

Growing Vulnerability

What Happened to Europe's Middle Class in the Course of a Decade?

Maurizio Bussolo

Jonathan Karver

Michael Lokshin

Luis-Felipe López-Calva

Iván Torre



WORLD BANK GROUP

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Abstract

This paper uses a vulnerability-based approach to analyze the evolution of the middle class in Europe between 2005–08 and 2015–18. The analysis reveals that, on average, the income level needed to ensure a low probability of falling into poverty—also understood as the vulnerability threshold—increased between those periods in real terms. This increase correlates with decreases in the size of the middle

class in many European countries. In parallel, the composition of the middle class changed, with an increased share of tertiary-educated household heads and a larger share of household heads with managerial and professional occupations. Lastly, the households that were not poor, but not yet middle class, were further from becoming middle class in the second period than in the first period.

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Growing Vulnerability: What Happened to Europe's Middle Class in the Course of a Decade?

Maurizio Bussolo, Jonathan Karver, Michael Lokshin, Luis-Felipe López-Calva, and Iván Torre

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I. Introduction and motivation

A large social science literature suggests that the larger and more established the middle class, the better off society is, or will be (Easterly 2001; Banerjee and Duflo 2008). This suggestion is not new: Aristotle argued, in *Politics*, that the middle class serves as a mediator between the rich and the poor, preserving values conducive to stability and prosperity. Among academics but also in the public discourse, a narrative of increasing inequality and a crisis of the middle class has emerged (Fukuyama 2012; Besharov and others 2016; Sitaraman 2018; Bussolo and others 2018). Remarkably, the most common way in which the crisis of the middle class has been represented is by its shrinking.

This paper examines the *health* of the middle class by using on a novel definition of the middle class. In this new definition, introduced by López-Calva and Ortiz-Juarez (2014), being in the middle class requires absence, or a low risk, of vulnerability to poverty. The risk of experiencing poverty –defined as having income levels below a given poverty line– is what makes an individual *vulnerable* or insecure in an economic sense. Since economic security is a hallmark of the middle class, being vulnerable means not being in the middle class. So rather than focusing on what happens to the size of the middle class, this paper investigates changes in the risk of vulnerability to poverty. In essence, this vulnerability is assessed by estimating a level of household income associated with a low probability (defined as less than 4 percent over four years) of falling into poverty. By using European panel data covering 22 countries during the period from the 2008 global financial crisis to just before the onset of the COVID-19 pandemic, this paper assesses, for the first time, whether the crisis of the middle class manifested itself as an increase of the risk of falling into poverty or, equivalently, as an increase of the minimum income needed to be (almost) immune from this risk.

Our results show that to maintain this low risk between 2008 and 2018, household incomes had to increase, on average, by about 11 percent in real terms. This value, however, is an average of a heterogeneous picture at the country level: in many countries, the income associated with this low probability of falling into poverty has increased substantially – above 20 percent – while in some countries, the associated level of income has decreased. Interestingly, the increase in the level of the vulnerability threshold is related to an increase in the magnitude of the shocks which households have been facing between the two periods. The average income shock experienced by a household that fell into poverty in the most recent period is about 21 percent larger than the shock in the earlier period. To *insure* against these larger shocks, the minimum income needed to maintain the middle class status had to increase.

There is a correspondence between the changes in vulnerability and changes in the size of the middle class. We find that the size of the middle class for Europe as a whole (all countries pooled together) has remained stable between 2008 and 2018, with around 28 percent of households categorized as middle class. However, this stability hides considerable cross-country heterogeneity and countries experiencing a substantial increase in the vulnerability income threshold -above 10 percent- have seen their middle classes reduce by eight percentage points. The increase in the vulnerability threshold has also been associated to an increase in the size of the vulnerable group which, as a share of the population below the vulnerability line and above the poverty line, grew from around 38.7 percent in 2008 to 44 percent in 2018.

This paper finally highlights that the increase of the vulnerability threshold is linked to structural changes rather than to a short term rise of income volatility. The analysis shows that the composition of the middle class changes and that, at least in part, these changes reflect the polarization of labor markets due to long term trends of technology, demography and globalization as characterized by a recent literature (Acemoglu and Autor, 2011; and Goos and Manning, 2007). We find that the characteristics and assets of middle class households have changed between 2008 and 2018, pointing to an increased share of tertiary-educated household heads and a larger share of household heads with managerial and professional occupations, further highlighting the economic security nature of the middle class (i.e., to safely be middle class over time, steady jobs and steady incomes are necessary). Importantly, these compositional changes in the middle class are different from the changes in the overall population, pointing out the reshuffling of the positions of the households in the overall income distribution.

The paper is organized as follows. Section II reviews the literature on the measurement of the middle class. Section III describes the methodology and data used to measure vulnerability in Europe. Section IV presents the results of the analysis. Section V summarizes the paper's conclusions.

II. The literature on the middle class: A short review

Analysis of the evolution of the middle class is a central topic of public discussion because of its strong influence on many spheres of societal life. Studies note that the middle class constitutes the backbone of democracy (Birdsall 2010; Stewart 2005; Alesina and Rodrik 1994) or helps produce economic benefits and foster economic development (Easterly 2001). The entrepreneurial activities that often originate in the middle class lead to employment creation and productivity enhancements, incentivizing investments in education and health, contributing to human capital accumulation and growth in consumption and

savings, and creating a virtuous circle that expands the middle class (Szymańska 2019; Banerjee and Duflo 2008; Doepke and Zilibotti 2007; Acemoglu and Zilibotti 1997). Middle-class consumption patterns may lead to market diversification and help mitigate shocks (Murphy, Shleifer, and Vishny 1989). A robust middle class also demands adequate public services and good governance (OECD 2019). As such, it may act as a buffer for potential social conflicts emerging from horizontal inequalities between racial and ethnic groups and from vertical inequalities between the poor and the rich (Barro 1999; Stewart 2005; Bussolo and others 2018; Bosco and Poggi 2020).

In sum, there is a consensus about the fact that countries benefit from having a large and stable middle class. However, the definition of the middle-class varies across and within disciplines (Ricci 2020) and no consensus has been reached on how to measure it and its evolution. This is clearly an issue because without a clear definition, without a firm understanding of whether the middle class denotes homogeneous or heterogeneous groups of people or whether it varies in different regions, countries, and at different stages of development, it becomes difficult to design policies that are effective at strengthening and fostering the middle class.

From a simple notion to make tax collection more effective, the concept of class became something much more complex and, at least in sociology, it involved more than levels of income. In the Weberian tradition, the concept of stratification contains three intertwined notions: (i) class, or the strictly economic aspect of stratification; (ii) status, or the identity and prestige associated to membership (cultural consumption); and (iii) party (power) which is related to the notion of power in social relations. Sociologists are thus more likely to focus on occupational status and education (Reeves, Guyot, and Krause 2018) while economists are likely to rely on income levels (Banerjee and Duflo 2008; Ravallion 2010).

More in detail, in the economics literature two approaches are used to define and measure the middle class: a relative and an absolute approach. In the relative approach, the middle class is identified as the population located at the middle of the income distribution. Different authors set intervals for the middle class constructed in relation to the median income or average income, or based on specific quintiles of the distribution of wellbeing. For example, Graham, Pettinato, and Birdsall (2000) choose 75% to 125% of median income as their interval; Castellani and Parent (2011), 50% to 150% of median income; Song and others (2016), 100% to 250% of average income; Barro (1999) and Easterly (2001), the middle three quintiles; Alesina and Perotti (1996), the third and fourth quintiles; and Partridge (1997), the third quintile. The theoretical framework used to define the middle class in this relative approach is related to the idea

of polarization. The middle class is defined as the set of individuals whose feelings of identification within the group and alienation with respect to the set of poor and rich individuals are both contemporarily maximized (Esteban, Gradin and Ray 2007). The second or the absolute approach uses instead boundaries that are fixed exogenously, and that have the important advantage of allowing for international comparisons. So for example Banerjee and Duflo (2008) define the middle class as those people whose income is within the \$2 to \$10 interval; Ravallion (2010) uses the \$2 to \$13 range; Castellani and Parent (2011), \$2 to \$20; Milanovic and Yitzhaki (2002), \$10 to \$20; Ferreira et al. (2013), \$10 to \$50; Kharas (2010 and 2017), \$10 to \$100; and Clementi et al. (2023), \$5.5 to \$ 10. In this absolute approach, the theoretical framework is one of vulnerability, and the middle class is defined as the set of individuals who are able to insure against idiosyncratic shocks, and therefore are able to reach a level of economic security that makes them safe from becoming poor.

