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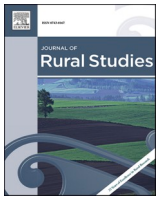

Are rural households poorer than non-rural households in Europe?

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ABSTRACT

A significant amount of political support is directed towards promoting the development of rural areas in Europe. One reason is that rural households are perceived as having a lower income than non-rural ones. However, empirical evidence on the income differential between rural and non-rural areas in Europe is hard to find and incomplete. The present study aims to fill this gap by answering the following research questions: is there an income gap between rural and non-rural households in Europe? If so, what is its magnitude, and does this gap vary based on the country's income level? Does the inclusion of non-monetary sources of income contribute to mitigating the extent of this gap?

The empirical analysis relies on the EU Statistics on Income and Living Conditions (EU-SILC) database, a survey that combines registered sources and direct interviews, providing a wide range of monetary and non-monetary variables. The analysis contributes to the literature, providing evidence that rural households have a lower income than non-rural ones. Furthermore, it reveals that this gap declines when the level of the country's income increases and that the inclusion of non-monetary components of income appears to play a role in reducing the extent of this gap.

1. Introduction

European countries allocate significant public resources to support the development of rural areas, primarily through the EU Rural Development Policies. One of the main reasons to do so is that households in rural areas face disadvantages compared to their non-rural counterparts (Shucksmith et al., 2006). Rural areas often experience less development, characterised by lower income levels and more pronounced challenges in employment, education, and administration compared to non-rural ones (Bock et al., 2015; Shucksmith et al., 2006, 2009; Sørensen, 2014). The existence of this income gap is particularly relevant from a policy perspective, as rural areas and small towns tend to exhibit greater Euroscepticism than larger cities (Dijkstra et al., 2020). Furthermore, low-income individuals are more likely to hold Eurosceptic views and vote accordingly compared to those with higher incomes (Antonucci et al., 2017; Becker et al., 2017; Dijkstra et al., 2020).

While the issue of the income gap between rural and non-rural areas holds significant policy relevance, empirical evidence remains limited and inconsistent. Some studies have identified the existence of an income gap. Yet, the magnitude of this disparity varies considerably depending on the country under consideration, the methodology employed in the analysis, and the data used (Alexandri et al., 2015; Bock et al., 2015; Chivu et al., 2015; Grzega, 2019; Rodríguez-Pose and Tselios, 2009; Schnorr-Baecker, 2021; Shucksmith et al., 2006, 2009; Sloka et al., 2019; Stanef, 2012). Moreover, the extent of this gap appears to diminish when the country's average income increases (Shucksmith et al., 2006). Finally, it is important to acknowledge that these analyses often encompass a limited number of countries, thereby restricting the scope for cross-country comparisons.

This paper provides an assessment of the existence of the income gap between rural and non-rural households across 25 European countries, using a unified harmonized database spanning the years 2016–2019. The study contributes to previous analyses by answering the following questions. Firstly, it investigates the presence of an income gap between rural and non-rural households within the selected European countries. Secondly, it seeks to quantify its magnitude. The analysis employs two definitions of income: monetary disposable income and extended income. The latter adds to the former two non-monetary income components: imputed rent income and the in-kind income derived from the self-consumption of produced goods. Comparing the results of the

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Table 1
Sample size by country (2016–2019).

Code	Country	Non-rural households	Rural households	Total households	% Rural households
AT	Austria	8,973	5,442	14,415	38%
BE	Belgium	15,869	2,878	18,747	15%
BG	Bulgaria	13,899	7,838	21,737	36%
CH	Swiss	12,832	2,923	15,755	19%
CY	Cyprus	7,698	2,044	9,742	21%
CZ	Czech Republic	13,133	7,274	20,407	36%
DK	Denmark	6,220	3,683	9,903	37%
EE	Estonia	7,580	6,671	14,251	47%
EL	Greece	30,985	24,090	55,075	44%
ES	Spain	18,239	7,816	26,055	30%
FI	Finland	14,990	7,622	22,612	34%
FR	France	22,864	14,038	36,902	38%
HR	Croatia	11,175	8,332	19,507	43%
HU	Hungary	10,866	6,939	17,805	39%
IE	Ireland	4,883	4,375	9,258	47%
IT	Italy	43,125	11,968	55,093	22%
LT	Lithuania	4,971	6,452	11,423	56%
LU	Luxemburg	5,864	4,196	10,060	42%
LV	Latvia	7,973	5,113	13,086	39%
NO	Norway	9,530	4,132	13,662	30%
PL	Poland	19,090	13,878	32,968	42%
PT	Portugal	20,113	10,953	31,066	35%
RO	Romania	9,204	7,054	16,258	43%
RS	Serbia	6,720	4,936	11,656	42%
SE	Sweden	9,937	2,498	12,435	20%
TOT	Total	336,733	183,145	519,878	35%

Source: Own elaborations on EUROSTAT EU-SILC microdata.

analysis of these two definitions of income gives the opportunity to answer a third question: can non-monetary sources of income mitigate the income gap between rural and non-rural households? Finally, the research investigates whether the magnitude of the income gap changes according to the country's economic development level (i.e., its average pro-capita income level).

Relying on the EU Statistics on Income and Living Conditions (EU-SILC), this article investigates the income gap first through a descriptive analysis, focusing on the differences in average incomes between the two groups in each country. As mentioned above, both disposable income and an extended version of it, including two sources of non-monetary income (imputed rent and the value of goods produced for own consumption[1]), are employed in this first descriptive analysis. The paper also analyses the differences between the two groups, controlling for a set of variables related to household characteristics that could potentially influence income levels. We analyse these differences at the country level and also by comparing three distinct groups of countries, which are categorised according to their average national economic development. The latter analysis aims to evaluate whether the extent of the income gap varies according to the economic development of the countries.

The novelty of this paper lies in the analysis of the income differential between rural and non-rural households across 25 European countries, using two distinct income definitions: one monetary and one extended.

The paper is structured as follows: the next section provides a background by exploring the existing literature on the topic. Section 3 presents the data and the research methodology. Session 4 shows the results, while section 5 concludes with a general discussion on the insights gleaned from the analysis, its limitations, and possible future developments of research.

[1] The definitions of the two considered non-monetary sources of income are reported in Appendix (Box A.1).

2. Background & literature review

As previously stated, this paper focuses only on the economic dimension of well-being, with a specific emphasis on individual household income. Income is a crucial component of both individual and societal well-being because its level constrains people's consumption possibilities (OECD, 2011a). It also confers a range of non-economic benefits, such as improved health status and education, enhanced life satisfaction, and the opportunity to reside in safer, cleaner environments (OECD, 2011b, 2011a, 2013).

Examining national averages can sometimes lead to inaccurate or distorted conclusions because they often mask significant inequalities among different population groups. For this reason, the distribution of income should be analysed in different ways, including among different subpopulations (OECD, 2020a). This paper focuses on the difference between households living in rural and non-rural areas. The definitions of "rural" and "rurality" have been subjects of considerable academic and policy debate for almost 60 years (Mantino, 2021). This difficulty is partly due to the concept of "rural," which is notoriously challenging to define, given that the precise boundary between rural and urban has been open to interpretation and controversy (Woods and Heley, 2017). Given the complexity of the topic, six approaches have been identified in the literature to define the criteria of rural classification: the administrative, the morphological (population density), the locational, the functional, the landscape, and the combined approaches (combination of at least two of the other methodologies) (Féret et al., 2020; Mantino, 2021). Moreover, it is important to acknowledge that rural areas can be situated within a Functional Urban Area (FUA), outside in close proximity to a FUA, or in a remote location (OECD, 2020b). Furthermore, approaches and definitions are rarely similar between countries (Bontron, 1996; Depraz, 2007; Shucksmith et al., 2009). Therefore, the task of defining rural areas is an issue that still needs attention in both research programs and policies.

2.1. Income

In general, studies have highlighted that individuals residing in rural areas typically have lower income than people in non-rural ones across

Europe (Alexandri et al., 2015; Bock et al., 2015; Chivu et al., 2015; Grzega, 2019; Rodríguez-Pose and Tselios, 2009; Schnorr-Baecker, 2021; Shucksmith et al., 2006, 2009; Sloka et al., 2019; Stanef, 2012). Considering the income differences between European rural and non-rural areas, recent years have instead witnessed a convergence between the two groups, marked by notable income growth in rural areas and a slower improvement in non-rural ones (Grzega, 2019; Wochner and Holzhausen, 2019).

More in detail, it is crucial to note that income differences between non-rural and rural areas vary in relation to the wealth of the respective country. Specifically, non-rural/rural income differences are milder in the wealthiest countries and more pronounced in those with a lower average income (Bock et al., 2015; Shucksmith et al., 2006, 2009). Consequently, it can be inferred that this income gap diminishes as the average income of the country increases.

Income differences between non-rural and rural areas in poorer countries may be less extreme than people thought when considering domestic self-supply of food (growing food and raising animals is a widespread activity in rural areas of low-income countries), which helps to mitigate the existing income differential. Therefore, non-rural/rural differences in the poorest countries could be less than what might be expected based solely on monetary income differences (Bock et al., 2015; Shucksmith et al., 2006, 2009).

