Employment, education and other means of reducing poverty

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Réka Branyiczki (TÁRKI)
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Abstract

The paper assesses micro drivers of relative income poverty of those aged 20-59 in the EU Member States in 2011, and macro drivers during 2004-2011, focusing on the role of work and education. Both employment and educational attainment prove to be strong determinants of avoiding the risk of poverty. A cross-sectional multivariate regression analysis on the EU-SILC 2012 database, on the sample of 27 member countries, indicates that a household with high work intensity has a 47 percentage point lower probability on average to be at risk of poverty than a household with very low work intensity, with all else equal. Someone with tertiary education tends to have an 11 percentage point lower probability of being at risk than someone with only basic education. There is a marked variation across countries in these estimated probabilities, reflecting the importance of contextual factors, such as the macroeconomic and institutional environment. According to a macro level analysis on a sample of 20 EU Member States, a country with an employment rate 10 percentage points higher than average tends to have an at-risk-of-poverty rate 2 percentage points below average, while longer schooling and wider access to tertiary education are also associated on average with a lower rate. Nevertheless, policies aimed at reducing the number at risk of poverty by increasing employment need to pay attention to the distribution of the additional jobs across households.

Introduction

European countries have experienced mixed results in fighting poverty over recent years. The tendency for the proportion of people at risk of poverty – i.e. those with income below 60% of the median (which is of course a relative concept) – to remain unchanged over the economic upswing1 was followed by the onset of the crisis, which resulted in the proportion increasing in nearly all EU Member States. There was, however, considerable variation across countries in the scale of the increase and in the pace of recovery afterwards.

The paper reviews and investigates the determinants of risk of poverty of the working-age population in the EU Member States (EU27) in 2011 and during the time period between 2004 and 2011, in order to have data based insights into reducing risk of poverty. To identify major poverty risk determinants, the paper analyses the role of micro (individual and household level) and macro (country level) factors of relative income poverty, separately (supplemented by a tentative model including both micro and macro variables).

At the micro level, the analysis refers to individuals, in most cases characterised by the circumstances of the household they live in or the socio-demographic attributes of the head of the household. The main explanatory variables of interest are the work intensity of the household and the education attainment level of the household head. Other socio-economic and demographic factors are also included in the analysis, largely as control variables.

At the macro level, the heterogeneity of at-risk-of-poverty rates across the EU is explained by macroeconomic and institutional factors like the employment rate, the redistribution system and the process of wage setting, and also by the socio-economic structure of the society. In line with the analysis at the micro level, the key explanatory variable on which the analysis is focused at the macro level is the employment rate of active age population.

The research note analyses the micro and macro drivers of relative income poverty in similar model settings across EU countries (cross-sections and panel regressions on country pooled data and cross-sections on countries separately) in order to assess policies aimed at increasing social inclusion. The role of micro level risk factors, such as work intensity and education level, are compared across countries to see if the impact of work and education on the chances to be at risk of poverty vary in different macroeconomic and institutional settings. Variables describing the socio-economic composition of society are included in the macro level models in an attempt to account for the social risk factors prevalent in societies. The paper contributes to the analysis of the relationship between employment and relative income poverty by running panel models with several control variables which take account of macroeconomic and institutional differences between countries. Analysis both at the micro and macro level attempts to avoid 'ecological fallacies'2 when assessing the determinants of the risk of poverty by estimating individual and group regressions separately.

The paper is structured as follows. A literature review describes the socio-economic characteristics that may be associated with being at risk of poverty and gives an overview of the main country level factors influencing this. The data and the variables used are then outlined before the results of two main sets of regressions are presented. The first set of estimations is cross-sectional (covering EU27 in 2011[3]), takes the

[1] However, other indicators of income and living conditions, such as material deprivation (which is an absolute measure of poverty that expresses the inability to afford some items considered by most people to be desirable or even necessary to lead an adequate life) tended to decrease during the economic upswing before the crisis (Eurostat 2015).

[2] Ecological fallacy occurs if an inference about individual behaviour, condition is drawn from aggregate data, from information on the group the individual belongs to (Freedman 1999).

[3] Croatia (HR) is excluded from the sample as the country was not involved or was still in test implementation of the EU-SILC instrument at the time frame analysed in the paper (survey years 2005-2012).

household head as the unit of observation[4] and focuses on micro level factors. The second set of regressions consists of panel models of at-risk-of-poverty rates in EU countries over the period 2004-2011 and takes macro variables into account.[5]

Drivers of risk of poverty

Being at risk of poverty, as defined by the EU

An alarming number of people, around 17% of the total population were at risk of poverty in the European Union in 2012 (Eurostat 2015). A person is at risk of poverty if he or she lives in a household with a disposable income below 60% of the median equivalised (i.e. adjusted for household size and composition) income in the country. Such a relative head-count measure is intended to indicate the percentage of people who are deprived of the means of fully participating in society (Atkinson 1998, Atkinson et al. 2002). Residents of two countries with the same at-risk-of-poverty rate may have very different standards of living, because of differences in median income levels. The poverty threshold is not "anchored" or fixed over time, but changes from year to year as median income changes, implying that risk of poverty trends may not indicate absolute changes in a fixed poverty indicator. The at-risk-of-poverty rate can equally be regarded as a measure of inequality, which focuses on the lower tail of the income distribution[6].

The paper focuses on the risk of poverty of working-age population, defined as those aged 20-59, as the role of work in mitigating poverty risk is of particular interest. The age range excludes younger people who are mostly in education or training – or who ought to be in many cases if they are not working – and those older than this age who in many cases are retired if they are not employed. The focus is on disposable (post-tax and post-transfers) income rather than earnings or market incomes. Although the concern is with the relative income of those of working-age, the income and characteristics of the rest of the population (e.g. pensions of the elderly) are also considered since they affect the risk of poverty threshold through their effect on median income.

Poverty trends between 2004 and 2011 were in many cases worsening, rather than improving. The time frame includes a period with steady global economic growth, followed by a crisis period in most (but not all) countries and, in some cases, a period of slow recovery. At-risk-of-poverty rates (AROP) did not change much in the first period, the average poverty rate of the working-age population (ages 20-59) across the EU27 was close to around 13.5% (see Figure 1). As the economic crisis hit the EU, the average AROP rate increased to 15.2% in the 2011 income year[7]. At the same time, the range of AROP rates in the EU27 widened somewhat. In 2004, AROP rates ranged from 9% to 21%, whereas in 2011 they ranged from 9% to 24%. There were larger

[4] The unit of observation is the head of household as in this case the bias that would come from the nested data structure is eliminated (each household is represented only once, by the head of household) and the sample size is still large. Nevertheless, the cross-sectional regressions with micro level explanatory variables are estimated with individuals as units of observation as well, the results are reported in the Appendix.

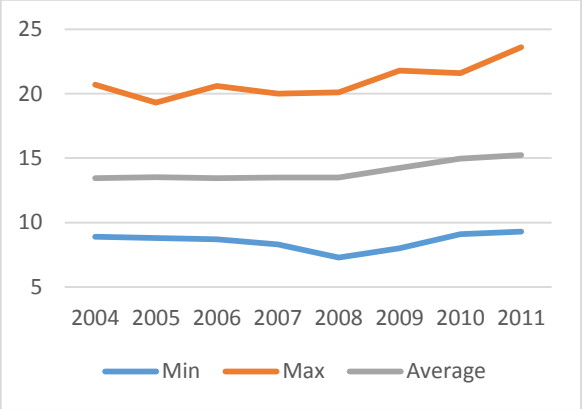
[5] The author thanks István György Tóth, Márton Medgyesi and Terry Ward for careful guidance. The author is also grateful for comments and support from András Gábos, Frank Vandenbroucke, Kenneth Nelson and actively commenting participants of the Budapest SSM meeting in July, 2015.

[6] For a review on the merits and demerits of the 'at risk of poverty' indicator see Atkinson et al. 2002, Decancq et al. 2013. An alternative to improve the measure is provided by multidimensional measurements of poverty that take into account several deprivation dimensions (basic and consumption deprivation, health, neighborhood environment) and adjusted headcount ratios are determined by both the prevalence and the intensity of poverty in the country (Whelan et al. 2014).

[7] Income year refers to the year preceeding the survey year, as the questions of the EU-SILC survey of year 't' refer to the preceeding year 't-1'.

differences in country performances of fighting risk of poverty during the crisis, though there were no positive outliers.

Figure 1. The minimum, maximum and the average of at-risk-of-poverty rates (%) in the EU27, 2004-2011



Source. Own estimates based on EU-SILC 2005-2012.

Notes. The figure depicts the minimum, maximum and the simple average of the countries' at-risk-of-poverty rates (%) of the working-age population (ages 20-59) in the EU27, 2004-2011, based on EU-SILC 2005-2012.

In Bulgaria, Greece, Spain, Italy, Latvia, Lithuania, Poland and Romania rates were above 15% throughout the period, while in the Czech Republic, Slovenia, Slovakia, the Netherlands, and Sweden, they were around 10-11% in most years (Table A1 in the Appendix). In Germany, Estonia, Greece, Spain, Poland and Sweden, AROP rates were particularly volatile (over 4 percentage points difference between the minimum and the maximum poverty rates between 2004 and 2011). Various risk of poverty trends reflect that there were differences in the severity of economic downturn and in the impact of labour market and welfare policies across countries.

Socio-economic circumstances of those at risk of poverty

A systematic theoretical framework of the determinants of poverty is presented by Diris et al. (2014). The at-risk-of-poverty rate is primarily the outcome of market inequality and redistribution, which are affected by macro-economic forces, inequality of skills, labour market institutions and demographic forces. Links between factors and their relationship with risk of poverty are difficult to disentangle as direct and indirect, one and two-way causalities may occur between them. (For example health status may be a determinant and a consequence of poverty at the same time, as it influences ability to work and at the same time it is an outcome of the living standards.) The paper builds on the above framework and introduces the determinants of risk of poverty following a somewhat different logic, grouping them into factors that prevail at the individual and household level and at the country level. This part assesses the micro level drivers.

The socio-economic characteristics of those at risk of poverty have been the subject of a great deal of research. Socio-economic characteristics include age, gender, educational attainment, employment, occupation, family structure, etc. According to the cumulative disadvantage perspective of poverty processes, there are traditional stratification factors, such as educational attainment and occupation that define multiply disadvantaged groups that transmit their low living standards across generations. By contrast, the individual perspective tends to see poverty as a relatively transient phenomenon that is related more to life events (such as unemployment, or being a recent migrant) than to social groups (Layte and Whelan 2002). Another typology makes a distinction between "old" and "new" social risks, where the former group have traditional social policy answers (i.e. short-term unemployment, active age disability and insufficiency of resources in old age), while the latter category consists of less structured risks that prevail at particular life stages of specific sub-groups (e.g. young people entering the labour market, or becoming single-parent as traditional family

models change) (Salverda 2011). Typically, the vulnerable groups of society in terms of relative income poverty, in general or at certain stages of life, are the low skilled with low levels of education, youth (and the elderly in some cases), lone parents, members of large households and migrants (Lelkes et al. 2009). Such socio-economic circumstances tend to be associated with higher risk of poverty.

Notwithstanding all kinds of welfare state arrangements, the most (though by no means the only) reliable way to escape poverty is to actively participate in the labour market and more especially to be in gainful employment as this is the main source of income in all countries. Employment income was the largest component in the income of household on average, even during the recession years of 2007-2011 in a sample of 21 rich countries (Jenkins et al. 2013). Correspondingly, at the individual level, loss of employment or not being able to find a job is a key determinant of being at risk of poverty. On average in the EU, just over 40% of those aged 20-59 who were for the most part unemployed during 2010 had income below the AROP threshold, compared to 16% of the age group as a whole (Özdemir and Ward 2014). The income of the unemployed is mostly way below the poverty line, amounting to only around 69% of the threshold in 2010, on average (Özdemir and Ward 2014). Accordingly, jobless households face a much higher poverty rate compared to working families (Salverda 2011). In most countries, the probability of being at risk of poverty is 4-6 times higher if a person lived in a workless household (defined as households containing at least one person of working-age where no-one was in employment) at the time of the survey than if they did not (Özdemir et al. 2010).[8]

Secondly, though no less importantly, higher education levels generally mean higher returns to labour and lower unemployment risk. Skill biased technological changes (Goldin and Katz 2007, Acemoglu and Autor 2012) and 'routinisation' (Autor et al. 2003) has tended to shift the demand toward more skilled labour, resulting in higher wage inequality. Wage dispersion has been more pronounced toward the top-end of the distribution (where education levels are generally higher) in recent decades, the earnings gap between high- and low-skilled workers has been growing (OECD 2011).[9] Apart from the generally higher earnings of those with higher education, their rate of social benefit in the case of unemployment is also higher in countries where unemployment compensation is related to earnings. However, the negative association between education and risk of poverty is not universal if education levels above primary school are compared. In some Member States, (Germany, Ireland, Spain, Italy, Cyprus, Portugal and Sweden), among the unemployed aged 25-64 not living in a workless household, it is those with upper secondary qualifications who have the lowest risk of poverty, instead of those with tertiary education (Özdemir et al. 2010). Still, overall, employment (or work intensity at the household level) and education level are key factors that affect the risk of poverty. They are therefore a major focus here.

Macro level determinants of the risk of poverty

Apart from the micro level risk factors, the AROP rate depends on country level (contextual) drivers. The varying poverty rates across the EU may be attributed to differences in the macroeconomic and institutional contexts of the countries.

The relationship between country level indicators of development on the one hand and the risk of poverty on the other is not straight-forward, since a high degree of income

[8] Chances of being at risk of poverty for someone living in a workless household is significantly higher in all EU countries, however there are cross-country differences. Compared to the EU average of 4-6 times higher probability, the chances are only less than twice as high in Greece, and less than three times as high in Poland, Romania, Italy and Luxembourg (Özdemir et al. 2010).

[9] An interesting decompositional study on the role of educational inequality in income inequality in the United States found that the between education contribution to inequality is rather small (Breen and Chung 2015). So it is not only the earnings gap between low- and high-educated, but the inequality within the group with the same attained education level that explains income inequality.

inequality may well exist despite high levels of economic development. Similarly, the impact of recessions on relative income poverty depends on who in the income distribution is affected most (Jenkins et al. 2013). Macro level country characteristics may have an impact on both the absolute levels of household income and on the inequality of the distribution of income.