In this paper, following the recent work of Lopez-Calva and Ortiz-Juarez (2014), we opt for a definition of the middle class in terms of absolute monetary thresholds. However, at least for the lower bound of the middle class, we do not set it arbitrarily and we proceed by analogy with well-established approaches to setting poverty lines. We identify income levels associated with the “functionings” that define the class. In the case of the poor class, the functioning corresponds to sufficient nutrition or a given minimum level of calories. A poor person is a person whose income is not sufficient to purchase such a minimum level. In the case of the middle class, the functioning is one corresponding to economic security, which in turn is defined as low vulnerability to falling back into poverty. In this definition, the lower threshold for the middle class is absolute in the sense of the functioning that defines it, relative in terms of the specific context. Note also that this concept of middle class encompasses more than being able to afford a particular living standard. Its key feature is a sense of stability and economic security, often achieved by owning assets, having high level education and skills, or working in certain professions (Atkinson and Brandolini, 2013).

Vulnerability is typically measured by poverty dynamics—transitions from one level of vulnerability to another (Dercon 2011; Elbers and Gunning 2003). Some studies define vulnerable households as households with income between the poverty line and a higher vulnerability line that puts them at high risk of falling into poverty (Pritchett and others 2000). Dang and Lanjouw (2017) propose a non-parametric method for establishing the vulnerability line, and Schotte and others (2018) apply a method in which they model the poverty transition of households as a first-order Markov process. More recent analysis by Prieto (2024) follows this method and estimates two vulnerability lines – one higher, which focuses on

households in the central part of the income distribution, and one lower, which focuses on households in the upper part of the income distribution.

Many studies indicate that global vulnerability and economic and social inequalities increased in recent decades (Pleninger, Haan, and Sturm 2022), despite the rapid decline in absolute poverty (Kharas 2017; Kochar and Oates 2015; Burrows 2015).

Globally, the middle class has been affected by the simultaneous trends of globalization, automation, and job polarization (Pleninger, Haan, and Sturm 2022; Derndorfer and Kranzinger 2021; Salido and Carabaña 2020). A shrinking middle class implies that individuals may experience more difficulties reaching or maintaining their middle-class status and are more vulnerable to falling into poverty (OECD 2019).

Historically, Europe has been a middle class society with low levels of inequality (Ranci et al. 2021). However, in recent years, between-group inequality has been growing (Callan, Doorley, and Savage 2018). Estimates on the size of the middle class using different absolute and relative definitions show little movement in size, despite growing perceptions of inequality (Bussolo et al. 2018). There has not been, however, an assessment of the evolution of the middle class in the region using a vulnerability approach. This paper is the first to apply such approach used, for instance, in Latin America (López-Calva and Ortiz-Juarez 2014), to the case of Europe.

III. Methodology

The vulnerability approach identifies members of the middle class using three variables: a poverty line, a low probability of falling into poverty, and a permanent income threshold that guarantees that households earning at least such an income face such a low probability risk of becoming poor.

The poverty line is set at \$24.35¹ per day.² A household in the European Union is considered middle class if its permanent income is equal to or above the level required to maintain the specified low risk of falling

¹ All dollar figures in this paper are in 2017 purchasing power parity (PPP).

² The vulnerability-based approach to the middle class relies on an absolute poverty concept and thus on an absolute poverty line. Eurostat has established a relative poverty measure (“at-risk of poverty”) which relies on a relative poverty line equal to 60 percent of the median household equivalized income in a given year. Since this poverty line is a function of the income distribution, it is not fixed over time or across countries. An at-risk of poverty rate of 20 percent in one country does not mean the same thing in another (and a change in at-risk of poverty might reflect a change in the income distribution rather than a change in the share of the population living under a certain level of

into poverty and below the level that makes it affluent.³ Using data from four-year panels of the EU Statistics on Income and Living Conditions (EU-SILC), an annual harmonized income and living standards survey conducted in EU countries, we can observe transitions into and outside poverty and thus specify a low probability of falling into poverty. Clearly, the vulnerability to falling into poverty is negatively correlated with the lifetime or permanent income. This, in turn, is a function of household and individual assets and characteristics. Focusing on income generation characteristics, such as the assets and skills of household members, we link vulnerability to poverty to permanent income rather than to the more transient ups and downs of annual income flows.

Data

The EU-SILC survey is based on a rotating panel that allows for cross-sectional and longitudinal estimations for most EU and three other countries—Iceland, Norway, and Switzerland. Our analysis focuses on the European Union (excluding Germany⁴), Iceland, and Norway⁵ ([Table 1](#)). Panels in two- to four-year increments are defined from 2005 through 2021. We use the four-year panels corresponding to reference years 2005–08 (just before the global financial crisis) and 2015–18 (the post-global financial crisis period).⁶ We exclude the panels that span the COVID-19 pandemic (2020 and 2021).⁷ The choice of the two periods—the first characterized by inclusive growth throughout Europe, the second characterized by recovery but still plagued, in many cases, by scarring from the global financial crisis—was motivated by our desire to assess changes in vulnerability.

income). We therefore use the high-income poverty lines of \$24.35 per day. Note that this poverty line is the poverty line for high-income countries and that that all countries in the European Union except Bulgaria (an upper-middle-income country) are high-income countries. Another option would have been to use the upper-middle-income line for upper-middle-income countries. But as this value (\$6.85) is substantially lower than the high-income line (\$24.35), we use the same line for all countries. For a discussion of how the poverty line for high-income countries was established, see Joliffe and others (2022).

³ For symmetry with the lower threshold, we define the upper threshold also in terms of probability of falling into poverty – but at an even lower level (of 1 percent). Alternative definitions can be to use the income that puts a household in a certain top percentile of the income distribution. We discuss these alternative definitions in section 4 and table A.4.

⁴ Eurostat requires permission from each participating country to access microdata. Unfortunately, Germany does not authorize the access to microdata pertaining to that country for researchers that are based in non-EU institutions.

⁵ Switzerland is excluded because some years of data were not available.

⁶ The analysis excludes Croatia and Romania, because data for these countries are not available for the 2005-08 period.

⁷ As of 2024, there is not yet a 4-year panel that completely excludes the pandemic shock of 2020 and 2021.

Estimation

To identify the middle class, we use a regression-based approach which is organized in three stages (López-Calva and Ortiz-Juarez 2014).

In the first stage, we classify households in different groups depending on their transitions in and out of poverty. In this stage, we use the four-year intervals panel (the longest panel available) of the EU-SILC datasets. For each country and four-year interval and depending on their transitions, households are classified into four groups: poor-to-poor, poor-to-nonpoor, nonpoor-to-nonpoor, and nonpoor-to-poor (Tables A.1 and A.2 in the Appendix). Across all countries, the average share of households that become poor was around 4 percent, that means that 4 percent of households move from being non-poor to being poor.⁸ We thus specify this 4 percent chance of falling into poverty in a four-year period as the “low” probability of falling into poverty.

In the second stage, using a logistic probability regression, we estimate the probability of being poor at the end of each panel (year $t2$) as a function of characteristics measured at the beginning of the panel (year $t1$).⁹ Formally, this can be written as follows:

$$p_{ic} = E[poor_{ic,t2} | \mathbf{X}_{ict1}] = F(\mathbf{X}_{ict1} \boldsymbol{\beta}_c), \quad (1)$$

where: p_{ic} is the probability of household i in country c of being poor in year $t2$ ($poor_{ic,t2}$) conditional on observable household characteristics in year $t1$; \mathbf{X} is the vector of such household characteristics; $\boldsymbol{\beta}$ is the associated vector of country-specific model parameters for the logistic probability function $F(\cdot)$.

The vector of household characteristics includes measures of human capital and occupational status of the household head, as well as demographic characteristics, the quality of housing, a subjective measure of welfare, and observed health and labor shocks at the household level. We refer to these characteristics, which include tangible and intangible variables, as *assets* of households.

⁸ For middle-income countries, this average is almost 10 percent (Cruces and others 2011).

⁹ Note that this estimate is different from the probability of becoming poor between $t1$ and $t2$. In terms of the matrices in tables A.1 and A.2, it is the sum of both being poor at time $t1$ and remaining poor at time $t2$ plus not being poor at time $t1$ and becoming poor at time $t2$. Following López-Calva and Ortiz-Juarez (2014), we are interested both in those who enter poverty and those who remain in poverty. Additionally, restricting the analysis to only those that enter poverty shrinks the estimation sample to the point where estimates become statistically unreliable.