The growing importance of extra-agricultural income in rural households is contributing to the reduction of the income gap between rural and non-rural areas, as supported by Stanef (2012) with reference to Spain. The income differences between the two groups reflect the structure of consumer expenditure. Specifically, rural households tend to spend relatively more on goods and services that satisfy their primary needs, while allocating fewer resources to those that meet secondary needs (Alexandri et al., 2015; Grzega, 2019).

Obviously, there are several exceptions to this rule. Some studies have highlighted that non-rural areas exhibit lower income levels than rural ones (Rietveld and Ouwersloot, 1989; Zwiers and Koster, 2015). These results seem to suggest that high-income individuals may perceive rural areas as offering a superior quality of life and leave non-rural regions to settle in more rural areas (Viganó et al., 2019; Zwiers and Koster, 2015).

Sørensen (2014) found a positive correlation between income and life satisfaction, noting that residents of rural areas have greater life satisfaction than urban citizens. Looking at the personal perception of rural and non-rural income differences, it was found that high-income non-rural residents are less likely to perceive substantial income differences than high-income rural residents. At the same time, low-income individuals seem not to perceive significant rural/non-rural differences (Binelli and Loveless, 2016).

The differences between rural and non-rural are not only income-related, but also encompass additional dimensions pertinent to quality of life, which will not be discussed in this paper. For instance, poverty is an important theme that should be analysed with specific research, but will not be explored in this study. Indeed, poverty is systematically found to be more prevalent in European rural areas (Macours and Swinnen, 2008; Piras, 2020). According to Bernard (2019), the escalation of impoverishment in rural areas can be observed in countries characterised by a lower population density in these areas due to reduced accessibility to opportunities for local people. This trend is also evident in nations with a higher percentage of farmers (especially those who work on very small farms), in post-socialist transition countries, and in those with generally lower economic development and diminished living standards. However, Bertolini et al. (2008) argue that poverty rates drop further and significantly in rural areas when corrected to take into account that many rural households dwell in property homes and do not pay rent.

3. Data and methodology

The data source used in this study is EU Statistics on Income and Living Conditions (EU-SILC), a survey based on a mix of register sources and direct interviews that offers a wide range of monetary and non-monetary variables. Data on the economic activity and the income received in the reference year are collected for each member of the household aged more than 15. The analysis employs a pooled sample of European countries spanning the period from 2016 to 2019.

To define a household as rural or non-rural, this paper used the Degree of Urbanization (DEGURBA) variable provided by EU-SILC (Bernard, 2019; Mattioli, 2017; Weziak-Bialowolska, 2014). The variable DEGURBA categorises all Local Administrative Units into three types of areas: thinly, intermediately, and densely populated. Thinly populated areas refer to units with a density of less than 300 inhabitants per km.[2] Following Bernard (2019), this study created a dichotomous rural/non-rural variable where thinly populated areas are identified as rural areas, while the others are designated as non-rural areas.[2]

Even though EU-SILC includes all European countries, this analysis includes only 25 countries[3]: Austria, Belgium, Bulgaria, Cyprus, Croatia, Czech Republic, Denmark, Estonia, Finland, France, Greece, Hungary, Ireland, Italy, Latvia, Lithuania, Luxemburg, Norway, Poland, Portugal, Romania, Serbia, Spain, Sweden, and Switzerland. The final sample size is 519,878 households. Rural households represent 35% of the total sample (see Table 1). At the individual country level, the situation is heterogeneous: rural households range from 15% to 56% of the total sample.

This paper aims to conduct a comparative analysis of income levels between rural and non-rural households using equivalized disposable income.[4] The considered variable refers to the total disposable household income divided by the equivalent household size.[5] According to the EUSILC guidelines, the variable includes only monetary sources of income (earnings from labor, pensions and other transfers, and income from capital assets).

As can be seen from Table A1 and Figure A1 in the Appendix, the distributions of the equivalised disposable income within the rural and non-rural subgroups are characterised by the presence of outliers and non-normality[6] in each country. For this reason, this study employs a logarithmic transformation of the income variable rather than the linear form to analyse distributions with these characteristics[7] (Hashimzade and Thornton, 2021; Pareto, 1895).

The purpose of the analysis is to compare the average income values for non-rural and rural households. The comparison was carried out

[2] We are aware that the considered approach has some limitations. For example, a rural area can be located inside a functional urban area (FUA), outside but in close proximity to a FUA or in a remote area (OECD, 2020b). However, data needed to explore this issue are not available.

[3] 2019 data are missing for three countries (Iceland, Slovakia, and United Kingdom), while there is not information about the degree of urbanization for four countries (Germany, Netherlands, Slovenia, and Malta).The percentage of rural households out of the total sample for each country tends to be in line with the official statistics present in Eurostat regional yearbook, 2017) Edition.

[4] Since equivalence seeks to bring households of all types and sizes to the same standard, this study employs equivalized incomes to ensure comparability between households (Herrero, 2017; Hills, 2012).

[5] The equivalence scale used in the EUSILC survey is equal to 1 for the reference person, 0.5 for other adult members (fourteen years old or elder) and 0.3 for members up to thirteen years old.

[6] This qualitative assessment was confirmed via a test for normality. This test combines a test for normality based on skewness and another based on kurtosis into an overall test statistic The test was implemented via the *sktest* package in STATA 15.

[7] To approximate the distribution of income to a normal one, we drop the negative (1,221), equal to 0 (1352), and missing observations (10). Overall, the dropped observations represented 0.5% of the total sample.

Table 2
Variables used in the OLS models (1) and (2) and definition of the three macro groups of countries.

Dependent variables	
Equivalised disposable income	Logarithm of total income of a household, after tax and other deductions, that is available for spending or saving
Extended income	Logarithm of extended income defined as: Equivalised disposable income + Imputed rent + Value of goods produced for own consumption.
Independent variables	
Rural	Dummy (1 = rural; 0 = non-rural)
Age	Age at the time of interview
Age2	Age square at the time of interview
Gender	Dummy (1 = female; 0 = male)
Edu_post_1[10]	Dummy (1 = if > Lower secondary education; 0 = if≤Lower secondary education)
Edu_post_2	Dummy (1 = if > Post-secondary non-tertiary education; 0 = if≤Post-secondary non-tertiary education)
Work[11]	Dummy (1 = working; 0 = inactive)
Retirement	Dummy (1 = retired; 0 = not retired)
Hhsize	Household size (number of individuals in the households)
Macro group	Countries
High-income countries	AT, BE, CH, DK, FI, FR, IE, IT, LU, NO and SE
Intermediate-income countries	CY, CZ, EL, ES, and PT
Low-income countries	BG, EE, HR, HU, LT, LV, PL, RO and RS

using Ordinary Least Squares regression, implementing two models where the dependent variable is the logarithm of the equivalised disposable household income (Y_i). While the only independent variable of the first model (equation (1)) is the dummy rural/non-rural, the second model (equation (2)) includes a set of control variables that capture some of the most important household characteristics affecting income level[8] (Becerril and Abdulai, 2010; de Janvry and Sadoulet, 2001; Mendola, 2007). This second model resembles an expanded version of the Mincer earnings function, which is one of the most widely used models in empirical economics to investigate the factors affecting wage income, with a particular emphasis on schooling experience (Lemieux, 2006; Mincer, 1958):

$$Y_i = \alpha + D_i\delta + \varepsilon_i \quad (1)$$

$$Y_i = \alpha + D_i\delta + X_i\beta + \varepsilon_i \quad (2)$$

where Y_i is the log of income of the ith household, α is the intercept; D_i represents a dichotomous variable taking the value of 1 if the ith observation is a rural household, and 0 otherwise; X_i are the control variables, and ε_i is the classical Gaussian error. It is important to note that the coefficient δ provides the magnitude of the gap in relative terms: for example, if the dependent variable is logarithmic and the independent variable is a dummy (equal to 1 when the household lives in a rural area), a coefficient (δ) of −0.2 means that rural households have an income that is 20% lower than that of non-rural households. Furthermore, the regression provides a method to test whether the gap between two groups is statistically different from zero. Again, the coefficient of the dummy Rural (δ) in Model 2 could take on a different value from that obtained in Model 1 due to the presence of the covariates.

The control variables are defined at the household level, with the exception of household size (Table 2).[9]

Model 2 assumes that the impact of the control variables is the same on both rural and non-rural households. This assumption is clearly a limitation that could be theoretically addressed by including interaction variables generated by multiplying the covariates by the dummy Rural. However, this study tried this approach, finding relevant multicollinearity issues that forced us to remain with the model without interaction terms.[12]

Given the observed differences between countries (Table A1 in the Appendix), this paper further explored the relationship between the average income level of the countries and the differences in income between the two groups (rural and non-rural households). To enhance the interpretability of the results, countries were classified into three macro groups (see Table 2) based on the overall average income level at the country level (Shucksmith et al., 2009). Because the data refers to the period 2016–2019, the OLS models controlled for year effects to account for a possible trend, including the year as an additional independent variable. Furthermore, the analysis controlled for country effects by including a set of country dummies in the models developed for the three macro groups of countries.

