Patterns and drivers of EU income inequality: an analysis of EU-SILC data

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Abstract

Focusing on the period 2007-2021, this paper applies the Analysis of Gini (ANOGI) methodology introduced by Yitzhaki (1994) to the decomposition of EU-SILC household-level income data, to investigate the evolution of income distribution among EU Member States. Our findings show that aggregate income inequality has decreased in the European Union between 2007 and 2021, mainly driven by a drop in between-country inequality, aided by a reduction of the dispersive effect of within-country overlapping inequality. Within-country inequality and between-country overlapping inequality have instead remained broadly stable. The analysis of the bilateral within-country overlapping components also show that they are explained by macroeconomic factors such as cultural distance, geographical separation, technological differences, trade intensity, migration flows, and public expenditure patterns. The results indicate that closer cultural ties and stronger economic interactions are associated with greater overlap, suggesting that these determinants foster convergence in income distributions across the EU.

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1 Introduction

Promoting cohesion and reducing income disparities across Member States has been a fundamental objective of the European Union (EU) since its early stages. Article 3 of the Treaty on European Union states that the Union "shall promote economic, social and territorial cohesion, and solidarity among Member States" (EU, 2012a). Similarly, the Treaty on the Functioning of the European Union commits the Union to strengthening cohesion by "reducing disparities between the levels of development of the various regions" (Article 174) (EU, 2012b). However, most economic research has focused on the convergence of per capita income across EU countries or regions, often neglecting observations at the individual or household level (see, e.g., Sala-i Martin (1996) and Boldrin and Canova (2001)).

This gap in the literature has not gone unnoticed and, recently, some authors have studied within-EU income inequality at the household level. This is a crucial step, because convergence (or divergence) of average country or regional income per capita can hide very different patterns at the more disaggregated level. Indeed, average per-capita income across European countries could converge, while at the same time individual and household income distributions might diverge due to an increase in heterogeneity within each country.

Traditionally, EU-wide inequality has been analyzed through the decomposition of inequality indices [1] in the between and within components. Following this approach, Filauro and Parolin (2019), have compared results of income inequality decomposition across states in the EU and in the US, and find that in both areas within-state differences contribute more to aggregate inequality than between-state differences. Similarly, Filauro et al. (2025) have shown that reductions in between-country disparities – largely driven by income convergence among EU Member States – have compensated for the increases in within-country inequality.

From a methodological perspective, both studies employ the perfectly decomposable Theil inequality index as the main measure of income inequality. However, the perfect decomposability of the inequality indexes belonging to the entropy class is obtained at the cost of throwing away the information detected by the difference in rankings between the two (or more) sub-distributions considered in the analysis. In order to enhance this aspect, in our analysis we leverage on the framework developed by Yitzhaki (1994) and used in a number of other studies. Liberati (2015), for example, has decomposed an estimate of the aggregate value of the Gini index of world population into four components: within-group inequality, between-group inequality, and two overlapping terms related respectively to within-group and between-group overlaps. The two overlapping components measure the extent to which income distributions intermingle across countries, thus providing an indicator of economic convergence at the individual level rather than merely at the country level (Frick et al., 2006).

Studying the evolution of these components within the EU offers a richer perspective on economic integration than the analysis of aggregate evolution, or the simple comparisons of

[1] See Brandolini and Rosolia (2021) for a review of methodological issues related to the measurement of the aggregate EU inequality

means or medians across countries. In particular, examining the evolution of the overlapping component allows us to understand whether aggregate dynamics are driven by the evolution of average per-capita across countries or by a progressive convergence in the distribution of income in each Member State.

Focusing on the period 2007-2021, this paper applies the Analysis of Gini (ANOGI) methodology described by Frick et al. (2006) to the decomposition of EU-SILC household-level income data, to investigate the evolution of income distribution among EU Member States. In addition to presenting the evolution of the four components described above, our bilateral analysis of overlapping indices allows to study the convergence (or divergence) of the income distributions between all couples of countries. This offers a new perspective on EU-wide inequality evolution, complementing macro-level studies of GDP convergence (Fiaschi et al., 2018) and regional dynamics.

Furthermore, we study what macroeconomic factors drive the evolution of the overlapping terms, focusing on characteristics such as average per-capita income differences, trade intensity, migration flows, geographical and cultural distance, workforce structure and public expenditure composition, that have been widely studied as drivers of inequality (Nolan et al., 2019). relatively little attention has been paid to how these forces impact the degree of distributional overlap.

Our findings show that aggregate income inequality has decreased in the European Union between 2007 and 2021, mainly driven by a drop in between-country inequality, fostered by a reduction of the dispersive effect of within-country overlapping inequality. Within-country inequality and between-country overlapping inequality have instead remained broadly stable.

Interestingly, watching at the bilateral determinants of within-country overlapping inequality, we find that stronger economic and cultural ties between countries, as well as greater technological proximity, are associated with higher degrees income distribution overlap. These results suggest that economic integration in the EU has progressed not only through the convergence of national averages, but also through a deeper entanglement of individual incomes across borders.

The remainder of the paper is organized as follows. Section 2 describes the methodological framework and the ANOGI decomposition. Section 3 discusses the dataset and the construction of bilateral determinants. Section 4 presents the main results of the decomposition and econometric analyses. Section 5 concludes with policy implications and suggestions for future research.

2 Literature review

2.1 Explanations of Territorial Inequality

Historically, a central explanation for territorial inequality has been the productivity gap between labor employed in agriculture and that employed in other sectors of the economy. This view is grounded in the dual economy literature, which posits that structural differences between a traditional, low-productivity agricultural sector and a modern, high-productivity industrial or service sector are key determinants of income inequality (Fields, 1979; Knight, 1976; Robinson, 1976). The economic growth of urban areas and the underdevelopment of rural regions have also been explained by additional economic advantages arising from agglomeration economies, as first identified in Marshalls seminal work (Marshall, 1890). These external economies are associated with denser settlement patterns and include enhanced opportunities for knowledge sharing and learning, better matching between firms and workers, and easier access to intermediate inputsfactors that tend to concentrate in urban environments and reinforce spatial inequality over time (Combes and Gobillon, 2015; Duranton and Puga, 2004).

More recently, the combination of globalization and technological change has introduced new forces that have further reshaped the economic geography of Europe. These dynamics have reinforced spatial inequalities by concentrating high-skilled jobs and innovation-driven industries in specific urban regions, while leaving other areas behind (Moretti, 2012; Storper, 2013). Once relatively prosperous, many rural regions and small to medium-sized metropolitan areas have experienced income losses relative to national averages. In particular, the cores of small and medium-sized manufacturing cities have faced declines in both employment and income, while surrounding suburban or rural areas continue to suffer from longstanding issues of stagnation or decline (Iammarino et al., 2019). Conversely, many large metropolitan areasincluding their surrounding suburbs, are now among the most dynamic regions in Europe in terms of income growth and job creation. This has contributed to a widening divide between dynamic urban agglomerations and lagging remote regions. However, some studies have shown that several metropolitan regions were severely affected by the global financial crisis, while certain rural and intermediate regions demonstrated greater resilience (Dijkstra et al., 2015). These dynamics have led to increasingly divergent living conditions across Europe, between countries, between regions, and within regions, particularly between urban cores and peripheral areas. Interregional inequality persists due to the structural heterogeneity of regional economies. According to the theory of optimal currency areas, convergence within a unified economic space like the EU relies on knowledge diffusion and labor mobility (Mundell, 1961). Yet, these processes are often hindered by formal and informal institutional barriers (De Grauwe, 2020; Rodríguez-Pose, 2013).

2.2 Drivers of Income Inequality in Advanced Economies

The territorial dynamics described above are closely connected to broader drivers of income inequality at the national level. In high-income countries, inequality has been fuelled by a combination of structural and institutional transformations. In particular, Nolan et al. (2019) identify six main structural drivers of inequality in disposable income - beyond the role of redistribution - namely: globalization, technological change, financialization and macroeconomic shocks (including monetary policy and business cycles), labor market institutions and bargaining power, product market concentration, and demographic factors, such as household composition and participation in the labor force.

Globalization, through trade and offshoring, has placed downward pressure on wages in exposed sectors and increased returns to capital (Feenstra and Hanson, 1999; Helpman, 2016). Technological changeespecially skill- and routine-biased formshas polarized labour markets by raising demand for high-skilled workers and reducing opportunities for those in routine occupations (Autor et al., 2003; Goos et al., 2014). At the same time, financialization has disproportionately benefited top earners through capital gains and rents (Epstein, 2005; Krippner, 2005), while rising product market concentration and the dominance of superstar firms have reduced the labour share of income (Autor et al., 2020; De Loecker et al., 2020). In addition, demographic factors, including aging populations, increased participation in the female labor force, the increase of single-adult and dual-earner households, and changing household sizes, have also contributed to changes in the distribution of disposable income (Goldstein and Lee, 2014). Finally, less progressive tax and transfer systems have diminished the redistributive effect of fiscal policy, further reinforcing inequality (Piketty and Saez, 2007). These national-level processes interact with spatial economic structures, amplifying territorial inequalities and contributing to the fragmentation of the European socio-economic landscape.

2.3 Income Inequality and Convergence Dynamics in the European Union

Over the past two decades, the European Union has experienced a paradoxical evolution of income inequality. While EU-wide inequalitymeasured across all residents of EU Member States declined by 9 to 20% between 2007 and 2019, inequality within individual countries rose during the same period (Filauro et al., 2025). This apparent contradiction is reconciled by distinguishing between the between-country and within-country components of inequality. The decline in EU-wide inequality is largely attributable to convergence in pre-tax incomes across Member States, particularly driven by strong earnings growth among lower-income countries. Filauro et al. (2025)'s decomposition analysis reveals that between-country convergence explains over 125% of the overall inequality decline, while tax and transfer systems slightly increased inequality in the same period, due to diminishing redistributive effectiveness (Filauro et al., 2025).

Recent structural analyses provide deeper insights into the evolving nature of convergence and divergence in Europe. Using a novel FAVAR model, Bagliano and Morana (2025) show that long-run convergence in the Eurozone has been predominantly driven by productivity growth, whereas cost-push shocks and asymmetric exposure to crises, such as the global financial crisis, sovereign debt crisis, and pandemic recession, have periodically reversed this trend. Their results highlight that while the European Central Banks monetary policy has consistently acted as a convergence force, the Stability and Growth Pacts fiscal constraints have often exacerbated divergence during downturns (Bagliano and Morana, 2025).

At the regional level, persistent disparities continue to manifest in the form of spatial clubs of development. Fiaschi et al. (2018) identify three enduring regional clusters: one composed of Eastern European regions, another of Southern Mediterranean areas, and a third of more advanced regions in Western and Northern Europe. Their spatial distribution dynamics indicate limited convergence among these clubs and strong spatial dependence driven by geographical, technological, and social proximities, rather than institutional alignment (Fiaschi et al., 2018). These findings resonate with earlier skepticism about the effectiveness of EU cohesion policies. Boldrin and Canova (2001), for instance, questioned whether such policies genuinely promote growth or merely serve political redistribution, given the absence of clear empirical evidence supporting their success in reducing regional disparities (Boldrin and Canova, 2001).

Taken together, these findings suggest that the EUs success in reducing inequality across countries has not translated into equal progress within them or across their regions. A clearer understanding of the overlapping component of inequality, which captures the stratification of income distributions across space and population groups, is needed to identify targeted interventions. Building on the work of Liberati (2015), further decomposition of the Gini coefficient into within-country, between-country, and overlapping components could provide critical insights into the spatial structure of inequality in Europe and the effectiveness of both national and EU-level policy instruments.

