



## Fiscal redistribution and the narrowing urban–rural income gap

Diego Loras-Gimeno\*, Gonzalo Gómez-Bengochea, Jorge Díaz-Lanchas

Department of Economics, Universidad Pontificia Comillas-ICADE, Spain

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### ABSTRACT

This paper explores the regional impacts of heterogeneous fiscal redistribution policies on urban–rural income gaps. We construct market income and final income measures and use quantile regressions to estimate the impact across income deciles and across urban and rural areas of the different fiscal redistribution systems that operate regionally in Spain. To do that, we combine microdata from the Living Conditions Survey and Household Budget Survey for the 2017–2020 period. The results show that there is a 6 % urban–rural income gap for market income and that redistribution reduces it to 4 % for final income. Individuals in the lower deciles are more affected by the urban–rural income gap before and after fiscal interventions. There is large heterogeneity in the size of this income gap across regions and in their capacity to address it. Our results highlight the redistributive capacity of fiscal policies for narrowing the urban-rural income gap.

### 1. Introduction

In recent years the urban–rural division has been attracting more attention as a social phenomenon (Mettler & Brown, 2022; Carson et al., 2022; Proietti et al., 2022; Perpiña Castillo et al., 2022). It affects many dimensions of the social sciences, ranging from income differentials (Su & Heshmati, 2013; Su et al., 2015), skills distribution (Zarifa et al., 2019) and firm performance (Laurin et al., 2020), to child poverty (Wang, Hai, & Cai, 2022), youth engagement (Botrić, 2022), population changes (Henning et al., 2023), subjective well-being (Gross-Manos & Shimoni, 2020) and even political voting patterns (de Dominicis et al., 2022).

Seminal works on economic geography (Lukermann & Porter, 1960; Thrift & Olds, 1996) and New Economic Geography (NEG) (Krugman, 1999; Fujita et al., 1999; Henderson et al., 2001; Ottaviano et al., 2002; Combes et al., 2008) point out the emergence of territorial urban-rural disparities and subsequent territorial inequalities. The agglomeration and concentration of skills and firms in urban areas boosts productivity and attracts workers from peripheral rural to core urban areas. Under this scenario, income differentials between urban and rural areas increase and lead to the appearance of long-lasting income gaps among territories.

Fiscal redistribution policies may affect regional and urban-rural inequalities (Gaubert et al., 2021). In particular, their design determines their effects in reducing territorial inequalities. Although the

evidence of such effects is still not conclusive, a long stream of the literature raises two important policy dilemmas which are far from being close. The first one is whether fiscal interventions should address interpersonal or interregional inequalities (Rietveld, 1991; Gbohoui et al., 2019; Gaubert, et al., 2021). Should policymakers focus on regional policies that level-up poor regions, even if they are regressive from the households' point of view, or should they target poorest individuals independently of the region in which they live?

Fiscal redistributive policies focused on households in the lowest quantiles of the income distribution could reduce interregional inequalities if they are primarily located in lagging regions (Silveira-Neto & Azzoni, 2012) and when labour markets face distortions in depressed areas (Kline & Moretti, 2013). A larger interpersonal inequality mobility, as compared to regional inequality mobility, suggests that policies may have more impact on tackling income disparities from the individual rather than from the regional perspective (Rey, 2018). However, the discussion on how lagged regions development relates with interpersonal inequality reduction (and vice versa) is still open in the literature.

The second dilemma lies in the trade-off that exists between inter-regional equity and economic national growth (Richardson, 1979). Sometimes sacrifices in one of the two goals must be done. Evidence shows that the best way to tackle interregional inequality is to achieve sustained national growth (Williamson, 1965). However, this hypothesis is still disputed since the benefits derived from agglomeration

\* Correspondence to: Universidad Pontificia Comillas, C/Alberto Aguilera, 23, Madrid 28015, Spain  
E-mail address: [dloras@comillas.edu](mailto:dloras@comillas.edu) (D. Loras-Gimeno).

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economies have not been proven to expand to the rest of the surrounding territories (Dauth et al., 2018). Indeed, the effects of concentration and dispersion forces on economic growth and inequality is still under debate (Ganau & Rodríguez-Pose, 2022).

This paper contributes to this discussion on the role of redistributive policies across territories. Specifically, we focus in differences between urban and rural places. We argue that fiscal redistributive policies such as direct taxes, personal transfers, and in-kind transfers play a key role in reducing differences in final income between these two territorial categories. To such end, we propose a joint analysis of *market income*, i.e., income before taxes and subsidies, and *final income*, i.e., income after (direct and indirect) taxes, transfers, and in-kind transfers, for both rural and urban areas. Thanks to these two measures of income, we calculate the urban-rural income gap (urban-rural gap, henceforth) for both as well as the variation in this gap induced by fiscal interventions.

We focus on the case of Spain since it offers several specificities for its scientific relevance. The country has a governance system that gives some independence to the regional fiscal decisions; therefore, regional redistributive outcomes are expected to differ between territories (Díez-Minguela et al., 2018; López-Casasnovas & Rosselló-Villalonga, 2019). Additionally, Spain has the lowest settlement density across Europe (Gutiérrez et al., 2020). There is an uneven population distribution across Spanish territories that leads to the appearance of certain depopulation patterns (Proietti et al., 2022) and a more inefficient provision of public services in rural than in urban areas (Alloza et al., 2021).

With respect to the data, our analysis examines the role played by taxes and transfers at the low and high tails of the income distribution in different territories. We hypothesize that the urban-rural gap is not the same along the income distribution with some deciles being more affected than others. To tackle this hypothesis, we combine microdata from two micro databases, i.e., *Encuesta de Condiciones de Vida* (Living Conditions Survey, ECV in Spanish) and *Encuesta de Presupuestos Familiares* (Household Budget Survey, EPF in Spanish), for the years 2017, 2018, 2019 and 2020. This way we create a unique cross-sectional database that enables us to measure the gap between urban and rural areas before and after national and regional taxes and transfers. We then estimate a series of quantile regressions (QRs) that assess the urban-rural gap across deciles of both market and final incomes for each Spanish region.

Income survey databases entail two limitations that should be highlighted. First, survey data on living conditions are normally captured through domestic samples, which eliminates the variability of fiscal interventions, and limits the depth of the policies that could potentially be prescribed. Second, even when international living conditions surveys (such as the European Union Survey on Living Conditions, EU-SILC) are available, fiscal policy comparisons may be imprecise due to the different legislative and public sector structures that operate in each country, which might affect policies such as in-kind transfers.

These two limitations are overcome in the Spanish case. First, all individuals in Spain share the same fiscal intervention structure. Second, regions have enough fiscal and political autonomy to implement their own regulatory and fiscal policies. After decades of an in-depth decentralization process, Spain has become one of the most decentralized countries worldwide (Rodríguez-Pose & Ezcurra, 2011; Dziobek et al., 2011; Díaz-Lanchas et al., 2021). Third, Spanish regional and local governments involve heterogeneous regulatory jurisdictions accompanied by tax collection and fiscal expenditure policies that, in 2018, reached 8.5 % of GDP in terms of tax revenues and 18.8 % of GDP in terms of government expenditures (for further details, see OECD, 2021). Consequently, this regional diversity in fiscal and redistributive capacities allows us to exploit the differences in individuals' final incomes coming from varied regional fiscal policy agendas.