Since household well-being might also come from non-monetary sources of income, especially when considering rural areas (Marino et al., 2021), the analysis was replicated by considering an extended version of the income, which includes rents imputed for dwelling in a property house and income deriving from the self-consumption of produced goods. More specifically, the EU-SILC database provides two variables for this purpose: the imputed rent and the value of goods produced for own consumption (see EU-SILC definitions in Appendix). Unfortunately, data to build this extended income variable are available only for 14 of the over 25 countries.[13]

Table 3
Percentage of households with non-monetary sources of income.

Country	Non-Rural	Rural
BE	76%	85%
BG	100%	100%
CZ	82%	92%
EE	87%	96%
EL	82%	96%
ES	87%	93%
FR	71%	89%
HR	99%	99%
IE	85%	94%
LU	45%	57%
LV	92%	97%
PL	94%	98%
PT	82%	86%
SE	68%	76%
Total	83%	92%

Source: Own elaborations on EUROSTAT EU-SILC microdata.

[8] Correlation and multicollinearity test (VIF - Variance Inflation Factor) related to the OLS regressors showed the absence of correlation and multicollinearity among the regressors. Checks carried out by corr and vif packages in STATA 15. Further details on these results are available upon request to the authors.

[9] The householder is defined using the following criteria: first, he/she must be responsible for the accommodation; second, if there are two householders, the one earning the greatest income is considered; finally, if still no householder is identified, the eldest is selected (Marino et al., 2021).

[10] Due to missing values, 4725 observations (0.8% of total observations) were eliminated.

[11] Due to missing values, 1517 observations (0.2% of total observations) were eliminated.

[12] Most of the interaction terms are highly correlated to the dummy Rural. Four of these have a correlation coefficient higher than 0.6 with respect to this binary variable. Furthermore, some of the interaction terms are correlated with other interaction terms. In three cases showing a correlation coefficient higher than 0.6. Data are available upon request.

[13] We do not have information (missing value) about non-monetary income components in the following countries: Austria, Cyprus, Denmark, Finland, Hungary, Italy, Lithuania, Norway, Romania, Serbia, and Switzerland.

Table 4
Estimates of the Rural/Non-Rural income gap by country. Equivalised disposable income without and with covariates (Model 1 and Model 2).

Country	(1)		(2)									
	Rural	R^2	Rural	Age	Age2	Gender	Edu_post1	Edu_post2	Work	Retirement	Hhsize	R^2
AT	0.00838	0.001	−0.0314	0.0245***	−0.000132***	−0.0191	0.217***	0.175***	0.604***	0.284***	0.0155*	0.140
	(0.0228)		(0.0211)	(0.00465)	(4.79e-05)	(0.0209)	(0.0255)	(0.0223)	(0.0442)	(0.0541)	(0.00922)	
BE	0.00213	0.000	0.0105	0.0233***	−0.000192***	−0.0939***	0.111***	0.249***	0.565***	0.302***	−0.0184***	0.290
	(0.0217)		(0.0175)	(0.00384)	(3.54e-05)	(0.0146)	(0.0184)	(0.0178)	(0.0275)	(0.0300)	(0.00625)	
BG	−0.432***	0.075	−0.149***	0.0143***	−0.000125***	−0.0618***	0.361***	0.393***	0.590***	0.335***	0.0420***	0.313
	(0.0183)		(0.0158)	(0.00395)	(3.52e-05)	(0.0167)	(0.0189)	(0.0220)	(0.0255)	(0.0308)	(0.00716)	
CH	−0.0772***	0.003	−0.0782***	0.0286***	−0.000246***	−0.0887***	0.222***	0.271***	0.441***	0.140***	−0.0478***	0.231
	(0.0196)		(0.0173)	(0.00304)	(3.02e-05)	(0.0148)	(0.0221)	(0.0150)	(0.0290)	(0.0341)	(0.00676)	
CY	−0.142***	0.018	−0.0309	0.0558***	−0.000452***	−0.0769***	0.239***	0.410***	0.320***	0.163***	−0.0150*	0.306
	(0.0232)		(0.0198)	(0.00495)	(4.61e-05)	(0.0201)	(0.0215)	(0.0246)	(0.0284)	(0.0413)	(0.00768)	
CZ	−0.0306**	0.004	−0.0198*	0.0127***	−9.47e-05***	−0.105***	0.175***	0.259***	0.506***	0.114***	−0.00281	0.321
	(0.0120)		(0.0101)	(0.00222)	(2.07e-05)	(0.0108)	(0.0174)	(0.0138)	(0.0259)	(0.0275)	(0.00522)	
DK	−0.0339**	0.002	−0.0354***	0.0453***	−0.000368***	−0.0911***	0.0746***	0.171***	0.355***	0.0344	0.00847	0.295
	(0.0143)		(0.0116)	(0.00260)	(2.61e-05)	(0.0122)	(0.0159)	(0.0127)	(0.0218)	(0.0253)	(0.00606)	
EE	−0.136***	0.011	−0.0441***	0.0123***	−9.89e-05***	−0.0964***	0.0706***	0.295***	0.697***	0.175***	0.0672***	0.329
	(0.0206)		(0.0157)	(0.00388)	(3.72e-05)	(0.0171)	(0.0210)	(0.0185)	(0.0349)	(0.0411)	(0.00760)	
EL	−0.194***	0.025	−0.118***	0.00658***	1.23e-05	0.00965	0.203***	0.293***	0.544***	0.454***	−0.0520***	0.216
	(0.0100)		(0.00967)	(0.00215)	(1.96e-05)	(0.0106)	(0.0124)	(0.0129)	(0.0194)	(0.0175)	(0.00450)	
ES	−0.196***	0.015	−0.0938***	0.0364***	−0.000232***	−0.0372**	0.230***	0.293***	0.507***	0.373***	−0.0242***	0.198
	(0.0183)		(0.0168)	(0.00405)	(3.63e-05)	(0.0186)	(0.0221)	(0.0244)	(0.0274)	(0.0251)	(0.00711)	
FI	−0.0436***	0.003	−0.0540***	0.0328***	−0.000282***	−0.0894***	0.0795***	0.222***	0.472***	0.270***	0.0148***	0.324
	(0.0137)		(0.0108)	(0.00228)	(2.38e-05)	(0.0105)	(0.0146)	(0.0121)	(0.0164)	(0.0234)	(0.00545)	
FR	−0.0388***	0.001	−0.0362***	0.0259***	−0.000170***	−0.109***	0.166***	0.319***	0.443***	0.389***	−0.0170***	0.238
	(0.0115)		(0.0114)	(0.00225)	(2.11e-05)	(0.0123)	(0.0204)	(0.0114)	(0.0187)	(0.0222)	(0.00463)	
HR	−0.232***	0.032	−0.0923***	0.00550*	−2.89e-05	−0.0253**	0.322***	0.343***	0.852***	0.589***	0.0465***	0.347
	(0.0148)		(0.0121)	(0.00307)	(2.66e-05)	(0.0125)	(0.0148)	(0.0147)	(0.0278)	(0.0292)	(0.00469)	
HU	−0.169***	0.018	−0.0688***	−0.00440	6.06e-05**	−0.0868***	0.203***	0.314***	0.468***	0.393***	0.0127**	0.172
	(0.0160)		(0.0146)	(0.00310)	(2.87e-05)	(0.0152)	(0.0160)	(0.0217)	(0.0340)	(0.0365)	(0.00618)	
IE	−0.0990***	0.011	−0.0634***	0.00712**	−1.18e-05	−0.0657***	0.108***	0.246***	0.537***	0.228***	0.00378	0.257
	(0.0175)		(0.0148)	(0.00342)	(3.29e-05)	(0.0151)	(0.0210)	(0.0202)	(0.0207)	(0.0246)	(0.00582)	
IT	−0.0652***	0.001	−0.0340***	0.0143***	−1.69e-05	−0.0543***	0.294***	0.279***	0.563***	0.386***	−0.0120**	0.141
	(0.0141)		(0.0126)	(0.00297)	(2.79e-05)	(0.0119)	(0.0132)	(0.0162)	(0.0264)	(0.0217)	(0.00520)	
LT	−0.361***	0.062	−0.170***	0.0124**	−2.97e-05	−0.145***	0.0953***	0.366***	0.891***	0.251***	0.0488***	0.362
	(0.0275)		(0.0217)	(0.00543)	(5.25e-05)	(0.0225)	(0.0310)	(0.0251)	(0.0440)	(0.0559)	(0.0105)	
LU	0.0571**	0.005	0.0772***	0.0116*	−7.45e-06	−0.0415	0.195***	0.353***	0.535***	0.419***	−0.00528	0.195
	(0.0268)		(0.0230)	(0.00607)	(5.92e-05)	(0.0262)	(0.0283)	(0.0280)	(0.0511)	(0.0554)	(0.00956)	
LV	−0.187***	0.019	−0.117***	−0.00457	3.77e-05	−0.0886***	0.194***	0.394***	0.737***	0.279***	0.0869***	0.359
	(0.0226)		(0.0177)	(0.00397)	(3.83e-05)	(0.0179)	(0.0233)	(0.0194)	(0.0328)	(0.0421)	(0.00698)	
NO	0.00883	0.006	−0.0180	0.0597***	−0.000486***	−0.0951***	0.0940***	0.161***	0.576***	0.320***	0.0148**	0.309
	(0.0196)		(0.0164)	(0.00444)	(4.38e-05)	(0.0183)	(0.0254)	(0.0191)	(0.0358)	(0.0407)	(0.00716)	
PL	−0.264***	0.046	−0.167***	−0.00603***	0.000101***	−0.0964***	0.190***	0.367***	0.477***	0.243***	0.0157***	0.239
	(0.0122)		(0.0115)	(0.00233)	(2.22e-05)	(0.0109)	(0.0146)	(0.0130)	(0.0217)	(0.0199)	(0.00418)	
PT	−0.220***	0.025	−0.136***	0.0193***	−0.000114***	−0.133***	0.334***	0.419***	0.448***	0.409***	−0.00324	0.270
	(0.0159)		(0.0141)	(0.00341)	(3.17e-05)	(0.0139)	(0.0215)	(0.0238)	(0.0302)	(0.0332)	(0.00648)	
RO	−0.562***	0.167	−0.311***	−0.00446	6.87e-05*	−0.0662***	0.466***	0.565***	0.796***	0.824***	0.0205***	0.392
	(0.0208)		(0.0192)	(0.00427)	(3.77e-05)	(0.0177)	(0.0253)	(0.0211)	(0.0746)	(0.0749)	(0.00737)	
RS	−0.350***	0.050	−0.139***	0.00315	5.50e-07	−0.0520**	0.378***	0.343***	0.717***	0.611***	−0.00206	0.277
	(0.0250)		(0.0216)	(0.00557)	(4.90e-05)	(0.0218)	(0.0261)	(0.0252)	(0.0342)	(0.0377)	(0.00663)	
SE	−0.0792***	0.003	−0.0618***	0.0512***	−0.000449***	−0.126***	0.200***	0.120***	0.611***	0.420***	−0.00501	0.298
	(0.0243)		(0.0188)	(0.00388)	(4.38e-05)	(0.0197)	(0.0219)	(0.0220)	(0.0601)	(0.106)	(0.00748)	
TOT	−0.214***	0.017	−0.154***	0.00970***	−2.47e-05**	−0.107***	0.154***	0.380***	0.527***	0.299***	−0.0374***	0.158
	(0.00582)		(0.00549)	(0.00113)	(1.09e-05)	(0.00522)	(0.00705)	(0.00593)	(0.00925)	(0.00982)	(0.00206)	

