

**Shifting vulnerability in Europe:**

**A more nuanced approach to identifying and evaluating the middle class in the region**

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**Abstract**

While recent evidence for Europe has shown that the size of the middle class has not changed substantially over the past decade, the composition of this group has followed a different trend. By taking a vulnerability-based approach to defining the middle class (defined as those with a negligible probability of falling into poverty), we find that changes in size are muted relative to the underlying increase in the risk that individuals within and near the middle class face. Using a sample of mostly high-income countries in the European Union (EU), we show that the resources needed to stay comfortably middle class have shifted, such that the insurance premium to counteract the risk of falling into poverty has become, in effect, more expensive. [expand/modify]

## I. Introduction & motivation

One could argue there is no concept as unambiguously heated as the middle class in policymaking circles. As a recent blog by the authors<sup>1</sup> pointed out, “The middle class would seem to hold the economic fate of the world in its hands...”, and not without reason. Evidence is not lacking that suggest the stronger the middle class, the better off society is (or will be). The story goes: the middle class serves as a mediator between the rich and poor, and by definition holds values that are conducive to stability, prosperity, and democracy. As such, the larger (and stronger) the middle class is in society, the better off everyone will be (including the rich and the poor). This is important for developed and developing countries alike, but has embraced a new role in the developed world, where lines have become blurred between horizontal and vertical inequality, and perceptions are (at least in policymaking circles) treated as more salient than objective evidence on welfare. For those who think perceptions are not relevant in a utility maximization framework, look no further than some country’s push to make things spectacular again. Moreover, the shift in the task content of jobs across Europe has initiated a discussion on the future of work in the region (cite Growing United).

Europe is a case in point: not only because the region (specifically, the EU) is supranational along many economic (and social) dimensions, but because there is strong evidence to suggest that perceptions emphasize a broken social contract and deteriorating welfare, in spite of limited hard evidence to directly support this claim. There is evidence, however, that shared prosperity is being challenged in Europe, and most of this is due to increasing inequality in labor income, likely the result of changing job tasks (cite Growing United). [expand]

- Why is measurement of the middle class important?
- Why is Europe an important case study?
- Vertical vs. horizontal inequality

## II. Review of the literature on the middle class

- Why is the middle class important for growth/stability/democracy, measurement of the middle class, etc.?
- What lines/definitions have been used, what have these said about middle class shares over time?

## III. Methodology

The difficulty in classifying the middle class rests in the fact that, by definition, it is a relative measure. But relative measures tend to be country specific and thus not as valuable in a cross-cutting setting, which is why absolute measures are frequently favored when comparing countries over time (SOURCE). A vulnerability-based approach to defining the middle class allows us to identify absolute thresholds that can be applied consistently across countries and over time, since by construction these are associated with some absolute level of welfare. Beyond the benefit of observing changes in the size and composition of the middle class, the exercise of measuring a vulnerability-based middle class threshold allows us to identify shifts in vulnerability over time, and thus shifts in the amount of income needed to “belong” to the middle class.

Following Lopez-Calva & Ortiz-Juarez (2014), we part from the assumption that belonging to the middle class is a function of poverty risk, and we estimate the middle class thresholds using a regression

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<sup>1</sup> <https://www.brookings.edu/blog/future-development/2018/03/22/is-there-a-middle-class-crisis-in-europe/>

framework. Since belonging to the middle class is a function of poverty risk, for an individual to be considered middle class, he or she must have a reasonably low probability of falling into poverty. Given that most countries in the EU are high income (the exceptions being Bulgaria, Croatia, and Romania), the focus of our analysis will be on the newly established high-income poverty line, which is set at \$21.70 USD PPP per day. Absolute thresholds of the middle class based on vulnerability to poverty are defined using panel data; specifically, we estimate the probability of falling into poverty (at \$21.70 PPP /day) over an established period (we exploit the EU-SILC's four-year panels for a sample of countries). We then identify the income level associated with a spectrum of probabilities. This approach allows us to model falling into poverty with various household and individual characteristics that capture lifetime income and stocks (assets) rather than just income flows, and we use the same variables to predict levels of income. Thus, vulnerability is not just a function of income, but also income-generating assets.