At the macro level, the paper focuses on the employment rate, in line with the focus on work intensity at the micro level. The Europe 2020 strategy, apart from setting a poverty head-count target, specified that 75% of the population aged 20-64 should be employed by the end of the period (European Commission 2010). It is implicitly assumed in the European social inclusion strategy that higher employment correlates with or even induces lower AROP rates. There is evidence of an association between employment and risk of poverty at the individual level, although the correlation between employment and the AROP rate at the country level is not clear-cut across Member States. European countries in the period preceding the crisis were more successful in achieving higher employment than at reducing poverty, as the falling wage share and labour market deregulations hindered the potential beneficial impacts of job growth on poverty (Taylor-Gooby et al. 2015). Marx et al. (2013a) introduce three main reasons why job growth may not necessarily result in a reduction in the AROP rate. First, the distribution of the new jobs is key, as job growth may not always benefit those at risk of poverty – an upswing in employment may increase the number of multi-earner households instead of reducing the prevalence of jobless households, for example. Secondly, the poverty line is a moving target as median equivalent income may shift in line with job growth. And thirdly, a job may not raise household income enough to escape poverty, which is the phenomenon of in-work poverty. Still, even if transmission channels between employment and the AROP rate are not straight-forward (Cantillon et al. 2014, Marx et al. 2013a, Corluy and Vandenbroucke 2014, Hills et al. 2014, Gábos et al. 2015), there is no disagreement over the importance of employment in lowering the rate.

In addition to the overall level of employment (measured by employment rate), labour market institutions also influence income (more particularly, market income) inequality. Higher bargaining power groups of workers protected by trade unions and the consequent effect in raising wages may also play a role in shaping income distribution, the AROP alleviating effects of which will tend to be determined by the interaction between the increased wages of the groups concerned and the obstacles to those seeking to enter the jobs in question. The welfare system of the country may also have a substantial AROP decreasing effect as it can reduce the loss of income suffered by those becoming unemployed. Some of the narratives on the standstill in AROP rates in the EU during the period preceding the economic crisis emphasise that social protection systems have become less successful in safeguarding incomes (see Cantillon et al. 2014).

Methodology

Database

The primary source of data for the analysis is the EU-SILC database. Eight waves of the EU-SILC cross-sectional dataset are used for analysis; those for survey years 2005 to 2012[10] referring to income years 2004 to 2011. The countries covered are the EU-27 Member States[11], depending on the availability of data[12].

Variables

The dependent variable: poverty status

At the micro level the dependent variable is a dummy indicating whether someone (individuals aged 20-59) is at risk of poverty or not, in the sense of their income falling below 60% of median equivalised income. At the macro level, the dependent variable is the at-risk-of-poverty rate of the population aged 20-59.

Micro level risk factors

Assessing the determinants of relative income poverty is difficult, as factors are often interlinked, the direction of causality is unclear and multicollinearities may exist. The behaviour of households, employees, employers and governments is closely interrelated. One way of categorisation is to divide the determinants of the risk of poverty into two broad groups: risk factors at the micro level and various contextual variables defined at the macro (country) level.

The micro level variables describe the socio-demographic circumstances of the individual (household head) and include household work intensity, highest attained education level, age, gender, migrant status, health status, co-habitation status, household size (number of dependent people living in the household) and degree of urbanisation (see the definitions in Table 1). Work intensity is expected to be negatively associated with the risk of poverty, given that earnings from employment of household members are key determinants of household income. Those not working may be unemployed and actively seeking a job or inactive and not seeking employment. Both of the groups have higher chances of being at risk of poverty than those aged 20-59 as a whole (16%), though the inactive are more likely to share a household with someone in work, so have a lower probability to be at risk of poverty (27%) than the unemployed (41%), according to EU-SILC 2010 (Özdemir and Ward 2014). Education level is also expected to be negatively related to the risk of poverty, given that high skilled workers generally have relatively high earnings, and in many countries higher social benefits in case of unemployment.

Young people are expected to have higher chances of being at risk of poverty than others of working-age, as they generally have lower earnings, given the shorter work

[10] Versions of these eight are as follows: 2005-5, 2006-4, 2007-6, 2008-5, 2009-5, 2010-4, 2011-4, 2012-2. The most recent waves are 2011-4 and 2012-2, released on 01-08-2014. Data for 2011 and for 2012 are still subject to revisions in subsequent releases.

[11] Austria (AT), Belgium (BE), Bulgaria (BG), Czech Republic (CZ), Cyprus (CY), Denmark (DK), Estonia (EE), Greece (EL), Germany (DE), France (FR), Finland (FI), Hungary (HU), Ireland (IE), Italy (IT), Latvia (LV), Lithuania (LT), Luxembourg (LU), Malta (MT), Netherlands (NL), Poland (PL), Portugal (PT), Romania (RO), Slovakia (SK), Slovenia (SI), Spain (ES), Sweden (SE), United Kingdom (UK). Croatia (HR) is excluded from the sample as the country was not involved or was still in test implementation of the EU-SILC instrument at the time frame analysed in the paper (survey years 2005-2012).

[12] Data for Bulgaria and Romania is available from 2007 onwards; data for Malta is available from 2009 onwards. The validity of data for Germany up until 2008 has been questioned as quota sampling was practiced in a transition period until full random sampling was finally established. Sample sizes change due to missing values, for example the sample includes only EU20 and EU25 in the panel regressions.

experience and less expertise at the beginning of their careers. In addition, they are also more likely to be unemployed if economically active (the unemployment rate of those aged 15-24 averaged between 15% and 24% in the EU28 over the period 2005-2012, whereas for working-age population as a whole, it was only between 7% and 11%). Moreover, young people are more prone to be at risk of poverty if they are unemployed, even if there is someone working in the household (Özdemir et al. 2010).

Gender is included in the models as a control variable, given that there is some gender difference in at-risk-of-poverty rates. Women have, in general (but not always), a slightly higher probability of being at risk of poverty, the at-risk-of-poverty rate of females aged 18-64 averaged between 15.0% and 16.4% in the EU27 over the period 2005-2011, whereas that of men varied between 14.3% and 15.4% (Eurostat 2015). Migrant status is also added to the models, as those born abroad are relatively more likely to be at risk of poverty than those born in the host country. On average, 17% of the locally born population was at risk of poverty, compared to 26% of non-EU and 19% of EU migrants, in 2007 (Lelkes and Zólyomi 2010).

Poverty risk is expected to be negatively associated with the health status of the individual, for example via less working time due to illness. However, it is difficult to determine the direction of causation or the underlying factors at work, since being at risk of poverty may also lead to worse self-perceived health.

There are two control variables in the models as regards household structure. Those being single tend to face higher risk of poverty, partly due to the lack of income pooling (Lelkes et al. 2009). The number of dependent household members is also included in the estimations, as the risk of poverty tends to rise significantly with the number of dependent children (Lelkes et al. 2009).

The degree of urbanisation is included to account for a potential negative association between living in an urban area and being at risk of poverty, as higher skilled jobs tend to be concentrated in urbanised areas, while agricultural jobs with generally lower pay are concentrated in rural areas.

Table 1. Definitions of micro variables in this paper[1]

Variable	Operationalization
Household work intensity (WI)	The average of individual work intensities in a household. The individual work-intensity is the ratio of the number of months worked, corrected for number of hours worked, during the income reference year by a working-age household member to the number of months he or she could theoretically have worked full-time (defined as working 35 or more hours a week). The ratio ranges from 0 (meaning that no-one of active age worked during the preceding year) to 1 (meaning that everyone of active age was full-time employed throughout the year). The work intensity of the household is split into 5 categories: very low WI if the value of WI is equal or lower than 0.2, low WI for values between 0.2 and 0.45, medium WI for values between 0.45 and 0.55, medium high WI for values between 0.55 and 0.85 and high WI for values over 0.85.
Education (high, medium and low)	The highest ISCED level attained (pe040) 0=tertiary education, 1=upper secondary education, 2=lower secondary or lower education level.
Age (Age)	Year of the survey (rb010) minus the year of birth (rb080).
Gender (Female)	Gender (rb090) 0=Male, 1=Female.
Migrant status (Migrant)	Country of birth (pb210) 0=local, 1=migrant from EU or non-EU country. As there is no distinction between migrants from inside and outside the EU in Germany,

	Estonia, Latvia and Slovenia, migrants from and outside of the EU form one group in the estimations.2
Consensual Union (Single)	Based on consensual union (pb200) 0=yes, on a legal basis; yes without a legal basis, 1=no.
Urbanization degree (Urbanization)	Degree of urbanization (db100) 1=densely populated area, 2=intermediate area, 3=thinly populated area.
Subjective health status (Health)	Measure of self-perceived health. General health (ph010) 1=very good, 2=good, 3=fair, 4=bad, 5=very bad.
Number of dependent members (Dependent members)	Number of household members below 18 years of age or between 18 and 24 and studying (based on Self-defined current economic crisis (pl031): Pupil, student, further training, unpaid work experience).

Notes:

1 Labels in parenthesis refer to the variable names that are presented in the regression output tables. Labels in parenthesis under operationalization refer to the variable names in EU-SILC.

2 The lack of distinction between migrants within the EU and those from outside is not ideal as there is a difference in the characteristics of the two groups of migrants in many countries. However the sample size would shrink considerably in some countries if a distinction were made. Despite the differences, both groups of migrants tend to be more vulnerable compared to locally born. On average, 26% of non-EU migrants and 19% of EU migrants were at risk of poverty in 2007 compared to 17% of the "local" population, based on EU-SILC 2008 (Lelkes and Zólyomi 2010).

Most of the micro level variables (except for household work intensity and the number of dependent members in the household) are attributes of the household head. The assumed household heads are defined based on demographic characteristics (following Lelkes et al. 2009):

1. The household head is the oldest active-age (20-59) male in the household.
2. If that is not applicable, then it is the oldest active-age (20-59) female.

Country level variables influencing poverty

The set of country level variables affecting the risk of poverty is complex and factors are often interrelated. The group of macro level variables may be further divided into macroeconomic circumstances, institutional characteristics and variables describing the socio-economic or demographic composition of society.

Macroeconomic variables consist here of the employment rate and the household income per head. The employment rate is the main variable of interest at the country level, and it is expected to be negatively associated with the at-risk-of-poverty rate in a country. Household income per capita describes the average living standards and general level of development of the country. The analysis assumes that higher development might correlate with a smaller share of the population at the lower end of the income distribution, since richer Member States of the EU tend to have a more egalitarian and generous welfare system.

The institutional setting of a country is taken into account by various indicators of labour market institutions, such as the coordination of wage setting, the implicit tax rate on labour and the progressivity of taxes on wages (the latter two variables provide information on the redistribution system as well). These indicators cover most aspects of labour market circumstances, as the indicator of coordination summarises the main aspects of wage setting[13] (see footnote 14) on the one hand, and on the other hand implicit labour tax rate and the degree of progressivity capture the effects size and

[13] Potential impact of some other indicators of labour market institutions that are difficult to measure and compare across countries, like employment protection legislations, are included in the composite index of coordination of wage setting.

targeting of labour taxes may have. Many of the labour market institutions, such as centralised wage bargaining, have a supposedly equalising impact on the distribution of employment earnings, and accordingly on the distribution of post-tax and –transfer income (Diris et al 2014). Thus, a more centralised wage setting is expected to correlate with lower income inequality. However, at the same time, such institutions may also have negative effects on labour force participation and on the earnings of those not in a trade union. The implicit tax rate is an indicator of the extent of redistribution (how much is collected potentially to be redistributed) and as such it may be negatively correlated with at-risk-of-poverty rates. (However, it may also have disincentive effects to work at the margin, potentially increasing relative income poverty.) The progressivity of taxes on wages may indicate how 'pro-poor' the taxation and redistribution system are.

The institutional context is also captured by aspects of the welfare system, such as the relative size of social transfers, the extent to which social transfers are targeted at the most needy, plus the relative size of pensions, and an indicator of transparency in the operation of the governance of the country (see the definitions of the variables in Table 2.)[14]. The relative size of social transfers and the indicator of targeting are included in the models to take account of the impact of redistribution on market income inequality. Social transfers are generally expected to have equalising effects, so their relationship with the risk of poverty is expected to be negative. The targeting of social transfers is measured by the share of social transfers received by the lowest two deciles of the income distribution. Higher 'pro-poor' spending is expected to be negatively associated with the risk of poverty[15].

The size of pensions relative to mean equivalised disposable household income may correlate with at-risk-of-poverty rates, as spending on pensions may be at the expense of benefits targeted at working-age population. However, pensions that end up with multi-generational families may pull some of the working-age population out from a risk of poverty (especially in Southern and Eastern European countries, where multi-generational households are more widespread [Diris et al. 2014]).

Control of corruption is a very general approximation of the quality of governance in the country. The paper hypothesises that a State which is 'captured' by elites and private interests has a less equal income distribution and, hence, a higher at-risk-of-poverty rate.

[14] The construction of some of the institutional variables, like the relative size of pensions and social transfers, targeting of social transfers was following Diris et al. 2014, who assessed the role of social transfers on child poverty. Their list of variables and theoretical framework of the determinants of poverty gave useful insights.

[15] The term pro-poor spending refers to targeting. The famous study of Korpi and Palme (1998) indicates that universal benefits have a higher redistributive effect, however more recent studies (Marx et al 2013b) found that pro-poor transfer systems correlate with higher benefit sizes received by the poor, thus are more efficient in redistribution toward the lower end of the income distribution.