3 Methodology

This section details the inequality measures employed, with particular attention to the Gini coefficient and its decomposition. Specifically, we apply the Analysis of Gini method (Yitzhaki, 1994), following the approach in Frick et al. (2006) to disentangle total inequality into its within and between components, and to isolate and further decompose the residual overlap term (Section 3.2).

3.1 Within- and Between-Country Decomposition

Consider a set of m European individuals, each with an associated income y_h ($h = 1, 2, \ldots, m$). A standard measure of income inequality is the Gini index, defined by

$$G \;=\; \frac{\displaystyle\sum_{h=1}^{m}\sum_{k=1}^{m}\big|\, y_h - y_k\big|}{2\,m\,\displaystyle\sum_{h=1}^{m} y_h} = 2\frac{cov(y, F(y))}{\overline{y}}.$$

While G summarizes overall inequality among European individuals, it can be insightful to decompose this measure to distinguish the portion of inequality arising from households income disparities within each country versus the portion due to between-Member States differences. This distinction is particularly relevant when there is reason to believe that income distributions may not fully align across national boundaries.

A standard approach is to split the total Gini index into within-country and between-country components, plus an overlap term that captures the extent to which countries' income distributions intermingle. Two Member States might have mostly separate income ranges (low overlap) or heavily intersecting income ranges (high overlap).

One way to implement this decomposition is via the Analysis of Gini (ANOGI) framework proposed by Yitzhaki (1994) and extended, for example, by Liberati (2015). In this approach, the overall Gini index G is represented as

$$G \;=\; \sum_i \Big(s_i\, G_i\, O_i\Big) + G_B \;=\; \sum_i s_i\, G_i + \sum_i s_i\, G_i \Big(O_i - 1\Big) + G_{Bp} + \big(G_B - G_{Bp}\big),$$

where i indexes each EU Member State, and:

- G_i is the Gini index computed only for individuals within country i;
- s_i is the share of total income contributed by country i;
- O_i is the measure of the overlapping of the income distribution of Member State i with the EU income distribution;
- G_{Bp} is the between-country Gini index obtained by Pyatt (1976), i.e.:

$$G_{Bp} \;=\; \frac{2\,\mathrm{cov}\big(\overline{Y}_i,\, \overline{F}_i(Y)\big)}{\overline{Y}}.$$

where $\overline{F}_i$ is the rank of the mean income of country i among the distribution of mean incomes of all countries;

- G_B is the between-country Gini index obtained by Yitzhaki and Lerman (1991), i.e.:

$$G_B = \frac{2\,\mathrm{cov}\big(\overline{Y}_i,\, \overline{F}_{EU}(Y)\big)}{\overline{Y}}.$$

where $\overline{F}_{EU}$ is the mean rank of individual incomes of country i in the EU income distribution (Figures 12 and 13);

The overlapping term can be split in order to single out the overlapping of the country j's income distribution with the income distribution of country i:[2]

$$G = \underbrace{\sum_i \Big(s_i\, G_i\, p_i\Big)}_{\text{Within countries}} + \underbrace{\sum_i \Big[s_i\, G_i \sum_{j\neq i} p_j\, O_{ji}\Big]}_{\text{Overlap on within}} + \underbrace{G_{Bp}}_{\text{Between countries}} + \underbrace{\big(G_B - G_{Bp}\big)}_{\text{Overlap on between}},$$

where:

- $p_i = \frac{m_i}{m}$ is the proportion of individuals in country i, with m_i denoting the number of individuals in country i;
- O_{ji} is an overlap index measuring to what extent income distribution of country j intersect with the income distribution of country i ;

These terms capture different facets of inequality:

1. The sum $\sum_i \big(s_i\, G_i\, p_i\big)$ gauges how much of the total inequality stems from variation among individuals who reside in the same country.
2. The $\sum_i \big[s_i\, G_i \sum_{j\neq i} p_j\, O_{ji}\big]$ component incorporates the fact that, when income distributions overlap, the within-country term interacts with other countries' distributions.
3. The term G_{Bp} captures how far apart country mean incomes are.
4. The final term $\big(G_B - G_{Bp}\big)$ adjusts for the extent to which the mean rank of individual incomes is different from the rank of mean incomes in the overall income distribution for each country. Whenever there is an overlap among countries income distributions, these two rank measures diverge, leading to an increase of the absolute value of this component (Liberati, 2015).

[2] see Frick et al. (2006) and Liberati (2015) for the derivation of this decomposition of the overlapping component.

3.2 Formal Definition of the Overlap Index

The essential elements in the Gini-based decomposition are the overlap indexes O_i and O_{ji}. The former gauges the degree to which te income distribution of country i overlaps with the EU income distribution. Formally, it is defined as

$$O_i = \frac{\text{cov}\big(y_i,\ F_{EU}(y)\big)}{\text{cov}\big(y_i,\ F_i(y)\big)},$$

where y_i is the vector of incomes in country i and $F_{EU}(y)$ is the cumulative distribution function of the EU. When the incomes in country i have the same rankings both in country i's and in the EU's income distribution, $O_i = 1$. We have $O_i < 1$ when the rankings of incomes in country i's income distribution are more dispersed than they are in EU's income distribution, while we obtain $O_>1$ in the opposite case, i.e. when the rankings of incomes in country i's income distribution are less dispersed than they are in EU's income distribution.

Similarly, O_{ji} measures the degree to which the income distribution of country j intermingles with that of country i. Formally, it is defined as

$$O_{ji} = \frac{\text{cov}\big(y_i,\ F_j(y)\big)}{\text{cov}\big(y_i,\ F_i(y)\big)},$$

where $F_j(y)$ is the cumulative distribution function of country j.

Tables 3 and 4 report the bilateral overlapping coefficient for years 2007 and 2020, i.e. the first and the last year of our sample. Rows represent the member state whose distribution is used as the base distribution (member state i); therefore, each cell report the coefficient O_{ji}, where j is the member state in the column, and i the member state in the row.

When the two distributions do not overlap (i.e., one lies entirely above or below the other), we have $O_{ji} = 0$. For example, consider the distribution of net income in 2007 for Bulgaria and Luxembourg in Figure 1. Observing the distributions, it appears that the richest individual in Bulgaria is poorer than the poorest individual in Luxembourg, so it is expected that $O_{LU,BG} \approx 0$. By contrast, a greater intersection of income ranges leads to higher values of O_{ji}. When the distributions perfectly overlap, we have $O_{ji} = 1$. For instance, Figure 1 shows that Austria and Sweden in 2007 have similar income distributions, suggesting that $O_{AT,SE} \approx 1$. The overlapping term exceeds one ($O_{ji} > 1$) when the income range of country i is entirely encompassed by the income range of country j. As an example, in Figure 1 it can be seen that the income distribution range of Slovenia is contained within that of Spain (in other words, the poorest individual in Slovenia appears richer than the poorest individual in Spain, and the richest individual in Slovenia is poorer than the richest individual in Spain). In this case, it is expected that $O_{ES,SI} > 1$. The maximum value of O_{ji} is reached when all observations from distribution j that fall within the range of distribution i are concentrated at the mean of distribution i;

in such cases, $1 < max\{O_{ji}\} \leq 2$ (Frick et al., 2006; Liberati, 2015; Schechtman, 2005). It is worth noting that, in general, $O_{ji} \neq O_{ij}$, as each depends on which distribution is used as the baseline. For example, consider the net income distributions of Portugal and the Czech Republic in 2007 (Figure 1). Since a larger percentage of the Czech population falls within the income range of Portugal than vice versa, it is expected that $O_{PT,CZ} < O_{CZ,PT}$. Note that, $O_{ji} - O_{ij}$ is smaller when the value of the overlap coefficient approaches either to 0 or to 1.

As O_{ji} indicates a certain degree of alignment between the income distributions of countries i and j, it can be interpreted as a measure of economic integration. This alignment suggests a convergence of income distributions, which is particularly relevant when assessing the extent to which European countries are moving towards a unified income structure: the closer O_{ji} to 1 the more country j's income distribution overlaps to country i's income distribution. Consequently, the overlap index provides valuable insights into both the economic and social cohesion of the region. Given its capacity to capture the interconnectedness of national income distributions, we place particular emphasis on this measure. In the following section, we investigate the determinants of this bilateral component within Europe.

4 Data

We use household income data from the EU-SILC Database, which provides harmonized information on income and living conditions across all EU member states starting in 2004. For our analysis, we selected 2007 as the starting year to incorporate a broader range of countries, as in Filauro et al. (2025). The final year of observation is set as 2021. Since the survey reports income data from the previous year, the 2021 wave reflects 2020 income, while the 2007 wave reports 2006 income. We exclude the United Kingdom from our definition of the EU, as it was removed from the SILC in 2018 ahead of its exit from the European Union in 2020, and Croatia, which joined the EU in 2013. The EU countries included in our study represent a wide array of welfare systems and labor market institutions.

Our definition of gross household income includes market and non-market incomes, including public transfers. Net household income is obtained by subtracting total household tax liability and regular inter-household cash transfers from gross household income.[3]

To analyze the determinants of the overlapping component, we estimate an empirical specification that controls for several country-level and country-pairs determinants. To this end, we construct a bilateral dataset, including all of 26×26 EU country pairs, over the period 2007–2021. To capture the economic, cultural, and institutional determinants of the Gini overlapping between country-pairs, we construct a set of variables that reflect different dimensions of distance and economic integration, in terms of trade and migration flows.

[3]We use the $HY010$ variable from EU-SILC for gross household income, and $HY020$ for net household income. Household size is equivalized according with the OECD equivalance scale. Moreover, incomes are adjusted using Eurostat's PPP coefficients.

The cultural distance is measured using the Hofstede (2011) cultural dimensions, which provide a systematic framework to analyze the national culture. The six dimensions considered are: (i) power distance – PDI (i.e., the extent to which less powerful members accept and expect unequal power distribution), (ii) individualism vs. collectivism – IDV (i.e., the degree of interdependence within a society), (iii) masculinity vs. femininity – MAS (the preference for achievement and competition vs. cooperation and quality of life), (iv) uncertainty avoidance – UAI (i.e., the level of tolerance for ambiguity and uncertainty), (v) long-term vs. short-term orientation – LTOWVS (the focus on future rewards vs. traditions and past experiences), and (vi) indulgence vs. restraint – IVR (the degree to which societies allow or control gratification of desires).

In particular, to measure the bilateral cultural differences, we compute the Euclidean distance as follows:

$$Cultural\ distance_{lk} = \sqrt{\sum_{d=1}^{D} \left(dim_{d,i} - dim_{d,j}\right)^2}$$

where i and j denote two different countries in the dataset and dim is one of the six dimensions of the cultural distance.[4]

Geographical distance is retrieved from the CEPII Gravity section, which provides bilateral distances based on capital cities.[5] The selected variable represents the great-circle distance (in kilometers) between the capitals of country pairs i and j. This measure is widely used in gravity models of trade to account for the role of physical distance in world trade.