Our findings show that the urban-rural market income gap is 6 % on average. After fiscal interventions are implemented, we find that the

gap diminishes on average to 4 % for the final income. Furthermore, the size of the gap is larger for those in lower income deciles than for those in upper income deciles. The differences in the urban-rural gap endured by the richest and by the poorest individuals account for 4 % for market income and 1 % for final income. We document these results and verify that the urban-rural gap increases with the market income, whereas the urban-rural gap diminishes after fiscal interventions. Moreover, our results indicate that, for market income, the gap is 2 % higher for the 1st decile than for the 5th decile. In contrast, the gap is 2 % lower for the 9th decile than for the 5th decile. These differences change after redistribution takes place. For final income, the gap is similar for the 1st and 5th deciles, while it is 1 % lower for the 9th decile.

Our regional results also show that the urban-rural gaps for market and final incomes are different across regions. There is one high-income region (Navarre) and three middle-income regions (Extremadura, Cantabria, and Andalusia) that reduce the gap for the lowest deciles by more than 10 %, albeit these regions remarkably differ in their average income per capita levels. On the other side of the spectrum, Asturias (middle-income region) and the Basque Country (high-income region) increase the gap for all their deciles throughout the income redistribution.

The heterogeneity in the gap reduction among regions suggests the existence of a “place-blind” fiscal redistribution system (Gaubert et al., 2021), built around a set of taxes, transfers and other interventions based on specific households' socioeconomic characteristics that do not include the regions they belong to. This means that the way in which the Spanish fiscal system redistributes income between urban and rural territories is through fiscal interventions that are not designed for such purpose. In other words, fiscal policies based on standard income-taxation schemes may have redistributive impacts in poorer regions and in rural areas because of hosting larger percentages of unemployed and retired individuals receiving unemployment benefits and pensions transfers respectively. Consequently, we speak of “place-blind” policies when their main goal is related with individual socioeconomic conditions, even though they have territorial and spatial consequences. Therefore, we argue there is policy space to implement future place-based policies that complement the standard income-taxation scheme.

This paper contributes to the literature in three ways. First, it measures the urban-rural gap before and after taxes and benefits. Whereas measuring the urban-rural gap is becoming an increasingly relevant research topic (Yuan et al., 2020; He & Du, 2021; Lu et al., 2022; Zhong et al., 2022; Bucci, 1993; Nguyen et al., 2007; Sicular et al., 2008), there is little systematic evidence on this topic for advanced economies and, specifically, for European ones. Earlier papers focused on the estimation of urban-rural gaps in the case market income. They present mixed results on urban-rural gaps for market income ranging from values around 40 % in the case of emerging economies (Bucci, 1993) to values of 7 % for the case of advanced economies (Hertz & Silva, 2020), in line with our findings.

In the same line, there is an important stream of literature that has considered the effects of fiscal redistribution on variables such as inequality (Goñi et al., 2011), poverty (Lustig, 2017), or social welfare (Coady et al., 2022). Nevertheless, no study has measured before fiscal incidence from market to final income from the urban-rural gap perspective. This contribution of the paper is distinctive since it shows, not only the size of the gap, but also how effective is fiscal policy in the reduction of the gap. Public policies can be informed by this pre-redistribution and post-redistribution joint analysis.

Second, the paper analyses the urban-rural gap for the entire income distribution and not only for the mean values. It assesses the variation of the urban-rural gap throughout the entire income distribution. Finally, it extends the pre-fiscal and post-fiscal urban-rural gaps for the entire income distribution to all Spanish regions. This exercise allows us to draw some of the channels behind the redistributive capacity of regions and to contribute to the debate of the efficiency of place-based vs. household-oriented fiscal redistribution policies to tackle urban-rural gaps (Duranton & Venables, 2021; Austin, et al., 2018).

This paper is organized as follows. In the [Section 2](#), we revise the literature on the existence of urban–rural gaps. In [Section 3](#), we describe the data and the methodology, and we report the fiscal interventions conducted regionally and nationally. [Section 4](#) describes the data and the empirical results obtained. [Section 5](#) discusses the main findings. [Section 6](#) concludes.

## 2. Literature review

There is a wide set of exogenous circumstances that matter for opportunities in life ([Dang, 2014](#); [De Barros et al., 2009](#); [Hick, 2016](#); [Robeyns, 2017](#); [Sen, 1999](#); [World Bank, 2005](#)). The role played by location and territory in determining individuals' opportunities is studied, broadly, by the economic geography research ([Lukermann & Porter, 1960](#); [Thrift & Olds, 1996](#); [Barnes & Christophers, 2018](#); [Bonet-Morón & Ayala-García, 2020](#)) and, in particular, within NEG literature ([Krugman, 1999](#); [Fujita et al., 1999](#); [Henderson et al., 2001](#); [Ottaviano et al., 2002](#); [Combes et al., 2008](#)) as part of the so-called geography of inequalities ([Martin, 2009](#)).

Economic geography provides a theoretical and empirical framework for analysing the localization of economic activity. According to this literature, technology, knowledge, transport, infrastructure, and capital accumulation are among the factors that explain economic concentration. NEG research has shown how economic activity tends to be located in places where its initial level was already high.

Economic concentration generates economic growth. This is true for urban ([Henderson, 2000](#)) and industrial agglomeration ([Geppert et al., 2008](#)), which generally take place simultaneously. Spillovers from concentration affect both urban and rural locations ([Artz et al., 2016](#)) and have played a fundamental role in regional development programs like the EU cohesion policy ([Arbia et al., 2005](#)). However, at a certain level of economic growth, congestion costs may overcome agglomeration benefits ([Glaeser, 1998](#)). Public policies can be effective in fostering agglomeration in places below this development threshold while discouraging concentration in places above it ([Rodríguez-Pose & Griffiths, 2021](#)). The discussion is still open in whether efficiency and equity are complemented through concentration and agglomeration dynamics ([Gordon & Kourtit, 2020](#)).

These dynamics of spatial concentration of economic activity and their relationship with economic growth influence the design of public instruments and the formulation of territorial development policies ([Baldwin et al., 2005](#)). For instance, economic clusters play an important role in regional economic development. Therefore, there may be no need to foster big clusters from a public policy perspective since they are created naturally when there is an initial endowment of firms ([Mayer et al., 2008](#)).

Public policy interventions can be important in lagging regions to create, attract and sustain initial endowments that, ultimately, can lead to the formation of a specific cluster ([Ganske & Carbon, 2023](#)). The design and implementation of clusters in lagging regions cannot follow a top-down approach, but to profit from endogenous resources or activities. Place-based policies invest in profiting from local knowledge and underutilized resources in lagging regions to push regions to their maximum potential ([Barca et al., 2012](#)).

In addition to regional economic development, the formation of clusters and the new wave of place-based policies ([Austin, et al., 2018](#); [Duranton & Venables, 2021](#)), one of the many territorial attributes that economic geography has studied is the urban–rural gap, an old research topic ([Dewey, 1960](#); [Benet, 1963](#); [Pahl, 1966](#)). This branch of the literature has focused on how the gap relates with other social variables; factors such as inequality and migration within a country are widely explained by it ([Young, 2013](#)).