Table 2. Macroeconomic and institutional explanatory variables

Variable	Operationalization
Employment rate (Employment rate)	Employment rate (total, 20-64 years[2]) Data source: Eurostat.
Economic controls	
Household income per head (Household income)	Real adjusted gross disposable income of households per capita in PPS is calculated as the adjusted gross disposable income of households and Non-Profit Institutions Serving Households (NPISH) divided by the purchasing power parities (PPP) of the actual individual consumption of households and by the total resident population. The measure includes benefits in kind as well. (Data is missing for Malta and Luxembourg, and for Greece in 2004 and 2005.)[3] Data source: Eurostat.
Labour market institutions, circumstances	
Coordination of wage setting (Wage coordination)	Coordination of wage-setting (2011)[4] (Data is missing for Bulgaria and Romania in 2011.) Data source: Visser, 2015 (http://www.uva-aias.net/208).
Implicit tax rate on labour (%) (Labour tax)	The implicit tax rate on labour is calculated as the ratio of taxes and social security contributions on employed labour income to total compensation of employees and payroll taxes. The implicit labour tax is composed of employers' and employees' social security contributions and personal income tax. Data source: Taxation trends in the European Union, 2014 edition.
Progressivity of taxes on wages (Progressivity)	Percentage point difference between the average tax wedges at 167% and 67% of the average earnings of a single person with no child. (There is no data available for Bulgaria, Cyprus, Latvia, Lithuania, Malta and Romania.) Data source: OECD.
Welfare system, circumstances	
Relative size of social transfers (Social transfer)	Average size of social transfers[5] relative to the country's mean equivalised disposable household income. Data source: own computation from EU-SILC.
Targeting of social transfers (Targeting)	The share of social transfers received by the lowest two deciles of the income distribution (total disposable household income before social transfers other than old-age and survivor's benefit of the population between 20-59 years). Data source: Own computation from EU-SILC.
Relative size of pensions (Pension)	Average pension relative to the country's mean equivalised disposable household income. Data source: own computation from EU-SILC.
Corruption index (Corruption control)	Control of corruption[6]: percentile rank among all countries (ranges from 0, lowest to 100, highest rank). Data source: World Bank, Worldwide Governance Indicators.

Notes:

1 Labels in parenthesis refer to the variable names that are presented in the regression output tables. Labels in parenthesis under operationalization refer to the variable names in EU-SILC.

Descriptive statistics about the macroeconomic and institutional variables are shown in Table 2 in the Appendix. The table includes the averages and standard deviations of the variables by Member States during 2004-2011.

2 The age range of 20-64 years is the closest available at Eurostat to the definition of working-age (20-59 years) in the analysis. This inconsistency should not distort the results much.

3 Missing data points remain missing in the analysis, there was no imputation. The regressions are run on an unbalanced panel data. However in order to avoid a severely unbalanced panel dataset, some of the countries are dropped. The paper reports results on a sample of 20 EU Member States, where the data are almost fully

balanced (and on a sample of 25 EU Member States in the Appendix). Countries from EU27 that are excluded from the EU20 sample include Bulgaria (BG), Cyprus (CY), Latvia (LV), Lithuania (LT), Luxembourg (LU), Malta (MT) and Romania (RO).

4 The coordination of wage setting is an indicator taking values from 1 to 5 summarizing many aspects of wage coordination, like bargaining coverage, level and type of coordination, predominant level of bargaining, the average length of agreements, government intervention, grades of administrative extension of agreements, minimum wage setting, employer organization and union centralisation, etc. The indicator comes from the Database on Institutional Characteristics of Trade Unions, Wage Setting, State Intervention and Social Pacts in 34 countries between 1960 and 2012 (ICTWSS), created by Jelle Visser, Amsterdam Institute for Advanced Labour Studies (AIAS). The indicator is coded as follows: 5 = a) centralised bargaining by peak association(s), with or without government involvement, and/or government imposition of wage schedule/freeze, with peace obligation; b) informal centralisation of industry level bargaining by a powerful and monopolistic union confederation; c) extensive, regularised pattern setting and highly synchronised bargaining coupled with coordination of bargaining by influential large firms. 4 = a) centralised bargaining by peak associations with or without government involvement, and/or government imposition of wage schedule/freeze, without peace obligation; b) informal (intra-associational and/or inter-associational) centralisation of industry and firm level bargaining by peak associations (both sides); c) extensive, regularised pattern setting coupled with high degree of union concentration. 3 = a) informal (intra-associational and/or inter-associational) centralisation of industry and firm level bargaining by peak associations (one side, or only some unions) with or without government participation ; b) industry-level bargaining with irregular and uncertain pattern setting and only moderate union concentration; c) government arbitration or intervention. 2 = mixed industry and firm-level bargaining, with no or little pattern bargaining and relatively weak elements of government coordination through the setting of basic pay rates (statutory minimum wage) or wage indexation. 1 = fragmented wage bargaining, confined largely to individual firms or plants (ICTWSS database, Visser, 2015).

5 Social transfers include unemployment benefits, sickness benefits, disability benefits, education-related allowances, family/children related allowances, social exclusion not elsewhere classified, housing allowances.

6 Control of corruption captures perceptions of the extent to which public power is exercised for private gain, including both petty and grand forms of corruption, as well as "capture" of the state by elites and private interests. Percentile rank among all countries (ranges from 0, lowest to 100, highest rank).

Another set of explanatory variables of the prevalence of the risk of poverty include some measures of the demographic circumstances of a country. The socio-economic composition of society is described by the share of individuals in the country who live in a household with very low work intensity, have only basic education, are young, migrants, single (based on consensual status), live in a thinly populated area, in large households and those with more than two dependent members (see the definitions in Table 3). The variables are associated with a particular risk of poverty at the individual level (as described above), so it is of interest to see if the correlations exist at the macro level as well. In addition to the population shares of groups generally facing a higher risk of poverty, an indicator of ethnic fractionalisation is added to account for social homogeneity (see Table 3). Social homogeneity, in certain circumstances, may reflect attitudes about inequality in society and so might explain societies' willingness to accept wage inequality and to support social welfare systems, hence ethnic fractionalisation may be (even if indirectly) related to the risk of poverty. (Some of the potential impact may already be included implicitly in the social transfer variable or in the coordination of wage setting variable; nevertheless, other effects of fractionalisation may affect the risk of poverty via perhaps more lower-paid jobs on the labour market.)

Table 3. Socio-economic composition of the society - explanatory variables

Variable	Operationalization
Share of low WI households	Share of individuals in the country living in a household with very low work intensity (WI<=0.2). Data source: Eurostat.
Share of low educated	Share of low educated in the country in working-age (20-59) population. Data source: own computation from EU-SILC 2005-2012.
Share of young	Share of young (18-30) in the country in working-age (20-59) population. Data source: own computation from EU-SILC 2005-2012.
Share of migrants	Share of foreign born individuals in the country in working-age (20-59) population. Data source: own computation from EU-SILC 2005-2012.
Share of singles	Share of single people in the country in working-age (20-59) population. Singles are those not living in a consensual partnership (based on pb200). Data source: own computation from EU-SILC 2005-2012.
Low urbanisation	Share of people in the country living in thinly populated areas in working-age (20-59) population. Data source: own computation from EU-SILC 2005-2012.
Share of large households	Share of individuals in the country living in large households (with more than 4 members) in working-age (20-59) population. Data source: own computation from EU-SILC 2005-2012.
High dependency	Share of individuals in the country living in households with more than 2 dependent members in working-age (20-59) population. Data source: own computation from EU-SILC 2005-2012.
Ethnic fractionalisation	The probability that two randomly selected people from a given country will not share the same ethnicity, defined as a combination of racial and linguistic characteristics (Alesina et al. 2003). Data source: Alesina et al. 2003 via The Quality of Government Institute.

Results of the regression analysis

Descriptive statistics

Descriptive statistics of poverty risk by work intensity and education (the two main variables of interest) underline the importance that the various factors may have in reducing poverty risk. Descriptive statistics of risk of poverty by highest attained education level on a country level indicates that people with primary education are the most vulnerable in all countries. In other words, risk of poverty is the highest among individuals with primary education, it ranges from 13% to 56% (values correspond to the Netherlands and Romania, respectively) (see Table 4). As expected, individuals with medium attained education level have much lower risk of poverty rates, from 7% (in Malta) to 25% (in Latvia). The gap between the poverty risk of individuals with medium and high level of education is lower, only 3% (in the Czech Republic) and 15% (in Denmark) are at risk of poverty from the latter group, compared to the 7-25% range in the former group. The tendency that education level is negatively associated with risk

of poverty is straightforward, however there is considerable cross-country variation in the relative potential effectiveness of education as a mean to reduce poverty risk.

Poverty risk also varies among the individuals living in households with different levels of work intensity. Households with low work intensity are the most vulnerable. 39% to 75% of the individuals living in a household with low work intensity are at risk of poverty (the smallest share corresponds to the Netherlands and the highest to Estonia among the 27 EU Member States, see Table 4). Individuals living in households with medium work intensity are more resilient to poverty risk: only 7% (in Ireland) to 33% (in Romania) of them are at risk of poverty. The shares of individuals that are at risk of poverty among the ones living in high work intensity households are much smaller, the shares range from 1% (in Malta) to 11% (in Romania).

The role of education and work intensity in reducing poverty risk seems to be strong. To go beyond the descriptive statistics, the relationship between education, work intensity and poverty is further analysed by cross-sectional regression models, where other factors that may influence poverty risk are controlled for.

Table 4. Estimated proportion of people aged 20-59 who are at risk of poverty among the individuals with different levels of education and work intensity, EU-27, 2011

	low education	medium education	high education	very low WI	medium WI	high WI
BE	0.30	0.13	0.09	0.55	0.12	0.03
BG	0.47	0.14	0.06	0.66	0.23	0.03
CZ	0.33	0.11	0.03	0.52	0.13	0.03
DK	0.20	0.13	0.15	0.47	0.13	0.05
DE	0.48	0.23	0.12	0.74	0.16	0.06
EE	0.34	0.22	0.10	0.75	0.20	0.06
IE	0.23	0.19	0.12	0.48	0.07	0.02
GR	0.38	0.23	0.12	0.52	0.27	0.05
ES	0.31	0.20	0.12	0.58	0.22	0.07
FR	0.27	0.15	0.09	0.53	0.23	0.06
IT	0.28	0.16	0.09	0.53	0.26	0.07
CY	0.26	0.17	0.07	0.53	0.20	0.08
LV	0.43	0.24	0.12	0.68	0.26	0.06
LT	0.41	0.25	0.12	0.63	0.20	0.06
LU	0.27	0.14	0.08	0.47	0.27	0.07
HU	0.45	0.11	0.05	0.50	0.15	0.02
MT	0.19	0.07	0.04	0.55	0.18	0.01
NL	0.13	0.11	0.10	0.39	0.11	0.03
AT	0.30	0.16	0.11	0.53	0.17	0.06
PL	0.38	0.19	0.08	0.56	0.24	0.06
PT	0.21	0.10	0.11	0.49	0.29	0.05
RO	0.56	0.19	0.10	0.46	0.33	0.11
SI	0.28	0.16	0.06	0.62	0.25	0.06
SK	0.40	0.15	0.06	0.63	0.22	0.04
FI	0.24	0.16	0.07	0.61	0.09	0.03
SE	0.23	0.14	0.13	0.66	0.22	0.06
UK	0.27	0.18	0.13	0.47	0.18	0.06

Source. Own estimates based on EU-SILC 2012, most recent wave is 2012-2, released 01-08-2014

Cross-sectional estimations – micro level

The first set of cross-sectional estimations examine which risk factors at the individual level are associated with being at risk of poverty for those aged 20-59. The sample consists of the household heads of the 27 EU Member States for which EU-SILC 2012 data are available. The model is specified as follows:

(1)

$$\boldsymbol{Y_i = c + \alpha_1 WI_i + \beta_1 EDU_i + \gamma_1 DEM_i + \mu_1 CNTR + \in_i}$$

The unit of analysis is the household[16] – represented by the household head denoted by 'i'. The dependent variable (Y) is binary, set to one if at risk of poverty. WI denotes the work intensity of the household, 'EDU' stands for the education level, and 'DEM' is a vector of the demographic characteristics of the individual (age, gender, consensual status, migrant status, health status, degree of urbanisation and number of dependent members in the household). 'CNTR' indicates the country dummies. Household weights are applied to take account of the probability of selection, non-response and to adjust the sample to external data relating to the distribution of households in the target population (European Commission, 2012). Given that the outcome variable is binary, a linear probability model (LPM) and a probit model are estimated (see Table 5)[17].

All the micro level variables are significant (which is no surprise given the large sample size) and have the expected sign, except for the female variable, which is insignificant. The linear probability model indicates that an individual living in a household with low work intensity compared to someone living in a household with very low work intensity, is expected to face a 12 percentage point lower probability of being at risk of poverty, holding all other variables constant. Conversely, a household with high work intensity has a 47 percentage point lower probability on average of being at risk of poverty than someone living in a household with very low work intensity, keeping all else equal. In other words, the assumption that the higher the work intensity, the lower the chances to remain at risk of poverty is verified by the models.

A person with higher education has an 11 percentage point lower probability on average of being at risk of poverty than someone with only basic schooling, keeping all other variables constant. Similarly, upper secondary education is associated with a 7 percentage point lower chance of being at risk of poverty than basic schooling.

The estimated coefficients of the other demographic variables indicate, that households with younger heads tend to have a slightly higher chance of being at risk of poverty[18]; and singles are also more vulnerable than their counterparts living in a consensual relationship, irrespective of age. Being a migrant and having a large number of dependents are also significant risk factors of being at risk, in line with expectations. Self-perceived health and urbanisation also have the expected sign (the poorer the health and the lower the degree of urbanisation, the higher the risk of poverty), although

[16] For estimations on a sample of individuals instead of household heads see Appendix Table 4.

[17] Linear probability models (LPM) and probit models are multivariate statistical models, where the dependent variable is binary. The LPM follows the ordinary least squares (OLS) methodology with a binary dependent variable. Probit models are non-linear, multivariate statistical models, which are usually used in the case of a binary left-hand-side variable. A LPM is easier to interpret, however it may predict probabilities below 0 or above 1 and the estimations are often biased and inconsistent (Horrace and Oaxaca, 2006). The estimated coefficients of a probit are more difficult to interpret, as the effect of an explanatory variable varies with the level of other explanatory variables in non-linear models.

[18] Although one should bear in mind that elderly people are not included in the sample. The sample consists of working-age people.

the urbanisation coefficient is only significant in the probit model, indicating that it is not a strong determinant of risk of poverty.