Given that an analysis of Europe that excludes middle income countries outside of the EU would neglect the heterogeneity in the region, for completeness we carry out the same exercise for the subset of upper middle income countries in the EU using the corresponding international poverty line (\$5.50 PPP /day), which is more relevant for Eastern European countries not in the EU (Western Balkans, Russia, Moldova, Belarus, South Caucasus) as well as Central Asian countries (which fall under the regional classification of Europe & Central Asia for World Bank operations). The focus here is mostly to show trends in a middle class line that is more representative of the ECA region as a whole rather than highlight changing vulnerability.

#### Data

A vulnerability-based approach to defining the middle class requires panel data because implicit in its measurement is a dynamic trend; namely, a change in an individual's income flows over an established period of time. However, panel data that captures income in a systematic way across countries is not easy to find. Fortunately, European countries in the EU participate in the EU Statistics on Income and Living Standard (EU-SILC) survey, a harmonized income and living standards survey carried out each year among EU countries, starting as far back as 2004 for some countries.<sup>2</sup> The survey is made up of a rotating panel that allows for both cross-sectional and longitudinal estimation for most EU countries beginning in 2006.

Given data limitations, the focus of our analysis will be on EU countries (excluding Germany<sup>3</sup>) and participating non-EU countries (Iceland, Norway Switzerland) rather than Europe as a whole (which could be extended to include the Western Balkans, South Caucasus, and other Eastern European countries). Table X below shows the coverage of countries used in our analysis. Panel data coverage for Western European countries begins in (income year) 2004, and for newer member states (Central and Eastern Europe) begins in 2006, while the last country to begin coverage is Croatia (in 2009). While panels in two-to-four year increments are defined from 2005 through 2014, our focus will be on two panels that highlighting changing vulnerability over time: 2005-2008 (pre-crisis period) and 2011-2014 (post-crisis/recovery period). Some of the analysis, therefore, excludes Croatia since data in the pre-crisis period is not available.

[insert Table X here]

[expand on some basic trends from the data – maybe show the evolution of the poverty line over time? 5.50 and 21.70?]

<sup>2</sup> More information on EU-SILC. Survey vs income years, NMS countries start later, etc.

<sup>3</sup> Explanation as to why we don't get Germany data...

**Commentato [JGK1]:** I think it is important to calculate the middle class line that we used in the report here, even though the focus will be on the high income EU countries and thus a higher middle class line. I am not sure how you are referencing the middle class stuff in the social contract report, but it would be good to triangulate anyway.

In addition to the EU-SILC panel data, to show the evolution of the middle class in Europe and the ECA region as a whole we use combination of of the EU-SILC's cross sectional data as well as the World Bank's ECAPOV harmonized income and consumption surveys (the latter primarily for non-EU countries).

### Estimation

The regression-based approach to defining a vulnerability-based measure of the middle class, as in Lopez-Calva & Ortiz-Juarez (2014), can be broken into three stages. In the first stage, we identify transitions in and out of poverty using panel data from the EU-SILC. Since most countries in the EU are high income countries, and the World Bank's poverty line for upper middle income countries (UMICs) is 5.50 USD PPP per day (which is only relevant in a handful of countries), we define transitions in and out of high income poverty, which the World Bank has set at 21.70 USD PPP per day (on average this coincides with the PPP equivalent of the relative poverty line used by the EU of 60% of the median equivalized income).<sup>4</sup> The second parameter needed to construct poverty transitions is the time frame, which we set to four year intervals in most of our analysis (the longest panel available). The EU-SILC follows households for a total of four rounds, which despite attrition provides the most informative set of information, though at the risk of masking short-term transitions. As a robustness check, we also test yearly transitions in and out of poverty, such that we can observe multiple transitions per household.