Research that focuses on urban systems has shown that they tend to accumulate knowledge, innovation, and economic growth ([Duranton & Puga, 2004](#); [Glaeser, 2011](#); [Combes et al., 2012](#)) due to more dynamic economic settings, in contrast to rural areas. This idea alone will predict

an increase in the urban–rural gap due to the contrast between the permanent growth in urban areas and the decline or stagnation of rural areas. Nevertheless, recent research has pointed out that “there is no law that makes big cities always more dynamic” ([Rodríguez-Pose, 2018](#)). The degree of urbanisation (our variable of interest) is confirmed as a determinant of income differences. Consequently, urban–rural gap dynamics continue to be an area of discussion in which there is an opportunity to shed more light by providing new evidence.

Since the differences in income suggested by the economic geography literature play a crucial role in the development of the urban–rural gap, it is necessary to evaluate whether and how fiscal redistribution can help in reducing such differences. According to [Lustig \(2018\)](#), fiscal redistribution refers to the process by which the state collects revenues from individuals and households (primarily through taxes) and spends these revenues on benefits (for example, cash transfers, price subsidies, and in-kind benefits such as education and health) intended for specific individuals and households. In doing so, the state changes the post-fiscal income distribution that would have prevailed in the absence of any intervention.

Efficient fiscal redistributive systems help to reduce income inequality and to close social gaps in a country. Understanding the efficiency of the fiscal redistributive systems should contribute to the design of better policies capable of addressing inequality problems without damaging other economic outcomes, such as growth or employment creation.

Modern ideas on how to reduce income inequality have relied on fiscal redistributive system reforms ([Atkinson, 2015](#); [Milanovic, 2016](#); [Blanchard & Rodrik, 2021](#)). In the case of Spain, [Ayala and Cantó \(2018\)](#) analysed the relationship between inequality of opportunities and income inequality. They detected the crucial role of regional minimum income benefits in reducing inequality before and after fiscal interventions.

This paper grounds on these two branches of the literature and tackles four specific hypotheses. First, we suggest that there is a significant urban–rural gap in Spain, both for market and final incomes. Second, this urban–rural gap is reduced thanks to the redistribution operated through the fiscal system. Third, the different income deciles bear different sizes of the urban–rural gap. Fourth, the urban–rural gap is remarkably different across regions.

## 3. Methods

### 3.1. Data

For our analysis, we use microdata from two different databases. The first one is the ECV, which is an annual survey that contains data on approximately 13,000 households and 35,000 individuals in Spain collected by the Spanish National Statistical Institute (INE). It provides data on income distribution and social exclusion dimensions, among others. The second is the EPF, which provides annual information on consumption expenses. For this survey, approximately 24,000 households are interviewed by the INE. We merge both surveys (ECV and EPF) for 2017, 2018, 2019 and 2020 to obtain a combined cross section database of approximately 140,000 observations with detailed information on individuals' and households' income and expenses.<sup>1</sup> It is worth highlighting that, first, individuals are not the same across all the years and, second, the aggregation of the four years provides enough number of observations by region and type of territory.

### 3.2. Income definitions and tax–benefit policy decentralization

We consider two income definitions to characterize the rural–urban gap. According to [Lustig \(2018\)](#), market income includes labour

<sup>1</sup> The database uses the most recent surveys, and it is unaffected by the effects of the COVID-19 pandemic since the survey in 2020 collected the data in 2019.

**Table 1**  
Income definitions for Spain.

A. Transfers	Income Concepts	B. Taxes
A.1. Contributory social insurance old-age pensions	Market Income (MI) MI + pensions	B.1. Contributions to social insurance old-age pensions - Employee contributions - Employer contributions
A.2. Direct cash and near transfers + Non-contributory pensions + Unemployment benefits + National family transfers + Regional family transfers + Minimum income benefit	Disposable income	B.2. Direct taxes - Personal income tax (IRPF) - Other contributions to social security
A.3. Indirect subsidies + Energy + Food	Consumable income	B.3. Indirect taxes - VAT
A.4. Monetized value of in-kind transfers + Education + Health	Final income	B.4. Co-payments/user fees

Source: Own elaboration from [Lustig \(2018\)](#).

income, capital income, private pensions income, self-consumption, imputed rent, and other sources of income (e.g., remittances). Final income is obtained from the process of adding and subtracting each fiscal intervention through its direct imputation, estimation, or simulation from the indirect information available in the survey.

Most of these fiscal interventions are built through the complementary use of the information contained in different variables in the survey. For instance, through the combined use of income data and family conditions, we can infer whether a household or an individual has the right to obtain a particular subsidy. [Table 1](#) summarizes all the taxes and benefits estimated for the Spanish case. Full details on the construction of each indicator can be obtained in [Gómez-Bengochea & Quan \(2020\)](#).

In the case of Spain, we consider income tax and social security contributions as direct taxes and value-added tax (VAT) as an indirect tax. Direct benefits include cash transfers (contributory and non-contributory pensions, unemployment benefits, national and regional family transfers and minimum guaranteed income). Indirect benefits (energy subsidies, food subsidies, etc.) or in-kind transfers (monetary value of public education, public health services and other public services) are also taken into account to estimate final income.

The tax-benefit system in Spain is currently evolving towards more decentralized mechanisms. Most of the taxes are collected partly by regions and partly by the national government ([Bozio et al., 2021](#)).<sup>2</sup> This is the case of the personal income tax; its structure is the same, but the tax rates and tax credits may differ across regions. VATs are claimed at the national level. Regarding benefits, contributory and non-contributory pensions, unemployment, and some family transfers are centralized, whereas the minimum income benefit and in-kind transfers are designed and established by regional governments. The benefit eligibility conditions, amounts and durations may differ across regions as well.

In-kind transfers (education and public health) require a particular estimation methodology ([Lustig, 2018](#)). For in-kind public education transfers, we first group individuals by educational level based on their age and the response given regarding their current employment status, which includes student as a possibility. We then stratify students by income level. Using data from [Murillo et al. \(2018\)](#), we randomly assign a percentage of students who, based on their income level (10th, 25th, 75th and 90th percentiles) and their region, might attend a private or public educational centre. Finally, using data from the Spanish Ministry

<sup>2</sup> The Basque Country and Navarre have their own tax systems, with a different tax and benefit structure. The results for both regions were estimated including those particularities of fiscal devolution.

of Education, we allocate for each student the average public spending per region and type of educational centre. We also scale-down the results using total expenditures on education from public accounts and disposable income from national accounts.

For the allocation of in-kind transfers linked to health expenditures, we follow a two-step strategy. First, we use the European Health Survey (EHS) for the definition of income levels and the random selection of individuals who, based on their income and region, may complement public health care with private plans. Second, we assign to each individual the regional public spending per capita depending on the individual's use of public health care ("average number of visits to a specialized doctor") and the existence of complementary private plans.

### 3.3. Territorial differences

We consider different territorial definitions based on the degree of urbanization of the area in which an individual lives. Territories are divided into urban, intermediate, and rural areas following the definition of local administrative units (LAUs) developed by Eurostat-European Commission ([Eurostat, 2018](#)). For Spain, the definition corresponds to municipalities (NUTS-5 level). In order to divide the municipalities into the categories, the total area of each municipality is divided in grid cells of 1 square kilometre.

Those groups of contiguous grid cells that have a density of at least 1.500 inhabitants, and a total population over 50.000 inhabitants are categorized as urban centres. Those groups of cells that have a density over 300 inhabitants and they have a total population over 5.000 inhabitants are categorized as urban clusters. Rural grid cells are defined as those outside urban centres and clusters. Urban municipalities are those where at least 50 % of the population lives in urban centres. Intermediate municipalities include those where at least 50 % of the population lives in urban clusters. Rural municipalities comprise those whose grid cells have at least 50 % of the population living in rural grid cells ([Eurostat, 2018](#)).