Table 5. Cross-sectional regressions with micro level explanatory variables, EU27, 2011

	LPM (1)	LPM (2)	Probit (1)	Probit (2)
Variables	AROP	AROP	AROP	AROP
Low WI	-0.120***	-0.120***	-0.257***	-0.252***
	(0.0357)	(0.0344)	(0.0843)	(0.0783)
Medium WI	-0.323***	-0.321***	-0.833***	-0.829***
	(0.0338)	(0.0339)	(0.0743)	(0.0710)
Medium high WI	-0.412***	-0.411***	-1.228***	-1.229***
	(0.0333)	(0.0333)	(0.0898)	(0.0845)
High WI	-0.467***	-0.465***	-1.608***	-1.619***
	(0.0337)	(0.0338)	(0.0878)	(0.0853)
Medium education	-0.0724***	-0.0658***	-0.275***	-0.257***
	(0.0135)	(0.0132)	(0.0519)	(0.0513)
High education	-0.121***	-0.111***	-0.557***	-0.527***
	(0.0142)	(0.0149)	(0.0653)	(0.0630)
Single	0.0804***	0.0947***	0.442***	0.512***
	(0.0145)	(0.0169)	(0.0850)	(0.0978)
Migrant	0.0932***	0.0917***	0.418***	0.408***
	(0.0211)	(0.0196)	(0.0741)	(0.0669)
Dependent members	0.0367***	0.0399***	0.162***	0.181***
	(0.00930)	(0.00909)	(0.0385)	(0.0391)
Age	-0.00222***		-0.00912***	
	(0.000524)		(0.00263)	
Female	0.0224		0.0922	
	(0.0160)		(0.0735)	
Urbanisation	0.0138		0.0772**	
	(0.00833)		(0.0394)	
Health	0.00767*		0.0396**	
	(0.00435)		(0.0166)	
Country fixed effects	Yes	Yes	Yes	Yes
Constant	0.540***	0.471***	-0.182	-0.405***
	(0.0387)	(0.0294)	(0.114)	(0.0451)
Observations	116,303	140,358	116,303	140,358
R-squared	0.255	0.250		

Source. Own estimates based on EU-SILC 2012.
*Notes. Clustered standard errors in parentheses. *** p<0.01, ** p<0.05, * p<0.1. Probit models present coefficients, not marginal effects.*

Work intensity has the highest estimated coefficient in absolute terms and education has the second highest. This means that the largest difference in the risk of poverty is

between those with different levels of work intensity, keeping all else constant. However, it should be noted that very low work intensity affects comparatively small numbers of people in many countries, whereas those with low education are more numerous, and more variable across the EU. The share of individuals living in a household with low work intensity is 10%, whereas individuals with primary education account for 20% on average in the Member States (EU27) (see Table A3). Apart from work and education, the estimated coefficient of migrant status is also high. Being a migrant is associated with a 9 percentage point higher probability of being at risk of poverty, the difference being similar to that between high and low educated people.

Multicollinearity among independent variables is not a factor affecting the results – there is no evidence of high correlation between the independent variables (see Table A5). However, the regression coefficients are unstable as the variables included in the equation are changed. To tackle this, the variables that are close to being insignificant or which have very small coefficients (age, female, urbanisation, health) can be omitted from the estimation (see LPM (2) and Probit (2) models in Table 5). The reduced model proves to be relatively stable overall, again without multicollinearity among the independent variables (see Table A6). Coefficients of the explanatory variables in the full and reduced models are essentially the same.

The same regressions run on the sample of all individuals aged 20-59, instead of the sample of household heads only, give similar results, especially in the case of the main variables of interest, work intensity and education level, where the estimated coefficients differ only slightly from those indicated above (see Table A4)[19]. The similar coefficients of education level imply that working-age household members have similar levels of education as the household head. The estimated coefficient of being female is again not significant. The degree of urbanisation and self-perceived health are not highly significant either, indicating that they are not strongly correlated with risk of poverty. The results confirm that work intensity and educational attainment are the root sources of risk of poverty.

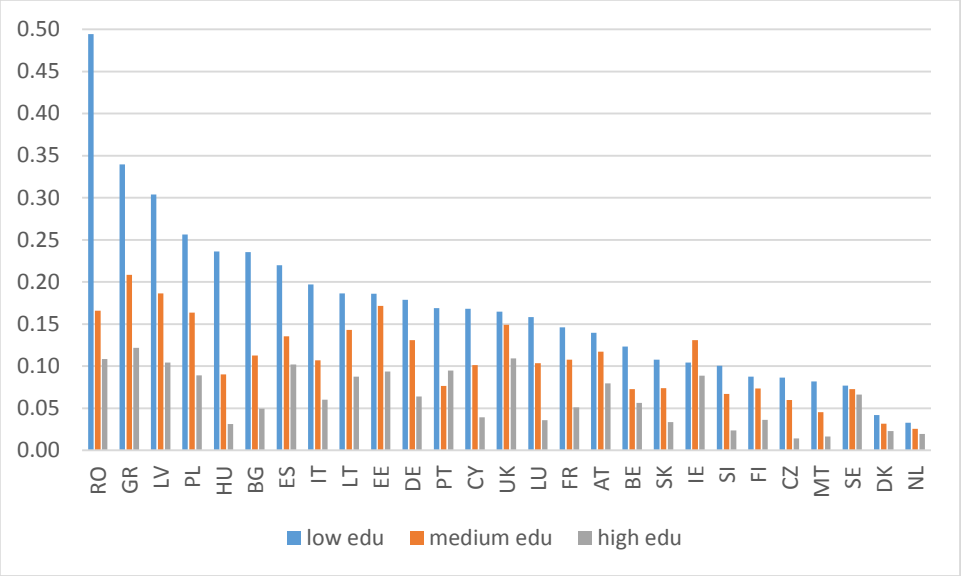
Based on the models, the socio-economic circumstances of those at risk of poverty in the EU are in line with predictions of theory, although the micro level risk factors may have different effects across countries (characterised, among other things, by varying compositions of society in respect of the relevant factors, such as education level). The risk of poverty of an individual is affected not only by their characteristics and circumstances but also by the macroeconomic conditions and institutional setting in the country concerned, so the same micro level risk factors may result in different outcomes as regards the probability of being at risk of poverty in different countries. Separate estimations are made in the next section for each EU27 country to see whether there is a heterogeneity across countries in the effect of the two main micro explanatory variables of interest (work intensity and education level).

Differences in the role of micro level poverty risk factors across countries

Predicted probabilities of being at risk of poverty at different levels of education and work intensity across the EU are estimated based on probit models in each Member State, the unit of analysis being the household head. The results are in line with the descriptive statistics reported in the previous subchapter.

[19] The only variables that are still defined at the household level is the work intensity of the household and the number of dependent members in the household.

Figure 2. The predicted probability of being at risk of poverty at different attained education levels, by country, EU27, 2011



Source. Own estimates based on EU-SILC 2012.
Notes. Estimations are from probit models on EU-SILC 2012, sample filtered for household heads, the unit of observation is the household head. The graph shows the predicted probability of being at risk of poverty at different attained education levels, when keeping all micro level variables of model (1) (work intensity, age, female, single, migrant, dependent members) constant at their means. In the case a dummy variable the mean equals the share of the population for which the dummy variable holds true (equals 1).

There is a large variation across Member States in the probability of being at risk of poverty at different education levels. This is especially so for households with low educated heads. Such a household has less than 5% probability of being at risk of poverty in the Netherlands compared to close to 50% in Romania. Such differences reflect both differences in at-risk-of-poverty rates and in the shares of people with different education levels. On average 36% of the individuals at risk of poverty have primary education, 44% have medium and 20% have high education in the EU27 in 2011, with high variance across countries, standard deviations are approximately 19%, 17% and 11% of the low, medium and high educational groups among the poor, respectively (see Table A7). In other words the composition of the people at risk of poverty and the education premium, or the returns to education, also vary greatly across Member States (see Figure 2).

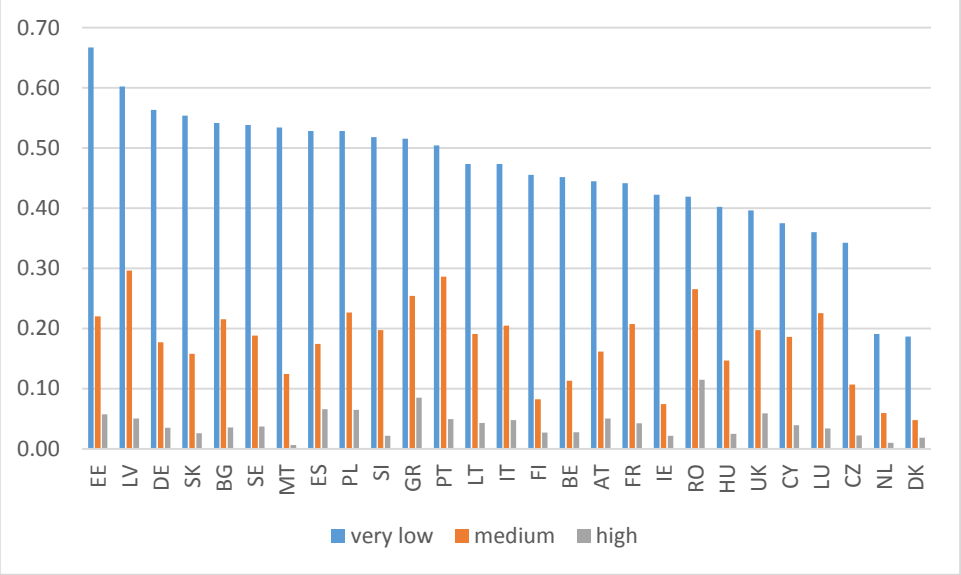
Having only basic education is a strong predictor of being at risk of poverty in most Central and Eastern European countries. However, Slovakia, Slovenia and the Czech Republic are exceptions, where – together with generally lower at-risk-of-poverty rates – relatively fewer people have low education than in other post-socialist countries. In Romania, by contrast, almost every second person with a low level of education is predicted to be at risk of poverty.

A low level of education is also a very strong risk factor in the Southern European countries, especially in Greece and Spain. People with only basic education in Malta, Cyprus and Portugal are less vulnerable in this respect, probably because the share of low educated is relatively large (in Portugal, for example, around two-thirds of the population have low education). So the share of low educated may also affect the cross-country results. The dispersion across countries in the risk of poverty of those with upper secondary education is narrower than for the low educated and it is narrower still for those with tertiary degrees.

There are some countries where the gaps in the risk of poverty between those with low education and those with a high level are substantial. Educational inequality goes with high income inequality in the Eastern and Southern parts of Europe, whereas in Northern Europe the differences in educational attainment do not seem to translate into high income inequality between those with different education levels. For example in

Hungary, the difference between the probability of being at risk of the highly educated and the low educated is considerable – around 8 times. The relative difference is also large in Bulgaria and the Czech Republic (where the highly educated have a very low probability of being at risk of poverty). Conversely, there is a very small difference between the risk of poverty of low and highly educated people in Sweden, Denmark and the Netherlands. One of the roots of this difference is that in the Eastern-European countries a low level of education may pick up other factors of disadvantage, such as coming from an ethnic minority, e.g. being a Roma.

Figure 3. The predicted probability of being at risk of poverty at different levels of household work intensity, by country, EU27, 2011



Source. Own estimates based on EU-SILC 2012.
Notes. Estimations are from probit models on EU-SILC 2012, sample filtered for household heads, the unit of observation is the household head. The graph shows the predicted probability of being at risk of poverty at different levels of household work intensity, when keeping all micro level variables of model (1) (education level, age, female, single, migrant, dependent members) constant at their means. In the case a dummy variable the mean equals the share of the population for which the dummy variable holds true (equals 1).

There is also considerable variation across Member States in the probability of being at risk of poverty at different levels of household work intensity (see Figure 3). Individuals living in a household with very low work intensity have over a 60% chance of being at risk in Estonia, compared to less than 20% in Denmark. Households with medium work intensity have a predicted probability of almost 30% of being at risk in Latvia, while in Denmark, it is only around 5%. In Romania, those living in households with high work intensity have a predicted probability of over 10%, much more than in other countries.

It is hard to find a geographical pattern or the effect of different welfare regimes in the differences across countries in respect of the influence of work intensity on the risk of poverty because the underlying factors linking the two tend to vary. In Denmark, the Netherlands and Sweden, the low risk may reflect generous welfare systems, while in Romania, it is probably because of the large number of people in subsistence farming recorded as being fully employed but having very low incomes.

Compared to educational inequality, it is even more general across countries that inequality of work intensity (the inequality of the distribution of employment across households) translates into income inequality. The relationship is more stable across Member States, where households with high work intensity are very likely to have a low risk of poverty and households with a very low level are very likely to have a high one, regardless of the country concerned. Variation in the risk across countries is much larger in the case of households with medium work intensity.

Introducing macro determinants into micro model specifications

The substantial heterogeneity across countries in the relationship between micro level explanatory variables and the risk of poverty prompts an investigation of the effects of country level variables. The estimation of the risk of the household head based on micro level independent variables (see Equation 1) is, therefore, modified by adding macro level variables (instead of the country dummies) in order to capture the potential influence of country level macroeconomic (denoted by 'ECO') and institutional factors (denoted as 'INST') on the risk of poverty of individuals (see Equation 2).

Macro variables form a complex context to the risk of poverty at the household level. Some of the effects of the macro variables work through the micro-level ones, though some macro-contextual factors may not have a direct impact on the micro level explanatory variables but still affect the risk of poverty. It is also of interest to 'decompose' the country dummies of the previous estimations to see which of the macro variables affect the micro level results. (The models estimate clustered standard errors that are robust to heteroskedasticity while also allowing for arbitrary correlation between errors of observations from the same country (Cameron and Miller 2015). This is to ensure that the regressions do not overestimate the confidence in results.)

(2)

$$\boldsymbol{Y_i = c + \alpha_1 WI_i + \beta_1 EDU_i + \gamma_1 DEM_i + \delta_1 ECO_i + \delta_2 INST_i + \in_i}$$

As results in Table 6 show, the estimated coefficients of the variables describing the country contexts are mostly insignificant, as macro variables contain only one observation per country, unlike the micro level indicators (with many observations) which remain significant and relatively unchanged. Overall differences in employment rates, added to the original linear probability model, are not significantly associated with at risk of poverty rate since household work intensity captures employment effects. Country level variables that are significant, at least at the 5% level, are household income per capita and the implicit labour tax rate, although the size of the coefficients is small. Higher household income per head correlates with a lower probability of being at risk of poverty, indicating that people living in a country with higher living standards on average have lower chances of being at risk, all else being constant.