The matrix in Table X below shows, for each country and four-year interval, four cells to identify poverty transitions: poor-to-poor, poor-to-nonpoor, nonpoor-to-nonpoor, and nonpoor-to-poor. Proportions are such that within each 4x4 matrix, rows sum up to 100% (that is, those who are poor in  $t$  are divided into two groups: those who remain poor in  $t+1$  and those who escape poverty in  $t+1$ ). These matrices are informative in and of themselves (changes in the poverty headcount alone mask the magnitude of transitions into one space versus the other), but for the sake of our analysis provide a key input into a vulnerability-based approach to defining the middle class. Specifically, we use the matrices to identify the average share of the population that transitions into poverty during the time period. This share is then used to identify the lower bound threshold of poverty probability below which an individual must be to be classified as middle class. Among the X countries listed below, the average (unweighted) rate of transitions into poverty is 8% (though it ranges from X% in XX to X% in XX). Among middle income countries using the 5.50 USD PPP line, the probability is closer to 5% (see annex). As argued by Lopez-Calva & Ortiz-Juarez, the benefit of calculating transitions rather than looking at static income flows alone is that behind these movements are changes in *permanent* income (i.e., assets as well as income flows) that underlie the risk of poverty. This same logic is applied to subsequent stages of estimation.

The second stage involves a two-step estimation to identify poverty probabilities and predicted income levels associated with each probability. Following Lopez-Calva & Ortiz-Juarez, we first estimate the probability of being poor in  $t+n$ , conditional on observable characteristics, using a logistic regression:

$$(1) \quad p_{ic,t+n} = E[\text{poor}_{ic,t+n} | X_{ict} \beta_{ct}]$$

<sup>4</sup> Another option would have been to use different poverty lines for each country; for example, use the upper middle income line for upper middle income countries. But since this value is substantially lower than the high income line, we use the same line for all countries.

**Commentato [JGK2]:** This will take a little more time but I think it is worth it...

where  $\mathbf{X}$  and  $\boldsymbol{\beta}$  are both vectors of covariates (evaluated at time  $t$ ) and their coefficients, respectively, and  $p_{ic,t+n}$  is the poverty status at time  $t+n$ . What  $p_{ict}$  captures is the predicted probability that an individual either falls into poverty or remains poor between  $t$  and  $t+n$ . The estimation is carried out at the household level (income evaluated in per capita terms), but accounts for changes in the household composition underlined by changes at the individual level. For our measure of middle class to be based on permanent income, we predict the probability of being poor at  $t+n$  with measures of human capital (and occupational status, which together with education capture market resources of the household), demographic characteristics of the household, quality of housing, subjective measure of welfare, and observed shocks at the household level. Based on the estimation above, we define quantiles of predicted probability and the average of each covariate within the quantiles.

The final stage involves constructing a measure of permanent income by using the same covariates described above. Namely, we estimate the equation below using Ordinary Least Squares (OLS):

$$(2) \quad \ln Y_{ict} = \alpha + \mathbf{X}_{ict} \hat{\boldsymbol{\beta}}_{ct} + \varepsilon_{ict}$$

Where  $\ln Y_{ict}$  is the natural logarithm of household income in per capita terms at the *start of the period*. Permanent income is then defined at the quantile level, wherein the product of the vector  $\hat{\boldsymbol{\beta}}$  (from equation 2) and the average of  $\mathbf{X}_{ict}$  solves the income equation and is used to identify the per capita income associated with each quantile in the probability distribution. Specifically, income at the quantile level then becomes defined by

$$Y_{qct} = \sum_1^k \bar{x}_{qct} \beta_{xct}$$

For all  $x=1, \dots, k$  independent variables.  $\bar{x}_{qct}$  is the quantile mean and  $\beta_{xct}$  the coefficient associated with each  $x$  from (2).  $Y_{qct}$  is then multiplied by the mean (exponentiated) error in (2) to obtain the Smearing corrected estimate (though it is worth mentioning that the corrected and uncorrected estimates are very similar).

#### IV. Results

The exercise outlined above generates a wealth of information that can help us understand dynamics of the middle class as well as those right along the threshold (especially those striving to be middle class that cannot be classified as poor or middle class, but are rather classified as ‘vulnerable’). Our focus will be on changes in middle class shares over time, the observed shift in vulnerability over time, and the changing composition of the middle class and those near the threshold.

##### *Size of the middle class over time*

Figure X below shows the distribution of income classes over time among the sub-sample of EU countries considered in our analysis using the cross-sectional data from the EU-SILC.