[Fig. 1](#) shows these three territories and the NUTS-2 regional borders. The north-western regions (Galicia, Asturias, and Cantabria) and inner-centre regions (Castille and Leon, Castilla-La Mancha, Extremadura, and Aragon) have the highest share of rural territories, whereas the Mediterranean coast (Catalonia, Valencian Community, Murcia, and Andalusia) and the Madrid region are the most urban-oriented areas.

[Table 2](#) provides a general overview of the socioeconomic situation of each region and allows to compare them. The table indicates the total population for each region, the percentage of that population that lives in an urban, intermediate, or rural area. It also indicates the GDP per capita and the poverty rate (ARPE). Last, it shows the number of observations per region that our database includes, showing that our

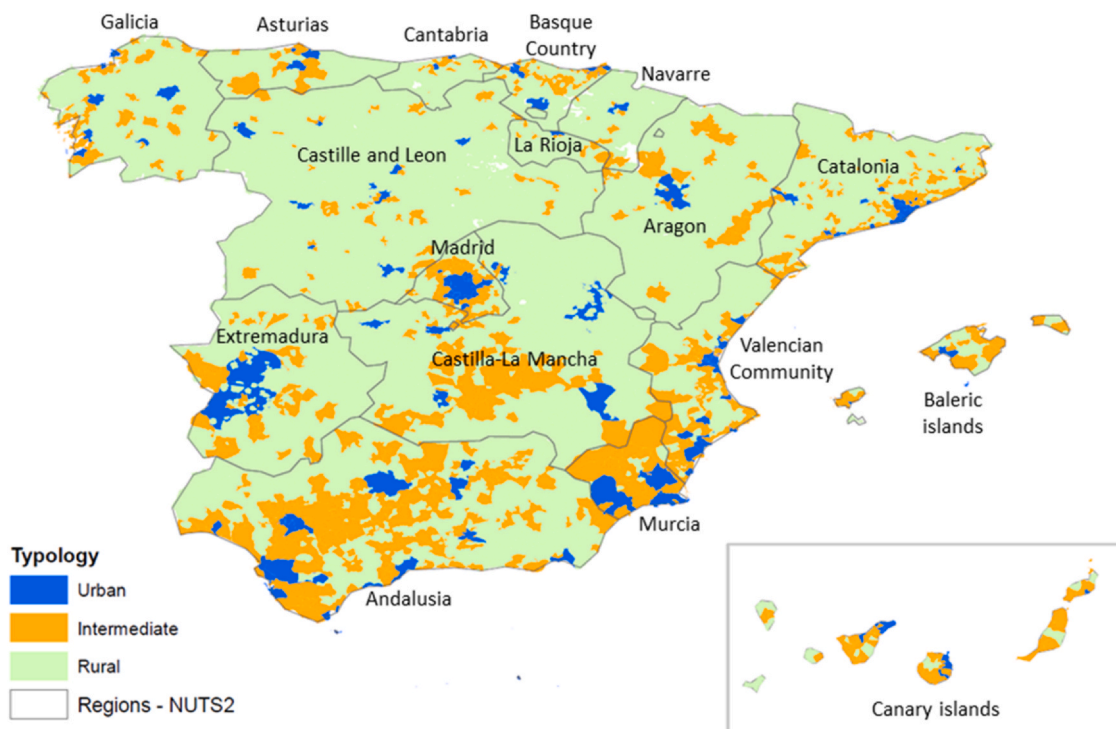


Fig. 1. Urban, intermediate, and rural territories in Spain. Source: Own elaboration from Eurostat data.

Table 2  
Regional socioeconomic figures.

Region	Population	% Urban	% Intermediate	% Rural	GDP per capita (€)	Poverty rate (%)	Observations
Madrid	6.750.336	93	5	2	32.048	14,8	13.571
Basque Country	2.208.174	75	15	10	30.401	12,2	7.327
Navarre	664.117	50	26	23	29.314	10,9	3.800
Catalonia	7.792.611	76	14	10	27.812	14,5	28.817
Aragon	1.326.315	62	13	24	26.512	15,0	5.516
Balearic islands	1.176.659	54	33	13	22.048	16,9	3.946
La Rioja	319.892	58	20	23	25.714	16,6	3.911
Castille and Leon	2.372.640	49	12	38	23.167	17,8	8.400
Cantabria	585.402	48	18	34	22.096	14,8	4.425
Galicia	2.690.464	32	10	58	21.903	18,0	9.489
Asturias	1.004.686	52	15	33	21.149	20,1	5.033
Valencian Com.	5.097.967	73	18	9	20.792	22,3	9.489
Murcia	1.531.878	53	28	19	19.838	26,3	6.003
Canary islands	2.177.701	49	26	25	17.448	29,4	4.933
Castilla-La Mancha	2.053.328	44	31	26	19.369	26,1	6.853
Andalusia	8.500.187	67	22	11	17.747	29,1	16.468
Extremadura	1.054.776	38	36	26	18.301	30,0	5.800

database is large enough to ensure significant results not only at the national level but also for each region.

### 3.4. Empirical strategy

We use Quantile Regressions (QRs) to assess the existence of gaps between different territories throughout the entire income distribution for both the market and the final incomes. In contrast with standard OLS regressions providing average results, QRs allow to assess income differentials by type of territory in the lower and the upper tails of the income distribution (Nguyen et al., 2007; Su & Heshmati, 2013). In other words, given that income distributions are different between and within territories and regions, estimates of urban-rural gaps may change across income deciles. We, therefore, argue that QRs are optimal to estimate the magnitude of such gaps, and, ultimately, to answer the research question that this paper addresses.

Eq. (1) captures the specification for individual  $i$  at time  $t$ :

$$Q_{\varnothing}[y_{it} | m_{it}, r_{it}, x_{it}, s_{it}, a_i] = \alpha_{it}^{\varnothing} + \delta Intermediate_{it}^{\varnothing} + \rho Rural_{it}^{\varnothing} + \beta x_{it}^{\varnothing} + \gamma s_{it}^{\varnothing} + \lambda a_i^{\varnothing} + \epsilon_{it}^{\varnothing} \quad (1)$$

where  $y_{it}$  independently represents the (logarithm of) market income and final income of individual  $i$  in year  $t$  for a given conditional quantile ( $\varnothing^{\text{th}}$ ) and  $x_i$  represents individual control variables such as age, gender (takes value 1 for females), educational level (taking the value of 1 for the secondary and tertiary educational levels), employment status (taking the value of 1 for employed individuals), household size (single-individual households vs. all other sizes), and sectors of activity (primary, secondary or tertiary sector). These control variables are in line with the literature on the determinants of income per capita (Huber & Stephens, 2014). An individual's age (Murphy & Welch, 1992), education, employment status, household size (Atkinson, 1992) and sector of

activity (Kenessey, 1987) are expected to have a positive effect on personal income, whereas the gender dimension is expected to negatively impact income (O'Neill, 2003).