Implicit labour tax is positively associated with the risk of poverty, perhaps reflecting the fact that the redistribution associated with the higher taxes collected may benefit the elderly more than working-age population. Also, higher taxes on labour may act as a disincentive to work. Insignificant effects of macro level variables might also be the result of the small number of countries covered in the analysis. The number of observations is small also due to missing data for some country level variables[20], which again calls for cautious interpretation. The estimates are, therefore, somewhat tentative and indicate that while the micro level characteristics of the household head discussed above have a significant influence on the probability of individuals being at risk of poverty, the model is limited in indicating the potential effects of macro-level factors.[21]

[20] See the missing observations in Table 2, where the macroeconomic and institutional variables are described.

[21] Multi-level regression models may be more reliable tools to assess the macro, contextual impact of a country on the risk of poverty of the individual.

Table 6. Cross-sectional regressions of being at risk of poverty (AROP) with micro and macro level explanatory variables, EU27, 2011.

Variables	AROP
WI	-0.437***
	(0.0161)
Medium education	-0.0679***
	(0.0131)
High education	-0.116***
	(0.0133)
Single	0.101***
	(0.0114)
Migrant	0.0950***
	(0.0208)
Dependent members	0.0398***
	(0.00654)
Employment rate	0.000725
	(0.00124)
Household income	-6.24e-06**
	(2.35e-06)
Wage coordination	-0.00588
	(0.00617)
Labour tax	0.00369***
	(0.00123)
Progressivity	0.00322
	(0.00214)
Social transfer	-0.000147
	(0.00176)
Targeting	0.00213
	(0.00145)
Pension	0.000579
	(0.000546)
Corruption control	0.000708
	(0.000695)
Constant	0.206
	(0.120)
Observations	104,436
R-squared	0.224

Source. Own estimates based on EU-SILC 2012 and macro-level data as shown in Table 2.
*Notes. Clustered standard errors in parentheses. *** p<0.01, ** p<0.05, * p<0.1*

As the previous analysis has shown, the work intensity of the household and the education level of the household head are especially strong determinants of differences in the risk of poverty between individuals and the effect of these varies considerably across countries. The next section examines the effect of macro level factors on differences in average at-risk-of poverty rates across countries.

Panel regressions – macro level

In order to better capture the role of country level characteristics influencing the risk poverty, both the independent variables and the outcome variable are defined here at the country level. The panel regressions investigate the factors underlying the heterogeneity of at-risk-of-poverty rates across EU Member States over the period between 2004 and 2011.

The main explanatory variable of interest is again the employment rate. The correlations between the at-risk-of-poverty rate, on the one hand, and the employment rate, the share of low educated and the share of low work intensity households, on the other, are significant at the 1% level (see Table 7) and suggest that employment has a strong negative association with the overall risk in the country.

Table 7. Correlations between at risk of poverty (AROP) rate and the main explanatory variables of interest

	Employment rate	Low_edu	Lowwi_sh
AROP	-0.51***	0.47***	0.24***

Source. Own estimates based on EU-SILC 2005-2012 and macro-level data as shown in Table 3.
*Notes. Correlations between the AROP rate and the main explanatory variables of interest in the panel database of EU27, 2004-2011. Stars indicate significance levels: *** p<0.01, ** p<0.05, * p<0.1*

The relationship between country level variables and at-risk-of-poverty rates is estimated by panel regression models, as specified by the following equation (see Equation 3).

(3)

$$Y_{it} = c + \alpha_1 EMP_{it} + \delta_1 ECO_{it} + \delta_2 INST_{it} + \mu_1 COMP_{it} + \in_{it}$$

The unit of analysis is the country, denoted by 'i'. The dependent variable (Y) is the overall at-risk-of-poverty rate of population aged 20-59, 'EMP' is the employment rate, the key variable of interest. 'ECO' stands for the macroeconomic indicators, 'INST' denotes the institutional setting of the country (including the labour market and welfare system characteristics) and 'COMP' is a vector of the indicators describing the socio-economic composition of the country.

The pooled OLS regressions estimate the general association between employment, macroeconomic indicators, institutional variables, socio-economic characteristics of society and poverty rates observed in the years 2004-2011 on a sample of 20 EU Member States[22]. A country with a 10 percentage point higher employment rate is expected to have a 2.9 percentage point lower at-risk-of-poverty rate, when controlling for the household income per capita of the country and for the time effects (see Table 8). The relationship is in line with expectations and previous findings (see Gábos et al. 2015, Corluy and Vandenbroucke 2014). The association between employment and the at-risk-of poverty rate remains similar (though less significant), when taking explicit account of the macroeconomic and institutional indicators of the labour market and the welfare system of the country. However, the control variables are not significant, except for the implicit labour tax rate, which is negatively associated with at-risk-of poverty rates. A possible reason, as noted above, may be that a higher implicit labour tax rate results in a larger pool of revenue that can be redistributed, though neither of the social

[22] The EU27 sample was reduced due to missing data points in some of the countries' control variables. The sample of EU20 consists of Austria (AT), Belgium (BE), Czech Republic (CZ), Denmark (DK), Estonia (EE), Greece (EL), Germany (DE), France (FR), Finland (FI), Hungary (HU), Ireland (IE), Italy (IT), Netherlands (NL), Poland (PL), Portugal (PT), Slovakia (SK), Slovenia (SI), Spain (ES), Sweden (SE), United Kingdom (UK). Bulgaria (BG), Cyprus (CY), Latvia (LV), Lithuania (LT), Luxembourg (LU), Malta (MT), Romania (RO) are dropped from the database due to missing data points in some of the control variables. However the regressions were run on an extended sample of 25 EU Member States, where only Malta and Luxembourg are dropped. The results are reported in the Appendix.

transfer variables that would support this explanation are significant. Moreover, the variable is sensitive to differences in the sample composition and the coefficient is not significant in a larger sample of 25 Member States (see Table A11). Collinearity diagnostic tests indicate that macroeconomic and institutional explanatory variables are not highly correlated and so the results are not affected by this, though the regression coefficients are not particularly stable as the variables included in the equation vary.

Adding the variables describing the socio-economic composition of society into model (4) increases the estimated coefficient of the employment rate. The negative relationship between the employment rate and at-risk-of-poverty rate is more apparent once other risk factors related to the demographic composition of society are taken into account.

Another result of the extended model is that the progressivity of taxes becomes significant with the expected sign, indicating that more progressive taxes are associated with a lower risk of poverty. The indicators of the societal composition are mostly not significant. An exception is the share of large households. Surprisingly, a larger share of large households is associated with a lower at-risk-of poverty rate: a country with a 10 percentage point larger share of individuals living in large households with more than four members has a 2.8 percentage point lower at-risk-of-poverty rate on average. Large households may benefit from multi-generational income sharing, as pensions supplement income from labour and other transfers.[23] The model also suggests that there is an association between the share of migrants in society and the overall at-risk-of poverty (though only at the 10 percent significance level), in line with previous findings (Lelkes et al. 2009). However, there are considerable difference between migrants from the EU and outside the EU which is concealed in the results, the latter having a much higher risk of poverty. The correlation matrix indicates that there is a significant positive correlation between the proportion of migrants from outside the EU and the risk, whereas there is no significant relationship between the share of migrants from within the EU and the risk (calculations not shown).

In model specification (4) two of the variables describing the socio-economic composition of society are omitted because of collinearity which would distort the results (see Tables A9 and A10). As the share of people living in households with more than two dependents and the share of those living in large households (more than 4 members) are closely related, only the latter remains in the model. For similar reasons, the share of people living in households with low work intensity was also excluded, since it is another indicator of employment. Nevertheless, the share of people living in households with low work intensity was included in model (5), as it is also an indicator of the distribution of jobs across households, which is not captured by the employment rate. Its estimated coefficient is not significant, while that of the employment rate remains stable (and significant only at the 5 percent level), indicating that the low work intensity variable does not add to the explanatory power of the model.

As the dependent variable, risk of poverty may be non-stationary (may have a time trend), serial correlation may be an issue in the pooled analysis. Based on the Wooldridge test for autocorrelation in the panel data, the null hypothesis of no serial correlation is rejected[24] (see Table A13). When a lagged dependent variable is included in the model, its estimated coefficient is statistically significant and high in magnitude (0.86) (see Table A14). (Including a second lag of the dependent variable is not significant.) The employment variable is still significant and has the expected sign, however its magnitude is smaller (-0.13). The presence of autocorrelation suggests to

[23] To test the hypothesis that large households may benefit from multi-generational income sharing, a cross-sectional regression with a so-called pension dummy (indicating that the household receives old age benefit) was run on the EU27 sample in income year 2011. A household that receives old age benefit has on average a 20 percentage points lower probability to be at risk of poverty, compared to a household that does not receive pension (see Table 12 in Appendix).

[24] Wooldrige's test uses the residuals from a first differences regression, which are regressed on variables' lags to identify serial correlation in the panel-data model.

include the lagged dependent variable, although it may bias the coefficients of the explanatory variables downward, if residual autocorrelation is present.

The country and time fixed effect regressions (FE) investigate whether there is a possible longer-term stable relationship between employment, macroeconomic indicators, institutional variables and the risk of poverty, as they control for specific country time trends. The FE model (or within groups estimation method) is based on the averages of all the variables over the years 2004-2011, so that time-invariant variables that could cause omitted variable bias, such as cultural differences, do not bias the estimations. However, it follows that a FE model cannot investigate the effect of time-invariant determinants of the at-risk-of-poverty rate, such as institutions that change generally slowly.

Table 8. Pooled OLS regressions of at risk of poverty (AROP) rate, EU20, 2004-2011

Variables	(1) AROP	(2) AROP	(3) AROP	(4) AROP	(5) AROP
Employment rate	-0.269***	-0.288**	-0.291*	-0.535***	-0.517**
	(0.0939)	(0.109)	(0.140)	(0.164)	(0.200)
Household income		7.33e-05	0.000206	-0.000195	-0.000191
		(0.000172)	(0.000163)	(0.000152)	(0.000149)
Wage coordination			0.108	0.233	0.232
			(0.364)	(0.382)	(0.385)
Labour tax			-0.300***	-0.207**	-0.204**
			(0.0758)	(0.0807)	(0.0843)
Progressivity			-0.202	-0.327**	-0.335**
			(0.123)	(0.126)	(0.148)
Social transfer			0.0555	-0.0339	-0.0353
			(0.175)	(0.142)	(0.144)
Targeting			-0.116	0.0444	0.0397
			(0.104)	(0.0760)	(0.0804)
Pension			0.0323	-0.00748	-0.00570
			(0.0332)	(0.0344)	(0.0363)
Corruption control			0.0117	0.0699	0.0665
			(0.0870)	(0.0680)	(0.0719)
Share of young				0.1026	0.1066
				(0.2035)	(0.1971)
Share of migrants				0.1937*	0.1877*
				(0.09409)	(0.1002)
Share of singles				0.07720	0.07373
				(0.1302)	(0.1407)
Share of low educated				0.03810	0.03995
				(0.03008)	(0.03223)
Share of big households				-0.2780***	-0.2743***
				(0.08905)	(0.09577)
Ethnic fractionalization				-0.0515	-0.0504
				(0.0308)	(0.0318)
Share of low WI households					0.0295
					(0.193)
Time dummies	Yes	Yes	Yes	Yes	Yes
Constant	31.72***	31.80***	41.59***	53.20***	51.84***
	(6.599)	(6.497)	(10.28)	(16.57)	(16.88)
Observations	160	158	158	157	157
R-squared	0.281	0.286	0.510	0.662	0.662

Source. Own estimates based on EU-SILC 2005-2012 and macro-level data as shown in Table 2 and Table 3.
*Notes. Clustered standard errors in parentheses. *** p<0.01, ** p<0.05, * p<0.1*

The FE models indicate that the relationship between the deviation of the employment rate from the country specific mean rate (for the period 2004-2011) and the deviation of the at-risk-of-poverty rate for the country concerned is only significant at the 10% level (see Table 9). If the employment rate is 10 percentage point higher than the long-

term country-specific mean, the at-risk-of-poverty rate is expected to be 2 percentage point lower than the long-run country-specific mean rate, controlling for the household income per head. Average household income per capita is not statistically significantly related to the risk of poverty in any of the model specifications, suggesting that increasing income is not necessarily associated with less poverty.

Adding the country level macroeconomic and institutional variables into the third FE model results in an insignificant coefficient of employment. Only some of the institutional variables are significant. The relative size of pensions is positively associated with the risk pf poverty, a 10 percentage point higher pension (relative to the country's mean equivalised disposable household income) than the average pension is correlated with a 0.5 percentage point lower at-risk-of-poverty rate. Higher pensions maybe come at the expense of the income of working-age population, pensions may also raise the median income in the country, leaving a larger proportion of working-age people under the at-risk-of poverty threshold. Moreover, Southern and Eastern European countries that are characterised by higher at-risk-of poverty rates, have higher relative pension levels (see a similar cross-sectional observation in Diris et al. 2014).

The estimated coefficient of the control of corruption is also significant at the 5% level, indicating that a one percentile higher rank in the control of corruption index is associated with a 0.1 percentage point lower at-risk-of rate, *ceteris paribus*. The underlying explanation may be that redistribution and market competition is less distorted by political favouritism, which may reduce risk of poverty. A more efficient governance system may also strengthen the level of trust in government and the willingness to pay taxes, potentially leading to a better functioning welfare system.

A full FE model, which includes both the country level macroeconomic and institutional variables and the indicators of the socio-economic composition of the country also gives mostly insignificant coefficients. Similarly to the previous specifications, the exceptions are the employment rate, the relative size of pensions and the control of corruption, which have relatively stable coefficients across the models. (However, the relationship between pensions and risk of poverty seems to be more sensitive to model modifications; the estimated coefficient is not significant in most cases in a larger sample of 25 Member States, when the tax progressivity variable is excluded.)

The variables indicating socio-economic composition are mostly insignificant in the full FE models (models 4 and 5). A potential reason is that many of the variables may not vary substantially over time, given that the time period is short. There is some heterogeneity across countries in the composition of the society, but it does not vary much over time in most of the countries.

The only significant variables are the proportion of low educated and the share of migrants. The estimated coefficient of the share of low educated is significant at the 10% and 5% levels, and has the sign theory predicts. A 10 percentage point larger proportion of low educated in working-age population is associated with a 0.6-0.7 percentage point higher risk of poverty, on average, *ceteris paribus*. The share of migrants in society is also positively associated with the at-risk-of-poverty rates, a 10 percentage point higher than average share being associated with a 1 percentage point higher at-risk-of-poverty rate.

