

Do an income and poverty gaps exist between rural and non-rural areas in Europe?

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Abstract

This paper aims to address the issues of the so-called "rural effect", which imputes the disparities in income between those who live in rural areas and those in urban areas. Differences in poverty rates, or more broadly, the living conditions of households, are influenced not only by the individual characteristics of residents, conceptualised as levels of human capital, but also significantly shaped by the structural attributes of their place of residence (Bernard, 2019). While the existence of the rural effect has been demonstrated in numerous developing countries, its applicability in Europe remains uncertain. Using the Kitagawa-Oaxaca-Blinder decomposition on the EU-SILC panel data wave (2017-2021) covering 25 European countries, this paper investigates whether the evidence supports the existence and the possible characteristics that affect this effect in the Member States. To our knowledge, tackling the income and poverty gaps between rural and non-rural areas at the same time in the EU using this approach has not been attempted before. Although poverty trends are diminishing overall, rural areas remain at greater risk. Higher education and employment consistently reduce the probability of poverty, underscoring the importance of targeted investment in human capital and labour inclusion.

Keywords: Income poverty; Income gap; poverty gap; Urbanization degree; Rural areas

JEL Codes: I32; O18; R20

1. INTRODUCTION

In economic literature, great interest is given to income disparities among different groups. One such case is the income gap between those who reside in urban areas versus those who live in rural households, which can be assessed in terms of differences in the average values of the household income of the two groups. A natural extension of this line of research is the assessment of the differences in poverty gaps between urban and rural dwellers. However, because income is distributed unevenly among the members of the population, it seems necessary to evaluate whether the two groups also differ in terms of the extent and severity of poverty. Moreover, more interesting are the factors that contribute to these disparities, considering that these groups vary according to several dimensions that can indeed affect household income. This requires an appropriate method to evidence the issue empirically.

Bernard (2019) suggests that differences in income poverty are not always caused by differences in people's choices and characteristics. Still, they depend merely on the fact that they live in one of the two areas, which is named the "rural effect". Determining if the rural effect exists or not is fundamental in the progression of the debate in rural studies, and it has intrinsically essential policy implications. Knowing whether the differences between two subgroups (such as urban and rural dwellers) are caused by a discriminating factor or by their individual choices could shape the potential policies toward these subgroups. To the authors' knowledge, while the existence of the rural effect has been established in numerous developing countries (Lichter & Johnson, 2007; Lichter & Parisi, 2008; Young, 2013), there remains uncertainty regarding its applicability to Europe (Bosco & Poggi, 2020; Mussida & Sciulli, 2022; Rocchi et al., 2021; Želinský et al., 2022). Through an empirical analysis, this paper seeks to provide further insight into this phenomenon by combining the study of the rural effect with the Kitagawa-Oaxaca-Blinder decomposition, which has not been used together in this kind of analysis. Indeed, to determine if rural households have a disadvantage in terms of income and poverty, this decomposition disentangles the gaps, focusing attention on the distribution (difference) in the endowment of observed characteristics between rural and non-rural households. We believe that such results could be an innovative contribution to the ongoing conversation regarding urban-rural differences and the possibilities for convergence, specifically in Europe, as the empirical analysis covers 25 European countries.

The paper is structured as follows. Section 2 provides a brief review of the existing literature, whereas Section 3 introduces the dataset and the descriptive statistics. Section 4 presents the econometric model, and Section 5 describes and discusses the results. Finally, Section 6 concludes.

2. LITERATURE REVIEW

The problem of disparities between rural and urban areas is and has been a topic of utmost interest in economic literature. As observed by Biggeri et al. (2025), substantial core-periphery disparities exist in environmental, social, and economic sustainability throughout European Countries: core and northern regions outperform, while peripheries, especially eastern and southern areas, register significantly lower scores of the Human Development Index. Focusing on the economic dimension and on income, a particularly compelling advancement in this research area is the alleged presence of a distinct "rural effect" (Bernard, 2019, p. 370). This research field argues that the evident disparities between rural and urban residents are attributable not only to differing choices and lifestyles but also to variations in their respective opportunities, namely that those who live in rural areas have more limited access to several commodities and services, usually earn smaller incomes and, more generally, enjoy a lower well-being status (Bernard, 2019).

Prior to examining the studies that have attempted - either theoretically or empirically - to address this question, it is essential to establish a clear definition of what constitutes a rural area. This task is complex due to the existence of various interpretations of the concept (Woods & Heley, 2017), often in contrast to each other (Shucksmith et al., 2009). Based on Féret et al. (2020) and Mantino (2021), six are the most common approaches:

- 1- The administrative or statutory approach, in which rural areas are the areas outside towns' administrative boundaries (Bański, 2006; Dymitrow, 2013). It is mainly used in Eastern European countries (Depraz, 2008). A limitation of this method is that rural areas situated near or adjacent to large urban agglomerations are considered purely rural, whereas they exhibit more urban-like characteristics. Conversely, small towns that are more integrated with their rural environment are treated as purely urban (Bański & Mazur, 2016).
- 2- The morphological approach uses two factors to determine the distinction, which are the population size and the population density, respectively. The thresholds vary from one country to another, but the methodology is used in Scandinavian countries as well as in the Netherlands, Portugal, Spain, and Belgium (Chevalier, 2008; Depraz, 2007). The OECD considers urban areas as those in which more than 85% of the population lives in municipalities of more than 150 inhabitants per square kilometre; semi-rural ones in which the percentage is between 50% and 85%; and rural when it's less than 50% (Serrano, 2014). While statistically robust, it can lead to problems depending on the thresholds chosen by the individual countries (Depraz, 2008). This approach is used for estimating the EU-SILC's DEGURBA variable (DB100) of the EU statistics on income and living conditions survey (EU_SILC), which is adopted in this analysis - more on that in the concluding remarks of this paper.
- 3- The locational approach defines rural areas in relation to urban areas, such as the distance to urban centres or the time that a daily commute to an urban-located job would take (Bański & Mazur, 2016). This methodology is also used to assess the rural population's access to a series of services (Dijkstra & Poelman, 2008). Moreover, it lies mainly in the integration or isolation from urban areas.
- 4- The Economic approach defines the urban and rural areas according to the specific type of economic activity more commonly pursued in the area. Urban areas are, therefore, more characterized by a clusterization of the land for economic profit (Bibby & Shepherd, 2004). Instead, rural areas are distinguishable by the share of the primary sector in the GDP, average per capita income and the cost of services. In particular, Blanc (1997) divides the economic approach into three different sub-approaches:
 - a. The spatial approach considers the availability of resources, transport costs and distances, leading to a clusterization of areas to achieve economies of scale, creating a tiered area with centres and peripheries, in which the latter are less high-skilled, make more use of natural resources, and labour is unskilled and undiversified.
 - b. The functional or territorial approach is based on the relationships between economic agents and proximity as factors conducive to economic performance and the upgrading of resources. Rural areas are defined as a "regional interactional concept closely linked to urban areas" (EU, OECD, ESPON, EUROSTAT).
 - c. The constructivist approach is based on representation by a group of actors. Rurality will take on different meanings for farmers, who consider the area as a working environment and resource, and for other residents who see it as representing the landscape and a contribution to their quality of life.
- 5- The landscape approach significantly considers the environmental aspect in the perception of rural areas (Bański & Mazur, 2016). Land-cover data and climatic conditions are used to define rural areas (Van Eupen et al., 2012). Such characteristics are, for example, building density, level of urbanization, continuity of the built-up area and share of forest. Such criteria have sometimes been used within morphological approaches to enhance the definition of rural areas (Bontron, 2015; Serrano, 2014).