Following Fiaschi et al. (2018), we also adopt a technological distance measure computed on the sectoral employment composition of each country. In particular, we consider employment shares in six major sectors, using data from the Annual Regional Database of the European Commissions Directorate (ARDECO), providing pan-European regional (sub-state) disaggregated data.[6] The bilateral technological distance between countries i and j is calculated using the Euclidean distance formula:

$$Tech\ distance_{ij} = \sqrt{\sum_{s=1}^{S} \left(share_{s,i} - share_{s,j}\right)^2}$$

where $share_{s,i}$ and $share_{s,j}$ represent the employment share in sector s for countries i and j, respectively. In particular, we consider the following sectors: (i) agriculture, (ii) industry, (iii) construction, (iv) wholesale, retail, transport and distribution, communications, hotel and

[4]Data for cultural indicators are sourced from The Culture Factor and described in Hofstede's 6D Model.
[5]Bilateral gravity variables are available at CEPII website.
[6]Data are available at JRC ARDECO dataset.

catering, (v) financial and business services, and (vi) non-market services.

The intensity of bilateral trade relationships is captured by trade share and is defined as:

$$Trade\ share_{ij} = \frac{export_{ij} + import_{ij}}{total\ trade_i}$$

where $export_{ij}$ and $import_{ij}$ represent the trade flows between countries i and j, and $total\ trade_i$ is the total trade volume of country i. Data on bilateral trade flows are obtained from the World Integrated Trade Solution (WITS) database.[7]

Migration flows are sourced from Eurostat, specifically by the dataset on immigration by citizenship. This variable reflects the number of individuals migrating from country j to country i in a given year and allows us to assess the role of labor mobility in economic integration. Migration flows are normalized on the population of country j.

Moreover, to account for differences in public spending priorities across countries, we construct a measure of public expenditure distance using Eurostat data on government expenditure by function, according to the classification of the functions Of government (COFOG):[8]

$$Public\ expenditure\ distance_{ij} = \sqrt{\sum_{f=1}^{F} \left(GF_{f,i} - GF_{f,j}\right)^2}$$

where $GF_{f,i}$ and $GF_{f,j}$ denote the share of government expenditure in function f for countries i and j, respectively.

Finally, to account for the effects of EU membership on bilateral relationships, we include four dummy variables for the 2004 and 2007 enlargement waves: a dummy equal to 1 if country i (or j) joined the EU in 2004, and zero otherwise; a dummy equal to 1 if country i (or j) joined the EU in 2007, and zero otherwise; a dummy capturing the joint effect when both countries accessed the EU in 2004; and a dummy capturing the joint effect when both countries accessed the EU in 2007.

[7] World Integrated Trade Solution (WITS).

[8] The COFOG classification includes expensed on: general public services, defence, public order and safety, economic affairs, environmental protection, housing and community amenities, health, recreation, culture and religion, education, social protection.

5 Results

Figure 3 shows the evolution of the Gini index on gross and net income considering Europe as a unique economic area between 2007 and 2021. Remarkably, gross income inequality decreased in Europe during this period, with a drop in the aggregate index from 0.401 in 2007 to 0.378 in 2021. Most of the drop in the Gini index, from 0.401 to 0.386 took place between 2007 and 2009, across the global financial crisis. The European Sovereign debt crisis, whose most acute phase was between 2011 and 2013 had no major sizable impact on income distribution, while between 2019 and 2021 a further one-percentage point drop took place, with a blip in 2020 due to the COVID-19 crisis (see also Filauro and Parolin (2019)).

Interestingly, during the same period the Gini index on net income, which excludes tax and includes public transfers, shows an even larger drop, from 0.364 to 0.334. Also the time evolution shows some differences with respect to the index calculated on gross income. The 1.8 percentage points reduction between 2007 and 2009 is even larger than that on the index on gross income, but it is followed by a one point increase in the years around the Sovereign debt crisis, to the level of 0.353 in 2014, and a further steady decrease of 1.9 percentage points in the next six years, that include the COVID-19 crisis. Comparing the two patterns, it appears that the Sovereign crisis reduced the ability of government policies to reduce income inequalities, while public interventions allowed to fully absorbed the heterogeneous impact of the pandemic on family incomes.

5.1 Decomposition

Figures 4 and 5 show the dynamics of total inequality along with the within and between components of the Gini index referred to the EU as a whole. Figure 4 shows the evolution of the three components normalized on their means, to better visualize the relative change of each one of them. Both for gross and net income it is the between component that drives total inequality down, while the within component exhibits a stable path. In particular, also in this case three significant drops in the between component can be observed in 2009, 2019, and 2021. This outcome can be interpreted as a first preliminary evidence of convergence in per-capita income between EU countries. However, during our sample period, about 90 per cent of total inequality is explained by within country inequality, while between inequality explains about 20 per cent (Tables 1 and 2; see also Fiaschi et al. (2018)). Normalization therefore overemphasizes the impact of the between component.

As discussed above in 3.1, the sum of within and between inequality indices do not add up to the Gini index calculated on all European household incomes, due to the overlapping components. It is therefore interesting to analyze also the evolution of the impact of both within and between overlapping on aggregate inequality, which are presented in the third and fifth column of Tables 1 and 2 and, normalized on their means, in Figure 7. It is noteworthy that overall the overlapping components represent approximately one third of the Gini index referred to the EU income distribution.

In addition, Figure 6 presents the ratio of the Yitzhaki and Pyatt between Gini indices, that "measures the reduction of between inequality caused by overlapping of incomes across countries compared with the case where the two income distributions were perfectly stratified" (Liberati, 2015). For both gross and net income, the impact of overlapping on the between component of inequality shows a decreasing pattern. Since the contribution of overlapping in the decomposition of the aggregate Gini index is negative, this pattern implies that between 2007 and 2021 the income distributions of EU countries have become more and more similar (i.e., overlapped). This effect must be added to the drop in between inequality discussed above. On the contrary, the between overlapping component shows a slight increase.

The stability of the within component observed in Figures 4 and 5 may hide differentiated patterns at country level, as it is in fact shown in Figures 8 and 9, where the change between 2007 and 2021 of the Gini index for each EU country is reported. For example, as for the gross income inequality it has been stable in 12 countries (Austria, Belgium, Cyprus, Czech republic, Germany, Spain, Finland, Italy, Luxembourg, Latvia, Netherlands, and Slovenia); it sharply increased in Bulgaria, Denmark, and Malta, and sharply decreased in Estonia, Poland, and Slovak Republic.

Also in this case, we can get some further insights by breaking the figure down at the country level. Figures 10 and 11 show the change of the within overlapping index calculated with respect to the income in each country and the aggregate EU level impact between 2007 and 2021. Remarkably, overlapping raised for all countries between 2007 and 2021, with some very sharp increases in some new accession countries, namely Bulgaria, Lithuania, and Romania. The only two countries registering a non appreciable change are Belgium and Poland.

Finally, Figures 12 and 13 present each EU country's mean rank in the aggregate European distribution for gross and net income between 2007 and 2021. The figures show some stark differences across countries: in 2007 the average income of households in Luxembourg placed them just below the $80th$ percentile of the European distribution, while Bulgaria's and Romania's households were around the $10th$ percentile. Consistent with the previous evidence, most new accession countries experienced an increase in their mean rank, notably Bulgaria, Estonia, Latvia, Lithuania, Poland, and Romania. Few countries registered a drop. In the case of Cyprus and Greece this is likely to be explained by the impact of the Sovereign debt crisis, that heavily impacted on the overall performance of the two countries. For Netherlands and Sweden, the explanation is more likely due to idiosyncratic factors.

5.2 Econometric analysis

The objective of the econometric analysis is to understand what drives the evolution of the bilateral within-country overlapping components. To this purpose, we leverage on the fact that the ANOGI decomposition produces a set of time-varying, dyadic measures of bilateral overlapping between the distributions of each country couple in our sample, as explained in Section 3.1. This provides us with a rich panel data set counting all $26x25$ country couples

(excluding a country coupled with itself), for the 15 years in the original EU-SILC sample.

From an empirical perspective, we estimate the following specification:

$$\begin{aligned} O_{jit} = \alpha + \beta_0 + \beta_1 GDP_{jt} + \beta_2 GDP_{it} + \beta_3 Gini_{jt} + \beta_4 Gini_{it} \\ + \beta_5 trade\_share_{jit} + \beta_6 distance_{ji(t)} + \beta_7 migration_{jit} \\ + \omega_t + \varepsilon_{jit} \end{aligned}$$

where: O_{jit} is the overlapping component between countries j and i, that is, the share of citizens of j that lies in the range of the distribution of country i. All other variables are defined as described in Section 4. We adopt a linear regression model, with robust standard errors.

Table 5 reports the baseline estimates of the determinants of the overlapping component, obtained through regressions without country-pair fixed effects (columns (1) and (2)) and with country-pair fixed-effects (column (3)). The table presents three different model specifications that include explanatory variables at both the country and country-pair levels.

The results show that a higher level of per-capita GDP in country j reduces the extent of the overlap of the two distributions, that is the share of the share of citizens of j that lies in the range of the distribution of country i. This is consistent with the evidence of Figures 10 and 11, showing little overlapping between Luxembourg and other countries. On the contrary, a higher per-capita GDP in country i is associated with a higher level of overlapping. Unsurprisingly, higher income inequality in country j makes it less likely that the income of its citizens lies in the range of the distribution of country i, and the opposite is true with respect to income inequality in country i.

More interestingly, a number of bilateral characteristics of the relationship between countries j and i have a statistically significant impact on the degree of overlapping. Stronger trade linkages and smaller cultural distance increase the extent of overlapping. Interestingly, stronger migration flows from country j to country i, normalized by the population in j are associated with lower overlapping. Since standard migration models suggest that workers tend to migrate to countries with higher income per-capita, this suggests that emigrants are likely to be in the part of the distribution that was already overlapping with that of the destination country. Differences in the composition of both the workforce and the structure of public expenditures also reduce the degree of bilateral overlapping. Interestingly, new accession countries have a higher degree of overlapping than other countries. This may be due to the fact that the distribution of income in new accession countries increased its degree of overlapping with other Member States during our sample period. Finally, and a bit surprisingly, higher distance increases the degree of overlapping. This may be because new accession countries, that are on average geographically more distant from other EU countries, such as Bulgaria and Romania, are among those that experienced a stronger increase in overlapping in our sample period.

6 Concluding remarks

Using the ANOGI (Analysis of Gini) methodology, we have decomposed the evolution of income inequality within the European Union between 2007 and 2021 using household-level EU-SILC data. The approach allowed us to identify the contribution of between- and within-country components, as well as that of the overlapping coefficients, that capture the extent to which national income distributions intermingle. This perspective provides a richer understanding of how European economic integration has translated into distributional convergence at the individual level.

Our analysis highlights two interesting patterns. First, aggregate income inequality in the EU has declined over the past fifteen years, largely due to a marked reduction in between-country inequality. This decline has been accompanied by a reduction in the dispersive effect of overlapping component, while within-country inequality has remained broadly stable. In other words, the narrowing of average income gaps across Member States has continued, while this was not paralleled by a generalized improvement in the internal distribution of income within countries.

Second, as shown by the econometric analysis, the reduction in the impact of the overlapping component on total inequality – i.e. the reduction in the overlapping term of the ANOGI decomposition – has been more marked among countries with stronger trade relationships, closer cultural proximity, and greater technological similarity. Conversely, differences in workforce composition and in the structure of public expenditures and migration flows have limited the extent of overlapping. Interestingly, countries that joined the EU in the 2004 enlargement display higher levels of overlap with other Member States, suggesting that accession accelerated the alignment of their income distributions with the EU average.

From a policy perspective, our results show that European integration has advanced not only through macroeconomic convergence but also through a gradual homogenization of individual income distributions.