The variables  $Intermediate_{it}$  and  $Rural_{it}$  account for territorial differences. In particular,  $Intermediate_{it}$  is a dummy variable that takes the value 1 if the individual lives in an intermediate area and 0 otherwise, whereas  $Rural_{it}$  takes the value 1 when the individual lives in a rural area. Our coefficients of interest are those attached to  $Intermediate$  ( $\delta$ ) and  $Rural$  ( $\rho$ ). They measure the impacts on income of living in an intermediate area (urban–intermediate income gap) or in a rural area (urban–rural gap) compared to individuals that live in an urban area.

The remaining variables account for region ( $s_i^{\rho}$ ) and time-variant year ( $a_t^{\rho}$ ) fixed effects, which, in the case of regional effects, capture the differences in the per capita income variables compared to the Madrid region. We include time and region fixed effects to control for time-specific and region-specific variations that could potentially bias the regression results. As argued above, Spanish regions are characterised by their heterogeneity and their high levels of decentralization. In the 4.2. Results section we provide further evidence on the appropriate use of regional fixed effects to reduce potential biases in the urban–rural gap.<sup>3</sup>

We run a series of QRs for the 1st, 5th and 9th deciles ( $\varnothing$ ) for both market income and final income. This way, we isolate urban–rural gaps once the fiscal redistribution process takes place. We argue that regions with stronger redistributive fiscal policies achieve a lower final urban–rural gap.

We calculate the redistributive capacity of each region in each quantile as the difference between the quantile coefficient of the rural variable ( $\rho$ ) for the market income and final income regressions. In other words, we define the redistributive capacity of region  $R$  in quantile  $\varnothing$  as follows:

$$Redistribution_R^{\varnothing} = (\rho_{market\ income}^R - \rho_{final\ income}^R)^{\varnothing} \forall \varnothing = (1, \dots, 9) \quad (2)$$

## 4. Results

### 4.1. Descriptive analysis

Table 3 shows the values of the main statistics for each type of territory.<sup>4</sup> Individuals in rural areas tend to experience lower median market income levels, less income dispersion and lower income growth rates between 2017 and 2020 than individuals in intermediate and urban environments. Market income inequality, measured by the Gini coefficient, is higher in rural areas than in the other two types of territories. These patterns are in line with the NEG literature, as stressed above.

Regarding the final income, data shows a narrower gap between rural and urban areas. The final income dispersion is lower, and the income distribution becomes more evenly distributed for the three types of locations, with lower and more similar growth rates and Gini coefficients.

Fig. 2 displays the distributions of market income and final income for urban and rural areas. Final income is higher in both urban and

<sup>3</sup> In Annex B, we include a correlation matrix between all the variables used in the regressions (except for region and time variables). Rural correlates negatively (and significantly) with market and final income, while urban correlates positively (and significantly). Correlations are also informative in other dimensions: Rural correlates negatively with gender (less women than men in rural areas), while the correlation with age is positive (older people in rural areas). Rural correlates positively with autonomous workers and negatively with salaried ones, showing the structure of the labor market in those areas. In the same direction, rural correlates positively with the primary sector and negatively with the tertiary sector. The correlations for urban areas point in the opposite direction.

<sup>4</sup> Tables A.1 and A.2 in Annex A show further evidence on the distribution of individuals in each decile for market income and final income, respectively.

rural areas, and compared to market income, a more even income distribution is revealed. Nevertheless, rural areas tend to concentrate lower final income households.

Fig. 3 illustrates the market income and final income gaps between urban and rural areas for the 1st, 5th and 9th deciles. Income gaps are estimated as the difference between the median market income and the median final income within each decile. The higher the decile for both types of income, the larger the absolute gap. In contrast to market income, the final income gap is remarkably lower, which highlights the role played by fiscal redistribution. However, as it is shown in the Results section, this difference is reversed when we observe the results of the regressions, instead of looking simply to the data descriptive analyses.

Fig. 4 depicts the median income gap between urban and rural locations for each region. Regions such as Extremadura, Castilla-La Mancha, La Rioja, and Catalonia present large market income gaps, whereas Navarre and Aragon have narrower gaps. In contrast, larger final income gaps are mainly concentrated in regions such as Asturias, the Basque Country and, again, La Rioja and Catalonia. These differences in final income gaps highlight the heterogeneous redistributive policies that exist among Spanish regions and indicate their divergent spatial impacts across territories, which we analyse in the next section.

Regional income data differentiated by urban and rural areas is shown in Figure A.1 of Annex A. Regional heterogeneity in both market income and final income follows the patterns obtained for the national distributions. As shown in panels a) and c) of Figure A.1, some regions (Aragon and Murcia) have a higher median market income in urban areas that is reduced after fiscal interventions. Other regions, such as Navarre and Galicia, experience the opposite. Panels b) and d) of Figure A.1 also show a similar redistribution pattern from market income to final income in each region. However, there are some exceptions, such as Andalusia, which have a different pattern compared to the urban trajectory; the redistribution process benefits more to those individuals in urban areas of Andalusia than in the rural areas of the same region.

### 4.2. Quantile regression results

Table 4 shows the QR results for the 1st, 5th, and 9th deciles and for market income and final income. It also includes the results of an ordinary least squares (OLS) regression as a baseline comparison. The first column presents the OLS regression, while from the second onwards, the columns show the QR results for the 1st, 5<sup>th</sup> and 9th deciles. The table shows our coefficients of interest for the analysis, while Annexes C.1 and C.2 show the full results including all the coefficients. Annex C.1 shows the results using market income as the dependent variable, and Annex C.2 shows the results with final income as the dependent variable. Almost all the variables are significant. Age and educational level have a positive effect on income. In contrast, household size has a negative effect. Sectors of activity and employment status also matter in determining income.

These results on the urban–rural gap reveal three main findings. First, OLS estimations show that market income is 1.84 % lower for individuals who live in intermediate areas than for those in urban areas and 5.69 % lower for those in rural areas compared to those in urban areas. Regarding final income, the urban–intermediate gap increases to 2.08 %, and the urban–rural gap falls to 4.41 %. Fiscal interventions increase the urban–intermediate gap and reduce the urban–rural gap. The urban–rural gap is larger for both market and final incomes.

Second, the negative impact on income of living in a rural area is higher than the one when living in an intermediate area. Finally, in general terms, the higher the income decile is, the smaller the gap.

The findings suggest that living in a rural or in an intermediate area may not be a substantial disbenefit in terms of income for high-income individuals. However, living in such an area may constitute a disadvantage in terms of income for those in the lower deciles of the income distribution. For market income, individuals in the 1st decile of

**Table 3**  
Summary statistics for market income and final income, 2017–2020.

Type of income	Urbanization	Obs.	Median (€)	Std. Dev. (€)	Gini Coef.	Growth rate (%)	Diff. with rural med.
Market income	Rural	40.894	10.085,22	13.643,85	0,48	12,07	-
	Intermediate	33.875	11.014,86	14.238,96	0,47	42,45	929,64
	Urban	68.314	11.432,55	14.840,59	0,47	33,77	1.347,33
Final income	Rural	40.894	12.197,81	7.272,62	0,28	-6,10	-
	Intermediate	33.875	12.616,24	7.349,01	0,28	5,46	418,43
	Urban	68.314	13.084,64	7.636,67	0,28	7,22	886,83

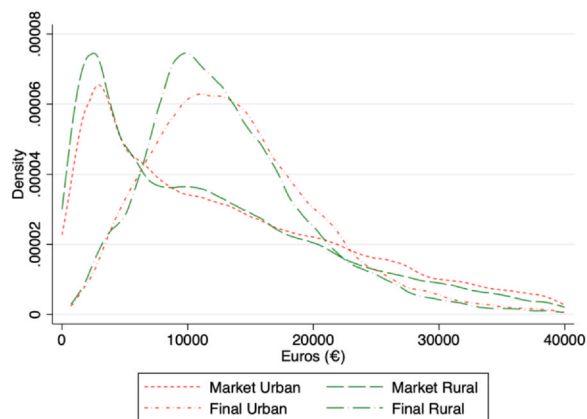


Fig. 2. Market and final income density distributions (in €), 2017–2020.

the income distribution experience an urban–rural gap close to 9 %, compared to 4 % for those in the 9th decile.