- 6- The combined approach, in which at least two of the methods mentioned above are combined (see, for instance, Berchoux et al. (2019), Copus (2013), Dijkstra & Ruiz (2010), Meloni et al. (2024), Prieto-Lara & Ocaña-Riola (2010), and Rosner (2008)).

Having provided several possible interpretations of what rurality is, this paper adopts the second one for the analysis. Therefore, the central issue, namely the existence or absence of the "Rural Effect", is defined as *"the impact of specific, spatially localized opportunity structures and the deficiencies of these structures on poverty"* (Bernard, 2019, p. 370). The question regards the purported existence of several factors that may influence the residents of a particular geographical location, those who live in rural areas, so that their welfare, be it expressed through wages, income - or, in our works, in poverty gaps - is affected negatively by the fact that these people are living in rural areas instead of urban, and not by their individual choices and characteristics. In a seminal work, Bernard (2019) addresses the issue, using cross-sectional data from the 2013 wave of EU-SILC, analyzing 245,352 households from 28 European countries. In the first stage, Bernard analyzed bivariate correlations between the poverty gap and independent variables measured at the country level. Subsequently, he applied random effects models, i.e. *"hierarchical linear regressions with random intercepts for countries and a random slope of the rural/urban variable, allowing for the variations in country poverty gaps and the different effects of the rural environment in different countries"* (ibidem). The aim was to explain differences in poverty gaps among individuals and, most importantly, consider the rural/urban distinction, whether a specific characteristic of the population described the differences or if rural residence had a direct effect. Although the findings do not provide a conclusive resolution to the question, they seem to confirm the rural effect in Eastern Europe, especially if the countries were formerly part of the Eastern Bloc; conversely, this effect was not attested in the West. However, most poor people were found in urban areas, while rural ones exhibited higher levels of well-being.

Among the numerous scholars who have similarly sought to address this issue, Takahashi (2007) analyses Vietnam's income and living conditions in the 1993 and 1998 waves using the Kitagawa-Oaxaca-Blinder decomposition method. However, his analysis does not find a significant and strong correlation with the territory, primarily due to the compensatory effect caused by land ownership and use. Yet, a significant impact on disparity is given in the role of education. Petcu (2022) conducts a similar experiment in Romania. Its findings illustrate a positive effect on what concerns urban workers, as higher education once again plays a role by endowing them with skills that are usually more sought after by the markets. Moreover, Young (2013) finds a correlation between poverty and rurality, which concerns developing countries, while Lichter & Johnson (2007) and Lichter & Parisi (2008) identify it in the American continent. However, the rural effect does not seem to be easy to confirm in Europe, where the answer remains elusive. Scholars, such as Želinský et al. (2021), Bosco & Poggi (2020), Mussida & Sciulli (2022), and Rocchi et al. (2021), have not reached a consensus on this issue.

Concerning the object variables of the abovementioned analyses, it can be said that most of the variables under study can be included in the material deprivation set. Želinský et al. (2022) use subjective variables, such as the ability to make ends meet (HS120 code on EU-SILC). Many others employ variants of income, often in the form of Disposable Income (see, for instance, Nieuwenhuis et al. (2020), Takahashi (2007), and Yang et al. (2023)), other wage measures (for example, Bediakon et al. (2022), Petcu (2022), and Zdeněk et al. (2022)). Bernard (2019) and Marissal et al. (2013) employ, instead, a vector of material deprivation variables, which is composed of an aggregate of different variables, often without a normative determination but based on the information available in the dataset. Some examples are *"...unexpected expenses, afford a one-week annual holiday away from home, a meal involving meat, chicken or fish every second day, the adequate heating of a dwelling, durable goods like a washing machine, colour television, telephone or car, or being confronted with payment arrears"* (Kalinowski, 2020, p. 71). Finally, other analyses use the At Risk of Poverty Or social Exclusion Index (AROPE) or health indicators (Bhusal, 2022; Kalinowski, 2020).

The principal methodologies concern, on the one hand, the use of indices (e.g. Theil, 60% median income) for works that focus only on certifying levels of deprivation; on the other, the use of econometric models. Some examples are the Oaxaca-Blinder decomposition (see, for instance, Bhusal, 2022; Gupta & Kothe, 2022; Nieuwenhuis et al., 2020; Petcu, 2022; Prabowo, 2021; and Takahashi, 2007), spatial econometric models as in (Yang et al., 2023), or Meta-Regression Analysis (MRA) (see Yuan et al., 2020). The main control variables are the type of home ownership and its size, the Rural/Non-Rural area, the number of adults/children (Bosco & Poggi, 2020, and Mussida & Sciulli, 2022), employment variables (such as work performed, work sector (mainly agricultural one), human capital, work intensity as in (Ayllón & Gábos, 2017; Bernard, 2019; and Mussida & Sciulli, 2022), age (see, for example, Bernard, 2019; Bosco & Poggi, 2020; Fabrizi & Mussida, 2020; and Mussida & Sciulli, 2022), gender and education of the subject, householder and the children (Bernard, 2019; Bosco & Poggi, 2020; Fabrizi & Mussida, 2020; Mussida & Sciulli, 2022), sociodemographic (for example, being native or immigrant as in Prabowo (2021)), and economic (GDP of the territory, poverty - if the variable object is something else (Bernard, 2019; Zdeněk et al. 2022)).

There appears to be a lack of unanimous consensus on many conclusions, primarily due to the diverse characteristics of the regions analyzed, which often exhibit varying socio-economic structures, as well as the differing periods examined, which represented growth for some countries and stagnation for others. In Europe, poverty trends appear to be decreasing (Želinský et al., 2021). In general, larger households and greater population density logically result in greater poverty (Bruder & Unal, 2017; Marissal et al., 2013; Želinský et al., 2022). This last point could explain the lack of consensus on which of the territories exhibits the most poverty: some studies, in fact, find that rural poverty is greater if it is interpreted as the intensity of poverty and not the concentration of poor people, especially in less developed countries and with Soviet heritage (Bernard, 2019; Kalinowski, 2020); however, the data does not contradict the previous elements examined. Many works show a reducing effect of poverty due to female employment (Nieuwenhuis et al., 2020; Prabowo, 2021), education (Gupta & Kothe, 2022; Takahashi, 2007) and a distinction based on the sector of work (Bruder & Unal, 2017; Winkler, 2021). Therefore, this paper aims to contribute to the ongoing discourse by introducing a study on poverty within the European Union. We intend to advance this conversation by employing the Kitagawa-Oaxaca-Blinder decomposition to analyze poverty gaps and elucidate the Rural Effect, an approach that, to our knowledge, has not been previously undertaken.