We order all households by their predicted values of p_{ic} and define 50 quantiles of predicted probabilities of falling or remaining into poverty. For each quantile q , we define \bar{x}_{qct1} as the average value of the characteristics \mathbf{X} of the households in quantile q evaluated at time $t1$.

In the third and last stage, we estimate an income equation as follows:

$$\ln Y_{ict1} = \alpha + \mathbf{X}_{ict1} \boldsymbol{\gamma}_{ct1} + \varepsilon_{ict1}, \quad (2)$$

where $\ln Y_{ict}$ is the logarithm of per capita household income at the start of the panel ($t1$), \mathbf{X} is the vector of household characteristics evaluated in the initial year $t1$, and $\boldsymbol{\gamma}$ is the vector of associated country-specific returns.

We calculate Y_{qct1} , the predicted permanent income for each quantile q , by multiplying the average value of \mathbf{X} in each quantile (\bar{x}_{qct1}) on the respective return $\boldsymbol{\gamma}_c$ obtained from the estimation of equation (2).¹⁰ The permanent income of the quantile q is defined as

$$Y_{qct1} = e^{\sum_1^k \bar{x}_{qct1} \gamma_{x_c}} e^{\widehat{\varepsilon}_{ict1}}, \quad (3)$$

for all $x = 1, \dots, k$ independent variables, where \bar{x}_{qct1} is the quantile mean and γ_{x_c} the coefficient associated with each x from equation (2). We multiply the first term by the mean (exponentiated) error in equation (2) ($\widehat{\varepsilon}_{ict1}$) to obtain the Smearing-corrected estimate.

In a graph where permanent income levels are measured on the vertical axis and probabilities of falling into poverty on the horizontal axis, it is possible to plot a line which connects the levels of Y_{qct1} and the corresponding quantiles of the probabilities p_{ic} of falling into poverty. This line, labeled the vulnerability line, is shown in [Figure 1](#) as an example for Latvia in 2015-18. It clearly highlights the inverse relationship between poverty probabilities and permanent income levels. High risk of falling into poverty is associated with low levels of income or, vice versa, to reduce vulnerability to this risk income has to rise. The specific vulnerability threshold Y^V is defined as the value Y_{qct1} associated with the quantile q^V that has a predicted probability of falling into poverty of 4 percent.¹¹ It corresponds to the lower threshold of the middle class.

¹⁰ As López-Calva and Ortiz-Juarez (2014, p.33) point out, “it is important to use the predicted income - a mean, conditional on characteristics - instead of the observed average income, because the predicted income has lower volatility and becomes an index related to stocks (assets), as an income generation capacity of the households.”

¹¹ As there may not be a quantile that has a predicted probability of falling into poverty of exactly 4 percent, we select the quantile that has the predicted probability closest to this value.

Households with incomes *below* this threshold but above the poverty line are classified as vulnerable, they are neither poor nor middle class. The upper threshold of the middle class, Y^U , is defined as the value Y_{qct} associated with the quantile q^U that has a predicted probability of falling into poverty of 1 percent. Households with an income between Y^V and Y^U are classified as middle class.

IV. Results

The main objective of the approach outlined above is to identify the thresholds that define the middle class, the most relevant of which is the vulnerability threshold, i.e. the level of permanent income above which the probability of falling into poverty is lower than 4 percent.

Applying this approach separately to the panels for 2005–08 and 2015–18 highlights the fact that the vulnerability threshold increased in Europe between these two periods. This is the specific manifestation of the crisis of the middle class emphasized by this paper. Between these two periods, the vulnerability threshold rose, for the average country, by 10 percent in real terms. The average, across all countries, of the permanent incomes associated with the 4 percent probability of falling into poverty was \$50.5 per day in 2008 and became \$55.5 in 2018 ([Table 2](#)).¹² This 10 percent increase could be interpreted as an insurance premium to maintain the same level of protection against the risk of poverty. Households that did not “pay” this premium, and thus remained at the same level of income of the earlier period, faced an increased risk of falling into poverty which meant that they were no longer part of the middle class. The values reported in [table 2](#) show that in 10 countries, the middle-class lower threshold increased by more than 10 percent between 2008 and 2018. The largest increase was in Bulgaria, one of the poorest countries in Europe, where the predicted income associated with the lower middle-class threshold soared 70 percent, increasing from \$30 to \$51 per day. Within Central Europe and the Baltic countries, the lower threshold increased from \$42 to \$52 per day in Latvia and from \$44 to \$50 per day in Estonia. In the rest of Europe, substantial increases were seen in Austria, Denmark, Italy, the Netherlands, and Norway. Only in Cyprus did the threshold drop by more than 10 percent. That drop likely reflects the sharp decline in incomes after the global financial crisis, which disproportionately affected the bottom half of the

¹² In [Table A.5](#) we report the change of the vulnerability threshold between 2015-18 and 2017-20, that is, including the effect of the COVID-19 pandemic. In most countries for which data is available there was a decrease in the vulnerability threshold in that time period, most probably explained by the social protection mitigation measures implemented during 2020. There is not yet a 4-year panel in EU-SILC that completely excludes the years of the pandemic, so it is still early to know whether this change is permanent or not.

income distribution. In five other countries, the vulnerability threshold decreased less than 10 percent. It remained unchanged in Lithuania.

A useful way to show the change of the vulnerability threshold is to compare the vulnerability curves estimated for the two panels. As an example, [Figure 2](#) plots these vulnerability curves for Bulgaria and Latvia for the two panels. The upward shift in the vulnerability curve indicates that the permanent incomes needed to prevent a household from falling into poverty at any given probability were higher in 2015–18 than in 2005–08. The relevant shift in terms of impact on the middle class is that of the income levels associated with the 4 percent probability of falling into poverty, shown in [figure 2](#) by the vertical distance between the two vulnerability curves at the 4 percent probability.

An important corollary to these findings is that, since the poverty line has not changed between these two periods, an increase in the level of the vulnerability threshold means that the size of the shocks driving households into poverty must have increased. Indeed, the average income shock experienced by a household that fell into poverty in the latest period was larger than the shock in the pre-crisis period. In our sample, on average, the per capita income of a household that became poor between 2005 and 2008 fell from \$46 to \$17 per day. The corresponding figures for the 2015-18 period were \$48 and \$12. This means that the average cross-country shock produced a loss of \$29 per day in 2005-08 and a loss of \$35 per day in 2015-18, or about 21 percent larger. To *insure* against these larger shocks, the minimum income needed to remain in the middle class must increase.

To assess the sensitivity of our main results to different vulnerability thresholds, we provide estimates corresponding to a probability of falling into poverty of 8 percent (see appendix [table A.3](#)). Using this higher probability does not change the main finding. In nine countries, the lower middle-class threshold increased by more than 10 percent between 2008 and 2018. The most significant increase was in Bulgaria, where the income associated with the lower middle-class threshold increased from \$24 to \$43 per day.¹³ Within Central Europe and the Baltic countries, Estonia and Latvia saw increases. In the rest of Europe, substantial increases were seen in Austria, Denmark, Italy, Luxembourg, and the Netherlands. Only in Cyprus, Hungary, and Lithuania did the value of the threshold by this definition drop more than 10 percent. In six other countries, the vulnerability threshold decreased by less than 7 percent.

¹³ The lower middle-class threshold can be below the poverty line because the measure is based on predicted, rather than observed, income. In countries where the probability that an individual is poor is high, the predicted income level at low probabilities of poverty can be below the poverty threshold.

Between 2008 and 2018, the size of the middle class, expressed as the share of the population of the sample countries (pooled together) whose incomes fall between the middle class thresholds, remained stable at around 28 percent. This result does not change when alternative definitions of the thresholds are used. For example, as shown in appendix [table A.4](#), at the 8 percent probability of falling below the poverty line threshold, the middle class accounted for a larger share of the European population, but this share does not change much as it moves from 36.8 percent in 2008 to 39.8 percent in 2018. However, this stability at the Europe-wide level of aggregation masks the fact that there is significant heterogeneity in the evolution of the size of the middle class across countries: there was an increase in 14 countries and a decrease in 8 countries ([Figure 3](#)). As expected, there is a correspondence between the change in the vulnerability threshold and the change in the size of the middle class as illustrated by [Figure 4](#). In this scatter plot, increases of the vulnerability threshold are mostly accompanied by decreases in the size of the middle class. For those countries where there was a substantial increase in the vulnerability threshold -above 10 percent-, the average decrease in the size of the middle class was about 8 percentage points. Likewise, the few reductions of the vulnerability threshold observed during this period are coupled with increases of the middle class.