The share of people living in households with low work intensity is excluded from the variables representing the demographic composition of the society in order to avoid multicollinearity in model (4) (similarly to the pooled OLS regressions), given that the variable is closely related to the employment rate. Accordingly, adding the variable changes the estimated coefficient for the employment rate, which is no longer significant. Instead, the share of households with low work intensity is significant, indicating that the two variables are interchangeable. It seems that over the period of 2004-2011, when employment rates were first unchanged or rising and then fell as a consequence of the crisis, job losses occurred in households that were particularly vulnerable to having a very low work intensity, such as among those living alone or single-earner households.

Table 9. FE regressions of at risk of poverty (AROP) rate, EU20, 2004-2011

Variables	(1) AROP	(2) AROP	(3) AROP	(4) AROP	(5) AROP
Employment rate	-0.198*	-0.220*	-0.146	-0.185*	-0.0483
	(0.114)	(0.115)	(0.102)	(0.0958)	(0.0865)
Household income		0.000122	0.000184	0.000137	8.35e-05
		(0.000147)	(0.000145)	(0.000134)	(0.000123)
Wage coordination			-0.141	-0.182	-0.279
			(0.224)	(0.321)	(0.297)
Labour tax			-0.0619	-0.0652	-0.0396
			(0.0830)	(0.0927)	(0.0935)
Progressivity			-0.00598	-0.0629	-0.0590
			(0.115)	(0.123)	(0.120)
Social transfer			-0.0630	-0.0700	-0.124
			(0.0971)	(0.0913)	(0.0846)
Targeting			0.0426	0.0434	0.0349
			(0.0508)	(0.0467)	(0.0505)
Pension			0.0499**	0.0362*	0.0426**
			(0.0245)	(0.0201)	(0.0186)
Corruption control			-0.0917**	-0.0788**	-0.0722**
			(0.0419)	(0.0335)	(0.0321)
Share of young				0.08967	0.06487
				(0.1022)	(0.1034)
Share of migrants				0.1358*	0.08377
				(0.07609)	(0.06462)
Share of singles				0.06568	0.06826
				(0.05763)	(0.05397)
Share of low educated				0.06343*	0.07310**
				(0.03790)	(0.03582)
Share of big households				-0.08655	-0.03735
				(0.06739)	(0.07321)
Ethnic fractionalization				-0.00257	0.00945
				(0.0379)	(0.0382)
Share of low WI households					0.229*
					(0.122)
Time dummies	Yes	Yes	Yes	Yes	Yes
Country dummies	Yes	Yes	Yes	Yes	Yes
Constant	26.85***	26.51***	25.99**	24.35**	12.83
	(8.036)	(8.095)	(10.49)	(11.35)	(10.23)
Observations	160	158	158	157	157
Number of countries	20	20	20	20	20

Source. Own estimates based on EU-SILC 2005-2012 and macro-level data as shown in Tables 2 and 3.
*Notes. Clustered standard errors in parentheses. *** p<0.01, ** p<0.05, * p<0.1*

Both the pooled OLS and FE models are estimated on a slightly different sample of 25 Members States (leaving out the variable of progressivity of taxes) (see Tables A11 and A15). Based on the sensitivity checks of the pooled OLS models, the negative relationship between the employment and risk of poverty rate seems less robust for the expanded sample – the coefficient is not significant once institutional and compositional characteristics are controlled for. The implicit labour tax is also sensitive to sample specifications and is only significant in model (4). In this case there is no significant relationship between the share of migrants and the risk of poverty. On the other hand, there is an inverse relationship between the share of young and single people in working-age population and the risk of poverty. (The sign of the relationship is opposite to that expected in the case of the share of young people; perhaps because the young tend to be better educated than the older generation.) In the case of the FE models, the employment rate has relatively stable estimated coefficients across different model specifications, being insignificant only when the work intensity of households is included

to capture the employment effects on the risk of poverty. The coefficients of corruption control and the share of the low educated are also relatively stable across the model specifications, whereas those of relative pensions and share of migrants are less so.

The sensitivity of many of the variables to the different model specifications suggests that interpretation should be cautious and the conclusions drawn tentative, especially since the number of observations is relatively small. A longer time span and more countries would enable more reliable estimates to be made.

In sum, the panel regressions suggest that there is a strong, and relatively robust relationship between the employment rate and the at-risk-of-poverty rate, indicated by the pooled OLS regressions and by the FE models (in line with the findings of Corluy and Vandenbroucke 2014, Gábos et al. 2015). The relationship between the share of low educated and the risk of poverty is also significant in the FE specifications. The majority of the macro level variables, however, are not significant or stable across different specifications, also due to the limited capacity of the models. Surprisingly, most of the variables to control for the differences in welfare systems are not statistically significantly related to the at-risk-of-poverty rate, partly explained by the lower variation of the systems across the rather short time frame. The lack of statistical evidence for the relationship between country level variables describing the socio-economic composition of the country (which are created by aggregating poverty risk factors at the individual level) and the at-risk-of-poverty rate may imply that the link between individual circumstances and the risk of poverty is not straight-forward at the macro level. Nevertheless, the role of employment in reducing the risk of poverty is further underlined both at the micro and macro levels.

Concluding remarks

The cross-sectional analysis highlights the importance of labour market attachment (as measured by work intensity) and educational attainment (measured by the education level of the head of the household) in determining the risk of poverty. The relative importance of these factors, however, varies across countries.

An especially large variation across EU countries is found in the risk of poverty of the low educated. The disadvantage attached to a low level of education (or, to put it differently, the premium to higher level education) is much greater in Eastern and Southern countries than in Western parts of Europe. Accordingly, expanding participation in all levels of education and decreasing educational inequality should arguably be accorded a larger weight in policies to reduce the risk of poverty in Eastern and Southern Europe. Also, parallel to the expansion of education, there should be an emphasis on adequately paid, quality job creation that matches the higher levels of attained education.

The analysis indicates that a combined approach taking account of both the micro and the macro level factors to understand the determinants of risk of poverty is appropriate. In particular, the education level is among the strongest determining factors of the risk of poverty at the individual level, whereas there is no statistically significant association between the share of low educated in working-age population and the at-risk-of-poverty rates when macroeconomic and institutional factors are included in pooled OLS models. However, the association is significant in fixed effect models. On the whole, transmission channels between micro and macro level variables are complex. Risk of poverty alleviation policies should rely on analysis of both the individual and the country level effects.

The inverse relationship between employment (work intensity of the household), on the one hand, and the risk of poverty, on the other, is significant at both the micro and macro levels. The panel regressions confirm this, even when other macroeconomic and institutional variables are controlled for. The relationship is significant in both the pooled OLS and fixed effects models. Regardless of which EU Member State are examined, raising employment levels seems a good starting point for social inclusion. Employment, apart from being an income source, is also a building block of social capital supporting social cohesion. The variables included in the panel regressions describing the

institutional setting and the socio-economic composition of countries are mostly insignificant, perhaps because they tend to be relatively stable over time or change only slowly.

The core message of the paper is the importance of expanding employment for reducing the risk of poverty in the Member States, as lack of employment and low household work intensity are clearly among the main causes of being at risk of poverty. For individuals, the way to minimise the risk of poverty seems straight-forward: 'go to school, get a job'. However, when pursuing this seemingly simple remedy, serious obstacles may arise stemming from both individual circumstances and country contexts. There are no clear success stories of countries showing how to protect people at the lower end of the income distribution, either during periods of economic expansion or crisis. Even changes in the employment rate may leave the income distribution unchanged. Rising overall employment might benefit households with relatively high work intensity and similarly, falling employment might hurt households with low work intensity. The distribution of employment across households is key.

Account should, therefore, be taken of how the vulnerable groups in society, (the unemployed or those living in households with low work intensity, the low educated, and migrants) are affected by economic processes and policies. Governments may support them via social transfers or via mitigating sources of vulnerability (e.g. activating the inactive; educating and training the uneducated). Questions concerning costs, benefits and targeting of social policies and job creation are beyond the scope of the present paper. Nevertheless, the paper highlights the importance of expanding employment as a first priority but also of paying careful attention to its distribution across households and to its adequate level of payment, in order to reduce at-risk-of-poverty rates in the EU.

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Appendix

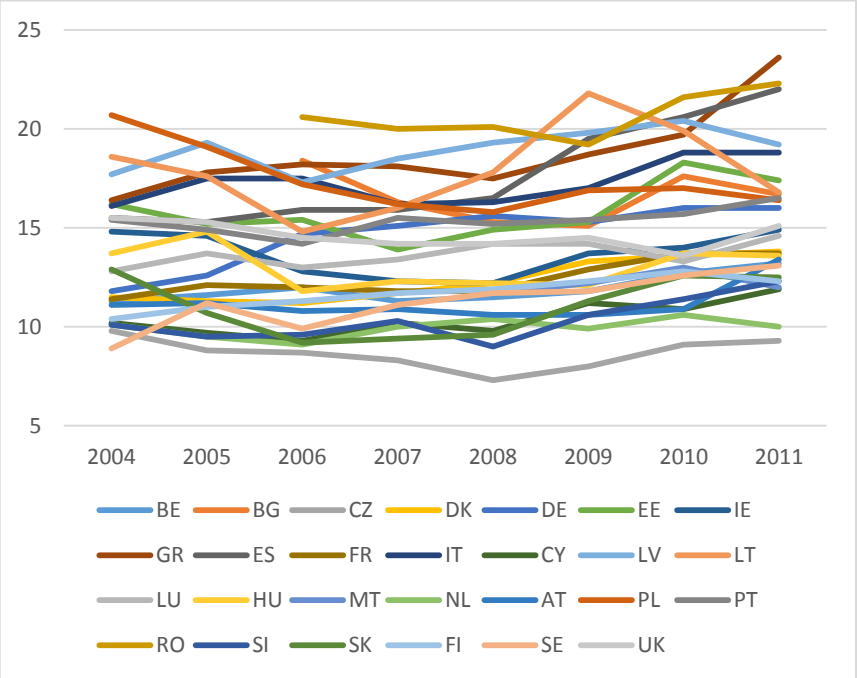
Table A1. At-risk-of-poverty rates among individuals aged 20-59 (AROP rates), EU-27, 2004-2011

	2004	2005	2006	2007	2008	2009	2010	2011
BE	11.3	11.6	12.0	11.3	11.5	11.8	12.7	13.2
	0.89	*0.76*	*0.80*	*0.67*	*0.73*	*0.73*	*0.87*	*0.67*
BG			18.4	16.3	15.3	15.1	17.6	16.7
			1.15	*1.11*	*0.91*	*0.86*	*0.79*	*0.79*
CZ	9.8	8.8	8.7	8.3	7.3	8.0	9.1	9.3
	0.77	*0.53*	*0.51*	*0.49*	*0.45*	*0.44*	*0.49*	*0.52*
DK	11.5	11.3	11.2	11.7	12.2	13.3	13.6	13.8
	0.68	*0.69*	*0.72*	*0.76*	*0.77*	*0.81*	*0.88*	*1.03*
DE	11.8	12.6	14.7	15.1	15.6	15.3	16.0	16.0
	0.40	*0.41*	*0.41*	*0.42*	*0.43*	*0.42*	*0.43*	*0.46*
EE	16.2	15.2	15.4	13.9	14.9	15.3	18.3	17.4
	0.74	*0.65*	*0.67*	*0.64*	*0.70*	*0.72*	*0.79*	*0.72*
IE	14.8	14.6	12.8	12.3	12.2	13.7	14.0	14.9
	0.80	*0.85*	*0.89*	*0.85*	*0.92*	*0.99*	*0.91*	*0.90*
GR	16.4	17.8	18.2	18.1	17.5	18.7	19.7	23.6
	0.77	*0.80*	*0.73*	*0.72*	*0.83*	*0.99*	*0.85*	*1.11*
ES	15.5	15.3	15.9	15.9	16.5	19.5	20.6	22.0
	0.46	*0.48*	*0.49*	*0.54*	*0.55*	*0.59*	*0.66*	*0.63*
FR	11.4	12.1	12.0	11.8	11.8	12.9	13.7	13.7
	0.42	*0.48*	*0.47*	*0.52*	*0.56*	*0.49*	*0.53*	*0.45*
IT	16.1	17.5	17.5	16.2	16.3	17.0	18.8	18.8
	0.52	*0.55*	*0.52*	*0.55*	*0.52*	*0.56*	*0.58*	*0.50*
CY	10.2	9.7	9.3	10.2	9.8	11.2	10.9	11.9
	0.58	*0.58*	*0.59*	*0.69*	*0.74*	*0.74*	*0.72*	*0.64*
LV	17.7	19.3	17.3	18.5	19.3	19.8	20.4	19.2
	0.95	*0.89*	*1.12*	*1.10*	*0.89*	*0.82*	*0.76*	*0.69*
LT	18.6	17.6	14.8	16.0	17.8	21.8	19.9	16.8
	0.79	*0.93*	*0.77*	*0.99*	*0.98*	*1.15*	*1.05*	*0.95*
LU	12.8	13.7	13.0	13.4	14.2	14.2	13.3	14.6
	1.01	*0.95*	*1.03*	*1.10*	*0.97*	*0.88*	*0.85*	*0.86*
HU	13.7	14.8	11.8	12.3	12.2	12.1	13.7	13.6
	0.67	*0.65*	*0.52*	*0.61*	*0.53*	*0.61*	*0.59*	*0.47*
MT					11.7	12.2	13.0	12.0
					0.64	*0.73*	*0.69*	*0.69*
NL	10.1	9.5	9.1	10.0	10.4	9.9	10.6	10.0
	0.61	*0.63*	*0.61*	*1.03*	*0.87*	*0.84*	*0.93*	*0.64*
AT	11.1	11.2	10.8	10.9	10.6	10.6	10.9	13.4
	0.55	*0.59*	*0.55*	*0.65*	*0.58*	*0.58*	*0.61*	*0.67*
PL	20.7	19.1	17.2	16.2	15.8	16.9	17.0	16.4
	0.48	*0.49*	*0.46*	*0.50*	*0.47*	*0.52*	*0.51*	*0.50*
PT	15.4	14.9	14.2	15.5	15.2	15.4	15.7	16.5

	2004	2005	2006	2007	2008	2009	2010	2011
	0.87	*0.86*	*0.90*	*0.94*	*0.93*	*0.99*	*0.90*	*0.70*
RO			20.6	20.0	20.1	19.2	21.6	22.3
			1.06	*1.10*	*1.19*	*1.13*	*1.19*	*0.84*
SI	10.1	9.5	9.6	10.3	9.0	10.6	11.4	12.3
	0.45	*0.35*	*0.41*	*0.42*	*0.39*	*0.45*	*0.46*	*0.47*
SK	12.9	10.7	9.2	9.4	9.6	11.3	12.6	12.5
	0.56	*0.52*	*0.48*	*0.47*	*0.49*	*0.57*	*0.63*	*0.63*
FI	10.4	11.0	11.3	11.7	11.9	12.3	12.8	12.3
	0.39	*0.42*	*0.45*	*0.47*	*0.47*	*0.48*	*0.52*	*0.49*
SE	8.9	11.2	9.9	11.1	11.7	11.8	12.6	13.1
	0.43	*0.52*	*0.44*	*0.46*	*0.51*	*0.48*	*0.52*	*0.53*
UK	15.5	15.3	14.5	14.2	14.2	14.5	13.6	15.1
	0.60	*0.54*	*0.56*	*0.60*	*0.69*	*0.70*	*0.67*	*0.58*

Source. EU-SILC 2005-2012, most recent wave is 2012-2, released 01-08-2014. Data for 2012 are subject to revisions in subsequent releases. Versions of waves 2005 to 2011 are as follows: 2005-5, 2006-4, 2007-6, 2008-5, 2009-5, 2010-4, 2011-4. Data for Malta are missing for 2005-2008 and observations for Romania and Bulgaria are missing for 2005 and 2006.
Notes. Standard errors are shown in italics.