7 Tables

Table 1: Summary of the ANOGI decomposition on gross income

Year	Total inequality	Standard within inequality	Impact of overlapping on within inequality	Between inequality	Impact of overlapping on between inequality	Average income
2007	0.401	0.344	-0.053	0.184	-0.075	17,038
2008	0.400	0.349	-0.050	0.170	-0.069	18,269
2009	0.386	0.348	-0.037	0.144	-0.069	19,258
2010	0.390	0.347	-0.043	0.157	-0.071	18,758
2011	0.390	0.349	-0.041	0.155	-0.073	19,023
2012	0.388	0.347	-0.041	0.156	-0.073	19,379
2013	0.391	0.348	-0.043	0.160	-0.075	19,806
2014	0.389	0.349	-0.039	0.156	-0.076	20,264
2015	0.389	0.349	-0.040	0.157	-0.077	20,583
2016	0.390	0.352	-0.040	0.157	-0.079	20,827
2017	0.388	0.349	-0.040	0.159	-0.080	21,337
2018	0.387	0.350	-0.039	0.159	-0.083	22,073
2019	0.380	0.350	-0.032	0.144	-0.081	23,044
2020	0.386	0.357	-0.033	0.154	-0.093	24,286
2021	0.378	0.353	-0.028	0.139	-0.087	24,907

Table 2: Summary of the ANOGI decomposition on net income

Year	Total inequality	Standard within inequality	Impact of overlapping on within inequality	Between inequality	Impact of overlapping on between inequality	Average income
2007	0.364	0.307	-0.047	0.165	-0.060	13,176
2008	0.363	0.310	-0.046	0.155	-0.056	14,175
2009	0.346	0.309	-0.034	0.131	-0.060	15,002
2010	0.350	0.307	-0.040	0.144	-0.061	14,683
2011	0.351	0.310	-0.038	0.143	-0.064	14,879
2012	0.348	0.308	-0.038	0.144	-0.065	15,095
2013	0.351	0.309	-0.039	0.149	-0.068	15,371
2014	0.353	0.312	-0.037	0.147	-0.070	15,632
2015	0.352	0.311	-0.038	0.148	-0.070	15,827
2016	0.351	0.312	-0.038	0.147	-0.071	15,993
2017	0.348	0.309	-0.037	0.144	-0.068	16,437
2018	0.346	0.310	-0.036	0.138	-0.067	16,928
2019	0.339	0.307	-0.031	0.130	-0.068	17,558
2020	0.337	0.308	-0.030	0.133	-0.074	18,334
2021	0.334	0.308	-0.027	0.124	-0.071	18,852

Table 3: The overlapping matrix by member state - 2007

	AT	BE	BG	CY	CZ	DE	DK	EE	EL	ES	FI	FR	HU	IE	IT	LT	LU	LV	MT	NL	PL	PT	RO	SE	SI	SK
AT	1	1,027396	0,10452	1,053616	0,184467	1,057597	0,882148	0,70314	1,067732	1,075884	1,025681	1,019558	0,749578	1,107519	1,100698	0,525207	0,166812	0,181444	0,993155	0,978532	1,072166	1,130396	1,005618	0,969304	0,899857	0,398441
BE	0,940943	1	0,120087	0,99083	0,22238	1,010246	0,804873	0,803116	1,09997	1,099119	0,996747	0,983174	0,655399	1,047608	1,082966	0,623063	0,125651	0,223143	1,017088	0,902424	1,010781	1,172497	1,071939	0,937272	0,940814	0,488142
BG	0,045992	0,071113	1	0,017795	0,489555	0,13528	0,10533	0,257574	0,13573	0,146927	0,042313	0,039178	0,018281	0,07977	0,128759	0,407443	0,002795	0,891663	0,119591	0,073462	0,050296	0,103208	0,227843	0,105388	0,062296	0,203335
CY	0,935994	0,947019	0,107832	1	0,199882	1,001875	0,847025	0,711966	1,014018	1,011892	0,945868	0,942881	0,743761	1,040922	1,036618	0,542829	0,19499	0,19296	0,917461	0,92165	1,01716	1,089307	0,977432	0,890718	0,829494	0,430827
CZ	0,091679	0,118374	0,977199	0,049799	1	0,190431	0,125679	0,603062	0,275433	0,261335	0,087625	0,084967	0,033596	0,116344	0,210027	0,860353	0,006425	1,230344	0,193232	0,105032	0,103531	0,307326	0,51315	0,168809	0,156251	0,519638
DE	0,936626	0,958502	0,117339	0,993752	0,205246	1	0,834878	0,705042	1,018251	1,019478	0,956709	0,951556	0,718899	1,041426	1,040155	0,539877	0,180369	0,20299	0,932668	0,919622	1,012046	1,085704	0,976185	0,903373	0,84645	0,417104
DK	1,040744	0,987265	0,076108	1,117587	0,124685	1,088772	1	0,527721	0,950262	0,965123	0,98829	1,00113	0,939587	1,154019	1,066401	0,360471	0,25239	0,108548	0,863774	1,05673	1,131777	1,015545	0,855412	0,934322	0,741858	0,267106
EE	0,343602	0,421257	0,488764	0,338415	0,768253	0,457047	0,285514	1	0,707638	0,66193	0,40176	0,388891	0,160453	0,395117	0,54773	1,054771	0,026495	0,811685	0,565169	0,31213	0,389252	0,80912	0,940018	0,421805	0,554007	0,821305
EL	0,695069	0,782471	0,225438	0,729292	0,403305	0,789753	0,570183	0,956074	1	0,972106	0,774477	0,755459	0,425137	0,783498	0,891027	0,837697	0,086734	0,416394	0,883439	0,64796	0,760072	1,093253	1,084358	0,735762	0,846011	0,681938
ES	0,761014	0,83637	0,193393	0,800485	0,344587	0,848819	0,63763	0,907085	1,020955	1	0,829548	0,814036	0,495055	0,853671	0,939395	0,770253	0,09929	0,355972	0,911515	0,71839	0,828742	1,109181	1,073478	0,786085	0,862975	0,627294
FI	0,936966	1,003446	0,121363	0,985335	0,230297	1,007832	0,793497	0,824247	1,113017	1,110907	1	0,984836	0,638412	1,042615	1,087076	0,642439	0,118998	0,231413	1,030007	0,894652	1,00564	1,186266	1,089419	0,939667	0,956291	0,503976
FR	0,951516	1,01783	0,117156	0,999045	0,22289	1,019184	0,802068	0,805329	1,114484	1,11396	1,015349	1	0,648914	1,060346	1,096381	0,622732	0,129203	0,222336	1,036604	0,912179	1,020506	1,181768	1,080919	0,954877	0,963401	0,481735
HU	0,983829	0,885464	0,066915	1,086882	0,099174	1,035686	0,993307	0,430736	0,834912	0,839954	0,891011	0,908864	1	1,098194	0,977929	0,274929	0,368089	0,077797	0,727115	1,026779	1,092619	0,90184	0,738074	0,832709	0,600147	0,203964
IE	0,886147	0,912342	0,112586	0,959952	0,202529	0,961609	0,791298	0,734458	1,01071	1,001672	0,913476	0,903249	0,702866	1	1,00956	0,559744	0,201943	0,19782	0,910686	0,865373	0,973327	1,087914	0,985352	0,84413	0,832019	0,440186
IT	0,855086	0,908811	0,150986	0,903634	0,266118	0,930532	0,735927	0,810665	1,032816	1,023292	0,90488	0,892815	0,602166	0,954677	1	0,654236	0,139969	0,271438	0,937603	0,822591	0,925928	1,10927	1,034446	0,854033	0,871116	0,520638
LT	0,234648	0,289961	0,653447	0,214547	0,849431	0,344349	0,216473	0,872671	0,540185	0,50249	0,266298	0,258783	0,105166	0,27289	0,407721	1	0,017798	0,955814	0,41207	0,220354	0,268409	0,622068	0,784516	0,312074	0,394277	0,741705
LU	0,406726	0,278484	0,024189	0,593963	0,027305	0,479145	0,48422	0,147536	0,284346	0,2276	0,317867	0,29685	0,635514	0,487561	0,370784	0,042654	1	0,009051	0,145073	0,539419	0,522549	0,302446	0,227795	0,244706	0,096995	0,025958
LV	0,084231	0,113416	0,946519	0,052351	0,67993	0,180556	0,125861	0,47361	0,24153	0,234605	0,085013	0,081983	0,033226	0,114955	0,192766	0,644465	0,005512	1	0,183727	0,100822	0,095918	0,249524	0,405605	0,151721	0,1399	0,404921
MT	0,809437	0,908252	0,161786	0,85195	0,308102	0,897981	0,655997	0,943457	1,101009	1,082176	0,902518	0,880776	0,495988	0,910314	1,007788	0,776967	0,083721	0,31559	1	0,753797	0,877286	1,187532	1,137478	0,845636	0,953434	0,629634
NL	1,020305	1,047081	0,092351	1,075835	0,165416	1,07461	0,898088	0,679384	1,072983	1,083724	1,04675	1,039561	0,766685	1,132273	1,115586	0,496207	0,173543	0,15969	1,004646	1	1,092683	1,130391	0,997046	0,986808	0,909565	0,368347
PL	0,922141	0,94833	0,117188	0,982771	0,208999	0,988305	0,815853	0,71635	1,018983	1,016203	0,948193	0,939801	0,705571	1,028896	1,032378	0,549592	0,198713	0,206205	0,930349	0,90467	1	1,08633	0,981208	0,890678	0,848058	0,425492
PT	0,556807	0,633486	0,306238	0,584126	0,524945	0,662929	0,465275	0,995225	0,894198	0,853083	0,622157	0,607757	0,341977	0,632252	0,758722	0,930981	0,084893	0,545732	0,753507	0,518291	0,622393	1	1,042115	0,603144	0,728843	0,764962
RO	0,517579	0,601649	0,371908	0,536028	0,553609	0,62234	0,425396	0,957341	0,8515	0,815391	0,589211	0,57118	0,29438	0,59095	0,718537	0,916713	0,062812	0,601616	0,725822	0,477698	0,574464	0,944916	1	0,574448	0,699953	0,730601
SE	1,008163	1,060294	0,112927	1,052006	0,195534	1,065619	0,865184	0,745332	1,112154	1,122699	1,057341	1,045507	0,705339	1,117179	1,127728	0,563138	0,122975	0,197799	1,047566	0,973586	1,072498	1,171911	1,052413	1	0,959433	0,423422
SI	0,811853	0,930616	0,171142	0,84774	0,327064	0,900281	0,634409	0,979263	1,134246	1,114903	0,925644	0,897443	0,459005	0,915886	1,02556	0,81154	0,066236	0,335758	1,040041	0,747382	0,875402	1,217228	1,174599	0,866014	1	0,650483
SK	0,23206	0,294088	0,498347	0,214688	0,874157	0,357116	0,206091	1,119633	0,644107	0,577534	0,272104	0,266726	0,09225	0,265177	0,443666	1,20884	0,017965	0,899029	0,459474	0,206002	0,278667	0,775056	0,955126	0,316697	0,463042	1