Composition of the middle class: Assets and returns

Up to this point, we have highlighted the shifts in the minimum *level* of income that guarantees a low exposure to the risk of falling into poverty. In most countries, households had to increase this minimum level, so the next relevant question is about *how* a typical middle class household generates this minimum income. Households are heterogeneous in terms of their income-generation capabilities because they have different characteristics and own different assets. Analyzing the shift in the assets and their returns for households at the vulnerability threshold provides insights into the incidence of the increase in vulnerability between the two periods and whether the composition of the middle class is changing. This detailed analysis is more policy relevant than one focusing only on the changes of the size of the middle class.

Consider first the change in the assets' returns by analyzing the estimates of equations (1) and (2) across the two periods. In these equations, parameters β can be interpreted as the 'returns' of households' assets related to the probability of falling into poverty; while parameters γ represents the 'returns' related to the permanent income. The estimates of β for the 2005–08 and 2015–18 panels are displayed in [Figure 5](#); note that the coefficients' signs are easily interpreted, however their magnitude cannot be interpreted

in a straightforward way given the use of a logistic regression. The main result is that the pattern for the coefficient of these assets remained stable across the two periods, indicating that the relative returns did not appear to change much. In both periods, households with children have a high probability of falling into poverty, while households owning a car or whose head has tertiary education or is employed in a managerial or professional occupation have a low probability of falling into poverty. The gender and marital status of the head appear uncorrelated with the probability of falling into poverty.

The estimates of γ —the ‘Mincerian returns’ associated with household characteristics—are shown in [Figure 6](#). The signs of the coefficients display the expected pattern and they do not change between the two periods. Households with a married head or children have lower household per capita income; households headed by a person with tertiary education or a professional or managerial occupation and households that own a car or live in urban areas have higher per capita income.

These estimates, obtained with a linear regression model, are comparable between two periods. [Figure 7](#) plots the differences between the coefficients γ of the two periods and demonstrates that premia for higher education over basic education increased (with the notable exception of tertiary education). The returns for professional and managerial occupations increased over that of more elementary occupations. Households with dependents (children and elderly people) were also better off in the second period.

The assets composition of the middle class households also shifted between 2005-08 and 2015-18. In the post-crisis period of 2015-2018, higher levels of education and professional/managerial occupations became more common among households in the middle class. Households with lower levels of education and skills were more likely to fall into poverty in the later period than in the earlier period ([table 3](#)). In 2005–08, for example, nearly one in four middle class households had a head with primary education; in 2015–18, this share dropped to less than one in seven, and nearly one in three heads at the threshold had tertiary education.

This shift in the educational composition of the middle class can be thought of as the result of two trends. The first is the change in education of the *overall* population, a simple quantity effect where population becomes better educated over time. The second is related to reshuffling, or reranking, of different households in the overall distribution. This is due to changes in relative returns. An increase in the premia for higher education favors households with better-educated heads which will move up in higher income ranks, while households with less educated heads will move down the ranks. While a general equilibrium analysis is beyond the scope of this paper, the rising premium of education observed in conjunction with

a secular improvement of education in the region is hinting that demand for highly educated workers is outpacing supply. These two components, the increases in quantity and in relative returns for education, determine that the changes in the educational composition of the whole population are not as marked as for the households in the middle class. In the whole population, the share of households with a household head with only primary education dropped by 7 percentage points which is less than the 10-percentage point drop observed for middle class households. Similarly, the share of households with a tertiary educated household head increased, for the overall population, by about 7 percentage points, while for middle class households that increase was of 9 percentage points. These differential compositional changes reflect the reshuffling of the positions of specific households in the distribution.

A similar compositional change linked to reshuffling is observed when considering the occupations of the household heads. Among the middle class, the share of heads employed in a managerial or professional jobs increased by almost four percentage points (or 8 percent of the 2005-08 value) while the share of heads working in sales or services occupations declined by almost three percentage points (or 11 percent of the 2005-08 value), and the share of heads in elementary occupations decreased by two percentage points (or 11 percent of the 2005-08 value). There was also an increase in the share of heads working as plant and machine operators at one percentage point (or 15 percent of the 2005-08 value). The occupational composition of the overall employed population evolved slightly differently than that of the middle class. For the total population, managerial and professional occupations became more prevalent, but so did sales and service occupations, while the latter became less common in the middle class. Sales and services occupations, though more prevalent in the overall employment, have become less of a guarantee of middle-class status. The changes in the “mincerian” returns to different occupations, a shift in relative returns favoring professional occupations vis-à-vis elementary and services ones, are behind the reranking of households and these different compositional shifts.

These findings about the changing composition of the middle class confirm conclusions in the literature on job polarization that shows that middle-income workers who are displaced by automation should sort out into low-paid or high-paid jobs based on their skill levels (Acemoglu and Autor 2011). In this sense, middle skilled workers who are better substitutes of low skills workers move “down” and become service workers, while those who are better substitutes of high skilled worker move “up” and become managerial and professional workers. In the past, having a medium level of skills seemed to ensure that an individual would not fall into poverty and be part of the middle class. These figures suggest that that may no longer be the case.

Changes in the vulnerability gap

As the vulnerability threshold has increased, it is relevant to understand what happened to the income of households below that threshold but above the poverty line. Has reaching the middle class status become more difficult? In many countries, the vulnerability gap—defined as the average distance between a vulnerable household’s income and the lower threshold for the middle class— significantly widened. This widening means that, for non-poor but not yet middle class households, it has become more difficult to belong to the middle class.

For the countries studied (except Bulgaria¹⁴), the average vulnerability gap increased by about 13 percent between 2008 and 2018, though it decreased in nine countries ([Figure 8](#)). Among countries in which the vulnerability gap increased, Norway stands out. Its gap rose from \$14.4 per day in 2008 to \$24.0 per day in 2018. Greece followed, with an increase from \$12.5 to \$19.6. Austria, Denmark, Estonia, Latvia, and the Netherlands saw increases exceeding 30 percent. Among countries in which the vulnerability gap narrowed, Czechia saw the largest decrease, with a 30 percent drop (from \$7.7 per day in 2008 to \$5.2 per day in 2018). Hungary and Poland saw decreases exceeding 20 percent.

V. Final remarks

Being middle class can be understood as not being vulnerable to falling into poverty. Using a vulnerability-based approach, we find that the size of the middle class in Europe has barely changed between 2008 and 2018. However, the income required to become middle class has increased. To be safely above the high-income country poverty line of \$24.35 per day in 2018, households needed a higher income than they needed in 2008, before the global financial crisis. On average, to ensure a low probability of falling into poverty (defined as 4 percent) and be considered middle class, European households required a daily per capita income of \$50.5 in 2008 and \$55.5 in 2018. The change was heterogeneous, with some countries registering increases in the lower middle class or vulnerability income threshold above 20 percent and others witnessing decreases of 10 percent or more. The vulnerability gap—the distance of vulnerable households, above the poverty line but below the middle class threshold, to that same threshold— increased by about 13 percent.

¹⁴ In Bulgaria, the vulnerability gap increased by 343 percent (from \$3.8 in 2008 to about \$16.8 in 2018). In 2008, the vulnerability threshold was very close to the poverty line, so the number of vulnerable households was very small.

The increase in the income threshold to become middle class has consequences for who makes up the middle class. Between 2008 and 2018, the composition of households in the middle class shifted to include more households headed by a person with tertiary education and a greater prevalence of households headed by a person in a professional or managerial occupation. Many formerly middle-class households with lower levels of education and households engaged in elementary occupations no longer qualified as middle class. Education and occupation now play a vital role in defining middle-class status.

The results of the analysis show that focusing only on the size of the middle class hides changes in key aspects of middle-class identity, such as lack of vulnerability, education, and type of job. Households that previously could aspire to be middle class can no longer do so, and a sizeable share of them are now vulnerable to falling into poverty.