Notes: (1) = model 1; (2) = model 2. (Standard errors in parentheses). Column Rural defines the income gap in relative terms that is as percentage of the non-rural household income. The coefficients of the year dummy are not shown, but they are available upon request.
***p < 0.01, **p < 0.05, *p < 0.1.
Source: Own elaborations on EUROSTAT EU-SILC microdata.

Except for Bulgaria, where there are no differences (see Table 3), the percentage of rural households is always greater than that of the non-rural ones in the other 13 countries. As expected, rural households tend to have more frequent non-monetary incomes from imputed rent and the self-consumption of produced goods than non-rural counterparts. To achieve comparability between the various countries over the entire period, all income data were expressed in Euros and adjusted using purchasing power parities (PPPs) to consider the differences in price levels and the Harmonized Indices of Consumer Prices to take into account variations in price over time (all values expressed in euro 2020).[14]

The analysis used weighted observations, the weight of which is supplied directly by the EU-SILC database.[15] Weights ensure non-biased

[14] Eurostat provides the coefficients to perform Purchase Power Parities and price variation adjustments (http://appsso.eurostat.ec.europa.eu/nui/show.do?dataset=prc_ppp_ind&lang=en - accessed on 5 April 2022). Details on the methodology can be found in (Mack and Lange, 2015).

[15] This weight is obtained as reported in Chapter 1. EU-SILC (2020) methodological guidelines – weighting, p.34-46.

Table 5
Comparison of rural dummy coefficients in models related to equivalent disposable income (Model 2) and extended income (Model 4) both with covariates, by country.

Country	(2)	(4)
BE	0.0105	0.0348**
	(0.0175)	(0.0164)
BG	−0.149***	−0.242***
	(0.0158)	(0.0128)
CZ	−0.0198*	−0.00625
	(0.0101)	(0.0100)
EE	−0.0441***	−0.0672***
	(0.0157)	(0.0150)
EL	−0.118***	−0.0740***
	(0.00967)	(0.00821)
ES	−0.0938***	−0.105***
	(0.0168)	(0.0129)
FR	−0.0362***	−0.00286
	(0.0114)	(0.0112)
HR	−0.0923***	−0.0727***
	(0.0121)	(0.0111)
IE	−0.0634***	−0.134***
	(0.0148)	(0.0128)
LU	0.0772***	0.0886***
	(0.0230)	(0.0226)
LV	−0.117***	−0.158***
	(0.0177)	(0.0159)
PL	−0.167***	−0.158***
	(0.0115)	(0.00886)
PT	−0.136***	−0.104***
	(0.0141)	(0.0129)
SE	−0.0618***	−0.0393**
	(0.0188)	(0.0176)

Notes: (2) = model 2; (4) = model 4. (Standard errors in parentheses). Column Rural defines the income gap in relative terms that is as percentage of the non-rural household income.
***p < 0.01, **p < 0.05, *p < 0.1.
Source: Own elaborations on EUROSTAT EU-SILC microdata.

estimates referred to the population. However, in countries where weights were not available, this study gave a value of 1.

4. Results and discussion

The study aims to investigate whether an income gap between rural and non-rural households in 25 European countries exists and what its intensity is. The hypothesis to test is that rural households have lower incomes than non-rural ones. Firstly, the analysis focuses only on the monetary disposable income. Secondly, the study assesses whether the income gap persists when considering the extended income that adds non-monetary sources to the previous one. The hypothesis suggests that the gap between the two groups should be smaller or disappear by considering non-monetary income components. All these analyses are performed for each country separately. However, to provide a clearer picture of the impact of a country's economic development on the income gap, the paper replicates the analysis carried out at the country level for the three macro groups of countries defined in Table 2.

4.1. Income gap between rural and non-rural households: equivalized disposable income

Results are heterogeneous because an income gap is not observed across all countries. In particular, there seems to be no income difference between rural and non-rural households in Austria, Belgium and Norway. However, the difference is negative in 21 of the 25 countries; therefore, rural households in Europe widely show a lower equivalised disposable income than non-rural ones. An exception is Luxembourg, where rural households exhibit a higher income than non-rural households.

The comparison of the results of the models without and with covariates (Models 1 and 2) allows to assess how much of the income gap depends on the household characteristics captured by the covariates included in Model 2. In 18 out of 25 countries, the Rural coefficient decreases when moving from the model with predictor variables to the one without, showing that covariates can partially explain the income gap between the two groups (see Table 4). In certain cases, like Cyprus, their inclusion implies the disappearance of the income gap.

The case of Luxembourg requires a separate discussion, as it is the only country characterised by a significant positive coefficient. Moving from Model 1 to Model 2, the gap between the two groups increases, but in "favour" of rural households. Model 2 also provides an opportunity to assess the impact of the covariates on the level of income. By adding regressors to the model, the rural coefficient changes and tends to decrease, meaning that some household characteristics can explain a part of the income gap between the two groups. Therefore, Model 2 seems more appropriate to describe the income gap between the two groups[16]. Overall, age is associated with the expected sign, with older people having a higher income. However, its coefficient is not statistically significant in Lithuania, Norway, Romania, Serbia and Hungary. In Poland, younger and older people have a higher income.

Gender is also in line with the literature: being a woman implies a lower income, from −15.0% in Lithuania to −2.6% in Croatia. However, the coefficient is not statistically significant in Austria, Greece and Luxembourg. In all countries, having at least a secondary education determines a higher income compared to those who do not have it, ranging from +7.1% in Greece to +46.6% in Romania. The same result is observed for those who have tertiary education compared to those without such qualifications (from +12.0% in Sweden to +56.5% in Romania).

With respect to employment, being employed determines a higher income compared to those who are not in all countries, ranging from

[16] This was also verified by comparing the two models using an F-test (*ftest* package in STATA 15).