Regarding final income, the results show that the fiscal system, through taxes and transfers, reduces the urban–rural and urban–intermediate gaps. From the income distribution perspective, the higher the decile is, the lower the reduction produced by the fiscal system. Individuals in the 9th decile experience a small gap reduction in relative terms.<sup>5</sup>

4.2.1. Regional results

Fig. 5 shows the urban–rural gap in market income and final income by decile for all the regions in our sample. The regions are ordered in descending order of regional GDP per capita. The blue squares represent the coefficient of the urban–rural gap for the 1st decile of each region. The red circles do the same for the 5th decile, whereas the green triangles reproduce the 9th decile. The red line placed at 0

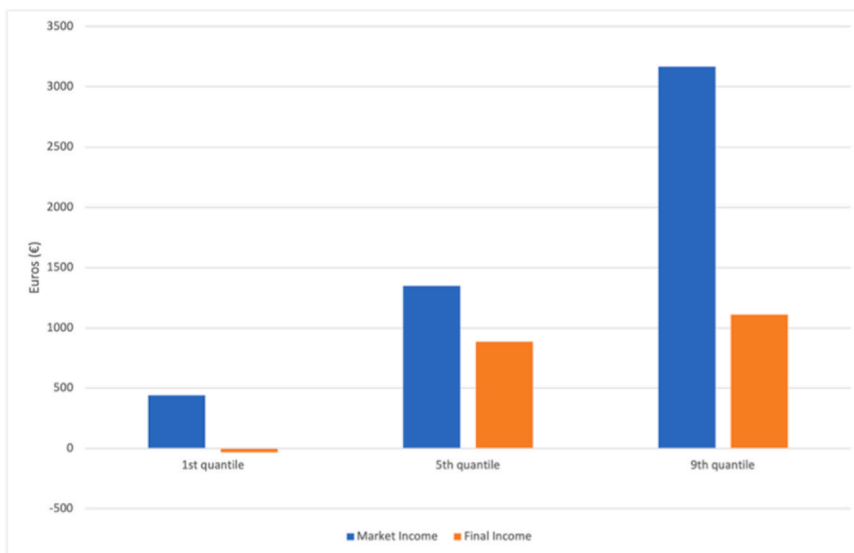


Fig. 3. Urban–rural gap by deciles, with median values in euros, 2017–2020.

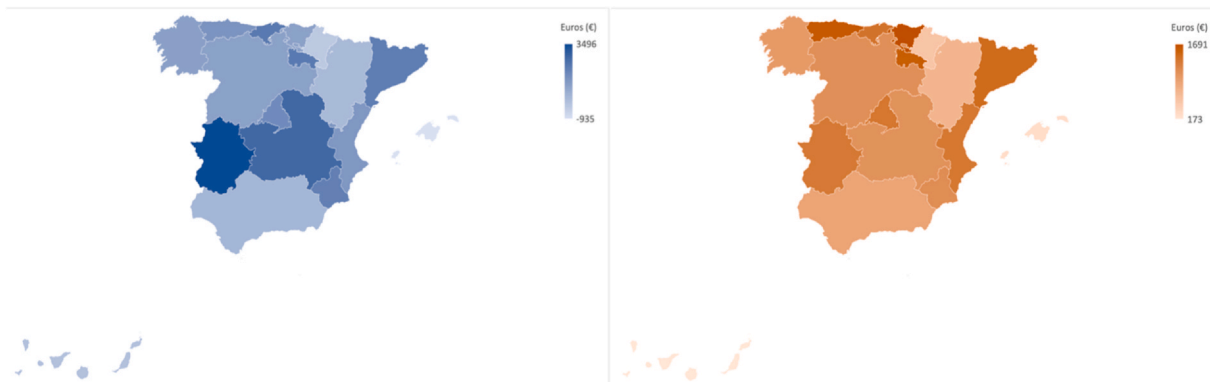
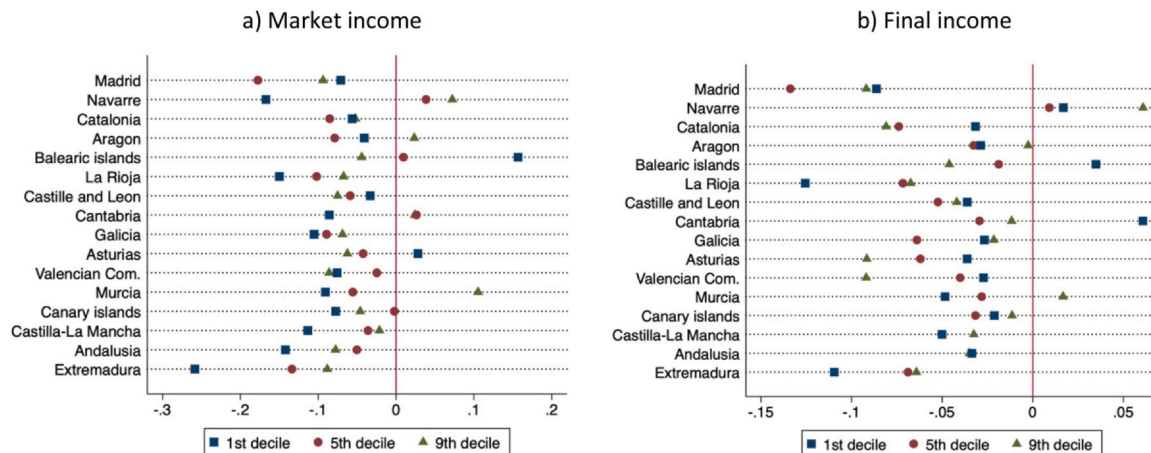


Fig. 4. Urban–rural gap by NUTS-2 regions, with median values in euros, 2017–2020.

**Table 4**  
Quantile estimation for different types of individuals' market and final income.

	(1) OLS	(2) 1st decile	(3) 5th decile	(4) 9th decile
Urban–intermediate gap ( $\delta$ coefficient)	Log market income pc -0.0184** (-2.61)	Log market income pc -0.0317* (-2.17)	Log market income pc -0.0200** (-2.59)	Log market income pc -0.0233* (-2.49)
Urban–rural gap ( $\rho$ coefficient)	-0.0569*** (-8.07)	-0.0869*** (-5.93)	-0.0619*** (-8.02)	-0.0430*** (-4.59)
Urban–intermediate gap ( $\delta$ coefficient)	Log final income pc -0.0208*** (-4.92)	Log final income pc -0.0229** (-2.93)	Log final income pc -0.0190*** (-2.93)	Log final income pc -0.0234*** (-3.34)
Urban–rural gap ( $\rho$ coefficient)	-0.0414*** (-9.75)	-0.0403*** (-5.16)	-0.0443*** (-8.78)	-0.0304*** (-4.32)

Note:  $t$  statistics in parentheses. \*  $p < 0.05$ ; \*\*  $p < 0.01$ ; \*\*\*  $p < 0.001$ .