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Table 1. Number of observations in panels, by country

<i>Country</i>	<i>2005–08 panel</i>	<i>2015–18 panel</i>
<i>Eastern Europe</i>		
Bulgaria	735	3,249
Czechia	3,052	2,028
Estonia	1,226	1,344
Hungary	1,844	1,529
Lithuania	1,337	1,145
Latvia	999	1,268
Poland	3,175	2,439
Slovenia	1,583	1,645
<i>Continental Europe</i>		
Austria	1,102	1,258
Belgium	1,266	2,106
Cyprus	761	1,015
Denmark	880	990
Spain	2,650	2,376
Finland	1,461	2,078
France	4,989	5,415
Greece	1,268	5,006
Italy	4,276	5,614
Luxembourg	349	823
Malta	674	841
Netherlands	1,286	2,672
Norway	2,616	1,216
Portugal	911	3,272

Table 2. Lower threshold of the middle class: income level associated with 4 percent probability of falling into poverty

Country	<i>Income level (2017 PPP dollars)</i>		% change between 2005–08 & 2015–18
	2005–08	2015–18	
<i>Eastern Europe</i>			
Bulgaria	30	51	69
Czechia	38	36	–6
Estonia	44	50	14
Hungary	48	43	–9
Lithuania	45	45	0
Latvia	42	52	23
Poland	50	46	–8
Slovenia	45	44	–1
<i>Continental Europe</i>			
Austria	56	72	29
Belgium	48	51	6
Cyprus	62	51	–17
Denmark	61	73	19
Spain	57	65	13
Finland	52	54	5
France	50	50	0
Greece	48	56	16
Italy	53	63	19
Luxembourg	69	67	–2
Malta	44	47	7
Netherlands	49	59	20
Norway	63	85	35
Portugal	50	46	–8
Europe (average)	50.5	55.5	10

Source: Authors' calculations using data from the EU-SILC UDB-L.

Note: Europe is average of countries listed in the table.

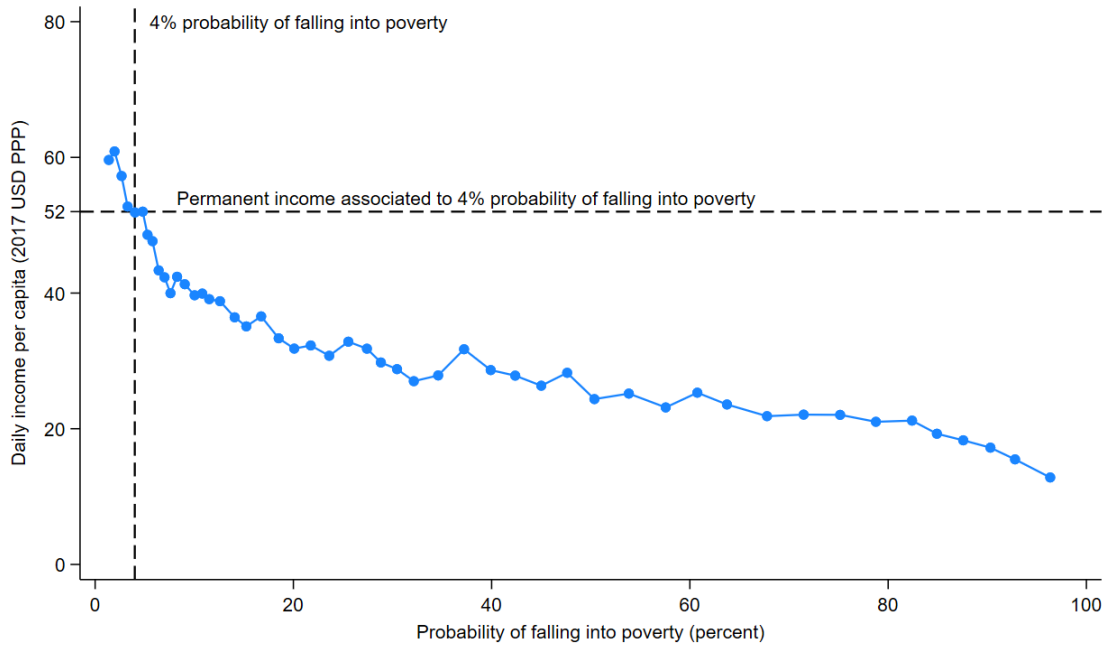
Table 3. Shifts in education level and profession for middle class households in 2005–08 and 2015–18

	Shares (%) by education level and type of occupation		% change
	2005–08	2015–18	
<i>Education of household head</i>			
Primary or less	24	13	–43
Lower-secondary	17	15	–14
Upper-secondary	35	40	13
Post-secondary	2	1	–49
Tertiary	22	31	41
<i>Occupation of household head</i>			
Managers, professionals, technicians	48	52	8
Support, service, sales workers	23	21	–11
Crafts, trades, elementary occupations	18	17	–11
Plant/machine operators/assemblers	7	8	15
Skilled and unskilled agricultural/etc.	2	2	–10

Source: Authors' calculations using data from the EU-SILC UDB-L.

Note: This table the composition in terms of education and occupation of the household head for the European households that belong to the middle class under the baseline definition (lower threshold = income associated to a 4 percent probability of falling into poverty; upper threshold = income associated to a 1 percent probability of falling into poverty). Values are pooled for all countries in the sample, population weighted.

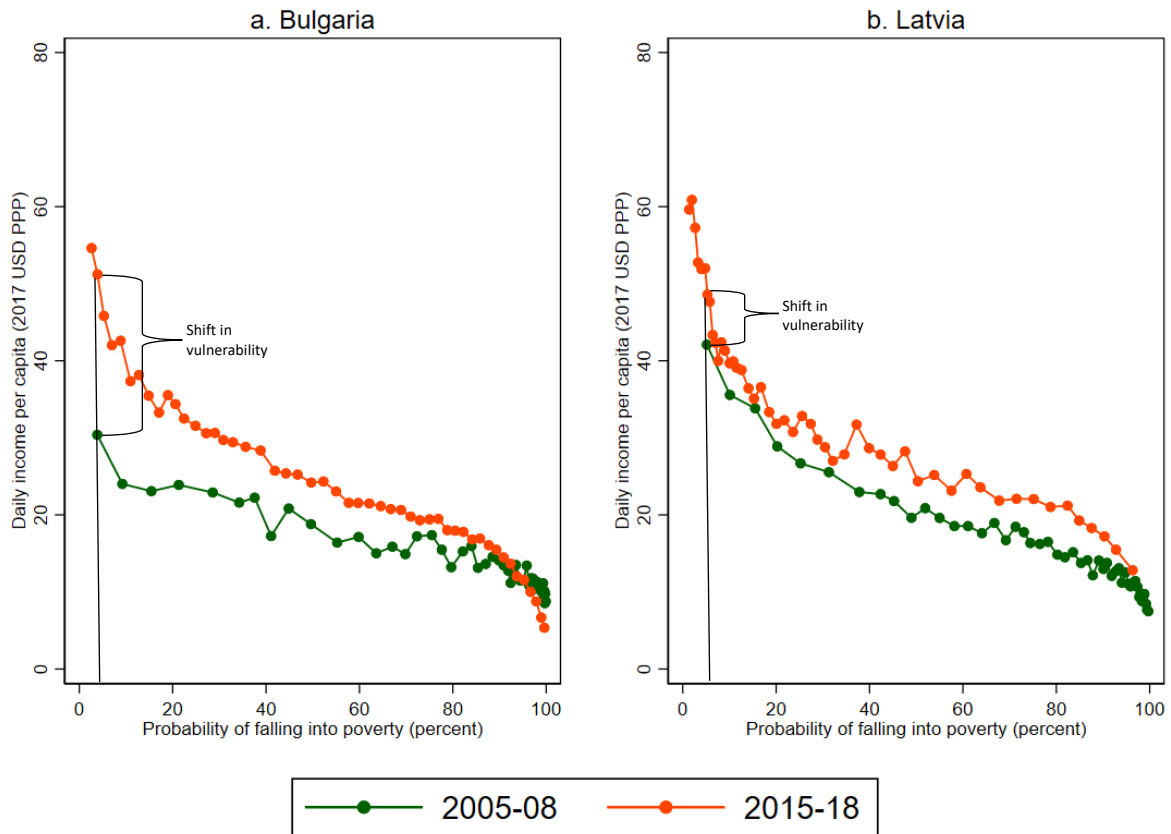
Figure 1. Vulnerability curve for Latvia, 2015-18.



Source: Authors' calculations using data from the EU-SILC UDB-L.