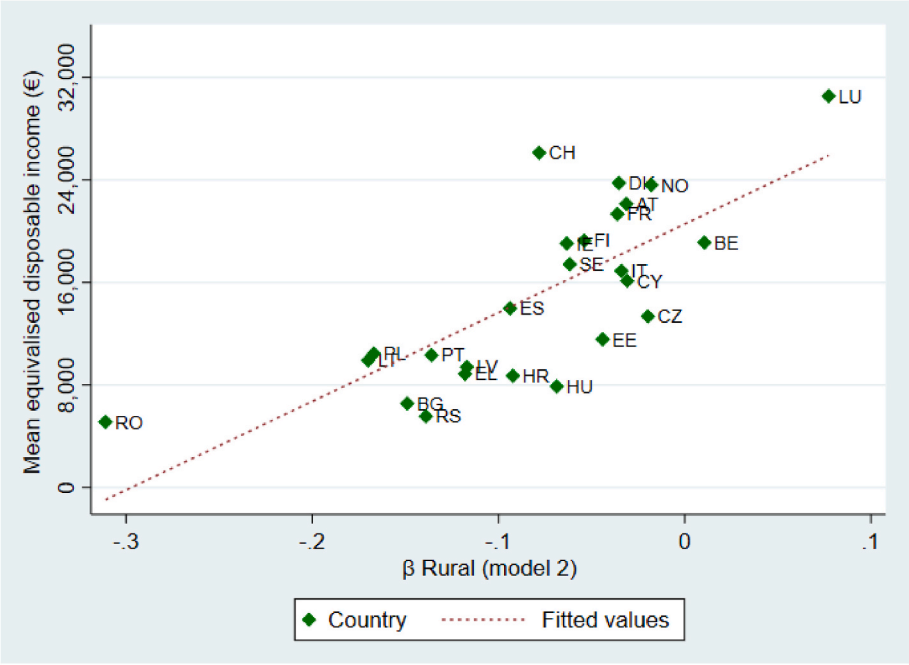


Fig. 1. Relationship between country mean income level and Rural coefficients of Model 2.
Source: Own elaborations on EUROSTAT EU-SILC microdata.

Table 6
Estimates of the income gap between Rural and Non-Rural households. Models refer to the disposable income in the three macro-groups of countries without and with covariates (Models 5 and 6).

Log Equivalised disposable income	High-income countries		Intermediate-income countries		Low-income countries	
	(5)	(6)	(5)	(6)	(5)	(6)
Rural	−0.0437***	−0.0353***	−0.173***	−0.0894***	−0.345***	−0.198***
	(0.00698)	(0.00665)	(0.0109)	(0.0100)	(0.00782)	(0.00717)
Age		0.0228***		0.0211***		−0.000340
		(0.00135)		(0.00230)		(0.00151)
Age2		−0.000130***		−0.000112***		3.53e-05**
		(1.30e-05)		(2.11e-05)		(1.41e-05)
Gender		−0.0847***		−0.0647***		−0.0817***
		(0.00645)		(0.0111)		(0.00662)
Edu_Post_1		0.213***		0.224***		0.304***
		(0.00950)		(0.0135)		(0.00983)
Edu_Post_2		0.268***		0.309***		0.385***
		(0.00680)		(0.0143)		(0.00800)
Work		0.506***		0.498***		0.544***
		(0.0121)		(0.0185)		(0.0139)
Retirement		0.341***		0.322***		0.377***
		(0.0135)		(0.0168)		(0.0147)
Hhsize		−0.0128***		−0.0195***		0.0191***
		(0.00264)		(0.00450)		(0.00274)
R^2	0.050	0.212	0.065	0.237	0.207	0.372

Notes: (5) = model 5; (6) = model 6. (Standard errors in parentheses). Row Rural defines the income gap in relative terms that is as percentage of the non-rural household income. The coefficients of the year and country dummy are not shown, but they are available upon request.
***p < 0.01, **p < 0.05, *p < 0.1.
Source: Own elaborations on EUROSTAT EU-SILC microdata.

+32.0% in Cypro to +89.1% in Lithuania. Regarding retirement status, except for Denmark where no difference emerges, being retired implies a higher income compared to those who are not retired, but lower than those who are employed. Finally, household size does not seem to have a homogeneous effect on income. In fact, it is not statistically significant in 7 countries, while it has a positive impact in 11 and a negative one in 7 countries.

4.2. Income gap between rural and non-rural households: extended income

This section discusses regression models with extended income as the dependent variable. To avoid confusion with the analysis carried out above with equivalised disposable income only, the OLS model for extended income with only the dummy rural/non-rural as regressor is called Model 3 and the same regression including the set of control variables as Model 4.

The complete results are reported in Table A2 in the Appendix. Considering Model 3, no income difference between rural and non-rural

Table 7
Comparison of rural dummy coefficients in models related to equivalent disposable income (Model 6) and extended income (Model 8) both with covariates, by macro-group.

Macro-group	(6)	(8)
High-income countries	−0.0353***	−0.0360***
	(0.00665)	(0.00961)
Intermediate-income countries	−0.0894***	−0.0899***
	(0.0100)	(0.0101)
Low-income countries	−0.198***	−0.167***
	(0.00717)	(0.00907)

Notes: (6) = model 6; (8) = model 8. (Standard errors in parentheses). Column Rural defines the income gap in relative terms that is as percentage of the non-rural household income.
***p < 0.01, **p < 0.05, *p < 0.1.
Source: Own elaborations on EUROSTAT EU-SILC microdata.

households emerges in Belgium and France. In the remaining 12 countries, there is a statistically significant difference between the two groups, ranging from −48.6% in Bulgaria to +6.1% in Luxembourg.

The difference is negative in 11 of the 14 countries analysed, indicating that rural households in Europe still show a lower income than non-rural households, even when considering non-monetary income sources. Considering Model 4, the difference between the two groups becomes significant and positive in Belgium. At the same time, the significance and negative sign of the coefficients remains unchanged compared to Model 3 in the remaining countries, with a shrinking value of the gap.

Covariates effects don't show any relevant differences compared with the Model 2. To conclude, Table 5 shows only the results of Models 2 and 4 to compare equivalized disposable income and extended income in the full model (with covariates). The main finding is that switching from the equivalised disposable income to the extended one causes an "improvement" in the relative income condition of rural households compared with non-rural ones for nine countries.

4.3. Income gap and economic development

The magnitude of the income differences between non-rural and rural areas change according to the economic development of the country of reference. Indeed, non-rural/rural income differences are smaller in wealthier countries and progressively larger in lower middle-income ones. This result has been reported in previous studies, such as Bock et al. (2015) and Shucksmith et al. (2006, 2009).

Fig. 1 shows the relationship between the country's mean income and the rural coefficients of Model 2. The graph supports the main findings of previous studies: as mean income increases, a reduction of the rural/non-rural gap can be observed. Then, the graphical analysis was replicated for the relationship between the country's mean extended income and the rural income gap using coefficients of Model 4 (see Figure A2 in Appendix), confirming results obtained with the standard measure of household disposable income.

The role of the country's overall level of economic development can also be appreciated by estimating the above regressions for the three groups of countries mentioned above: low, medium, and high income. These values are computed by averaging the total income of the whole set of households for each country. In other words, the analysis made for the individual countries was reproduced by pooling the countries into three groups, as described in Table 2. Model 5 considers only the dummy rural/non-rural as a regressor, while Model 6 also includes the set of control variables.

Results validate what has already emerged from the analysis at the individual country level (see Table 6). In both models, a negative difference between the rural and non-rural groups is always observed in all three macro groups. However, comparing the results among the three macro groups in both models, a decrease in the gap clearly emerges when moving from the low-income to the intermediate-income group and finally to the high-income one. These findings confirm the above-stated hypothesis: as the average income of the country increases, the differential between rural and non-rural households tends to reduce or even disappear. Covariates show a similar effect to the one observed in the individual country models. In particular, the importance of the level of education as a driver for higher incomes increases as the average income level decreases.

The same analysis was done also for the extended income. To avoid

Box A.1
Definition of the two considered non-monetary sources of income.

As described in the main text, the focus of the analysis is on the household disposable income and an extended version of this including two sources of non-monetary sources of income. These are the imputed rent and the value of goods produced for own consumption.

The imputed rent refers to the value that shall be imputed for all households that do not report themselves as paying full rent, either because they are owner-occupiers or they live in accommodation rented at a lower price than the market price, or because the accommodation is provided rent-free. The imputed rent is estimated only for those dwellings (and any associated buildings such a garage) that are used as a main residence by the households. The impoted value is the equivalent market rent that shall be paid for a similar dwelling as that occupied, less any rent actually paid (in the case where the accommodation is rented at a lower price than the market price), less any minor repair or refurbishment expenditure which the owner-occupier households make on the property of the type that would normally be carried out by landlords. Costs for heating, water electricity, etc. are excluded. Repair leading to improvements or fixing major problems of the dwelling are also excluded. Depreciation (consumption of fixed capital) shall not be taken into account because it is likely to be offset or superseded by variation of the market value of the dwelling. These latter are not covered in EU-SILC.

The value of goods produced for own consumption refers to the value of food and beverages produced and also consumed within the same household. The value of goods produced for own consumption are calculated as the market value of goods produced deducting any expenses incurred in the process of production. The value of food and beverages are included when they are a significant component of the income at national level or they constitute a significant component of the income of particular groups of households.

confusion with the previous one, the OLS model with the dummy rural/non-rural as a single covariate was entitled Model 7, while the one with the set of control variables was called Model 8 (see Table A3 in Appendix). The results confirm what has already been found from the evaluation at the single-country level. In both Models 7 and 8, a negative difference between the rural and non-rural groups always emerges in all three macro groups. Furthermore, a reduction in the gap between the two groups can be observed when passing from the low-income group to the intermediate-income group and finally to the high-income one. These results give further support to the hypothesis tested in the present section.

