        capture egen tv = sum(v)
        capture gen mc`i'8 = sv/tv

        capture noisily tab mc`i'8
        capture noisily tab sz`i'8s
        capture noisily tab sz`i'8b
        capture noisily tab MeMd`i'8
        capture noisily tab g`i'8
restore

preserve
        capture keep if ageymem >= 16 & ageymem <=40
        capture quietly sum `i', detail
        capture replace `i' = r(p50)*10 if `i' > r(p50)*10
        capture keep if `i' > 0
        capture replace `i' = `i'/(nhhmem)

        capture quietly sum `i' [weight=hpopwgt*nhhmem], detail
        capture gen sz`i'9s = 1 if  `i' >= r(p50)*0.75 & `i' <= r(p50)*1.25
        capture replace sz`i'9s = 0  if sz`i'9s ==.
        capture quietly sum sz`i'9s
        capture replace sz`i'9s = r(mean)

        capture quietly sum `i' [weight=hpopwgt*nhhmem], detail
        capture gen sz`i'9b = 1 if `i' >= r(p50)*0.60 & `i' <= r(p50)*2.50
        capture replace sz`i'9b = 0  if sz`i'9b ==.
        capture quietly sum sz`i'9b
```

```
capture replace sz`i'9b = r(mean)

capture quietly sum `i' [weight=hpopwgt*nhhmem], detail
capture gen MeMd`i'9 = r(mean)/r(p50)

capture quietly ineqdec0 `i' [w=hpopwgt*nhhmem]
capture gen g`i'9 = r(gini)

capture xtile v = `i' [weight=hpopwgt*nhhmem], nq(10)
capture bys v: egen sv = sum(v)
capture egen tv = sum(v)
capture gen mc`i'9 = sv/tv

capture noisily tab mc`i'9
capture noisily tab sz`i'9s
capture noisily tab sz`i'9b
capture noisily tab MeMd`i'9
capture noisily tab g`i'9
restore
}
```