Note: This graph plots the household daily per capita income in USD at PPP 2017 (vertical axis) associated to a given probability of falling into poverty over a four-year period (horizontal axis) in 2015-18 in Latvia.

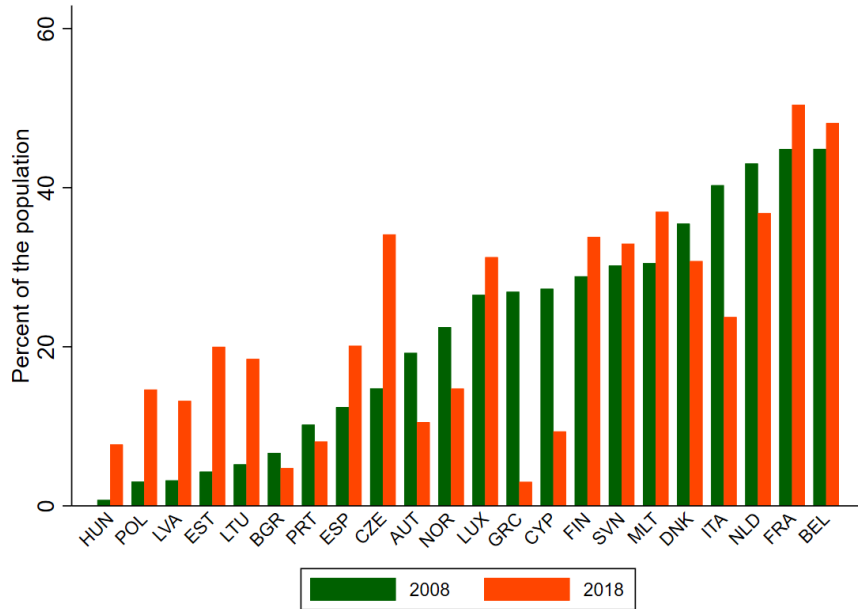
Figure 2. Shift in vulnerability to poverty in Bulgaria and Latvia, 2008–18



Source: Authors' calculations using data from the EU-SILC UDB-L.

Note: This graph plots the household daily per capita income in USD at PPP 2017 (vertical axis) associated to a given probability of falling into poverty over a four year period (horizontal axis) in 2005-08 (green line) and 2015-18 (orange line). The right panel shows the estimated values for Bulgaria and the left panel shows the estimated values for Latvia.

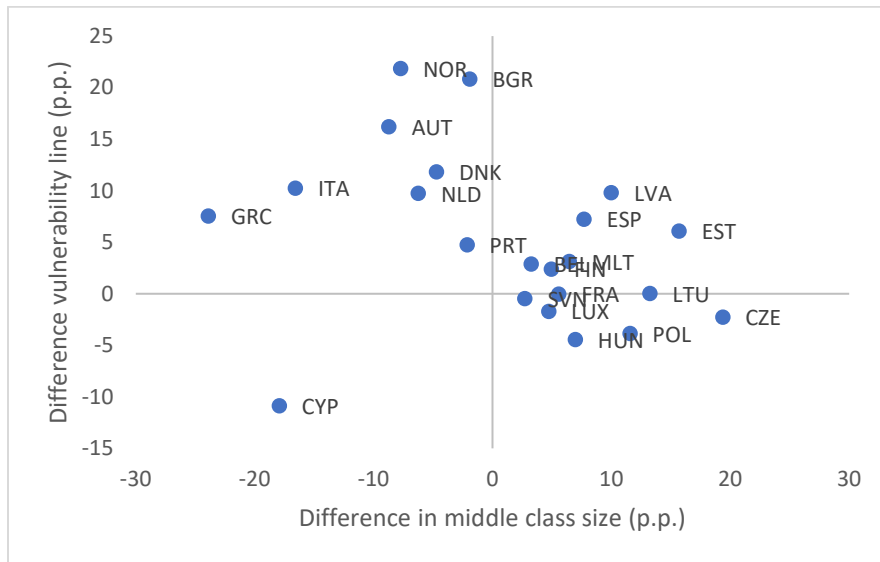
Figure 3. Estimated size of middle class in 2008 and 2018



Source: Authors' calculations using data from the EU-SILC UDB-L.

Note: This graph plots, for every country in the sample, the share of the population between the lower threshold and the upper threshold of the middle class in 2008 (green bar) and 2018 (orange bar).

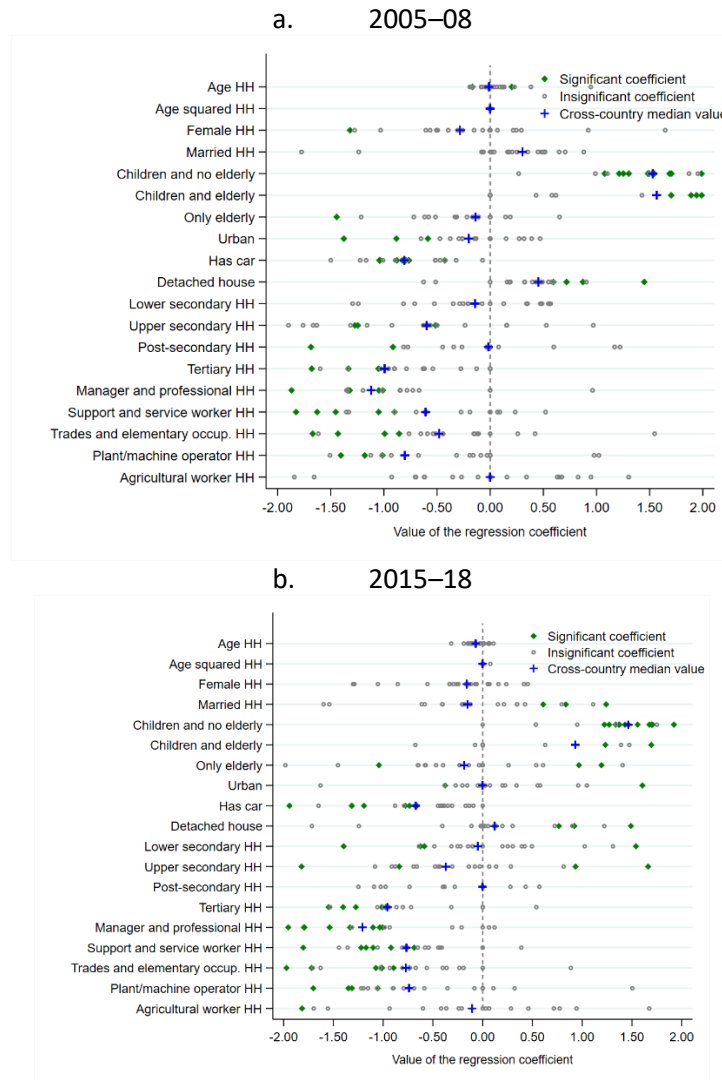
Figure 4. Change in vulnerability line and size of the middle class between 2008 and 2018



Source: Authors' calculations using data from the EU-SILC UDB-L.

Note: This graph plots, for every country in the sample, the difference in the size of the middle class in percentage points between 2008 and 2018 (horizontal axis) and the difference in the vulnerability line percentage points (vertical axis).