Finally, comparing the results of the models with disposable and extended income allows to assess again whether the income gap declines when the non-monetary income sources are considered. The main result is that switching from the equivalised disposable income to the extended income does not change the magnitude of the income gap between rural and non-rural households. However, a clear improvement in the rural condition appears within the low-income group when the non-monetary income sources are considered. In this case, the latter exert a positive role in reducing the income gap (see Table 7).

5. Conclusions

This paper assesses the extent of the income disparity between rural and non-rural households in the European Union using data from the European Union Survey on Incomes and Living Conditions (EU-SILC). The analysis contributes to the current literature by evaluating this income gap in 25 European countries and examining the role of non-monetary income components in mitigating the extent of income inequality between these two areas. Three main findings deserve special attention due to their significant policy implications. Firstly, rural households still exhibit lower incomes than non-rural ones. A considerable income difference is observed in 22 out of 25 countries, with ranging from −31.1% in Romania to +7.7% in Luxembourg. This result justifies the need for policymakers to consider increasing support for rural areas or making the existing policies more efficient.

The second relevant result is a negative correlation between the extent of the rural/non-rural income gap and the average income level of the countries. As the country's income grows, the difference between rural and non-rural shrinks: countries with income levels above (below) the European average exhibit a smaller (bigger) rural/non-rural difference. This result aligns with the findings of other studies (Bock et al., 2015; Shucksmith et al., 2006, 2009), showing that European countries with low incomes have greater differences between rural and non-rural areas than those found in high-income countries. Therefore, a possible policy implication is that the European Union's cohesion and convergence policies aimed at reducing the income gap between rural and non-rural households should be focused more on low-income countries than high-income ones.

Finally, the results suggest that the non-monetary components of income (income from imputed rents and the income in kind from self-consumption of produced goods) often contribute to mitigating the income gap observed between rural and non-rural households, regardless of the country's income level. However, this result cannot be generalised to 5 out of 14 countries analysed when using the extended definition of income. To conclude, this finding suggests that further analyses regarding the income condition of rural households should include these non-monetary income sources to improve our understanding of the rural/non-rural income gap. One policy recommendation stemming from our results is that extended income is a valuable piece of information to analyse the disparity among the two groups under analysis. Therefore, it would be desirable to extend data collection to information on non-monetary income components in those European countries where this information is not available.

The analysis, as it is usually the case, is not exempted from limitations, some of which are worth mentioning. The first is that the empirical analysis does not fully exploit the panel structure of the sample due to the low number of transitions of observed households from rural to non-rural residences and vice versa. Furthermore, a considerable number of observations would be lost to create a balanced panel due to the rotational nature of the EU-SILC database. For these reasons, a panel analysis could lead to results that are not robust. A second limitation is that the analysis of the role of non-monetary income is limited to a subsample of countries because data on these income sources are not available for 11 out of 25 European countries considered in this study. This problem keeps us from drawing a complete picture of the European countries. Finally, we also acknowledge that discrepancies exist between EU-SILC estimates of total amounts and national accounts totals (Törmälehto, 2019). Indeed, efforts to reconcile household income using microdata with macro data from the national accounts suggest that significant omissions may be present, potentially influencing income comparisons across different income groups.

We conclude by highlighting some interesting areas for future research developments. One potential area of exploration refers to the income distribution within each country and each group. The second one involves the analysis of the factors determining the household income. For example, the results of our study support the idea that education exerts a positive impact on income, particularly in the poorest countries. This latter type of analysis could feed the debate about how European rural policies could better address the income gap existing between rural and non-rural households. Finally, our results depend on the EU-SILC definition of rural areas. Although the EU-SILC definition is eminently defensible and provides plausible outcomes, it might be useful to replicate this study using different definitions of rurality to verify the robustness of the results obtained.

Author contributions

Cesare Meloni: Conceptualization, Data curation, Formal analysis, Investigation, Methodology, Software, Visualization, Writing – original draft. Benedetto Rocchi: Conceptualization, Methodology, Writing – original draft, Writing – review & editing. Simone Severini: Conceptualization, Funding acquisition, Methodology, Resources, Supervision, Writing – review & editing. Chiara Grazini: Data curation, Investigation, Writing – review & editing. Maria Marino: Methodology, Software, Writing – original draft

Declaration of competing interest

None.

Data availability

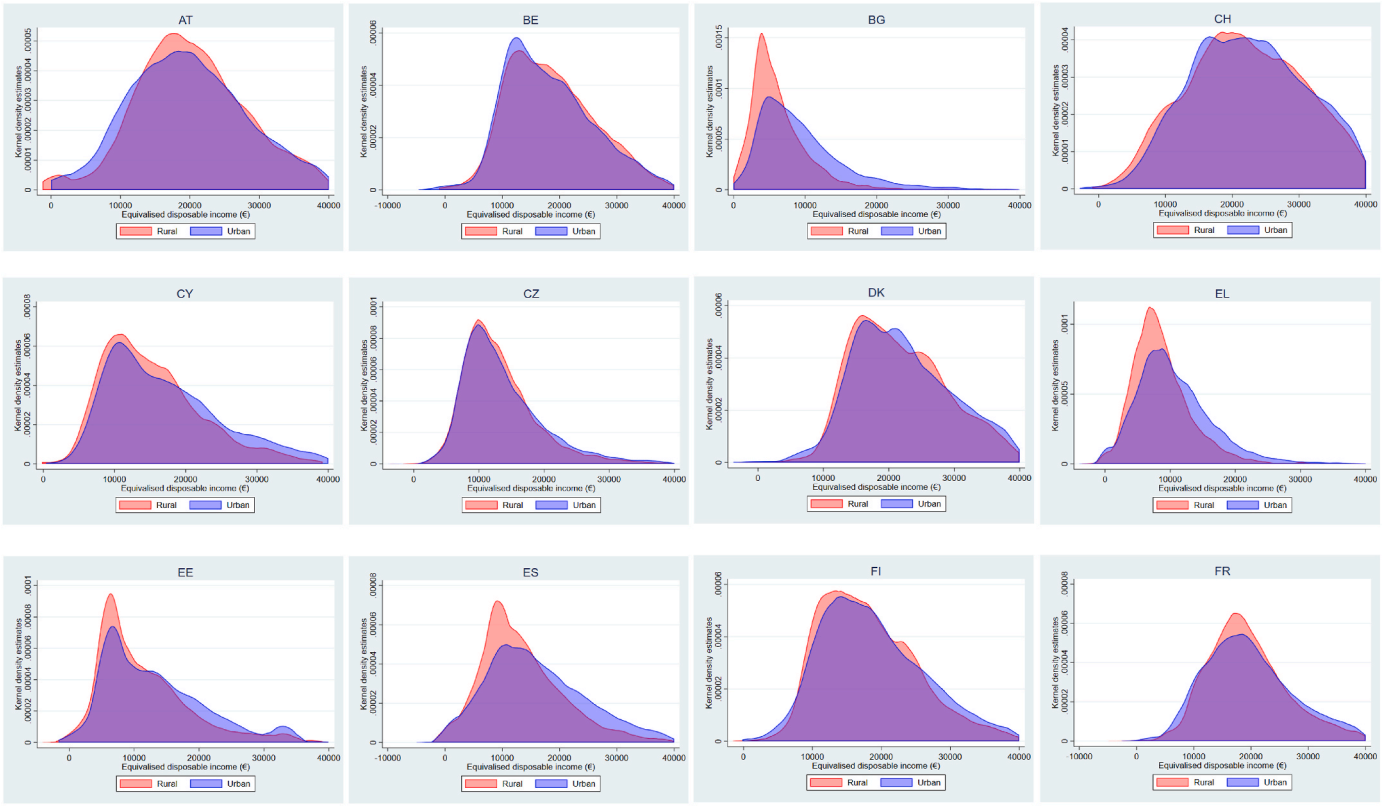
The authors do not have permission to share data.