3. DATA AND DESCRIPTIVE STATISTICS

The data used in this work are taken from the European Union Statistics on Income and Living Conditions (EU-SILC) longitudinal dataset provided by EUROSTAT. It is a European Union program that aims to provide comparable and harmonized data on income, poverty, social exclusion, and living conditions across EU member states. EU-SILC was launched to enhance the understanding of social and economic disparities within and among EU countries. EU-SILC gathers data through surveys conducted in each EU member state, using a common questionnaire and methodology to ensure consistency and comparability of the results. The collected information provides valuable insights for policymakers, researchers, and the public, aiding in the formulation and assessment of social and economic policies at both national and EU levels. The main dimensions observed by the EU-SILC survey are:

- **Income Distribution:** Collecting data on income and its distribution among different population groups to analyze and compare levels of income inequality.
- **Poverty and Social Exclusion:** Measuring the extent of poverty and social exclusion, including indicators such as material deprivation, low work intensity, and social participation.
- **Living Conditions:** Examining various aspects of living conditions, such as housing, health, education, and employment, to assess the overall well-being of individuals and households.
- **Social Policies:** Evaluating the impact of social policies and welfare systems on the well-being of the population.

In particular, the 2017-2020 wave of the longitudinal data is used to have more continuity in the analysis. This wave is the penultimate one available, but this study employs it over the latest one due to data consistency and some significant issues in the latest wave that would make our analysis less accurate. The dataset provides 1,199,504 observations for a total of 23 countries¹. Overall, the percentage of rural households in the sample hovers around 33% (see Tab. 1 for the individual countries' percentages of rural households). The highest levels are found in Lithuania, the only country to have more than 50% of rural households, followed by Estonia, Ireland and Poland. Belgium and Switzerland have the lowest levels.

Table 1. Share of Rural and non-rural households in the sample by country (Average Values 2017-2020).

Code	Country	Non-rural households	Rural Households	Total	% of rural population
BE	Belgium	46596	8395	54991	15%
CH	Switzerland	31497	7279	38776	19%
CY	Cyprus	20199	5044	25243	20%
IT	Italy	106116	30258	136374	22%
ES	Spain	53806	22938	76744	30%
NO	Norway	23013	9680	32693	30%

¹ Countries analysed are: Austria, Belgium, Bulgaria, Switzerland, Cyprus, Czech Republic, Denmark, Estonia, Greece, Spain, Finland, France, Croatia, Hungary, Ireland, Italy, Lithuania, Luxembourg, Latvia, Norway, Poland, Serbia and Slovakia. We had to eliminate Malta and Slovenia due to their lack of urban / rural distinctions. Data are not available for other countries, namely Romania, Sweden and the Netherlands.

Code	Country	Non-rural households	Rural Households	Total	% of rural population
FI	Finland	35758	19475	55233	35%
BG	Bulgaria	33136	19031	52167	36%
DK	Denmark	14127	8307	22434	37%
FR	France	24315	14384	38699	37%
HU	Hungary	22780	14373	37153	39%
LU	Luxembourg	21463	14384	35847	40%
CZ	Czechia	23116	15629	38745	40%
AT	Austria	17399	11599	28998	40%
LV	Latvia	16620	12154	28774	42%
SK	Slovakia	19047	13693	32740	42%
EL	Greece	56401	44408	100809	44%
HR	Croatia	25505	20565	46070	45%
RS	Serbia	20175	16470	36645	45%
PL	Poland	57075	49181	106256	46%
IE	Ireland	14180	11846	26026	46%
EE	Estonia	19291	16587	35878	46%
LT	Lithuania	12644	14384	27028	53%

Source: Authors' elaboration of EU-SILC data (2017-2020).

Concerning Income Poverty, Table 2 summarises the average household disposable income levels countrywide, considering the Purchasing Power Parity (PPP) levels. As one can see, the levels of poverty in the sample are quite heterogeneous. Countries like Czechia or Denmark have low levels of poverty, whereas in others, such as Latvia and Serbia, nearly a quarter of the population is poor. It is also very interesting to see the amount of poor people who reside in rural areas. In some cases, like Belgium, the percentage is very small; in others, like Lithuania, it is considerably higher. This heterogeneous result is in line with the difficulty encountered by other authors in determining if the Rural Effect can be applied to Europe. Table 3 shows the poverty trends across Europe for all the available years. A reduction in poverty gaps can be observed for most of the selected countries, with only some rising slowly in 2018 and just a few, like Ireland and Lithuania, that appear to be incrementing, albeit slowly.

Table 2. Poverty measures in the countries were observed for the whole population as well as for rural and non-rural groups (Average Values 2017-2020).

Code	Country	Total Population	Poor	Rural Pools	% of poor population	% of poor rural population
AT	Austria	28998	3987	1333	14%	5%
BE	Belgium	54991	8505	1133	15%	2%
BG	Bulgaria	52167	11582	6272	22%	12%
CH	Switzerland	38776	5541	1064	14%	3%
CY	Cyprus	25243	3966	1037	16%	4%
CZ	Czechia	38745	3259	1409	8%	4%
DK	Denmark	22434	2039	679	9%	3%
EE	Estonia	35878	6382	3166	18%	9%
EL	Greece	100809	17348	8622	17%	9%
ES	Spain	76744	16085	5550	21%	7%
FR	France	38699	5500	1444	14%	4%
HR	Croatia	46070	9391	5499	20%	12%

Code	Country	Total Population	Poor	Rural Poors	% of poor population	% of poor rural population
HU	Hungary	37153	4377	1996	12%	5%
IE	Ireland	26026	3559	1790	14%	7%
IT	Italy	136374	25780	6167	19%	5%
LT	Lithuania	27028	5424	3821	20%	14%
LU	Luxembourg	35847	6140	2008	17%	6%
LV	Latvia	28774	6482	3377	23%	12%
PL	Poland	106256	15911	9679	15%	9%
RS	Serbia	36645	8659	5166	24%	14%
FI	Finland	55233	6898	2403	12%	4%
NO	Norway	32693	3459	959	11%	3%
SK	Slovakia	32740	3520	1728	11%	5%

Source: Authors' elaboration of EU-SILC data (2017-2020).

Table 3. Poverty measures in the countries for each available year.