Figure A1. At-risk-of-poverty rates, EU27, 2004-2011



Source. Own estimates based on EU-SILC 2005-2012.
Notes. The figure illustrates the at-risk-of-poverty rate (%) of the working-age population (ages 20-59) across the EU27, 2004-2011, based on EU-SILC 2005-2012. Please see Appendix Table 1 for exact data points.

Table A2. Descriptive statistics of macro variables, EU-27, 2004-2011

	Employment rate		Household income per head		Wage coordination		Labour tax		Progressivity	
Country	Av.	St.d.	Av.	St.d.	Av.	St.d.	Av.	St.d.	Av.	St.d.
BE	67.04	0.79	21099.88	1178.25	5.00	0.00	42.78	0.61	11.12	0.53
BG	65.41	3.69	6685.75	1023.90	2.29	0.76	28.74	4.34		
CZ	71.08	0.78	13508.50	895.80	2.00	0.00	40.07	1.58	5.41	0.86
DK	77.84	1.52	18871.50	1442.76	4.00	0.00	36.01	1.33	9.94	1.25
DE	72.73	2.72	22640.50	1498.63	4.00	0.00	37.82	0.46	7.14	1.03
EE	72.45	3.77	10305.63	1408.03	1.63	0.52	34.79	1.16	2.76	0.42
IE	69.85	4.09	19340.50	934.09	3.63	0.52	25.75	1.11	18.02	1.08
GR	64.38	2.14	17976.67	994.37	2.75	1.39	32.20	1.27	10.74	1.48
ES	66.11	2.97	18103.75	614.38	3.88	0.35	32.52	0.68	6.60	0.57
FR	69.56	0.38	21579.25	1150.47	2.00	0.00	38.86	0.38	6.80	0.23
IT	61.84	0.74	20384.38	986.61	3.00	0.00	42.10	0.74	8.44	0.20
CY	75.26	1.11	18559.50	1684.56	2.00	0.00	24.92	1.53		
LV	69.75	4.29	9926.13	1280.17	1.00	0.00	32.25	2.64		
LT	69.28	2.95	11401.38	1318.81	1.00	0.00	33.25	1.58		
LU	69.43	0.98			2.50	0.93	31.02	1.04	13.52	0.44
HU	61.39	1.09	11327.88	604.86	2.00	0.00	39.46	1.53	11.56	2.48
MT	58.96	1.37			2.00	0.00	21.94	0.60		
NL	76.95	1.51	22138.00	1128.89	3.50	0.53	35.26	2.11	6.57	3.36
AT	72.45	1.76	23208.88	1196.74	4.00	0.00	40.83	0.31	7.67	0.27
PL	62.14	3.13	10567.63	1554.02	1.00	0.00	32.60	1.71	2.00	0.29
PT	71.64	1.46	15514.50	972.00	2.38	0.52	23.53	1.01	10.64	0.74
RO	64.10	0.56	7257.13	1412.71	2.57	0.98	29.56	1.73		
SI	71.13	1.44	15264.63	887.57	3.75	0.46	36.20	1.12	8.93	1.08
SK	65.78	1.67	11806.00	1909.59	1.88	0.64	32.11	1.25	5.14	0.38
FI	73.75	1.13	19547.25	1908.13	4.00	1.07	40.73	1.05	11.10	0.21
SE	78.83	1.06	20194.88	1542.31	4.00	0.00	41.24	1.96	9.33	1.07
UK	74.59	0.80	22085.63	666.30	1.00	0.00	25.66	0.51	7.67	0.77

Source. Own estimations based on Eurostat, EU-SILC 2005-2012, OECD, Visser, 2015, World Bank. For the definition, unit of measurement and source of each variable see Table 2.

Table A2 (cont'd). Descriptive statistics of macro variables, EU-27, 2004-2011

	Social transfer		Targeting		Pension		Corruption control	
Country	Av.	St.d.	Av.	St.d.	Av.	St.d.	Av.	St.d.
BE	23.09	0.74	43.83	1.81	86.88	2.86	88.88	2.56
BG	12.70	1.53	28.83	6.12	68.84	4.87	53.36	3.52
CZ	19.81	1.29	37.80	1.37	83.98	2.00	66.33	2.00
DK	18.62	1.89	44.09	1.84	78.81	10.29	99.76	0.37
DE	19.47	0.96	41.51	1.83	104.47	6.06	92.94	0.44
EE	13.08	2.06	26.51	1.11	73.35	4.53	79.55	0.89
IE	19.62	3.89	39.23	3.26	81.36	9.97	92.09	1.76
GR	14.53	2.83	34.26	2.38	100.46	8.60	62.58	6.07
ES	21.33	2.36	38.43	2.01	93.82	5.07	83.67	3.46
FR	16.40	2.54	38.29	2.41	97.51	8.37	90.53	0.93
IT	10.17	0.57	24.16	2.57	94.52	2.00	64.92	4.39
CY	10.40	1.48	23.74	2.38	87.90	8.87	81.43	2.31
LV	12.95	2.85	23.33	3.37	66.98	12.22	62.95	1.85
LT	16.54	1.99	31.93	2.90	77.55	5.74	62.02	2.95
LU	18.26	0.87	36.39	1.35	101.98	4.61	94.92	1.50
HU	21.53	1.23	35.47	0.96	100.10	3.11	70.34	3.81
MT	8.48	1.33	45.46	1.44	80.09	2.98	79.87	2.75
NL	12.66	0.51	42.61	1.59	78.34	7.90	96.67	0.83
AT	17.43	0.76	31.38	1.46	97.47	2.29	94.17	2.37
PL	17.53	1.22	40.91	0.87	100.18	5.39	65.01	5.00
PT	13.95	1.48	40.13	4.96	99.09	8.84	81.77	1.53
RO	12.83	1.33	37.03	1.51	103.39	12.78	52.50	2.41
SI	17.46	0.99	31.28	1.21	82.97	1.52	80.52	1.73
SK	11.97	1.26	36.45	2.22	89.19	3.22	67.01	2.25
FI	17.70	0.60	35.93	0.79	74.21	3.46	99.28	0.72
SE	20.81	1.65	34.96	1.18	87.19	13.49	98.06	0.75
UK	20.02	1.52	53.06	0.62	76.19	3.54	92.77	1.35

Source. Own estimations based on Eurostat, EU-SILC 2005-2012, OECD, Visser, 2015, World Bank. For the definition, unit of measurement and source of each variable see Table 2.

Table A3. Estimated share of individuals aged 20-59 who are low educated, and who live in a household with very low WI, EU-27, 2011

Country	Share of individuals living in low WI households (%)	Share of low educated (%)
BE	13.9	21.6
BG	12.5	18.1
CZ	6.8	7.0
DK	11.3	16.1
DE	9.9	13.3
EE	9.1	10.4
IE	23.4	21.4
GR	14.2	24.0
ES	14.3	39.8
FR	8.4	16.7
IT	10.3	36.6
CY	6.5	20.8
LV	11.7	13.9
LT	11.4	9.7
LU	6.1	32.1
HU	12.8	15.9
MT	9.0	59.4
NL	8.9	20.1
AT	7.7	14.6
PL	6.9	8.6
PT	10.1	56.2
RO	7.4	19.5
SI	7.5	15.0
SK	7.2	5.9
FI	9.3	11.2
SE	5.7	8.7
UK	13.0	9.5

Source. The share of low educated (among the people aged 20-59) are own estimates based on EU-SILC 2012, most recent wave is 2012-2, released 01-08-2014. The source of the share of individuals (aged 20-59) in the country living in a household with very low work intensity (WI<=0.2) is Eurostat.

Table A4. Cross-sectional regressions with micro level explanatory variables, EU27, 2011 – individual as a unit of observation

	LPM	Probit
Variables	arop	arop
Low WI	-0.158***	-0.414***
	(0.0306)	(0.0765)
Medium WI	-0.339***	-0.956***
	(0.0279)	(0.0639)
Medium high WI	-0.437***	-1.417***
	(0.0275)	(0.0787)
High WI	-0.460***	-1.657***
	(0.0245)	(0.0597)
Medium education	-0.0795***	-0.303***
	(0.0146)	(0.0546)
High education	-0.118***	-0.552***
	(0.0139)	(0.0593)
Age	0.0515***	0.299***
	(0.0146)	(0.0837)
Female	0.0971***	0.443***
	(0.0198)	(0.0644)
Single	0.0401***	0.183***
	(0.00773)	(0.0310)
Migrant	-0.00116***	-0.00425***
	(0.000329)	(0.00162)
Dependent members	-0.000875	-0.00448
	(0.00364)	(0.0203)
Urbanization	0.0141	0.0805*
	(0.00904)	(0.0437)
Health	0.00765*	0.0407***
	(0.00388)	(0.0156)
Time dummies	Yes	Yes
Constant	0.501***	-0.320***
	(0.0190)	(0.0543)
Observations	238,844	238,844
R-squared	0.235	

Source. Own estimates based on EU-SILC 2012.
*Notes. Clustered standard errors in parentheses. *** p<0.01, ** p<0.05, * p<0.1. Probit models present coefficients, not marginal effects.*

Table A5. Collinearity diagnostics of cross-sectional regressions with micro level explanatory variables, EU27, 2011

Variable	VIF	SQRT VIF	Tolerance	R-Squared	Eigenval	Condition Index
Low WI	1.42	1.19	0.7034	0.2966	6.5305	1
Medium WI	2.04	1.43	0.4903	0.5097	1.346	2.2027
Medium high WI	2.11	1.45	0.4734	0.5266	1.0515	2.4921
High WI	2.75	1.66	0.3632	0.6368	1.0064	2.5474
Medium education	1.72	1.31	0.5806	0.4194	0.9967	2.5597
High education	1.81	1.35	0.5515	0.4485	0.8716	2.7372
Age	1.2	1.1	0.8323	0.1677	0.8162	2.8287
Female	1.44	1.2	0.6957	0.3043	0.5233	3.5326
Single	1.7	1.31	0.5871	0.4129	0.2867	4.7724
Migrant	1.02	1.01	0.9788	0.0212	0.227	5.364
Dependent members	1.21	1.1	0.8243	0.1757	0.1484	6.6328
Urbanization	1.05	1.02	0.9536	0.0464	0.1273	7.1625
Health	1.22	1.1	0.8203	0.1797	0.0529	11.1061
Mean VIF	1.59					
Condition number	20.6284					

Source. Own estimates based on EU-SILC 2012.

Table A6. Collinearity diagnostics of cross-sectional regressions with micro level explanatory variables, EU27, 2011

Variable	VIF	SQRT VIF	Tolerance	R-Squared	Eigenval	Condition Index
Low WI	1.43	1.2	0.6984	0.3016	3.7277	1
Medium WI	2.03	1.43	0.4915	0.5085	1.1419	1.8068
Medium high WI	2.21	1.49	0.4515	0.5485	1.0336	1.8991
High WI	2.75	1.66	0.3631	0.6369	1.0015	1.9293
Medium education	1.78	1.33	0.5625	0.4375	0.9937	1.9369
High education	1.81	1.35	0.551	0.449	0.8382	2.1088
Single	1.23	1.11	0.8119	0.1881	0.7146	2.2839
Migrant	1.01	1	0.9913	0.0087	0.3556	3.2379
Dependent members	1.14	1.07	0.8739	0.1261	0.1445	5.0784
Mean VIF	1.71					
Condition number	8.7569					

Source. Own estimates based on EU-SILC 2012.

Table A7. Estimated proportions of individuals (aged 20-59) with primary, medium and high education among the individuals who are at risk of poverty, EU-27, 2011

Country	Share of individuals with primary education among people at risk of poverty	Share of individuals with medium education among people at risk of poverty	Share of individuals with high education among people at risk of poverty
BE	0.48	0.27	0.24
BG	0.46	0.47	0.08
CZ	0.20	0.75	0.06
DK	0.22	0.41	0.37
DE	0.18	0.52	0.30
EE	0.20	0.61	0.19
IE	0.37	0.25	0.37
GR	0.44	0.37	0.19
ES	0.59	0.22	0.19
FR	0.29	0.52	0.20
IT	0.57	0.33	0.10
CY	0.41	0.43	0.16
LV	0.29	0.53	0.18
LT	0.22	0.46	0.32
LU	0.53	0.32	0.15
HU	0.45	0.47	0.07
MT	0.88	0.05	0.07
NL	0.25	0.37	0.38
AT	0.22	0.54	0.23
PL	0.20	0.67	0.14
PT	0.77	0.10	0.13
RO	0.41	0.47	0.12
SI	0.27	0.64	0.08
SK	0.17	0.74	0.10
FI	0.23	0.57	0.20
SE	0.16	0.45	0.39
UK	0.18	0.47	0.35
Average	0.36	0.44	0.20
St dev	0.19	0.17	0.11

Source. Own estimates based on EU-SILC 2012, most recent wave is 2012-2, released 01-08-2014.