APPENDIX

Table A1
Descriptive statistics of the equivalised disposable income by country

Country	Rural							Non-Rural						
	Mean	Median	10-perc	90-perc	Dev.Std.	Kurtosis	Skewness	Mean	Median	10-perc	90-perc	Dev.Std.	Kurtosis	Skewness
AT	22,136.00	20,358.51	11,319.95	34,663.25	11,713.37	26.29	3.01	22,619.91	20,171.49	9721.84	36,976.46	14,562.12	37.20	3.98
BE	19,120.49	17,884.07	9,959.46	30,169.57	8,669.01	15.92	1.86	19,719.05	17,480.92	9704.66	31,471.29	12,974.36	219.83	9.76
BG	6,549.77	5,348.55	2,387.07	11,661.04	5,512.53	111.65	6.84	10,796.70	8,192.39	3500.26	18,671.24	14,260.29	274.61	12.82
CH	26,126.97	23,318.56	10,562.21	42,315.11	16,983.30	100.66	6.19	28,698.53	24,630.19	12,158.24	47,206.34	23,577.04	152.18	9.16
CY	16,122.44	14,132.70	7,743.01	25,661.13	10,180.66	76.19	6.04	19,611.12	16,232.92	8437.90	33,468.75	15,436.69	117.18	6.96
CZ	13,356.23	12,061.70	7,303.18	20,671.79	6,549.31	33.34	3.31	14,101.06	12,232.34	7361.49	22,555.15	8724.74	144.06	7.66
DK	23,765.96	21,277.64	13,447.76	34,887.19	16,177.98	356.19	14.40	24,750.49	22,095.64	13,657.02	37,702.49	13,163.24	42.95	4.18
EE	11,561.89	9,544.29	4,900.42	21,102.27	7,211.94	4.89	1.36	13,346.26	11,671.82	5389.32	24,718.13	7984.02	3.76	1.02
EL	8,865.95	7,975.64	3,861.95	14,658.72	5,331.24	98.37	5.19	11,250.03	9,750.46	4343.98	18,489.13	10,003.12	584.66	16.69
ES	13,978.84	12,299.18	5,727.42	24,011.51	8,428.60	19.46	2.46	17,884.58	15,343.47	6185.40	31,559.87	12,345.78	19.58	2.71
FI	19,265.77	17,399.09	10,098.38	29,469.97	10,292.80	45.60	4.28	20,645.09	18,288.00	10,160.46	32,303.90	12,585.97	52.93	4.82
FR	21,337.11	18,895.63	11,189.50	32,472.90	12,258.51	37.11	4.22	23,859.20	19,625.92	10,585.23	37,505.58	51,025.25	5938.66	70.91
HR	8,716.15	7,502.30	3,118.69	15,593.45	5,736.22	13.88	2.20	10,620.67	9,354.53	4336.21	18,034.89	6641.90	59.91	4.18
HU	7,885.73	6,929.20	3,870.08	12,523.18	4,792.85	94.97	5.78	9,605.43	8,346.59	4515.73	15,316.64	7119.72	136.14	8.28
IE	19,046.89	15,842.71	8,982.54	31,446.72	15,644.81	311.65	12.23	20,970.34	17,710.82	9404.76	34,931.43	14,873.50	74.46	5.64
IT	16,898.72	15,030.03	7,124.97	27,808.43	10,737.70	30.69	3.37	18,761.24	16,317.38	6952.88	31,714.51	14,683.15	374.70	10.50
LT	9,924.47	7,648.85	3,452.19	18,193.76	8,587.18	36.52	3.98	13,936.81	11,348.59	4720.53	26,220.95	12,215.04	76.87	5.93
LU	30,547.70	26,681.20	13,034.94	53,015.35	19,528.66	98.94	5.31	30,322.30	25,608.59	11,944.18	53,043.66	24,004.54	108.25	6.70
LV	9,397.25	7,397.94	3,200.79	17,113.88	7,604.48	21.27	3.17	11,022.84	9,074.64	3937.79	20,404.95	8238.30	23.48	2.99
NO	23,607.44	21,572.78	12,803.52	35,361.59	13,250.89	112.69	7.18	24,509.68	22,619.82	11,895.38	37,951.57	15,636.89	298.22	10.58
PL	10,448.75	9,291.16	4,619.88	17,042.78	6,215.48	24.60	2.99	13,774.27	11,905.32	5998.41	23,249.93	8774.37	29.95	3.38
PT	10,326.74	8,846.52	4,363.47	17,125.92	7,112.28	48.32	4.28	13,253.01	10,929.58	5146.47	23,840.70	9444.51	18.58	2.88
RO	5,115.67	4,440.47	1,558.97	9,216.52	3,346.26	8.06	1.61	8,360.19	7,467.57	3738.13	13,896.55	4878.87	19.32	2.58
RS	5,547.50	4,388.57	1,579.22	9,264.75	13,958.65	1,460.37	36.39	7,003.03	6,049.49	2544.10	12,063.46	5913.24	507.36	15.51
SE	17,427.29	16,196.99	9,023.19	27,022.85	10,366.96	251.46	11.04	19,166.66	17,585.49	9414.31	30,113.01	12,549.42	893.35	19.11

Source: Own elaborations on EUROSTAT EU-SILC microdata.



[17] For reasons of space, all the graphs are "cut" on the x-axis at 40,000 €.

Fig. A1. Equivalised distribution of equivalised disposable income in rural (red) and non-rural (blue) groups, in each country (euro).[17][1] Source: Own elaborations on EUROSTAT EU-SILC microdata.

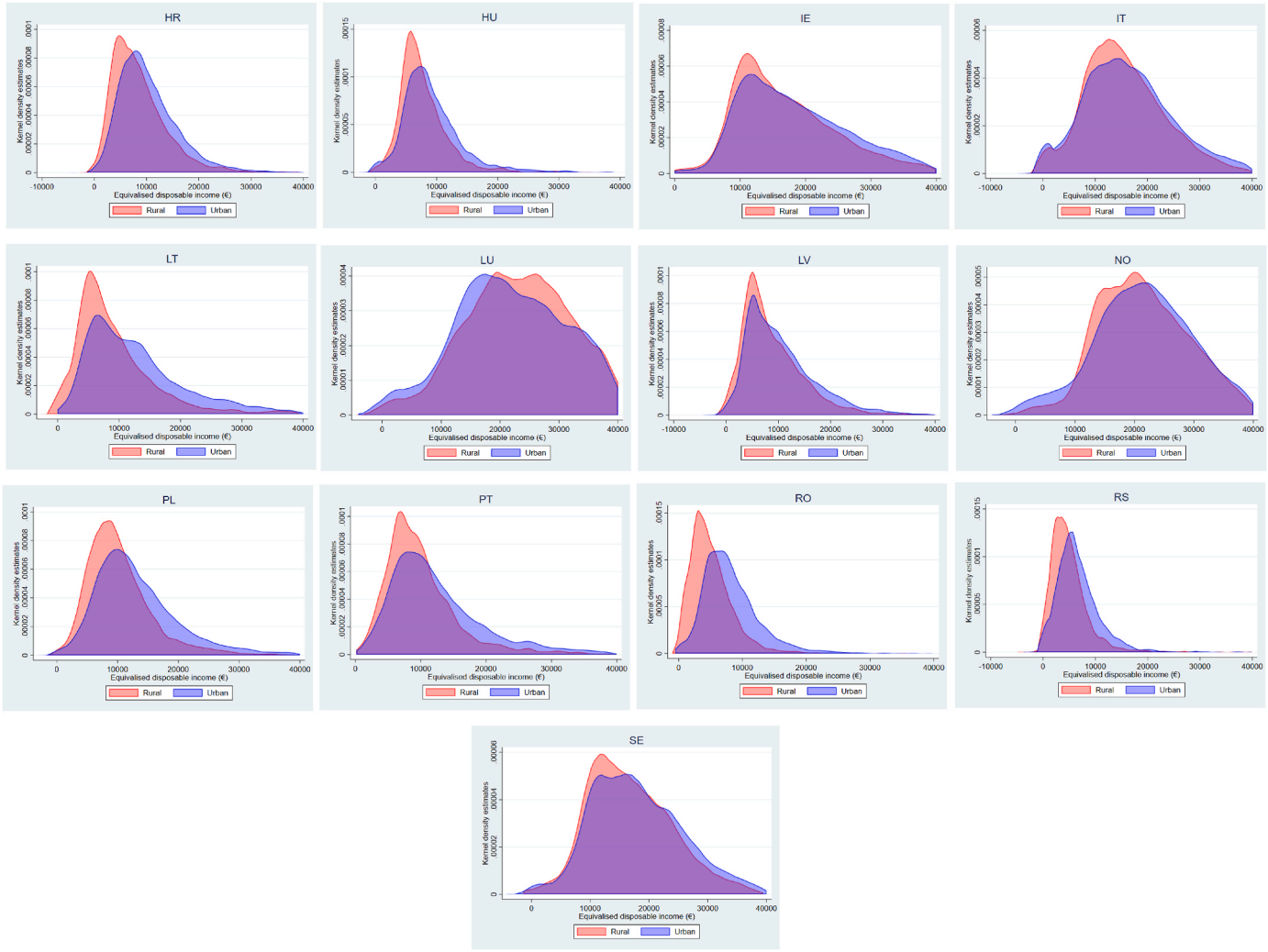


Fig. A1. (*continued*).

[17] For reasons of space, all the graphs are "cut" on the x-axis at 40,000 €.

Table A2
Estimates of the Rural/Non-Rural income gap by country. Extended income without and with covariates (Model 3 and Model 4).