Table 4: The overlapping matrix by member state - 2020

	AT	BE	BG	CY	CZ	DE	DK	EE	EL	ES	FI	FR	HU	IE	IT	LT	LU	LV	MT	NL	PL	PT	RO	SE	SI	SK
AT	1	0,988883	0,491641	1,066169	0,200301	1,031527	0,895522	0,969245	0,742025	1,033566	1,007119	1,018117	0,873462	1,041276	1,060825	0,96905	0,389042	0,378849	1,073159	1,006359	0,836154	0,947591	1,09602	0,964876	0,883463	0,449974
BE	1,002233	1	0,528807	1,099762	0,22565	1,021443	0,859236	1,056142	0,824221	1,092267	1,036633	1,024141	0,830172	1,075339	1,102349	1,045653	0,336447	0,419158	1,109498	1,014947	0,783495	1,028148	1,145646	1,023603	0,955925	0,545285
BG	0,193523	0,147151	1	0,173433	0,682277	0,169879	0,153354	0,403511	0,507009	0,37874	0,141451	0,184711	0,111303	0,161051	0,357653	0,505405	0,08631	0,928512	0,233353	0,188264	0,089345	0,365649	0,376887	0,282849	0,195016	0,380136
CY	0,873637	0,869384	0,634897	1	0,353597	0,887552	0,712765	1,085795	0,922476	1,059331	0,924633	0,904499	0,688026	0,977083	1,043664	1,099934	0,29149	0,551048	1,023097	0,893996	0,63488	1,055759	1,091646	0,981395	0,936835	0,687545
CZ	0,207701	0,149539	1,23516	0,187879	1	0,187092	0,149562	0,509024	0,665018	0,451907	0,150572	0,198628	0,116515	0,176105	0,416773	0,66993	0,082327	1,186276	0,261717	0,20991	0,082818	0,488634	0,447578	0,32725	0,241068	0,517426
DE	0,958691	0,941704	0,489926	1,016514	0,213005	1	0,879197	0,914334	0,716772	0,981192	0,955731	0,977592	0,863955	0,990803	1,013723	0,932222	0,426791	0,381126	1,023407	0,963434	0,83493	0,90174	1,043479	0,912844	0,829597	0,433271
DK	1,023079	0,991206	0,388134	1,037455	0,115128	1,085735	1	0,822609	0,6018	0,940415	0,979717	1,032562	0,996429	1,007001	1,004493	0,842285	0,509828	0,264446	1,035415	1,012861	0,981671	0,81936	1,026016	0,872539	0,76747	0,290572
EE	0,695393	0,676824	0,811972	0,795964	0,576027	0,698937	0,54364	1	0,92838	0,933971	0,725916	0,71829	0,520088	0,773281	0,902283	1,062827	0,211965	0,75357	0,835724	0,714982	0,465449	0,966652	0,951829	0,834327	0,789976	0,717286
EL	0,525275	0,500011	0,951509	0,643838	0,728548	0,518007	0,36266	0,987133	1	0,858797	0,563828	0,551284	0,339857	0,624486	0,79927	1,076094	0,143617	0,915537	0,699072	0,54761	0,277885	0,951394	0,854446	0,747658	0,720956	0,845467
ES	0,82046	0,811598	0,673712	0,926866	0,398578	0,829576	0,66997	1,023416	0,880199	1	0,858087	0,845232	0,64228	0,904579	0,98485	1,04629	0,263873	0,591758	0,953061	0,837519	0,590944	0,991338	1,031521	0,917328	0,866327	0,648334
FI	0,943808	0,945608	0,59387	1,070627	0,293294	0,9542	0,772689	1,108985	0,905622	1,105083	1	0,9729	0,742973	1,048206	1,09518	1,103754	0,294109	0,497367	1,087478	0,964013	0,68747	1,077423	1,143106	1,033978	0,982844	0,653344
FR	0,973216	0,976274	0,545309	1,074055	0,248134	0,990608	0,825323	1,044777	0,822457	1,077115	1,01399	1	0,794771	1,05167	1,083992	1,0385	0,335806	0,440999	1,085476	0,992505	0,748828	1,016009	1,123896	1,010897	0,946973	0,544374
HU	0,97504	0,934444	0,3717	0,974006	0,116939	1,054936	0,991349	0,734596	0,551	0,865439	0,915259	0,987616	1	0,943876	0,942044	0,780484	0,581659	0,252261	0,972701	0,963354	1,000685	0,746295	0,952165	0,800365	0,691203	0,244673
IE	0,906777	0,901299	0,62207	1,02338	0,335004	0,920397	0,748756	1,087997	0,906661	1,072006	0,94978	0,933597	0,72184	1	1,060458	1,094912	0,289054	0,532031	1,044357	0,923425	0,666517	1,054826	1,110491	0,991688	0,940698	0,661509
IT	0,851808	0,846411	0,630036	0,956388	0,348885	0,863791	0,705076	1,014702	0,853884	1,008371	0,89032	0,878021	0,677432	0,934788	1	1,030612	0,289702	0,542285	0,977398	0,869742	0,628425	0,985327	1,043185	0,932713	0,877693	0,612787
LT	0,551429	0,523385	0,922734	0,640478	0,69993	0,548559	0,41352	0,908372	0,909557	0,824409	0,571292	0,570459	0,389654	0,621768	0,782287	1	0,176611	0,875602	0,690843	0,568775	0,336667	0,880965	0,828817	0,718632	0,67309	0,73304
LU	0,504935	0,488172	0,136968	0,503883	0,022972	0,652921	0,712012	0,200214	0,23099	0,345012	0,449904	0,566753	0,749452	0,5062	0,441685	0,329377	1	0,067526	0,473279	0,536696	0,786543	0,26959	0,381062	0,368335	0,254829	0,042765
LV	0,227398	0,178648	1,058535	0,223281	0,777064	0,206915	0,168993	0,502845	0,613579	0,44991	0,182469	0,222484	0,133517	0,2094	0,418834	0,620996	0,088015	1	0,286961	0,226955	0,10186	0,467864	0,446635	0,342322	0,263325	0,48064
MT	0,854304	0,849974	0,63932	0,976449	0,360141	0,868676	0,698612	1,064131	0,908503	1,038343	0,903059	0,884926	0,673068	0,953822	1,023928	1,081175	0,292457	0,556521	1	0,874535	0,622806	1,034017	1,069973	0,960092	0,91502	0,675974
NL	0,983493	0,985013	0,540297	1,083704	0,23669	1,000805	0,836892	1,045184	0,819165	1,081667	1,022872	1,007893	0,805099	1,060609	1,090113	1,036332	0,33222	0,432267	1,094592	1	0,760727	1,017511	1,130682	1,015674	0,949559	0,541588
PL	0,936011	0,894331	0,334346	0,935656	0,091886	1,026589	0,97671	0,678659	0,519543	0,814468	0,874879	0,953064	0,991668	0,907235	0,896351	0,735275	0,641584	0,217506	0,929828	0,925224	1	0,701048	0,898223	0,758514	0,648353	0,228279
PT	0,634895	0,613616	0,866884	0,759454	0,622132	0,635052	0,472082	1,033137	0,996014	0,93043	0,677211	0,661989	0,450574	0,738703	0,882577	1,100997	0,190535	0,815843	0,805954	0,655109	0,389644	1	0,93748	0,826805	0,795804	0,82106
RO	0,821917	0,804926	0,641696	0,908779	0,372075	0,841667	0,700438	0,966595	0,828796	0,961195	0,841007	0,843778	0,680025	0,884655	0,958687	0,998586	0,30649	0,556107	0,932151	0,833624	0,636879	0,941095	1	0,878897	0,818426	0,59093
SE	0,87378	0,874057	0,665111	1,004596	0,373774	0,875476	0,690853	1,113098	0,939759	1,079968	0,932322	0,903171	0,658487	0,983833	1,05584	1,117303	0,240982	0,58088	1,03006	0,895892	0,596482	1,075167	1,108384	1	0,956751	0,705123
SI	0,859364	0,867634	0,708463	1,012577	0,417815	0,854431	0,65016	1,166191	1,000188	1,111141	0,939343	0,894686	0,61453	0,992249	1,075282	1,171935	0,217234	0,630674	1,04099	0,890502	0,549247	1,125382	1,130698	1,031911	1	0,77146
SK	0,54584	0,523659	0,953276	0,710913	0,722538	0,537547	0,350552	1,118735	1,129727	0,94519	0,61236	0,581058	0,332976	0,69018	0,86783	1,197874	0,130558	0,924978	0,768522	0,572131	0,258725	1,079114	0,933688	0,831611	0,827334	1

Table 5: **Baseline - country determinants of overlapping component**

	(1)	(2)	(3)
GDP per capita (j)	0.091***	0.080***	0.105***
	(0.003)	(0.003)	(0.016)
GDP per capita (i)	-0.049***	-0.058***	-0.023
	(0.003)	(0.002)	(0.016)
Gini within (j)	-1.096***	-1.431***	-0.389***
	(0.047)	(0.045)	(0.114)
Gini within (i)	1.641***	1.316***	2.203***
	(0.050)	(0.048)	(0.124)
Trade share (ij)	0.133***	0.258***	0.839**
	(0.038)	(0.041)	(0.342)
Migration flows (ij)	-0.017***	-0.017***	-0.021***
	(0.003)	(0.002)	(0.006)
Work composition (ij)	-0.015***	-0.014***	-0.011***
	(0.000)	(0.000)	(0.002)
Accession in 2004 (ij)	0.072***	0.067***	
	(0.005)	(0.005)	
Public expenditure composition (ij)		-0.008***	-0.002***
		(0.000)	(0.000)
Geographic distance (ij)		0.053***	
		(0.002)	
Cultural distance (ij)		-0.001***	
		(0.000)	
Time fixed effects	YES	YES	YES
Bilateral country j and i fixed effects	NO	NO	YES
Observations	9,672	9,672	9,672
Adjusted R^2	0.536	0.594	0.425

Standard errors in parentheses

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

8 Figures

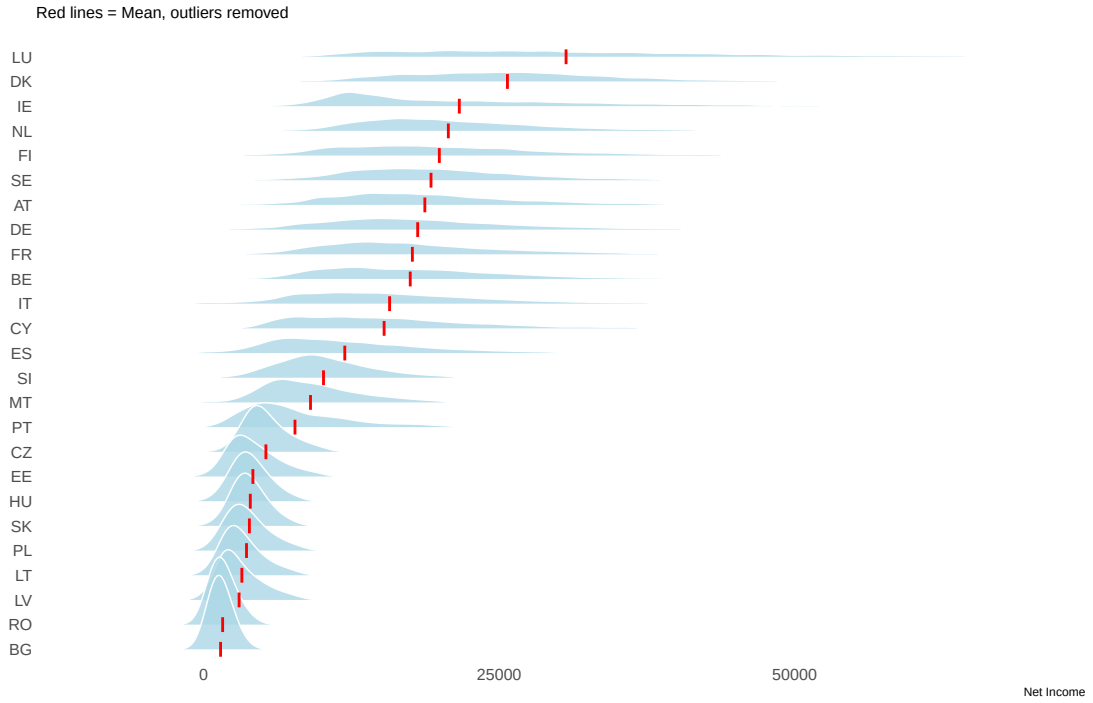

Figure 1: Net Income Distribution by Country (2007)