CountryCode	Country	2017	2018	2019	2020
AT	Austria	14.03%	14.39%	13.48%	13.36%
BE	Belgium	16.82%	16.33%	14.86%	14.17%
BG	Bulgaria	23.31%	21.47%	22.20%	22.03%
CH	Switzerland	14.09%	13.57%	14.80%	14.33%
CY	Cyprus	15.36%	16.57%	15.67%	15.26%
CZ	Czechia	8.25%	8.72%	8.84%	7.80%
DK	Denmark	8.44%	8.49%	8.96%	9.68%
EE	Estonia	16.24%	18.13%	18.03%	17.91%
EL	Greece	20.39%	17.27%	16.42%	16.07%
ES	Spain	21.98%	21.50%	20.83%	20.36%
FI	Finland	11.60%	12.33%	12.67%	12.81%
FR	France	16.52%	14.68%	14.00%	13.33%
HR	Croatia	20.40%	20.11%	20.37%	20.61%
HU	Hungary	11.84%	12.32%	12.81%	9.97%
IE	Ireland	17.07%	13.99%	12.75%	13.32%
IT	Italy	19.40%	19.38%	18.46%	18.25%
LT	Lithuania	21.58%	21.56%	18.93%	19.62%
LU	Luxembourg	17.58%	17.42%	16.78%	16.79%
LV	Latvia	20.51%	23.57%	23.15%	22.02%
NO	Norway	10.13%	10.53%	10.75%	10.61%
PL	Poland	15.38%	14.81%	14.92%	n.d.
RS	Serbia	26.37%	25.11%	23.02%	22.23%
SK	Slovakia	12.51%	11.09%	10.32%	10.25%

Source: Authors' elaboration of EU-SILC data (2017-2020).

Table 4 focuses on the Urban / Rural poverty gaps. We see that in most cases in the richer countries, the poverty gaps in rural areas are lower but increasing. In contrast, in some cases, such as Bulgaria and Norway, the levels are higher in rural areas, still showing signs of convergence.

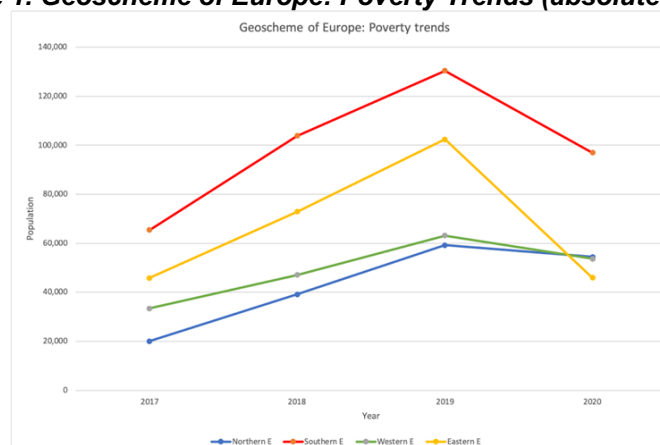
Table 4. Rural-Non Rural Poverty Measures in the countries for each available year.

Country Code	Country	2017		2018		2019		2020	
		Non-rural	Rural	Non-rural	Rural	Non-rural	Rural	Non-rural	Rural
AT	Austria	10.10%	3.90%	9.50%	4.90%	8.80%	4.70%	8.80%	4.60%
BE	Belgium	14.30%	2.50%	13.90%	2.40%	13.00%	1.90%	12.50%	1.60%
BG	Bulgaria	10.50%	12.80%	9.70%	11.80%	10.30%	11.90%	10.20%	11.80%
CH	Switzerland	11.40%	2.70%	11.00%	2.50%	12.10%	2.70%	11.40%	2.90%
CY	Cyprus	11.50%	3.90%	12.50%	4.10%	11.60%	4.10%	11.00%	4.20%
CZ	Czechia	4.60%	3.70%	5.20%	3.50%	5.10%	3.80%	4.20%	3.60%
DK	Denmark	5.30%	3.20%	5.40%	3.10%	6.00%	3.00%	6.70%	3.00%
EE	Estonia	7.00%	9.20%	8.80%	9.30%	9.50%	8.60%	9.30%	8.60%
EL	Greece	10.70%	9.70%	8.90%	8.40%	8.20%	8.20%	7.70%	8.30%
ES	Spain	14.30%	7.70%	14.00%	7.50%	13.80%	7.00%	13.20%	7.20%
FR	France	7.70%	3.90%	8.30%	4.10%	8.30%	4.40%	8.10%	4.80%
HR	Croatia	12.80%	3.70%	11.00%	3.70%	10.30%	3.70%	9.60%	3.70%
HU	Hungary	7.20%	13.20%	8.50%	11.60%	8.70%	11.70%	8.70%	11.90%
IE	Ireland	7.80%	4.00%	6.80%	5.50%	6.80%	6.00%	4.80%	5.20%
IT	Italy	8.20%	8.80%	6.90%	7.10%	6.50%	6.30%	6.50%	6.80%
LT	Lithuania	14.90%	4.50%	14.90%	4.50%	14.10%	4.40%	13.40%	4.90%
LU	Luxembourg	5.80%	15.70%	5.80%	15.80%	5.20%	13.80%	6.90%	12.70%
LV	Latvia	11.90%	5.70%	12.20%	5.20%	11.20%	5.60%	10.70%	6.00%
PL	Poland	10.40%	10.10%	12.00%	11.50%	10.60%	12.50%	10.20%	11.80%
RS	Serbia	7.20%	3.00%	7.90%	2.70%	7.60%	3.10%	7.70%	2.90%
FI	Finland	6.50%	8.90%	5.80%	9.00%	5.70%	9.20%	n.d.	n.d.
NO	Norway	9.90%	16.50%	10.30%	14.90%	9.30%	13.70%	4.50%	13.10%
SK	Slovakia	6.10%	6.40%	5.90%	5.20%	5.20%	5.10%	5.50%	5.10%

Source: Authors' elaboration of EU-SILC data (2017-2020).

Finally, the trends in poverty can be evaluated across various major regions. Figure 1 shows the poverty levels categorized according to the fourfold division of the Geoscheme of Europe: Northern, Western, Southern, and Eastern Europe. Southern Europe demonstrates the highest levels of poverty, followed closely by Eastern Europe. In contrast, Northern and Western Europe exhibit lower poverty levels.