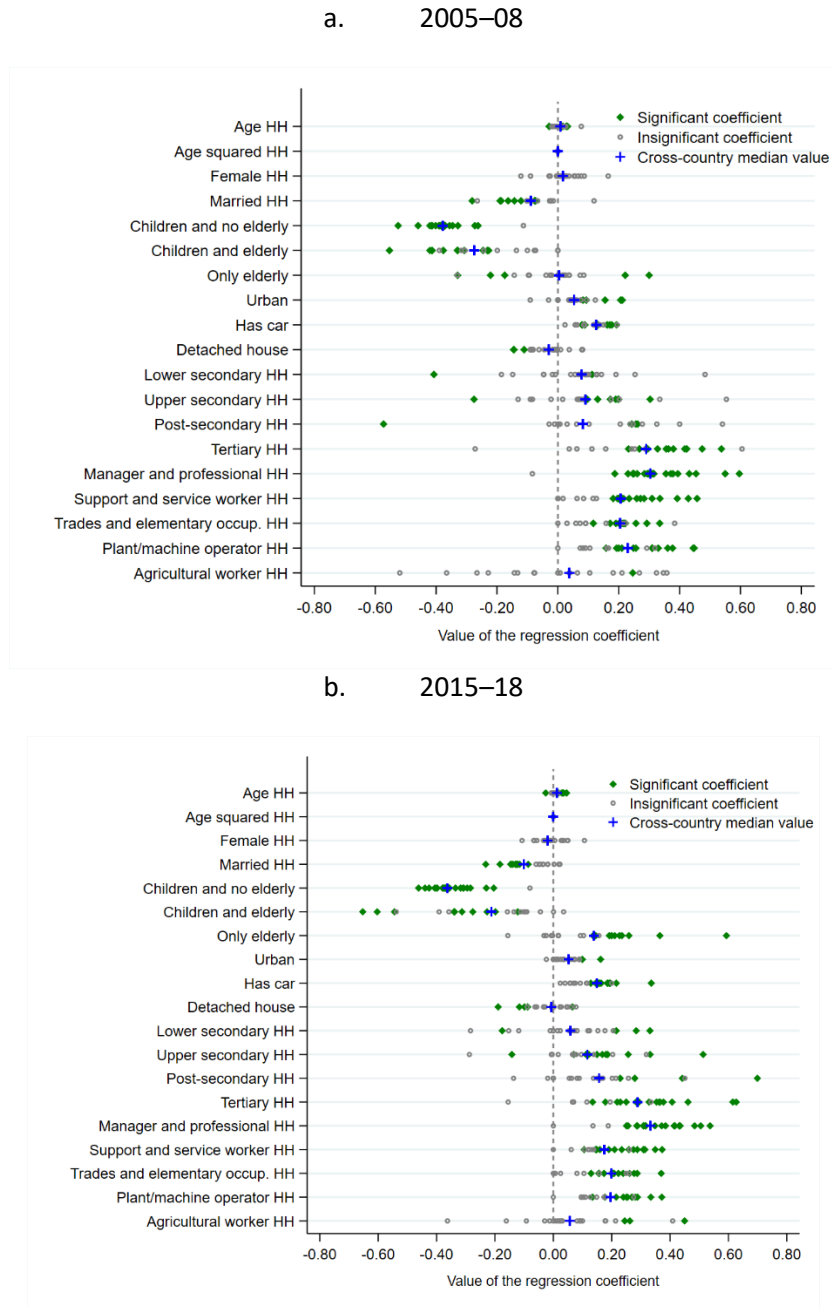
Figure 5. Estimates of equation 1 for selected household head covariates



Source: Authors' calculations using data from the EU-SILC UDB-L.

Note: This graph plots the coefficients associated to a selected set of covariates obtained from the estimation of equation (1) using a logistic regression in the household panels of 2005-08 (top panel) and 2015-18 (bottom panel). The estimations are at the country level, and each marker corresponds to a specific country's estimation. Coefficients that are statistically significant at the 5 percent level are marked in green, while those that are not statistically significant at that level are marked in grey. The blue cross indicates, for each covariate, the median cross-country value of the coefficient.

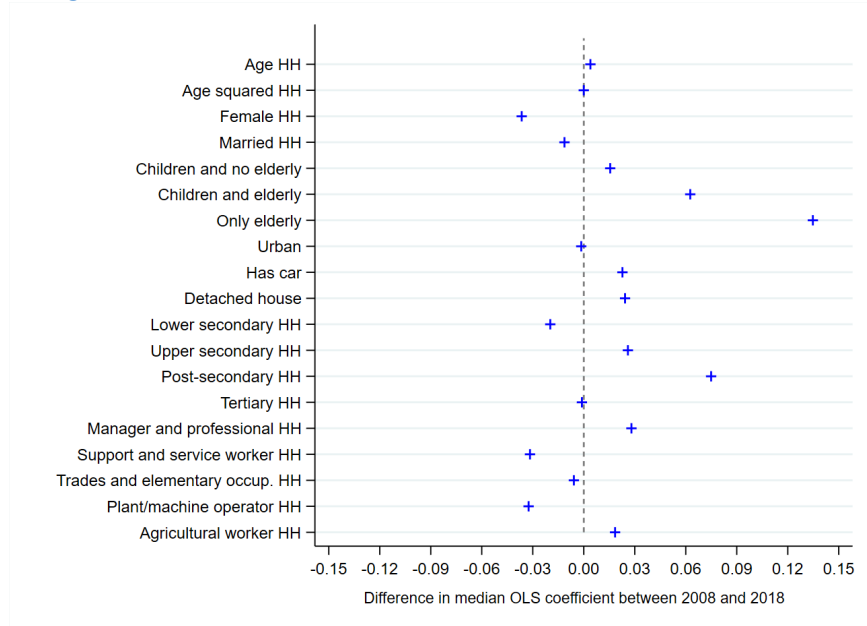
Figure 6. Estimates of equation 2 for selected household head covariates



Source: Authors' calculations using data from the EU-SILC UDB-L.

Note: This graph plots the coefficients associated to a selected set of covariates obtained from the estimation of equation (2) using a OLS regression in the household panels of 2005-08 (top panel) and 2015-18 (bottom panel). The estimations are at the country level, and each marker corresponds to a specific country's estimation. Coefficients that are statistically significant at the 5 percent level are marked in green, while those that are not statistically significant at that level are marked in grey. The blue cross indicates, for each covariate, the median cross-country value of the coefficient.

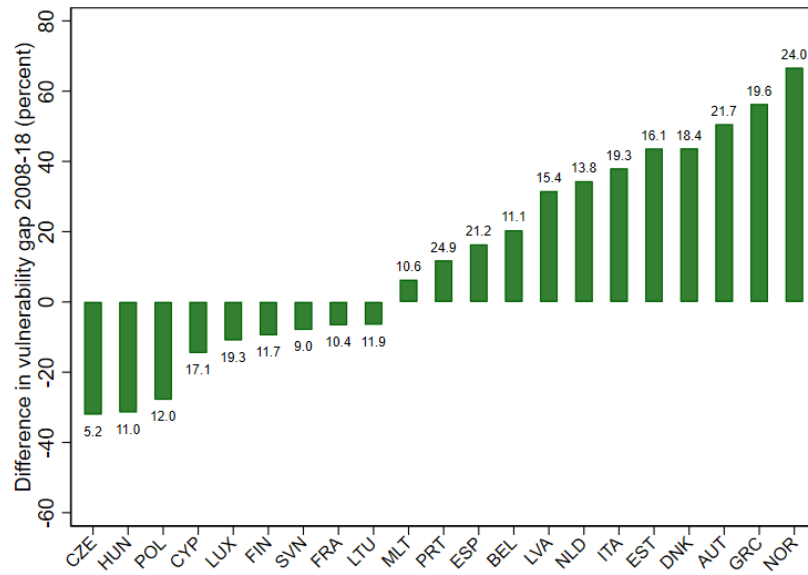
Figure 7. Difference in mincerian returns between 2008 and 2018



Source: Authors' calculations using data from the EU-SILC UDB-L.

Note: This graph plots the difference in the cross-country median value of the coefficients obtained from the estimation of equation (2) in the household panels of 2005-08 and 2015-18. The coefficients are obtained from a OLS estimation of equation (2) and the levels for each panel are plotted in figure 6.

Figure 8. Change in vulnerability gap between 2008 and 2018



Source: Authors' calculations using data from the EU-SILC UDB-L.

Note: Figure shows the average distance from middle-class threshold among the vulnerable. Bulgaria is not included, because including it would have distorted the scale.