Table A8. Collinearity diagnostics of panel regressions with macro level explanatory variables, EU27, 2004-2011

Variable	VIF	SQRT VIF	Tolerance	R-Squared	Eigenval	Condition Index
Employment rate	3.17	1.78	0.3159	0.6841	9.608	1
Household income	2.48	1.57	0.4035	0.5965	0.1583	7.7916
Wage coordination	1.97	1.41	0.5064	0.4936	0.096	10.0055
Labour tax	1.85	1.36	0.5393	0.4607	0.0469	14.3112
Progressivity	1.64	1.28	0.6111	0.3889	0.0385	15.7885
Social transfer	2	1.41	0.4996	0.5004	0.0213	21.2564
Targeting	2.17	1.47	0.4616	0.5384	0.019	22.4804
Pension	1.69	1.3	0.5902	0.4098	0.0082	34.2647
Corruption control	4.34	2.08	0.2305	0.7695	0.003	56.3885
Mean VIF	2.37					
Condition number	106.0997					

Source. Own estimates based on EU-SILC 2005-2012 and macro-level data as shown in Table 2.

Table A9. Collinearity diagnostics of panel regressions with macro level explanatory variables, EU27, 2004-2011

Variable	VIF	SQRT VIF	Tolerance	R-Squared	Eigenval	Condition Index
Employment rate	9.46	3.08	0.1058	0.8942	17.0982	1
Household income	7.40	2.72	0.1351	0.8649	0.4886	5.9159
Wage coordination	3.91	1.98	0.2558	0.7442	0.4052	6.4956
Labour tax	6.30	2.51	0.1586	0.8414	0.3051	7.4856
Progressivity	4.47	2.12	0.2235	0.7765	0.2207	8.8027
Social transfer	4.97	2.23	0.2012	0.7988	0.1386	11.1051
Targeting	6.85	2.62	0.1459	0.8541	0.1115	12.3821
Pension	2.93	1.71	0.3410	0.659	0.0795	14.6699
Corruption control	7.07	2.66	0.1415	0.8585	0.0494	18.6068
Share of low WI households	6.79	2.61	0.1472	0.8528	0.0364	21.6746
Share of young	5.32	2.31	0.1880	0.812	0.024	26.7096
Share of migrants	5.00	2.24	0.1998	0.8002	0.0189	30.0863
Share of singles	2.36	1.54	0.4241	0.5759	0.0074	48.1818
Share of low educated	4.46	2.11	0.2241	0.7759	0.0062	52.3226
Dependency	9.65	3.11	0.1037	0.8963	0.004	65.0821
Share of big households	6.00	2.45	0.1666	0.8334	0.0031	73.6856
Urbanization	5.87	2.42	0.1702	0.8298	0.0022	89.0473
Ethnic fractionalization	5.03	2.24	0.1989	0.8011	0.0008	150.4329
Mean VIF	5.77					
Condition number	285.5453					

Source. Own estimates based on EU-SILC 2005-2012 and macro-level data as shown in Table 2 and Table 3.

Table A10. Collinearity diagnostics of panel regressions with macro level explanatory variables, EU27, 2004-2011

Variable	VIF	SQRT VIF	Tolerance	R-Squared	Eigenval	Condition Index
Employment rate	5.48	2.34	0.1824	0.8176	15.2899	1
Household income	6.67	2.58	0.1498	0.8502	0.4771	5.661
Wage coordination	3.82	1.95	0.2618	0.7382	0.4031	6.159
Labour tax	4.18	2.05	0.239	0.761	0.2909	7.2503
Progressivity	2.87	1.69	0.3489	0.6511	0.1528	10.0045
Social transfer	4.27	2.07	0.234	0.766	0.1128	11.6429
Targeting	6.64	2.58	0.1507	0.8493	0.1101	11.7827
Pension	2.49	1.58	0.4014	0.5986	0.0655	15.2733
Corruption control	5.51	2.35	0.1814	0.8186	0.0357	20.6871
Share of young	4.24	2.06	0.2357	0.7643	0.0286	23.1176
Share of migrants	4.34	2.08	0.2302	0.7698	0.0141	32.9284
Share of singles	2.27	1.51	0.4414	0.5586	0.0074	45.3853
Share of low educated	3.16	1.78	0.3163	0.6837	0.0049	55.6378
Share of big households	3.15	1.77	0.3175	0.6825	0.0034	66.9539
Urbanization	4.83	2.2	0.2072	0.7928	0.0022	83.2154
Ethnic fractionalization	4.36	2.09	0.2296	0.7704	0.001	126.2025
Mean VIF	4.27					
Condition number	187.9459					

Source. Own estimates based on EU-SILC 2005-2012 and macro-level data as shown in Table 2 and Table 3.

Table A11. Pooled OLS regressions of at risk of poverty (AROP) rate, EU25, 2004-2011

Variables	(1) AROP	(2) AROP	(3) AROP	(4) AROP	(5) AROP
Employment rate	-0.329***	-0.256**	-0.226	-0.278	-0.178
	(0.0886)	(0.101)	(0.187)	(0.180)	(0.217)
Household income		-0.000159	3.86e-05	-0.000228	-0.000205
		(0.000115)	(0.000169)	(0.000162)	(0.000162)
Wage coordination			-0.00724	-0.448	-0.513
			(0.343)	(0.381)	(0.406)
Labour tax			-0.161	-0.203**	-0.176
			(0.101)	(0.0917)	(0.103)
Social transfer			0.0127	-0.108	-0.134
			(0.193)	(0.170)	(0.172)
Targeting			-0.00800	0.0169	-0.00104
			(0.0938)	(0.0647)	(0.0647)
Pension			-0.00383	0.0156	0.0345
			(0.0382)	(0.0300)	(0.0320)
Corruption control			-0.0646	-0.00232	-0.0150
			(0.0944)	(0.0840)	(0.0880)
Share of young				-0.3752*	-0.3407*
				(0.1839)	(0.1736)
Share of migrants				0.1228	0.08730
				(0.08824)	(0.09049)
Share of singles				0.05028**	0.04739*
				(0.02381)	(0.02429)
Share of low educated				0.01209	0.01903
				(0.03632)	(0.03730)
Share of big households				-0.1470**	-0.1341*
				(0.07107)	(0.07732)
Ethnic fractionalization				0.0350	0.0416
				(0.0296)	(0.0314)
Share of low WI households					0.160
					(0.174)
Time dummies	Yes	Yes	Yes	Yes	Yes
Constant	36.28***	33.55***	39.94***	52.90***	42.87**
	(6.205)	(6.523)	(12.50)	(14.46)	(17.71)
Observations	196	194	192	191	191
R-squared	0.293	0.332	0.410	0.590	0.597

Source. Own estimates based on EU-SILC 2005-2012 and macro-level data as shown in Table 2 and Table 3.
*Notes. Clustered standard errors in parentheses. *** p<0.01, ** p<0.05, * p<0.1*

Table A12. Cross-sectional regressions with micro level explanatory variables, including a dummy variable set to 1 if the household receives pension (old age benefit), EU27, 2011

	LPM	Probit
Variables	AROP	AROP
Pension	-0.197***	-0.848***
	(0.0218)	(0.0870)
Low WI	-0.126***	-0.288***
	(0.0338)	(0.0807)
Medium WI	-0.335***	-0.893***
	(0.0328)	(0.0705)
Medium high WI	-0.426***	-1.298***
	(0.0327)	(0.0860)
High WI	-0.484***	-1.697***
	(0.0331)	(0.0872)
Medium education	-0.0664***	-0.259***
	(0.0132)	(0.0519)
High education	-0.111***	-0.527***
	(0.0146)	(0.0643)
Single	0.0891***	0.488***
	(0.0167)	(0.0984)
Migrant	0.0878***	0.394***
	(0.0198)	(0.0690)
Dependent members	0.0364***	0.168***
	(0.00878)	(0.0386)
Country fixed effects	Yes	Yes
Constant	0.492***	-0.322***
	(0.0282)	(0.0403)
Observations	140,358	140,358
R-squared	0.258	

Source. Own estimates based on EU-SILC 2012.
*Notes. Clustered standard errors in parentheses. *** p<0.01, ** p<0.05, * p<0.1. Probit models present coefficients, not marginal effects.*

Table A13. Wooldridge test , EU20, 2004-2011

Number of obs = 137
F(15, 19) = 22.05
Prob > F = 0.0000
R-squared = 0.3612
Root MSE = .86561

D.AROP	Coeff.	Robust st. error	t	P>t	95% Confidence interval	
Employment rate D1	-.2672818	.0638748	4.18	0.001	-.4009734	-.1335903
Household income D1	.0001287	.0001161	1.11	0.281	-.0001142	.0003716
Wage coordination D1	-.1338541	.1734864	0.77	0.450	-.4969652	.229257
Labour tax D1	-.0053907	.0848916	0.06	0.950	-.1830708	.1722894
Progressivity	-.0933187	.0669621	1.39	0.180	-.2334719	.0468345
Social transfer	-.17161	.1125192	1.53	0.144	-.4071155	.0638954
Targeting	.0317195	.0580684	0.55	0.591	-.089819	.153258
Pension	.0360309	.0242814	1.48	0.154	-.0147905	.0868524
Corruption control	-.0646024	.0355168	1.82	0.085	-.1389399	.0097351
Share of young	.0965195	.0714248	1.35	0.192	-.0529744	.2460134
Share of migrants	.1142706	.0732121	1.56	0.135	-.0389642	.2675053
Share of singles	-.0159886	.0619485	0.26	0.799	-.1456484	.1136712
Share of low educated	.0182817	.0398647	0.46	0.652	-.0651561	.1017194
Share of big households	-.1358913	.0455735	2.98	0.008	-.2312777	-.0405049
Ethnic fractionalization				omitted		
Share of low WI households	.1483602	.1234601	1.20	0.244	-.1100448	.4067652

Wooldridge test for autocorrelation in panel data
H0: no first-order autocorrelation
F(1, 19) = 9.526
Prob > F = 0.0061

Source. Own estimates based on EU-SILC 2005-2012 and macro-level data as shown in Table 2 and Table 3.
Notes. Clustered standard errors are estimated.

Table A14. Pooled OLS regressions of at risk of poverty (AROP) rate with a lagged dependent variable, EU20, 2004-2011

	(1)	(2)
Variables	AROP	AROP
L.arop	0.862***	0.703***
	(0.0369)	(0.147)
L2.arop		0.131
		(0.138)
Employment rate	-0.125***	-0.135**
	(0.0406)	(0.0600)
Household income	-5.34e-05	-3.99e-05
	(3.86e-05)	(5.59e-05)
Wage coordination	0.218**	0.244**
	(0.101)	(0.0948)
Labour tax	-0.0592***	-0.0929***
	(0.0181)	(0.0278)
Progressivity	-0.0556	-0.102**
	(0.0391)	(0.0395)
Social transfer	-0.000846	-0.0133
	(0.0382)	(0.0405)
Targeting	-0.00110	-0.0175
	(0.0205)	(0.0245)
Pension	-0.00147	0.00939
	(0.00488)	(0.00778)
Corruption control	0.0155	0.0270
	(0.0172)	(0.0198)
Share of young	-0.0149	-0.0310
	(0.0596)	(0.0556)
Share of migrants	0.0473*	0.0256
	(0.0250)	(0.0328)
Share of singles	-0.0182	-0.0257
	(0.0280)	(0.0266)
Share of low educated	-0.000367	-0.00277
	(0.00733)	(0.00722)
Share of big households	-0.0896***	-0.101***
	(0.0227)	(0.0271)
Ethnic fractionalization	-0.00769	0.00187
	(0.00770)	(0.00732)
Share of low WI households	-0.0144	0.00937
	(0.0395)	(0.0343)
Time dummies	Yes	Yes
Constant	14.33***	16.13**
	(3.621)	(6.012)
Observations	139	120
R-squared	0.937	0.946

Source. Own estimates based on EU-SILC 2005-2012 and macro-level data as shown in Table 2 and Table 3.
*Notes. Clustered standard errors in parentheses. *** p<0.01, ** p<0.05, * p<0.1*

Table A15. FE regressions of at risk of poverty (AROP) rate, EU25, 2004-2011

Variables	(1) AROP	(2) AROP	(3) AROP	(4) AROP	(5) AROP
Employment rate	-0.198**	-0.184**	-0.174*	-0.211**	-0.0143
	(0.0887)	(0.0905)	(0.0925)	(0.0928)	(0.0894)
Household income		-6.05e-05	7.55e-05	9.15e-05	5.22e-05
		(0.000119)	(0.000131)	(0.000145)	(0.000136)
Wage coordination			-0.0582	-0.0389	-0.212
			(0.180)	(0.242)	(0.234)
Labour tax			-0.0941	-0.114	-0.0784
			(0.0742)	(0.0857)	(0.0818)
Social transfer			-0.0732	-0.0715	-0.137*
			(0.0965)	(0.0946)	(0.0803)
Targeting			0.0506	0.0504	0.0285
			(0.0468)	(0.0384)	(0.0384)
Pension			0.0381	0.0303	0.0384*
			(0.0252)	(0.0219)	(0.0209)
Corruption control			-0.0806**	-0.0752**	-0.0766***
			(0.0406)	(0.0340)	(0.0297)
Share of young				0.1112	0.09333
				(0.09354)	(0.09294)
Share of migrants				0.1140*	0.05797
				(0.06877)	(0.06238)
Share of singles				0.00860	0.00838
				(0.00670)	(0.00676)
Share of low educated				0.07682*	0.08305**
				(0.03929)	(0.03880)
Share of big households				-0.03908	-0.000282
				(0.04893)	(0.05487)
Ethnic fractionalization				0.0633	0.0650
				(0.0457)	(0.0413)
Share of low WI households					0.298***
					(0.107)
Time dummies	Yes	Yes	Yes	Yes	Yes
Country dummies	Yes	Yes	Yes	Yes	Yes
Constant	27.51***	27.51***	30.82***	27.20***	12.06
	(6.264)	(6.237)	(8.043)	(9.365)	(8.250)
Observations	196	194	192	191	191
Number of countries	25	25	25	25	25

Source. Own estimates based on EU-SILC 2005-2012 and macro-level data as shown in Table 2 and Table 3.
*Notes. Clustered standard errors in parentheses. *** p<0.01, ** p<0.05, * p<0.1*