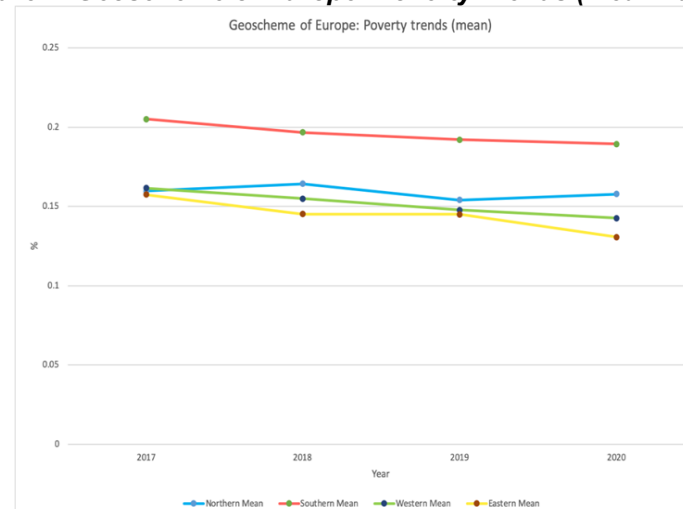
Figure 1. Geoscheme of Europe: Poverty Trends (absolute values).



Source: Authors' elaboration of EU-SILC data (2017-2020).

The mean values were calculated to account for variations in sample size (see Figure 2). The results indicate that the average poverty level in Eastern Europe is lower, with reduced dispersion among the categories. Nonetheless, Southern Europe continues to exhibit the highest poverty levels.

Figure 2. Geoscheme of Europe: Poverty Trends (mean values).

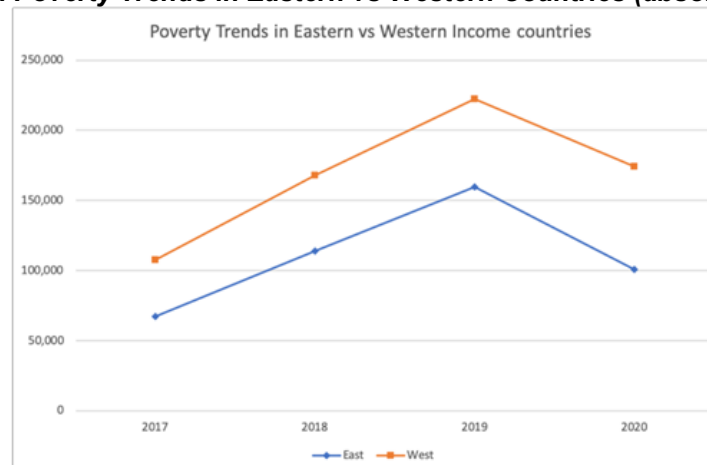


Source: Authors' elaboration of EU-SILC data (2017-2020).

The previous trends can be examined by considering three distinctions that will be incorporated into the model. These distinctions are:

- Est: if the country is part of Eastern Europe.
- Developed: if the country is considered developed according to the EU's European Structural and Investment Funds² (ESI Funds, ESIFs).
- High income: if the country is considered a high-income country, according to the European Commission.

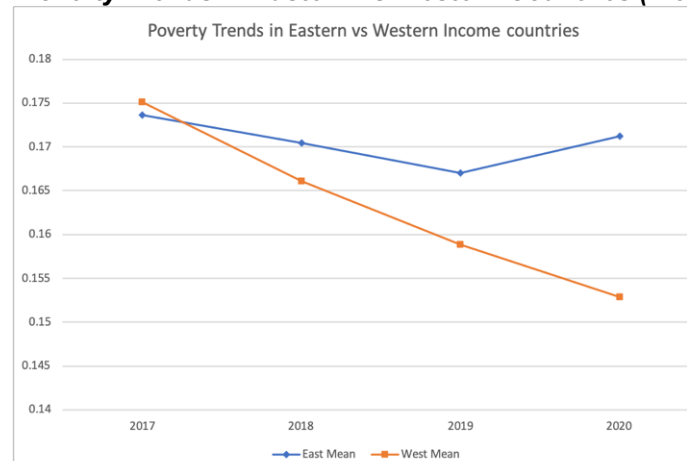
Figure 3. Poverty Trends in Eastern vs Western Countries (absolute value).



Source: Authors' elaboration of EU-SILC data (2017-2020).

² EU's European Structural and Investment Funds are financial mechanisms regulated by a shared set of rules established to enact the regional strategy of the European Union alongside the structural components of the Common Agricultural Policy and the Common Fisheries Policy. Their objective is to diminish discrepancies in income, wealth, and opportunities among regions. While support primarily targets Europe's less affluent regions, all European ones qualify for assistance through the diverse funds and programs of this policy. The existing framework is designated for a seven-year duration, spanning from 2021 to 2027. Countries are divided between "less developed", "transition", and "developed" (EU).

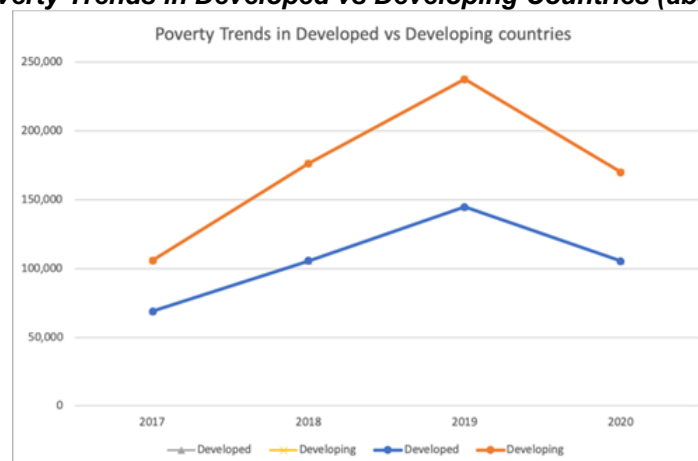
Figure 4. Poverty Trends in Eastern vs Western Countries (mean values).



Source: Authors' elaboration of EU-SILC data (2017-2020).

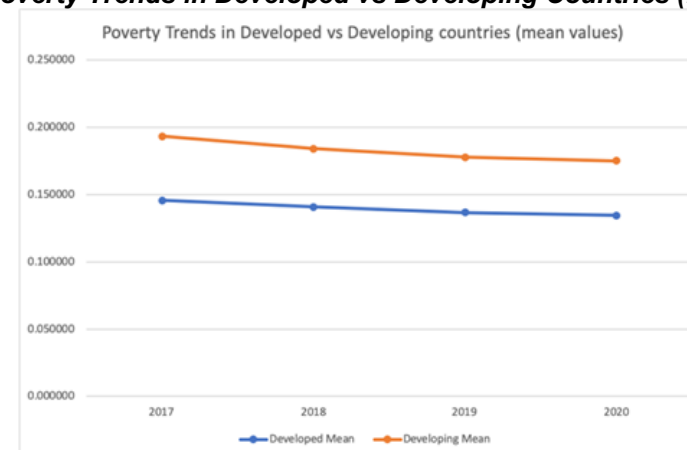
An examination of the absolute values presented in Figure 3 may lead to the impression that poverty is more prevalent in the West, which is indeed true given the larger sample size in that region. However, when analyzing the mean values illustrated in Figure 4, it becomes evident that poverty is, in fact, a more significant issue in the East. In Figures 5 and 6, instead, it is evident from both absolute figures and average values that developing countries exhibit higher levels of poverty.