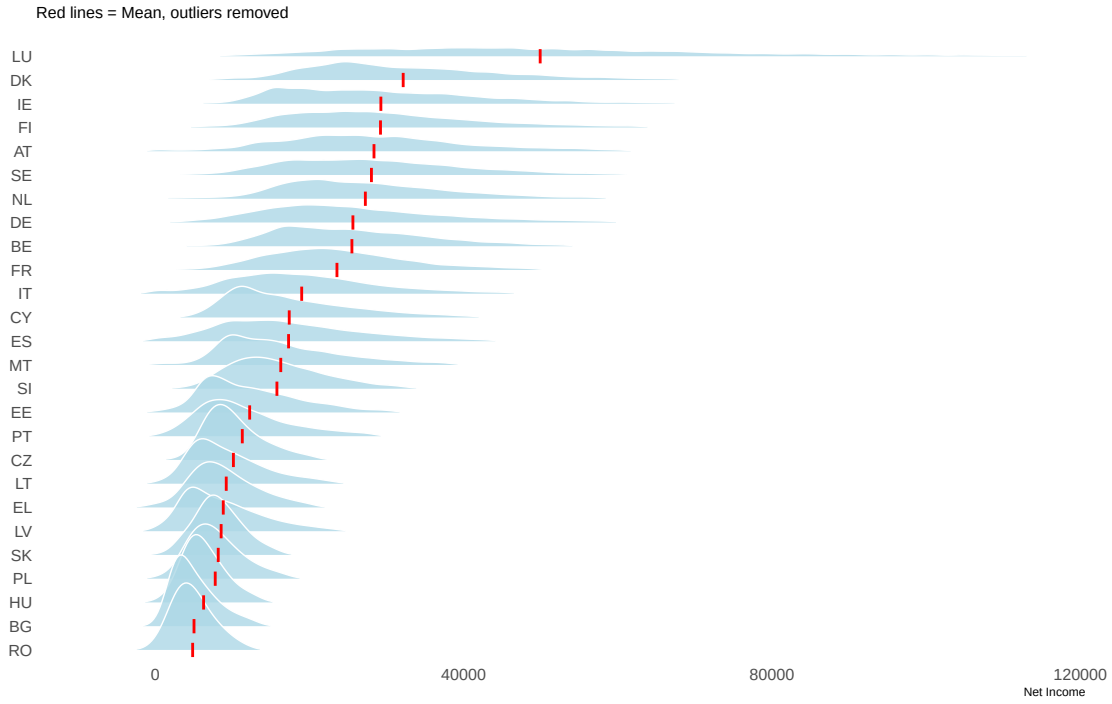

Figure 2: Net Income Distribution by Country (2021)