Country	(3)		(4)									
	Rural	R2	Rural	Age	Age2	Gender	Edu_post1	Edu_post2	Work	Retirement	Hhsize	R2
BE	0.0322	0.001	0.0348**	0.0255***	−0.000191***	−0.102***	0.130***	0.239***	0.554***	0.327***	0.0136**	0.310
	(0.0213)		(0.0164)	(0.00380)	(3.47e-05)	(0.0145)	(0.0178)	(0.0173)	(0.0276)	(0.0298)	(0.00643)	
BG	−0.486***	0.136	−0.242***	0.0122***	−0.000103***	−0.0564***	0.341***	0.335***	0.450***	0.243***	0.0492***	0.381
	(0.0154)		(0.0128)	(0.00297)	(2.70e-05)	(0.0133)	(0.0152)	(0.0178)	(0.0192)	(0.0240)	(0.00547)	
CZ	−0.0153	0.003	−0.00625	0.0137***	−0.000101***	−0.105***	0.183***	0.261***	0.500***	0.117***	0.00251	0.323
	(0.0119)		(0.0100)	(0.00221)	(2.06e-05)	(0.0107)	(0.0174)	(0.0137)	(0.0261)	(0.0275)	(0.00524)	
EE	−0.156***	0.045	−0.0672***	0.0129***	−9.94e-05***	−0.109***	0.0918***	0.301***	0.641***	0.142***	0.0876***	0.382
	(0.0197)		(0.0150)	(0.00356)	(3.45e-05)	(0.0161)	(0.0202)	(0.0175)	(0.0317)	(0.0379)	(0.00725)	
EL	−0.129***	0.016	−0.0740***	0.0285***	−0.000163***	0.00208	0.202***	0.265***	0.391***	0.322***	−0.0151***	0.240
	(0.00859)		(0.00821)	(0.00197)	(1.76e-05)	(0.00946)	(0.0108)	(0.0120)	(0.0169)	(0.0150)	(0.00389)	
ES	−0.188***	0.020	−0.105***	0.0431***	−0.000294***	−0.0404***	0.169***	0.274***	0.351***	0.254***	−0.0259***	0.220
	(0.0143)		(0.0129)	(0.00336)	(2.93e-05)	(0.0148)	(0.0197)	(0.0208)	(0.0201)	(0.0182)	(0.00636)	
FR	7.16e-05	0.000	−0.00286	0.0282***	−0.000178***	−0.111***	0.184***	0.329***	0.457***	0.392***	0.00377	0.267
	(0.0115)		(0.0112)	(0.00222)	(2.09e-05)	(0.0122)	(0.0200)	(0.0114)	(0.0181)	(0.0216)	(0.00474)	
HR	−0.197***	0.028	−0.0727***	0.0108***	−7.65e-05***	−0.0346***	0.290***	0.321***	0.749***	0.512***	0.0514***	0.347
	(0.0136)		(0.0111)	(0.00284)	(2.45e-05)	(0.0115)	(0.0135)	(0.0140)	(0.0239)	(0.0250)	(0.00437)	
IE	−0.145***	0.026	−0.134***	0.0189***	−8.59e-05***	−0.0487***	0.104***	0.219***	0.467***	0.207***	0.0152***	0.282
	(0.0152)		(0.0128)	(0.00306)	(2.86e-05)	(0.0133)	(0.0170)	(0.0171)	(0.0179)	(0.0200)	(0.00525)	
LU	0.0609**	0.014	0.0886***	0.0108*	−8.28e-06	−0.0178	0.218***	0.313***	0.496***	0.390***	−0.0324***	0.198
	(0.0259)		(0.0226)	(0.00594)	(5.68e-05)	(0.0255)	(0.0274)	(0.0278)	(0.0492)	(0.0522)	(0.00953)	
LV	−0.219***	0.033	−0.158***	−0.00183	1.70e-05	−0.0894***	0.210***	0.380***	0.608***	0.213***	0.0977***	0.399
	(0.0205)		(0.0159)	(0.00360)	(3.46e-05)	(0.0159)	(0.0206)	(0.0176)	(0.0276)	(0.0357)	(0.00609)	
PL	−0.230***	0.055	−0.158***	0.00507**	8.30e-06	−0.0840***	0.197***	0.336***	0.398***	0.189***	0.0306***	0.297
	(0.00978)		(0.00886)	(0.00200)	(1.86e-05)	(0.00886)	(0.0122)	(0.0107)	(0.0168)	(0.0157)	(0.00329)	
PT	−0.185***	0.020	−0.104***	0.0256***	−0.000174***	−0.133***	0.318***	0.397***	0.426***	0.376***	0.0297***	0.288
	(0.0148)		(0.0129)	(0.00324)	(3.02e-05)	(0.0129)	(0.0196)	(0.0222)	(0.0276)	(0.0310)	(0.00588)	
SE	−0.0497**	0.002	−0.0393**	0.0516***	−0.000445***	−0.125***	0.219***	0.114***	0.624***	0.458***	0.0224***	0.332
	(0.0242)		(0.0176)	(0.00398)	(4.47e-05)	(0.0197)	(0.0222)	(0.0214)	(0.0607)	(0.107)	(0.00756)	
TOT	−0.121***	0.009	−0.0712***	0.0239***	−0.000158***	−0.121***	0.123***	0.351***	0.437***	0.292***	−0.0127***	0.198
	(0.00605)		(0.00582)	(0.00126)	(1.19e-05)	(0.00594)	(0.00843)	(0.00659)	(0.00930)	(0.00987)	(0.00226)	

Source: Own elaborations on EUROSTAT EU-SILC microdata.
Notes: (3) = model 3; (4) = model 4. (Standard errors in parentheses). Column Rural defines the income gap in relative terms that is as percentage of the non-rural household income. The coefficients of the year dummy are not shown, but they are available upon request.
***p < 0.01, **p < 0.05, *p < 0.1.

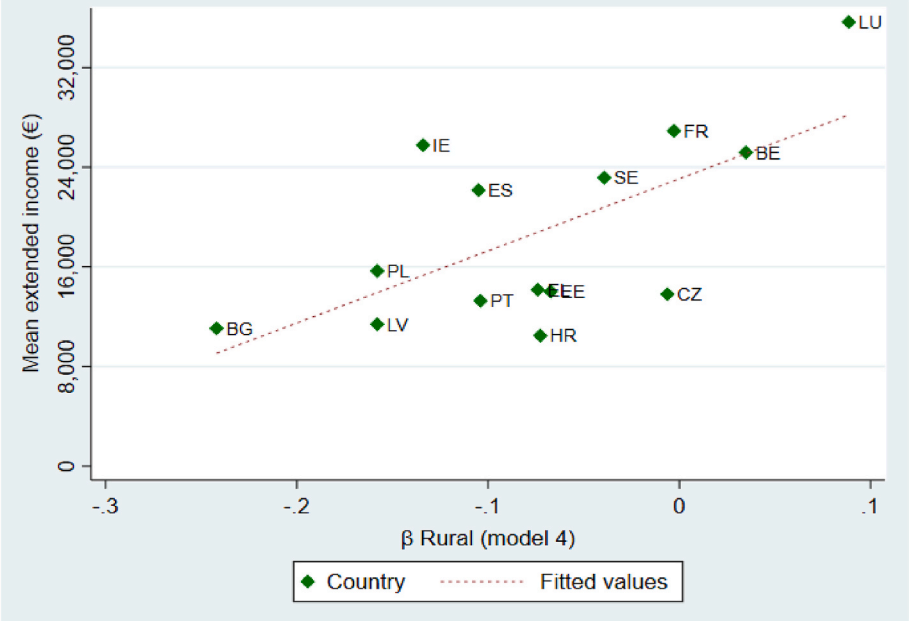


Fig. A2. Relationship between country mean extended income and model 4 Rural coefficients. Source: Own elaborations on EUROSTAT EU-SILC microdata.

Table A3
Estimates of the income gap between Rural and Non-Rural households. Models referring to the extended income in the three macro-groups of countries without and with covariates (Model 7 and 8).

Extended income	High-income countries		Intermediate-income countries		Low-income countries	
	(7)	(8)	(7)	(8)	(7)	(8)
Rural	−0.0394***	−0.0360***	−0.173***	−0.0899***	−0.283***	−0.167***
	(0.00991)	(0.00961)	(0.0110)	(0.0101)	(0.00971)	(0.00907)
Age		0.0300***		0.0208***		−0.000933
		(0.00185)		(0.00232)		(0.00187)
Age2		−0.000218***		−0.000109***		4.60e-05***
		(1.77e-05)		(2.13e-05)		(1.78e-05)
Gender		−0.108***		−0.0644***		−0.0866***
		(0.00983)		(0.0112)		(0.00868)
Edu_Post_1		0.162***		0.224***		0.226***
		(0.0164)		(0.0136)		(0.0111)
Edu_Post_2		0.279***		0.308***		0.369***
		(0.00938)		(0.0145)		(0.0103)
Work		0.487***		0.501***		0.508***
		(0.0160)		(0.0187)		(0.0162)
Retirement		0.391***		0.324***		0.238***
		(0.0207)		(0.0169)		(0.0166)
Hhsize		−0.0160***		−0.0197***		0.0219***
		(0.00370)		(0.00456)		(0.00351)
R-squared	0.017	0.245	0.064	0.235	0.105	0.297

Source: Own elaborations on EUROSTAT EU-SILC microdata.
Notes: (7) = model 7; (8) = model 8. (Standard errors in parentheses). Row Rural defines the income gap in relative terms that is as percentage of the non-rural household income. The coefficients of the year and country dummy are not shown, but they are available upon request.
***p < 0.01, **p < 0.05, *p < 0.1.

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