Figure 5. Poverty Trends in Developed vs Developing Countries (absolute values).



Source: Authors' elaboration of EU-SILC data (2017-2020).

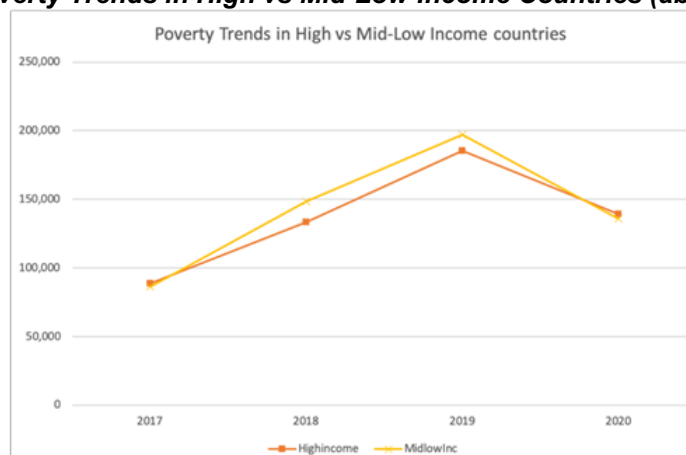
Figure 6. Poverty Trends in Developed vs Developing Countries (mean values).



Source: Authors' elaboration of EU-SILC data (2017-2020).

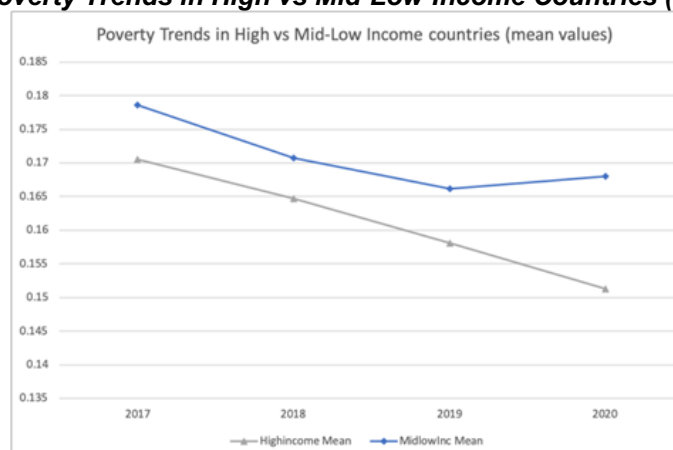
In terms of absolute values, the number of individuals living in poverty appears relatively similar and follows comparable trends in low-income countries (see Figure 7). However, an analysis of the mean levels reveals that these nations experience a higher degree of poverty, as shown in Figure 8.

Figure 7. Poverty Trends in High vs Mid-Low-Income Countries (absolute values).



Source: Authors' elaboration of EU-SILC data (2017-2020).

Figure 8. Poverty Trends in High vs Mid-Low-Income Countries (mean values).



Source: Authors' elaboration of EU-SILC data (2017-2020).

4. EU_SILC VARIABLES AND ECONOMETRIC MODEL

The household's Equivalised Disposable Income serves as the basis for the analysis. This variable takes the overall net disposable income in a household and divides it by the equivalent household size³ to facilitate comparability between households of different sizes. Moreover, the study also considers "extended income", which encompasses not only the equivalised value but also that of goods produced for own consumption and the imputed rent (Marino et al., 2021). In both versions of the income, following the literature, this analysis calculates and considers the natural logarithm. However, the primary objective variable of this study will be introduced subsequently, specifically in relation to poverty gaps.

To define whether the considered households live in urban or rural residences, this paper considers the EU-SILC's Degurba variable (DB100), which divides the areas in which the families live according to three levels of population density: densely populated, intermediate, and thinly populated areas. According to this variable, the households living in the latter areas are rural, while the other are non-rural. This classification could represent a limited and simplistic approach, given the articulated aspects of the rural areas, but it seems to be notably clear and has been utilized in previous studies (Bernard, 2019; Meloni et al., 2024; Winkler, 2021; Želinský et al., 2022). Moreover, it remains the only method available for distinctly identifying rural areas within the EU-SILC data. Following Bernard (2019), this analysis merged the densely and intermediately populated

³ The equivalence scale provides a weight of 1 to the first adult, 0.66 to each subsequent adult (aged 14+ living in the household) and 0.33 to each child aged less than 14 (EUROSTAT).

areas. There is an ulterior reason for this simplification: the Kitagawa-Oaxaca-Blinder decomposition works only with two subgroups at a time. Without it, we would have had to do the three groups two at a time (resulting in three iterations), which would have made the results less intelligible and more challenging to derive conclusions from.

For evaluating the poverty gap between rural and non-rural European households, this paper employs the Kitagawa-Oaxaca-Blinder (KOB) decomposition, this paper employs the Kitagawa-Oaxaca-Blinder (KOB) decomposition, a method that has been extensively utilized to address the relevant issues (see, for instance, Bhusal, 2022; Guarini, 2013; Guarini et al., 2018; Petcu, 2022; Prabowo, 2021). The KOB decomposition is a statistical method used in econometrics to analyze and decompose the differences in a particular outcome variable between two groups. It is commonly employed to understand and quantify the factors contributing to wage gaps or other disparities between different demographic groups, including gender and race. In particular, it attempts to explain a gap between two groups by breaking it down into two main components:

- Endowment effect: This component represents the portion of the rural poverty gap that can be explained by differences in characteristics or endowments between the two groups. For example, differences in education, experience, or other observable characteristics.
- Coefficient effect: This component captures the portion of the rural poverty gap attributed to differences in socio-geographical factors, which are difficult to pinpoint (corresponding to different treatment or discrimination in the classic wage gap application of the model). It examines how the returns (coefficients) on these characteristics differ between the two groups.

The overall intention is to decompose the observed difference in outcomes into a part that can be explained by differences in characteristics (endowments) and a part that remains unexplained, often attributed to factors like discrimination or unobservable variables.

Referring to two groups named A and B, the decomposition can be summarised in the following equations:

$$\ln(Y_{Ai}) = X_{Ai}\beta_A + \mu_{Ai} \quad (1)$$

$$\ln(Y_{Bi}) = X_{Bi}\beta_B + \mu_{Bi} \quad (2)$$

Where Y is the object variable, X is a vector of explanatory, β_A and β_B are vectors of coefficients, and μ is an error. If we name b_A and b_B the regression estimates of β_A and β_B , then, having the average value of residuals equal to zero, we have:

$$\text{mean } \ln(Y_{Ai}) - \text{mean } \ln(Y_{Bi}) = b_A \text{mean}(X_A) - b_B \text{mean}(X_B) = b_A(\text{mean}(X_A) - \text{mean}(X_B)) + \text{mean}(X_B)(b_A - b_B) \quad (3)$$

The first part of the equation (3) illustrates the impact of between-group differences in the explanatory variables X, evaluated using the coefficients for group A. Instead, the second part is the differential that is not explained by these differences in the observed characteristics X but by other unexplained characteristics attributable to the Rural Effect. Therefore, the first part symbolises the endowment effect, whereas the second represents the coefficient effect, which can be used to investigate the Rural Question.