**Fig. 5.** Regional urban–rural gaps by decile.

differentiates those having a negative urban–rural gap for rural areas, from those having a positive urban–rural gap for rural areas.

In general, the data points are closer to 0 in panel b) of final income, meaning that the fiscal system usually helps reduce the urban–rural gap across all deciles. While the coefficients for market income range from  $-0.3$ – $0.2$ , the coefficients for final income range from  $-0.15$ – $0.07$ . However, the variation between regions is large, and some regions redistribute better than others.

We observe noticeable heterogeneous results, especially for market income, where the differences are larger than in the final income graph. Extremadura, Andalusia and Castilla-La Mancha follow the previous pattern in which the market income gap is negative and is the largest for the 1st decile, followed by the 5th decile and, lastly, the 9th decile. Furthermore, the Balearic Islands and Castilla and Leon have the largest gap for the 9th decile, followed by the 5th decile and, lastly, the 1st decile. We also observe regions such as Cantabria, Navarre, and the Balearic Islands in which two out of the three deciles analysed have positive urban–rural gaps.

Exploring the results of the regional analysis in more depth, panel a) in Fig. 5 shows that there is a remarkably greater urban–rural gap for the lowest decile of income in regions such as Extremadura ( $-26\%$ ) and Navarre ( $-17\%$ ). Conversely, the lowest decile of individuals in the

Balearic Islands has a positive gap of  $16\%$ . For the middle part of the market income distribution, surprisingly, Navarre has a positive gap of  $4\%$ . Regarding the income distribution, Madrid ( $18\%$ ) and Extremadura ( $13\%$ ) have the largest gaps. With respect to the highest decile of market income, Extremadura continues to have a large negative gap ( $-9\%$ ) shared at that level only by the Valencian Community. In contrast, Murcia has a positive gap of  $11\%$  for the highest decile of income.

Panel b) in Fig. 5 shows that La Rioja ( $-13\%$ ) and Extremadura ( $-11\%$ ) have the largest urban–rural gaps for the lowest decile. However, Cantabria has a positive gap ( $6\%$ ) in that specific decile. Regarding the 5th decile, Madrid has the largest negative gap ( $-13\%$ ), and Navarre has the smallest and the only positive gap for that decile ( $1\%$ ). For the highest decile, three regions have a gap of  $-9\%$ , with these cases having the largest gap (Asturias, Madrid and the Valencian Community). On the other hand, Navarre has a positive gap of  $6\%$ .

Fig. 6 shows the extent to which each region reduces the urban–rural gap due to fiscal redistribution. That is, the coefficients in the figure show the result of subtracting the urban–rural final income gap from the urban–rural market income gap for each region and decile. Based on Eq. (2), if we subtract the urban–rural gap coefficient for the final income of a specific decile in a particular region from the same coefficient for market income, we obtain the results shown in Fig. 6. With this difference between incomes, we observe the gap reduction in absolute terms, that has taken place due to the redistribution process. The coefficients in the graph measure the redistributive efficiency of the fiscal system in terms of urban–rural gap reductions. The more negative a coefficient is, the larger the gap reduction from market income to final income for a specific region and decile has been. Similarly, to previous figures, regions are ordered in descending order of regional GDP per capita.

<sup>5</sup> We also perform additional robustness checks for the baseline regressions without controlling by regional fixed effects. Our results point out that the signs of the coefficients for the urban–intermediate and urban–rural areas remain the same. Nevertheless, the magnitude of such gaps increases in the case of the market incomes and decreases for final incomes. In either case, we consider the use of regional fixed effects in the baseline regressions as more appropriate to get accurate results.



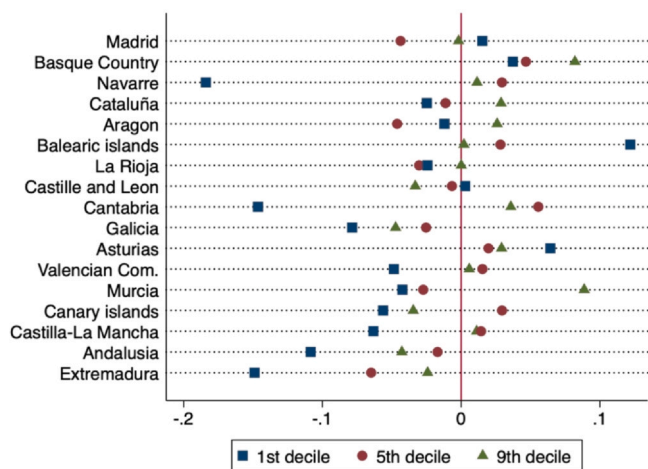


Fig. 6. Fiscal reduction in the urban-rural gap.

We observe a large shrinkage of the gap for the 1st decile of income in Andalusia, Cantabria, Extremadura, and Navarre. Positive coefficients suggest that they not only do not reduce the urban-rural gap through taxes and transfers, but that they also increase this gap. Asturias, the Balearic islands and the Basque Country are the three regions that have positive values for the three deciles. This result means that their redistribution process increases the urban-rural gap for all individuals, regardless of where they are in the income distribution. In contrast, Andalusia and Extremadura are regions that have coefficients for the three deciles below zero, meaning that they are conducting an effective redistribution process, reducing the urban-rural gap for all individuals, regardless of their income category. However, while the size of the gap reduction in Extremadura is highest for the 1st decile, followed by the 5th decile and, lastly, the 9th decile, in Andalusia, the gap is reduced by a larger size for the 9th decile than for the 5th decile.

From both Figs. 5 and 6, we note that there are considerable differences in the sizes of the urban-rural gaps among regions and deciles of the income distribution. Panel a) in Fig. 5 shows that larger and negative urban-rural gaps are generally located in the richer and poorer regions, but not on those with an intermediate GDP per capita. Fig. 6 indicates that poorer regions reduce more the urban-rural gap, at least for the 1st decile.

These results point out that we do not observe that richer regions reduce more the urban-rural gap than poorer regions. Indeed, we find that there is a great diversity in how efficient regional fiscal systems are in meeting the goal of reducing urban-rural gaps. Some regions such as Andalusia reduce the urban-rural gap while others even increase it (e.g., Asturias and the Basque Country). However, most regions have different gap reduction patterns for each income decile.

## 5. Discussion

Results in the previous section stress that individual's market and final incomes differ from rural to urban places, even after controlling for geographical variables such as the region of residence. This urban-rural gap is larger for lower income deciles, which means that poorer individuals in rural territories suffer from a proportionally larger gap than those in the higher deciles of the income distribution. These differences are reduced, but still exist, when we move from market to final incomes.

From the regional perspective, the urban-rural gap shows significant heterogeneity in both market and final incomes. Compared with market income, regional final income gaps are smaller in all cases. The gap reduction is not evenly distributed among deciles and regions. These differences can be explained, on the one hand, because of the rural sprawl of some regions. For instance, regions such as Aragon and

Castille and Leon experience one of the weakest reductions in the urban-rural gap as a result of having one of the highest percentages of rural territories in Spain.