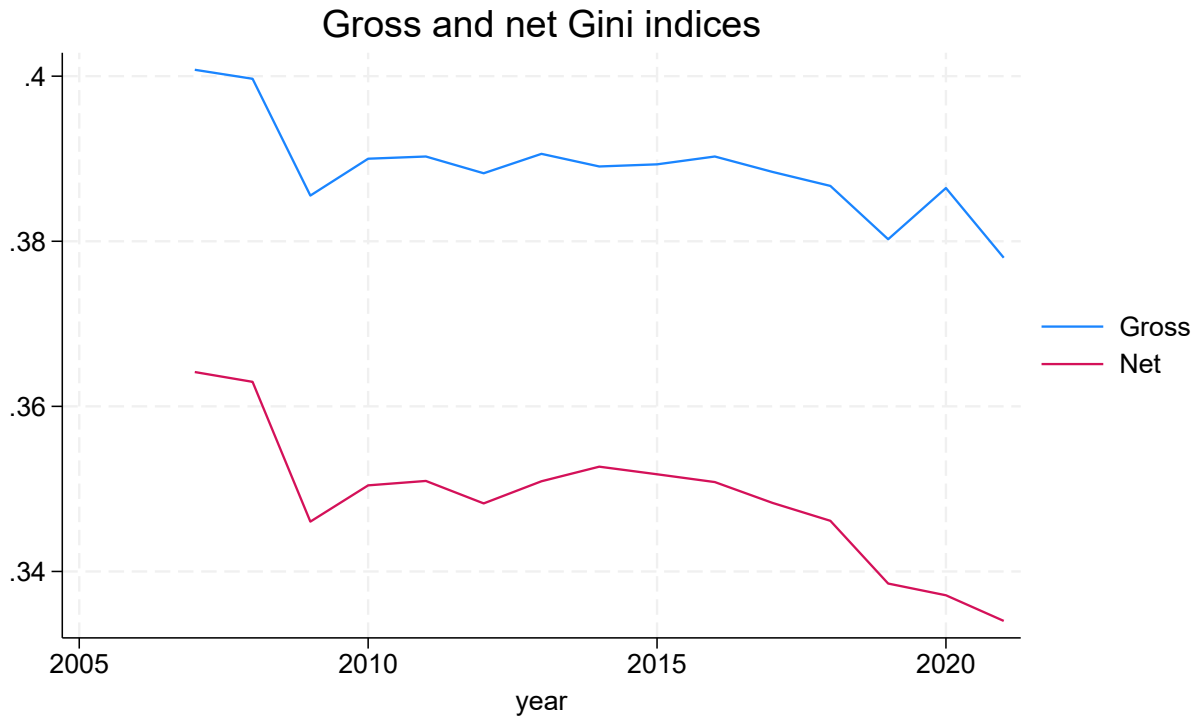

Figure 3: Gross and Net Gini indices

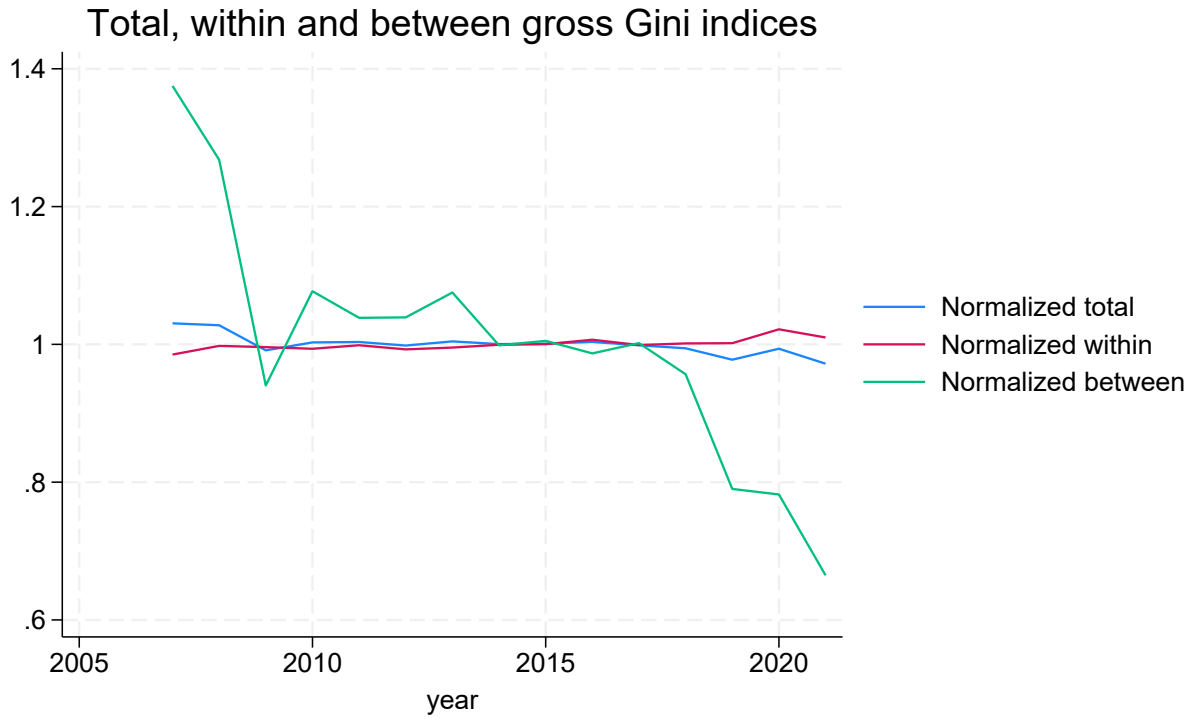

Figure 4: Total, within and between gross Gini indices

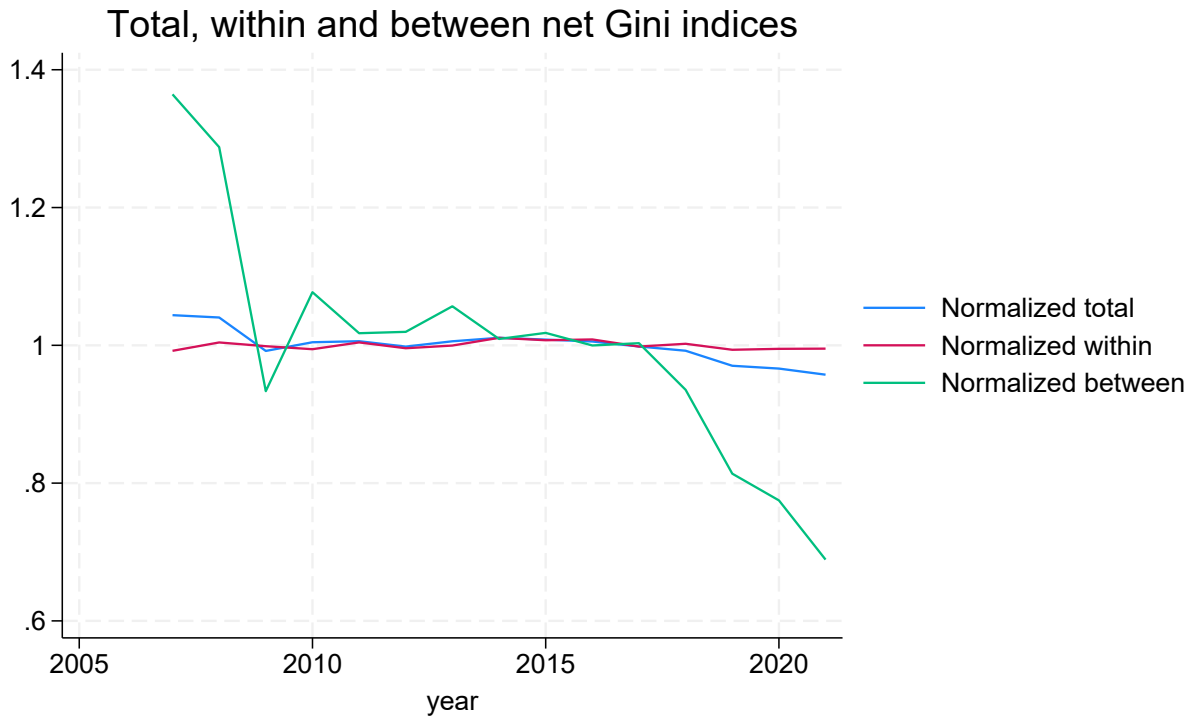

Figure 5: Total, within and between net Gini indices

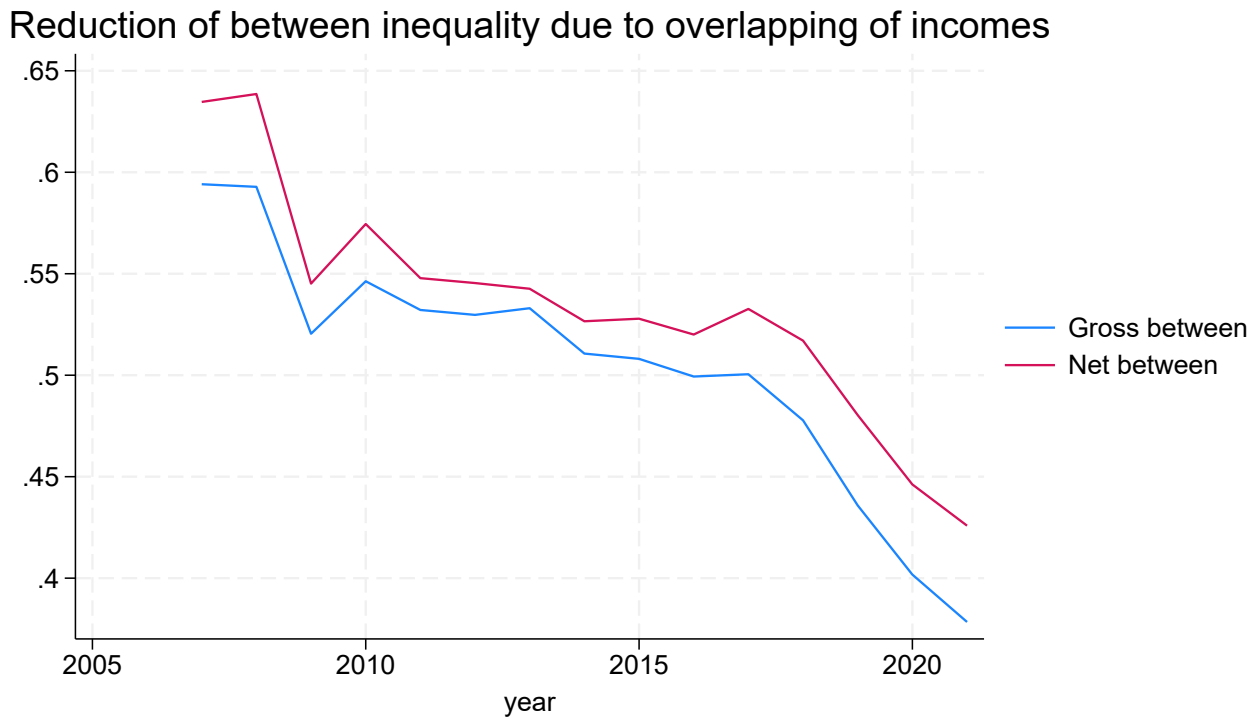

Figure 6: Between overlapping Gini indices

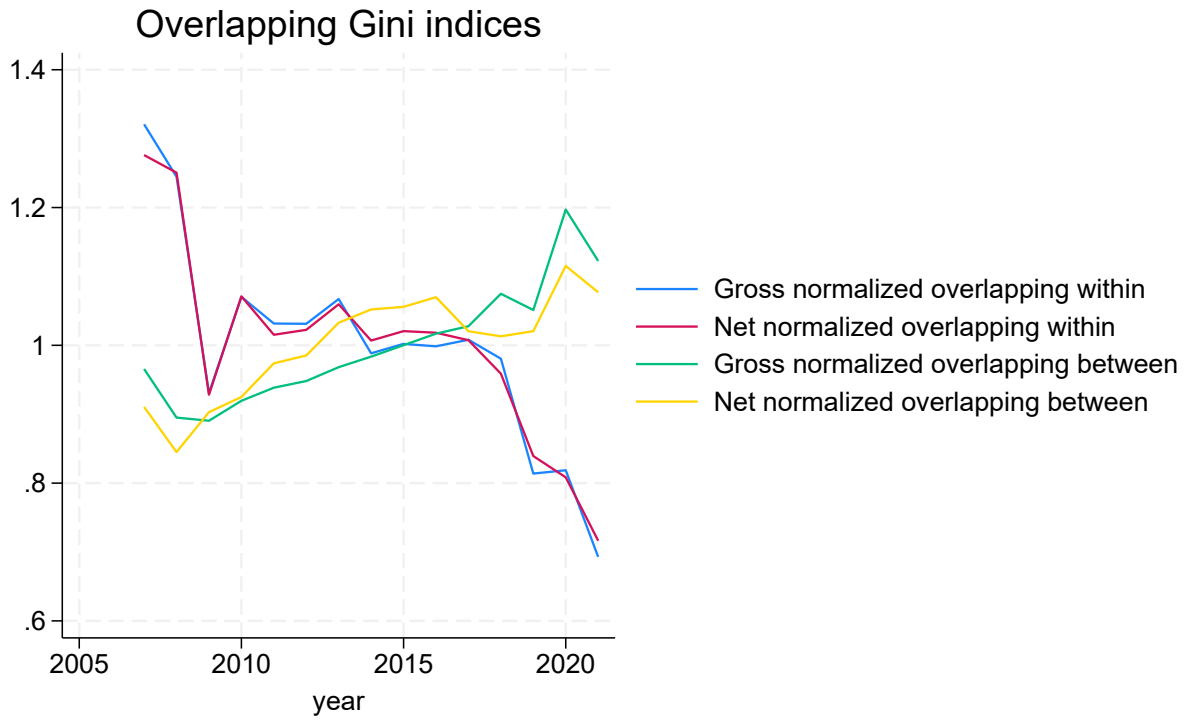

Figure 7: Overlapping between and within Gini indices

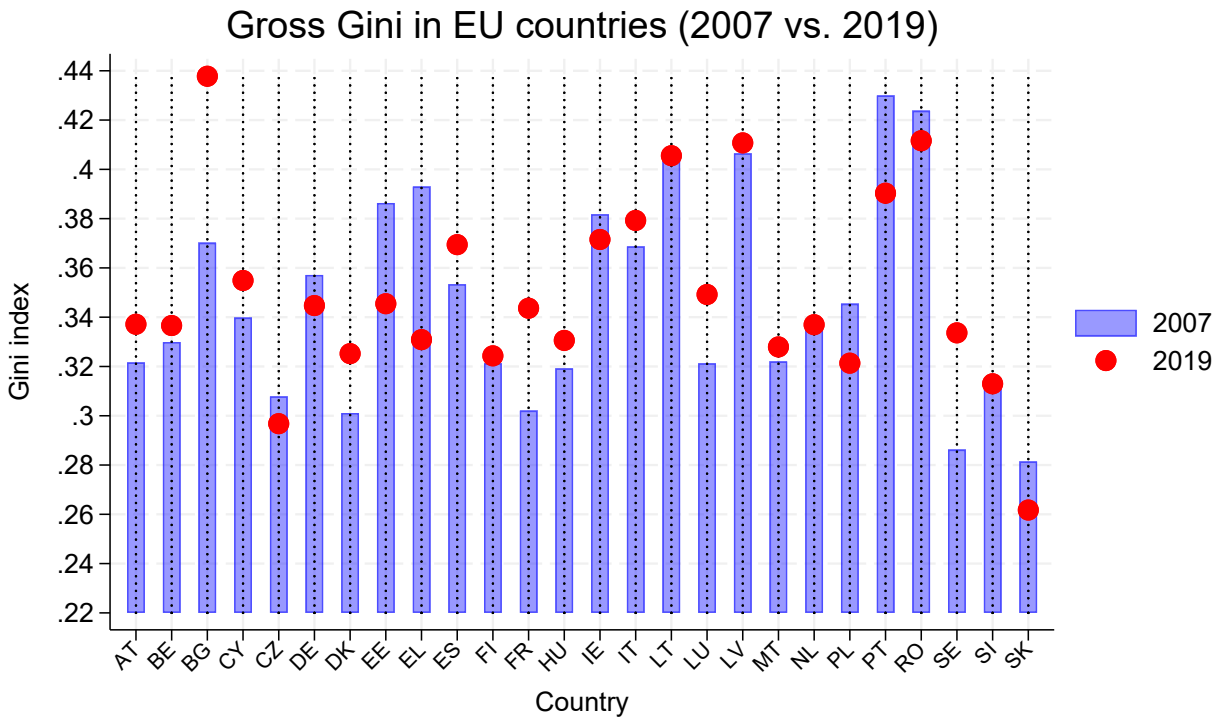

Figure 8: Gross Gini in EU countries (2007 vs. 2021)

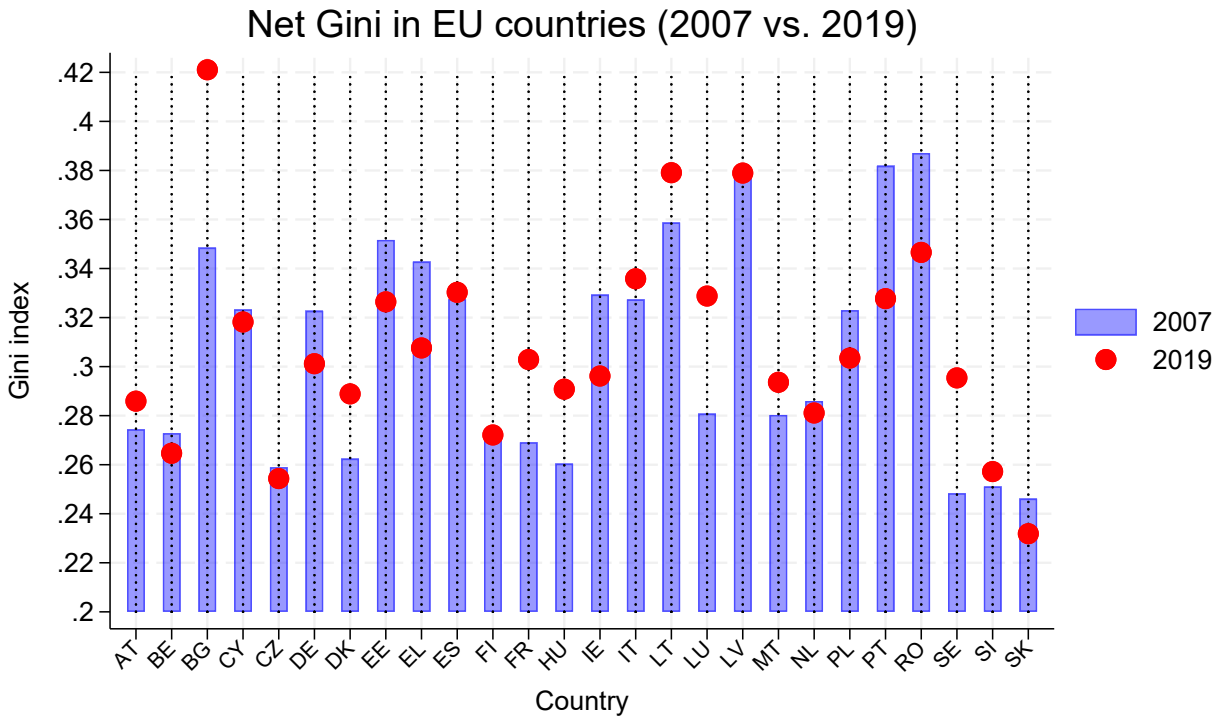

Figure 9: Net Gini in EU countries (2007 vs. 2021)