The main control variables used in previous analyses are the type of home ownership and its size, the Rural/Non-Rural area, the number of adults/children (see, for instance, Bosco & Poggi, 2020; Mussida & Sciulli, 2022), employment variables (such as, work performed, work sector (mainly, agricultural one), human capital, work intensity (see, for example, Ayllón & Gábos, 2017; Bernard, 2019; Mussida & Sciulli, 2022), age (see Bosco & Poggi, 2020; Fabrizi & Mussida, 2020; Mussida & Sciulli, 2022; Bernard, 2019), gender, education of the subject / of the head of the family / of the children (according to Bosco & Poggi, 2020; Mussida & Sciulli, 2022; Fabrizi & Mussida, 2020; Bernard, 2019), citizenship (e.g. be native / immigrant as in Prabowo 2021) and economic (GDP of the territory, poverty - if the variable object is something else as in Bernard, 2019; Zdeněk et al. 2022). Based on this literature, the following independent variables⁴ have been considered in this empirical analysis:

- *age*: the age of the householder.
- *Age²*: the square of the age of the householder.
- *Edu_Post_1*: is a dummy = 1 if the respondent has successfully completed their lower secondary education and = 0 otherwise.
- *Edu_Post_2*: is a dummy = 1 if the respondent has successfully completed their post-secondary non-tertiary education and = 0 otherwise.
- *worker*: is a dummy = 1 if the respondent is part of the workforce, = 0 if they are inactive.
- *retired*: is a dummy = 1 if the respondent is retired, = 0 otherwise.
- *hsize*: measures the household size, namely the number of people in the household.
- *year*: is the year of reference.

⁴ The variables are taken from either the Personal (P and R files) – selecting the head of the household as a respondent, or from the Household (H and D files) whenever they are referred to the entirety of the nucleus.

- *Country dummy*: refers to a set of dummies referring to the countries in which the households belong.

Firstly, models are estimated using household income as a dependent variable, and second, poverty. In particular, the Income model is estimated two times, using disposable Income and extended Income, respectively. According to Meloni et al. (2024), the latter is obtained by adding two income sources to the Equivalised Disposable Household Income: the imputed rent and the value of goods produced for own consumption. This last element is crucial in rural households (Meloni et al., 2024). The novelty of this approach, in contrast to other studies focusing on equivalised or extended income, resides in the implementation of the KOB decomposition method. Secondly, the poverty model considers the position of observations in relation to the Poverty Line. For each year and each country separately, this is calculated as 60% of the median income (as done by OECD). In particular, a dummy variable is created, taking the value of one if the observation is below the poverty line and zero otherwise. In this case, the KOB decomposition is implemented with a Probit model⁵.

5. RESULTS AND DISCUSSION

This section shows and discusses the results of the income model in its two iterations (with equivalised disposable Income and extended Income) and the poverty one, along with some additional findings.

5.1. Equivalised Disposable Income

Looking at the overall difference in the outcome variable between the rural and non-rural groups that are being compared, the explained component represents the portion of the overall difference between the two groups that can be attributed to differences in observable characteristics, such as age, education, experience, occupation, etc. Indeed, it quantifies how much of the gap can be accounted for by differences in these observable factors. Instead, the unexplained component represents the portion of the overall difference that differences in observable characteristics cannot explain. This is often interpreted as discrimination or other unobservable factors that affect the outcome variable differently for the two groups, capturing the portion of the gap that remains even after accounting for observable differences. Beyond the explained and unexplained components, the decomposition model generally includes coefficient estimates for each explanatory variable. These coefficients show the impact of each variable on the outcome variable and can help identify which factors contribute most to the explained component. Therefore, the Oaxaca-Blinder decomposition provides a valuable framework for understanding the sources of differences in outcomes between groups and can help identify areas where policy interventions may be needed to address disparities.

As shown in Table 5, the income gap between urban and rural households is positive and significant at 1%, suggesting that Individuals living in rural regions generally possess lower income levels compared to those residing in non-rural settings across various contexts (Alexandri et al., 2015). The endowment effect seems to be related to education, age, and employment status, which explain a considerable portion of the income gap, indicating potential areas for policy intervention. Indeed, urban families tend to have a higher average age, contributing positively to the income gap through a non-linear relationship, as indicated by the significant coefficient of Age². Higher education levels positively influence income levels in urban groups, as well as being a worker, so that the income gap between urban and rural households is significant related to educational inequality. Moreover, retirement in rural areas is linked to lower income levels, potentially reflecting the impact of retirement benefits or reduced labour market participation. Larger households tend to have lower incomes than single households. Their savings income tends to reduce as the number of members increases, which seems to increase the income gap (Bitana et al., 2024). However, the unexplained component suggests the presence of other factors contributing to income disparities that were not included in the analysis.

5.2. Extended Income

In Table 6, Higher levels of education (Edu_Post_1 and Edu_Post_2) are associated with higher values of extended income in group 1, suggesting that individuals with advanced education tend to have higher levels of income. The age shows a significant and positive value in endowment columns, so the increase in the age of the head of the family seems to contribute positively to the level of extended income of urban families compared to rural ones, in line with the 2019 estimates of the European Commission⁶ which records that 39.7 % of Europeans over 65 were living in intermediate regions and 38.2 % predominantly urban regions. Indeed, developed regions likely offer more economic opportunities and higher wages compared to less developed areas. Working status appears as a relevant characteristic for the extended income in urban areas since urban working conditions favour all forms of income. On the contrary, retirement status is associated with lower extended income values for urban households, implying that older individuals and retirees tend to have lower incomes compared to younger individuals, who tend to move to big cities for education and/or work.

⁵ This was done by running the package "oaxaca" on Stata and selecting the probit option.

⁶ <https://ec.europa.eu/eurostat/statistics-explained/SEPDF/cache/80393.pdf>

Table 5. Estimates of the KOB model on the Equivalised Disposable Income.

Oaxaca-Blinder Decomposition					
Rural income gap decomposition			Rural income gap		
(a)Urban Group	23078.07*** (38.72375)		Decomposition regressions		
(b)Rural Group	17160.19*** (37.4699)		Endowments	Coefficients	
(a) - (b) Rural income gap	5917.877*** (53.88434)		age	242.5818*** (10.1673)	-6259.929*** (372.571)
Endowment effect	5140.235*** (41.76691)		Age ²	-280.7539*** (11.41199)	4478.256*** (274.1779)
Coefficient effect	777.6419*** (36.04774)		Edu_Post_1	141.602*** (4.007586)	367.0253*** (45.12132)
			Edu_Post_2	716.5208*** (9.303442)	290.4441*** (23.84391)
			worker	93.56984*** (3.799274)	474.2634*** (40.66355)
			retired	11.05093*** (2.300532)	-120.7708*** (38.74133)
			hsize	51.46101*** (3.331875)	523.1996*** (75.90829)
			Constant	Yes	Yes
			Year	Yes	Yes
			dummies		
			Country	Yes	Yes
			dummies		
No. Observations	757,811				
R ²	0.6734				

Source: Authors' elaboration of EU-SILC data (2017-2020).