[insert figure with population weighted EU **average only with countries used above**]

*Shifting vulnerability over time*

More interesting than trends in the size of the middle class are trends in shifting vulnerability over time, which can be observed with the panel data by comparing the plot of income vs. poverty risk.

[insert EU level figure]

[country level figures to annex]

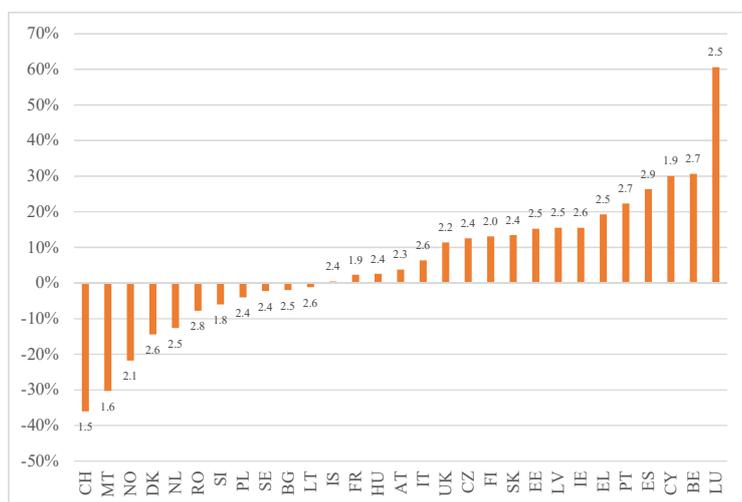
Table X. Income level associated with an 8% probability of falling into poverty (21.70 USD PPP)

Country	Quantile (n=50)		Predicted income	
	2005-2008	2011-2014	2005-2008	2011-2014
AUT	43	41	41.388298	50.7317429
BEL	40	39	36.922039	36.1705017
BGR	2	1	13.9997168	32.4407806
CYP	41	27	53.8594856	46.3696747
DNK	45	47	42.033947	44.1499176
ESP	14	15	32.3278389	46.6241035
EST	3	4	20.8576889	35.784111
FRA	39	38	32.112957	37.4248352
GRC	12	3	39.9179192	43.0049095
HUN	2	3	30.060688	32.3496208
ISL	47	38	37.4285126	49.6927376
LTU	3	3	25.3164425	28.7836819
LVA	4	2	22.0276051	44.1809502
NLD	44	38	37.6055794	42.1572342
NOR	47	45	48.2122765	56.4222679
POL	3	6	30.7968025	32.4704666
SVK	2	4	19.831728	30.7108841
SVN	22	21	33.3187141	39.1281624
EU	20	20	33.6569443	40.4285126

Note: quantile selected based on the probability closest to 8% (by country-panel)

Figure X. Deepening of the vulnerability gap over time (avg. distance from middle class threshold among the vulnerable (5.50-11 USD PPP))

Commentato [JGK3]: Need to update to the 21.70 line



### Changing composition of the middle class

Table X. Shift in market resource composition at the threshold over time (Pooled EU)

Topic	Level	Predicted income between 35-39 USD PPP					
		Mean near threshold (at baseline)		Change	Beta coefficient (OLS)		Change
		2005-2008	2011-2014		2005-2008	2011-2014	
Education	Primary or less (HH head)	24%	18%	-23%	0.00	0.00	
	Lower secondary (HH head)	14%	12%	-13%	0.08	0.07	-9%
	Upper secondary (HH head)	37%	36%	-4%	0.13	0.15	20%
	Post-secondary (HH head)	2%	3%	107%	0.19	0.21	12%
	Tertiary (HH head)	24%	31%	29%	0.30	0.31	4%
Occupation	Not working	41%	44%	7%	0.00	0.00	
	Managers, professionals, technicians (HH head)	24%	26%	5%	0.34	0.35	1%
	Support, service, sales workers (HH head)	13%	13%	-3%	0.24	0.21	14%
	Craft, trades, elementary occupations (HH head)	13%	10%	-25%	0.18	0.15	15%
	Plant/machine operators/assemblers (HH head)	6%	6%	-1%	0.22	0.22	-2%

Skilled and unskilled agricultural/etc. (HH head)

3%

2%

-20%

-0.07

-0.04

36%

## V. Discussion