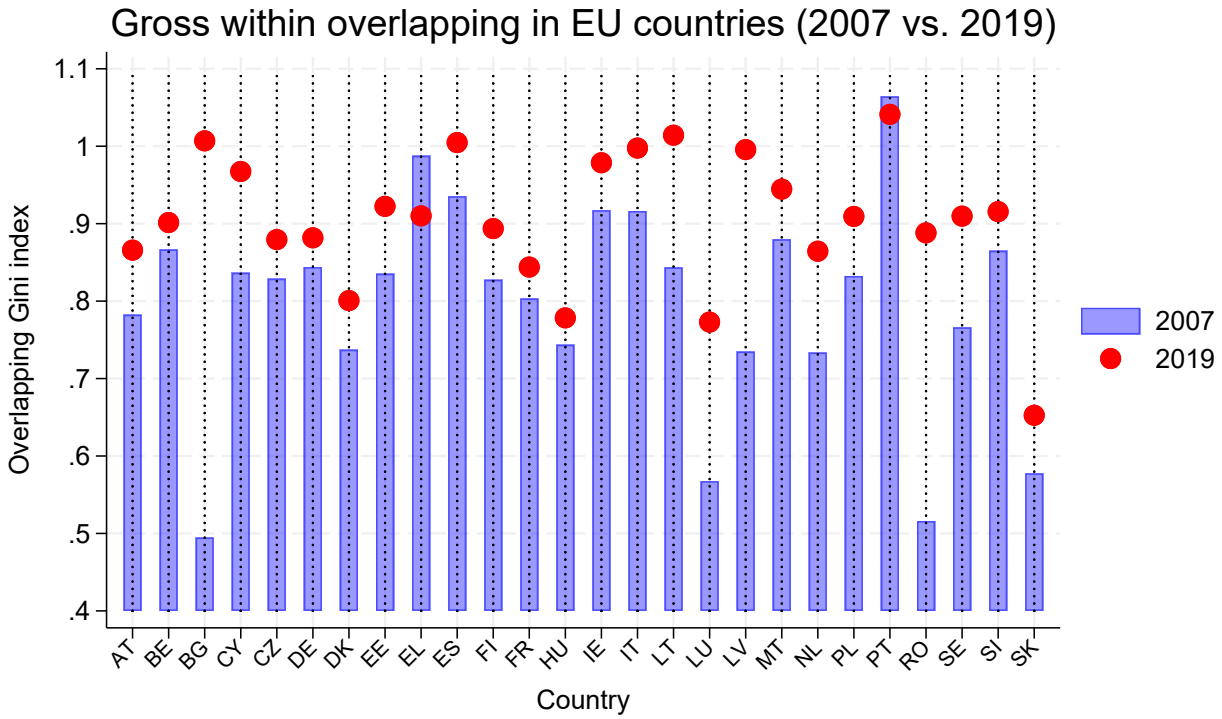

Figure 10: Gross within overlapping in EU countries (2007 vs. 2021)

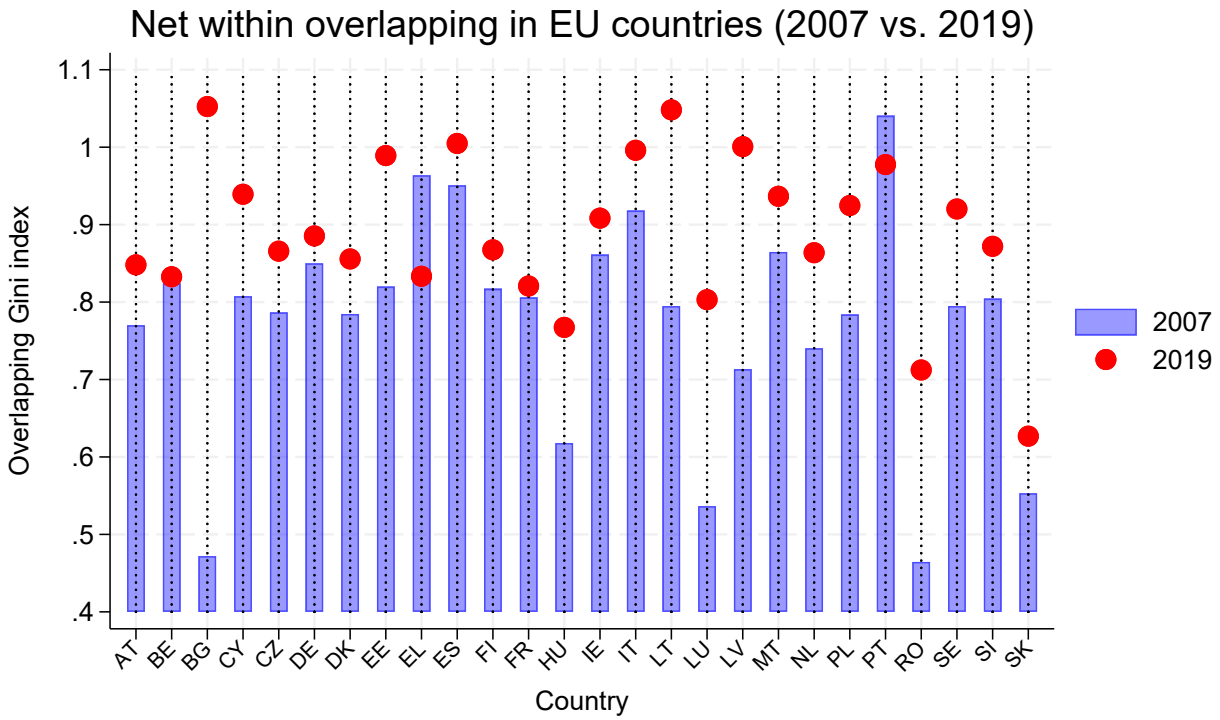

Figure 11: Net within overlapping in EU countries (2007 vs. 2021)

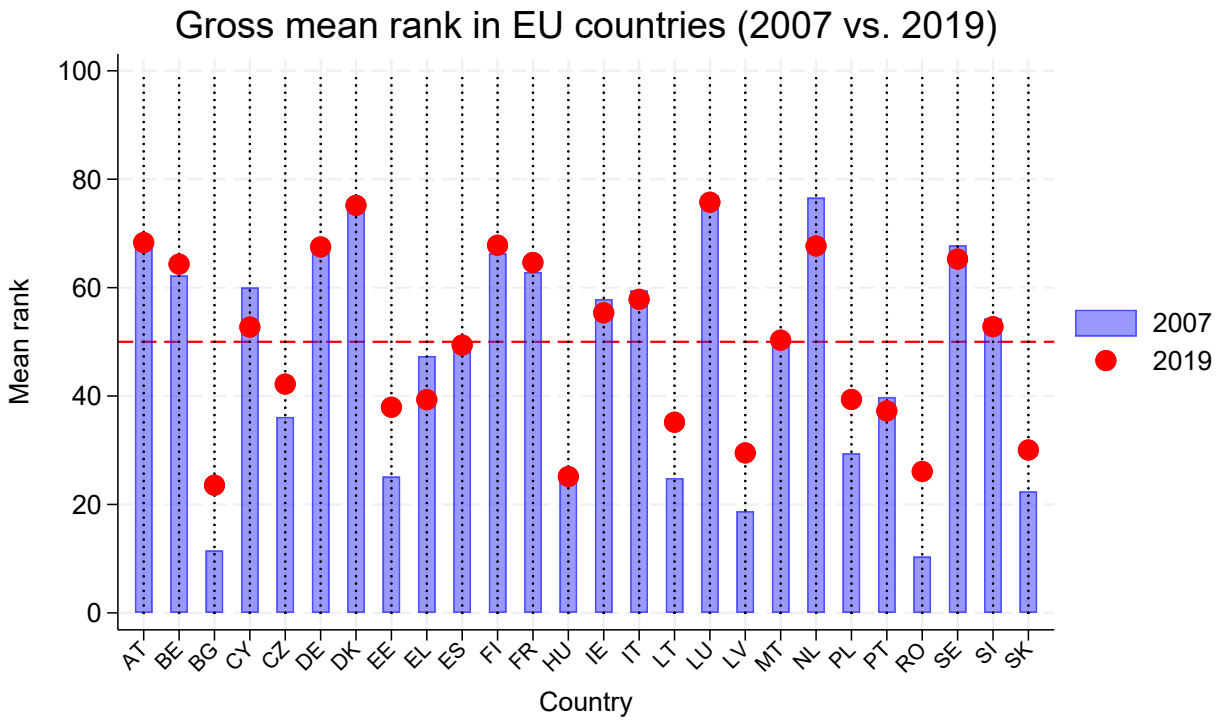

Figure 12: Gross mean rank in EU countries (2007 vs. 2021)

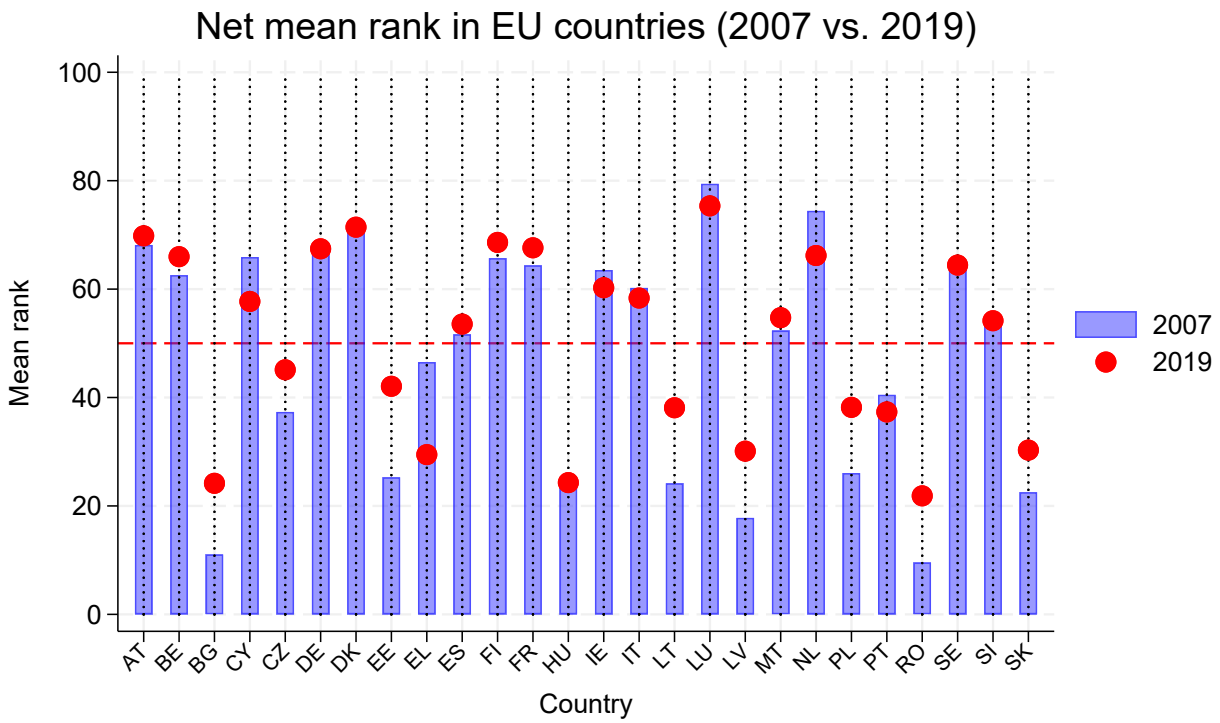

Figure 13: Net mean rank in EU countries (2007 vs. 2021)

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