Appendix

Table A.1. Poverty transitions between 2005 and 2008

AUT	poor in 2008	non-poor in 2008	BEL	poor in 2008	non-poor in 2008
poor in 2005	0.011	0.053	poor in 2005	0.034	0.080
non-poor in 2005	0.029	0.907	non-poor in 2005	0.031	0.855
BGR	poor in 2008	non-poor in 2008	CYP	poor in 2008	non-poor in 2008
poor in 2005	0.774	0.183	poor in 2005	0.002	0.004
non-poor in 2005	0.020	0.023	non-poor in 2005	0.049	0.945
CZE	poor in 2008	non-poor in 2008	DNK	poor in 2008	non-poor in 2008
poor in 2005	0.241	0.191	poor in 2005	0.009	0.038
non-poor in 2005	0.044	0.524	non-poor in 2005	0.012	0.941
ESP	poor in 2008	non-poor in 2008	EST	poor in 2008	non-poor in 2008
poor in 2005	0.140	0.109	poor in 2005	0.478	0.205
non-poor in 2005	0.097	0.653	non-poor in 2005	0.053	0.264
FIN	poor in 2008	non-poor in 2008	FRA	poor in 2008	non-poor in 2008
poor in 2005	0.022	0.070	poor in 2005	0.044	0.070
non-poor in 2005	0.030	0.878	non-poor in 2005	0.025	0.861
GRC	poor in 2008	non-poor in 2008	HUN	poor in 2008	non-poor in 2008
poor in 2005	0.187	0.150	poor in 2005	0.596	0.123
non-poor in 2005	0.068	0.595	non-poor in 2005	0.098	0.183
ITA	poor in 2008	non-poor in 2008	LTU	poor in 2008	non-poor in 2008
poor in 2005	0.093	0.071	poor in 2005	0.534	0.275
non-poor in 2005	0.055	0.781	non-poor in 2005	0.026	0.165
LUX	poor in 2008	non-poor in 2008	LVA	poor in 2008	non-poor in 2008
poor in 2005	0.017	0.053	poor in 2005	0.719	0.214

non-poor in 2005	0.017	0.913	non-poor in 2005	0.024	0.043
MLT	poor in 2008	non-poor in 2008	NLD	poor in 2008	non-poor in 2008
poor in 2005	0.140	0.118	poor in 2005	0.016	0.055
non-poor in 2005	0.059	0.683	non-poor in 2005	0.023	0.906
NOR	poor in 2008	non-poor in 2008	POL	poor in 2008	non-poor in 2008
poor in 2005	0.018	0.040	poor in 2005	0.566	0.207
non-poor in 2005	0.018	0.924	non-poor in 2005	0.026	0.202
PRT	poor in 2008	non-poor in 2008	SVN	poor in 2008	non-poor in 2008
poor in 2005	0.313	0.172	poor in 2005	0.077	0.098
non-poor in 2005	0.059	0.456	non-poor in 2005	0.028	0.798

Source: Authors' calculations using data from the EU-SILC UDB-L.

Note: Values show percent of the population.

Table A.2. Poverty transitions between 2015 and 2018, by country

AUT	poor in 2018	non-poor in 2018	BEL	poor in 2018	non-poor in 2018
poor in 2015	0.030	0.030	poor in 2015	0.036	0.049
non-poor in 2015	0.025	0.914	non-poor in 2015	0.028	0.887
BGR	poor in 2018	non-poor in 2018	CYP	poor in 2018	non-poor in 2018
poor in 2015	0.536	0.208	poor in 2015	0.390	0.164
non-poor in 2015	0.041	0.216	non-poor in 2015	0.031	0.416
CZE	poor in 2018	non-poor in 2018	DNK	poor in 2018	non-poor in 2018
poor in 2015	0.100	0.136	poor in 2015	0.012	0.014
non-poor in 2015	0.030	0.735	non-poor in 2015	0.004	0.970
ESP	poor in 2018	non-poor in 2018	EST	poor in 2018	non-poor in 2018
poor in 2015	0.148	0.099	poor in 2015	0.183	0.183
non-poor in 2015	0.049	0.703	non-poor in 2015	0.032	0.602
FIN	poor in 2018	non-poor in 2018	FRA	poor in 2018	non-poor in 2018
poor in 2015	0.017	0.037	poor in 2015	0.044	0.037
non-poor in 2015	0.017	0.929	non-poor in 2015	0.021	0.898
GRC	poor in 2018	non-poor in 2018	HUN	poor in 2018	non-poor in 2018
poor in 2015	0.427	0.147	poor in 2015	0.398	0.222
non-poor in 2015	0.063	0.362	non-poor in 2015	0.074	0.306
ITA	poor in 2018	non-poor in 2018	LTU	poor in 2018	non-poor in 2018
poor in 2015	0.327	0.183	poor in 2015	0.327	0.183
non-poor in 2015	0.047	0.753	non-poor in 2015	0.036	0.455
LUX	poor in 2018	non-poor in 2018	LVA	poor in 2018	non-poor in 2018
poor in 2015	0.012	0.033	poor in 2015	0.309	0.192
non-poor in 2015	0.034	0.921	non-poor in 2015	0.049	0.450
MLT	poor in 2018	non-poor in 2018	NLD	poor in 2018	non-poor in 2018

poor in 2015	0.098	0.087	poor in 2015	0.028	0.043
non-poor in 2015	0.033	0.782	non-poor in 2015	0.011	0.918
NOR	poor in 2018	non-poor in 2018	POL	poor in 2018	non-poor in 2018
poor in 2015	0.012	0.010	poor in 2015	0.277	0.218
non-poor in 2015	0.021	0.958	non-poor in 2015	0.052	0.453
PRT	poor in 2018	non-poor in 2018	SVN	poor in 2018	non-poor in 2018
poor in 2015	0.295	0.117	poor in 2015	0.062	0.093
non-poor in 2015	0.061	0.527	non-poor in 2015	0.021	0.824

Source: Authors' calculations using data from the EU-SILC UDB-L.

Note: Values show percent of the population.

Table A.3. Income level associated with 8 percent probability of falling into poverty

<i>Country</i>	<i>Income needed in 2005–08 (\$/day)</i>	<i>Income needed in 2015–18 (\$/day)</i>	<i>Percentage change between 2005–08 and 2015–18</i>
<i>Eastern Europe</i>			
Bulgaria	24	43	77
Czechia	34	33	-3
Estonia	35	39	13
Hungary	41	36	-12
Lithuania	41	33	-18
Latvia	36	42	19
Poland	38	37	-3
Slovenia	38	35	-7
<i>Continental Europe</i>			
Austria	45	66	47
Belgium	46	44	-4
Cyprus	54	44	-19
Denmark	67	76	13
Spain	50	50	-1
Finland	47	48	2
France	42	41	-4
Greece	45	49	8
Italy	45	54	20
Luxembourg	54	61	13
Malta	40	41	2
Netherlands	45	55	23
Norway	61	73	19
Portugal	46	48	4
Europe (average)	44	48	9

Source: Authors' calculations using data from the EU-SILC UDB-L.

Note: Europe is average of the countries listed in table.

Table A.4. Alternative definitions of middle class and estimated share of population

Definition	Lower threshold	Upper threshold	Year	Share of European population (percent)	Minimum share (percent)	Maximum share (percent)
I (baseline)	Income associated with 4 percent probability of falling into poverty (variable thresholds)	Income associated with 1 percent probability of falling into poverty (variable thresholds)	2008	28.0	0.7	44.9
			2018	28.0	3.1	50.4
II	Income associated with 4 percent probability of falling into poverty (fixed at 2008 values)	Income associated with 1 percent probability of falling into poverty (fixed at 2008 values)	2008	28.0	0.7	44.9
			2018	30.2	0.0	48.1
III	Income associated with 8 percent probability of falling into poverty (variable thresholds)	Income associated with 1 percent probability of falling into poverty (variable thresholds)	2008	36.8	3.1	57.4
			2018	39.8	7.1	64.2
IV	Income associated with 8 percent probability of falling into poverty (fixed at 2008 values)	Income associated with 1 percent probability of falling into poverty (fixed at 2008 values)	2008	36.8	3.1	57.4
			2018	39.7	8.7	54.5
V	Income associated with 4 percent probability of falling into poverty (variable thresholds)	Top 5 percent of income distribution (variable thresholds)	2008	37.1	0.7	58.3
			2018	36.2	4.3	61.9
VI	Income associated with 4 percent probability of falling into poverty (fixed at 2008 values)	Top 5 percent of the income distribution (fixed at 2008 values)	2008	37.1	0.7	58.3
			2018	40.8	1.3	64.8

Table A.5. Lower threshold of the middle class – updated values for 2017-20 for selected countries: income level associated with 4 percent probability of falling into poverty

<i>Income level (2017 PPP dollars)</i>			
Country	2015–18	2017–20	% change between 2015–18 & 2017–20
<i>Eastern Europe</i>			
Bulgaria	51	53	4
Czechia	36	36	0
Estonia	50	41	–18
Hungary	43	37	–14
Lithuania	45	39	–13
Latvia	52	43	–18
Poland	46	37	–20
Slovenia	44	40	–10
<i>Continental Europe</i>			
Belgium	51	50	–3
Cyprus	51	37	–28
Denmark	73	86	18
Spain	65	47	–28
Finland	54	46	–15
France	50	44	–11
Greece	56	46	–18
Malta	47	40	–15
Netherlands	59	64	8
Europe (average)	51	46	–10

Source: Authors' calculations using data from the EU-SILC UDB-L.

Note: Europe is average of countries listed in the table.