Table 6. Estimates of the KOB model on the Extended Income.

Oaxaca-Blinder Decomposition				
Rural income gap decomposition		Decomposition regressions		
(a)Urban Group	9.55563*** (0.00136)	Rural income gap		
(b)Rural Group	9.229217*** (0.00185)	Endowments		Coefficients
(a) - (b) Rural income gap	0.3264131*** (0.00230)	age	0.0158859*** (0.0006933)	-0.1970132*** (0.0148148)
Endowment effect	0.2346633*** (0.00191)	Age ²	-0.0173989*** (0.0006801)	0.1501561*** (0.0099856)
Coefficient effect	0.0917498*** (0.00131)	Edu_Post_1	0.0101912*** (0.0002076)	-0.0016348 (0.0017773)
		Edu_Post_2	0.0238075*** (0.0002832)	0.0072841*** (0.0006109)
		worker	0.0065921*** (0.0002715)	0.00058 (0.0014899)
		retired	-0.0034016*** (0.0001386)	0.0013129 (0.0012435)
		hsize	-0.0056496*** (0.000162)	0.0005552 (0.0034485)
		Constant	Yes	Yes
		Year	Yes	Yes
		dummies		
		Country	Yes	Yes
		dummies		
No. Observations	1,112,314			
R ²	0.6329			

Source: Authors' elaboration of EU-SILC data (2017-2020).

5.3. Poverty Gap

Model two employs a specialised integration of the KOB decomposition, tailored specifically for application within a Probit model framework. In this analysis, the dependent variable is poverty. The results, as presented in Table 7, indicate that the observed gap is statistically significant at 1% and negative, indicating that poverty tends to be more widespread in rural regions of Europe (Macours & Swinnen, 2008). Bernard (2019) notes that the intensification of deprivation in rural locations is apparent in nations with relatively sparse rural populations, a condition which stems from limited access to opportunities for residents. Observing the single covariates, the variable age shows a negative and significant coefficient, indicating that as age increases, the probability of being poor (binary outcome) decreases, mainly in rural areas. On the contrary, the positive and significant coefficient for Age^2 suggests a non-linear relationship. Both educational variables exhibit negative coefficients, indicating that higher levels of education are associated with a reduced likelihood of experiencing poverty in rural areas.

Similarly, the work-related variables also display negative coefficients, favouring a higher probability of not falling into poverty for working-headed households in rural areas. On the contrary, retired variable has a significant (1%) and positive coefficient, in line with the estimation of European Commission⁷, which observes that more older adults residing in rural parts of Europe are frequently at greater risk of experiencing income poverty compared to those living in urban environments, primarily as a result of reduced average earnings, although living expenses may also be comparatively lower in rural contexts. A positive coefficient for the hsize variable implies that a larger household in an urban area has a higher probability of falling below the poverty threshold in rural areas.

Table 7. The poverty gap decomposition.

Oaxaca-Blinder Decomposition		
Rural poverty gap decomposition		Decomposition regressions
(a)Urban Group	0.1504964*** (0.00042)	Rural poverty gap
(b)Rural Group	0.1908575*** (0.00063)	Endowments
(a) - (b) Rural	-0.0403612*** (0.00075)	Coefficients
poverty gap		age
Endowment effect	-0.009579*** (0.00026)	Age^2
Coefficient effect	-0.0307822*** (0.00076)	Edu_Post_1
		Edu_Post_2
		worker
		retired
		hsize
		Constant
		Year
		dummies
		Country
		dummies
No. Observations	1,114,320	
R ²	0.6329	

Source: Authors' elaboration of EU-SILC data (2017-2020). Note: Robust standard errors in parentheses. *p < .10; **p < .05; ***p < .01.

⁷ [https://www.europarl.europa.eu/RegData/etudes/BRIE/2017/599333/EPRS_BRI\(2017\)599333_EN.pdf](https://www.europarl.europa.eu/RegData/etudes/BRIE/2017/599333/EPRS_BRI(2017)599333_EN.pdf)

6. CONCLUSIONS

This study provides new insight into the rural-urban income and poverty gaps across Europe by applying the Kitagawa-Oaxaca-Blinder decomposition to EU-SILC panel data for the period 2017-2020. The results confirm that observable household characteristics such as age, education, and labour market participation account for a substantial share of the observed disparities in income level in urban areas. Especially, findings highlight the active role that being in a rural area plays in the income differences. Moreover, the existence of a significant unexplained component suggests that rural households face additional disadvantages beyond individual attributes, highlighting persistent structural inequalities linked to geographical location. Our analysis demonstrates that, although poverty trends are diminishing overall, rural areas remain at greater risk. Compared to the disparity in Income and extended Income, a higher number of educated and employed householders seems to reduce the probability of poverty in rural areas, underscoring the importance of targeted investment in human capital and labour inclusion.

Policy implications include the need for more nuanced territorial policies, with enhanced support for rural areas at risk of exclusion. Empirical evidence highlights significant spatial disparities both across regions and between urban and rural communities, with rural and peripheral territories experiencing substantially elevated risks of income poverty and social exclusion. These territorial divides exacerbate existing inequalities in education, health outcomes, and overall development opportunities. Such findings lend support to the logic underpinning contemporary European cohesion policy, emphasizing that advancing social and economic cohesion is most effectively pursued by strengthening local and regional contextual conditions and tailoring interventions to the specific assets and challenges of each territory. This place-sensitive paradigm affirms that fostering endogenous potential in regions, through locally targeted policies and investment, is essential for reducing disparities and promoting inclusive growth (Guarini et al., 2020). Therefore, Policymakers are encouraged to supplement individual-focused measures with investments in local infrastructure, improved access to education and the labour market, and tailored strategies addressing region-specific challenges.

The limits of the research can stimulate further research. Firstly, the empirical analysis is the definition of rurality used, which is based on population density, so future research could apply the same analysis to more specific data or use different surveys to test other broader definitions of rurality. Secondly, as suggested by Meloni et al. (2024), there are many other socio-economic and territorial factors explaining the rural income and poverty gaps. Future research should explore and include other determinants of the unexplained component and adopt richer definitions of 'rurality' to better inform interventions. Through this approach, the economic potential of rural communities could be fully realized, ultimately fostering greater convergence in welfare and opportunity across Europe.

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