On the other hand, the interplay between national and regional interventions determines the redistributive outcomes in many regions. To grasp these differences, a comparison of regions like Extremadura and Asturias becomes an illustrative example. The tax-benefit system of Extremadura is very effective in redistributing resources across territories. The reduction in the urban-rural gap for the 1st decile is 15 %, for the 5th decile 6,5 %, and for the 9th decile 2,4 %. For Asturias, the opposite occurs. The gap increases by 6,4 % for the 1st decile, by 2 % for the 5th decile and by 3 % for the 9th decile. Although they are two middle-income regions that operates within the same Spanish tax-benefit system, the combination of national income-taxation schemes and the specific regional fiscal structures generates very different redistributive outputs.

Furthermore, this analysis of the regional results after fiscal redistribution raises four main conclusions. First, even if regional income differences matter, most of the redistribution takes place at the national level through contributory and non-contributory old-age pensions, unemployment benefits and disability transfers. Centralized fiscal interventions are focused on individuals' characteristics and economic conditions while they do not consider the territory (urban, intermediate, or rural) or region where individuals are located. As a result, national policies could potentially exacerbate or ameliorate the urban-rural gaps.

Second, this prominence of national policies makes the Spanish Tax-benefit system to be "place-blind" since they focus on individuals' socioeconomic characteristics rather than in places' differentials. It does not exclude the possibility that policies designed for socioeconomic purposes also have territorial consequences. Indeed, our findings suggest that the Spanish urban-rural gap is reduced because of the individuals' socioeconomic characteristics and not because of policies designed to lift rural areas.

Third, idiosyncratic regional characteristics in terms of their economic, social, and institutional performances have a significant effect in the implementation of fiscal policies. Retired individuals tend to live in a higher proportion in rural areas (Brown et al., 2008) having an impact on the redistributive capacity of transfers (pensions). Unemployment is higher in the south than in the north of Spain (López-Bazo et al., 2005). Consequently, we could expect larger reductions of the gap in the rural southern regions (e.g., Andalusia and Extremadura) than in the urban northern regions (e.g., Asturias and Basque Country).

Last, middle-income regions are good in reducing the urban-rural gap specially for the lowest deciles of the income distribution. In particular, some poorer regions (Extremadura, Andalusia, or Castilla-La Mancha) are narrowing the low-income gap more intensively than richer ones (Madrid, Basque Country, or Catalonia).

These cases need a more nuance analysis. The significant reduction in the urban-rural gap for the lower deciles in Extremadura and Andalusia may be driven by a particular transfer called Plan de Empleo Rural (Rural Employment Plan, PER in Spanish). This transfer programme is specifically designed for workers in the agricultural sector who are unemployed throughout a year to complement temporary incomes and to avoid the migration of agricultural workers from rural areas. From 1986-1996, this transfer affected only the Andalusia and Extremadura regions. This transfer is now extended to other regions in Spain, although Andalusia and Extremadura benefit from more than 85 % of the total budget (more than 200 million €). The goal and design of this transfer policy should be reformulated as it presents relevant limitations even in retaining individuals in their territories (Serra, et al., 2023). In either case, this is a good example of a transfer policy that could complement standard income-taxation schemes in achieving higher redistribution outcomes.

Regarding Asturias and the Basque Country, both regions have been affected by deep industrial transformations whose associated social

costs were moderated through different fiscal interventions. In Asturias, direct benefits to individuals working on mining activities (mostly placed in urban areas) were established (Fernández-Vazquez, 2022). The Basque Country has experienced a reconversion towards a service-oriented economy (Navarro et al., 2014). This change took place mostly in urban areas through transfer programmes to those affected by the reconversion.

These specific policies from the Spanish case show that the inclusion of a rural perspective on fiscal redistribution can complement dominant households-oriented interventions. Furthermore, they align with the recent trend of public policy declarations that point to the need to adapt policies to rural areas through “rural proofing” mechanisms such as those proposed by the EU (European Commission, 2021).

This mechanism implies that legislations and policies have to be analysed from the perspective of the consequences that they will have in rural areas (Nordberg, 2021) to prevent governments from broadening the urban-rural gap in any aspect. The systematic review of the fiscal systems through a “rural lens” would be aligned with the most innovative policy, which should contribute to further reduce the gap by paying attention to it before any reform is implemented (Shortall and Alston, 2016).

From the literature point of view, recent works point in the direction of “place-based policies” (Lammarino et al., 2019) that normally contribute to the development of least developed regions. The implementation of place-based policies to address urban-rural gaps unfolds a series of new institutional challenges. For instance, national and subnational policies would need to be coordinated, otherwise, the effect of an adequate place-based national policy could be limited by regional policies, or the other way around (Liu et al., 2021). Evidence on this regard shows that there is not a complete set of guidelines for policies’ coordination. This coordination requires a case-by-case approach (Peters, 2018) in which there are some necessary, although not sufficient, minimal prerequisites for making collaboration across the different institutional levels involved as effective as possible. Similar administrative capacities is one of the key elements at this respect (Ferry, 2021).

Even though place-based fiscal redistribution might be a valid instrument to tackle urban-rural gaps, there are other policies that are more cost-effective in the long run (McCann, 2023), although less effective in reducing the urban-rural gap. Policies directed to increase productivity in rural areas might be useful in rising wages in those areas (Pezzini, 2001). Examples such as the creation of enterprise zones, infrastructures or investments in higher education have a role in creating self-sustaining longer-run gains that narrow the urban-rural gap (Neumark and Simpson, 2015). A combination of policies with immediate redistributive effects in the short run with enduring investment policies in the long run may balance the costs and timing of the urban-rural gap reduction.

Policies’ analysis confirms that socioeconomic dynamics in rural areas is quite different from those in urban areas where policies are usually designed. Public place-oriented interventions could complement income-based interventions and contribute to a more balanced redistribution system (Vittuari et al., 2020). Societies’ support for spatial redistributions would be the key challenge in this respect since economic evidence suggest the validity of fiscal place-based interventions (Gaubert, et al., 2021).

Traditionally, economists and policymakers have rejected this approach on fiscal redistribution (Glaeser, 2008), as it was considered to be inefficient due to the artificial increase in economic activity generated in less productive places and, conversely, the decrease in more productive areas. However, consensus on other non-fiscal place-based interventions that tie economic benefits to geographic locations is much wider (Glaeser and Gottlieb, 2008; Kline and Moretti, 2014; Ehrlich and Overman, 2020).

The results presented in Section 4 are aligned with the findings by Gaubert, et al., (2021). These authors suggest the necessity of

complementing place-blind taxation when income groups are segregated (across regions and areas) through the implementation place-based redistribution interventions. This would contribute to ease the costs of redistributing across individuals and households’ earnings. In highly decentralized countries such as Spain, this should ideally be done at the national level to avoid a new wave of competitive interventions between regions. Doing this, countries could create welfare gains that standard income-based redistributive schemes cannot.

## 6. Conclusions

This paper studies the existence of an urban–rural gap in households’ income in advanced economies using two types of income measures before (market income) and after (final income) fiscal redistribution takes place. We focus on the case of Spain since it offers several specificities for its scientific relevance. Results show that once fiscal redistribution is in play, the urban-rural income gap is reduced. In particular, we find that there is an average urban–rural gap of approximately 6 % for market income and 4 % for final income. These results are in line with the still few studies on the urban–rural gap for advanced economies (Hertz & Silva, 2020), which show a smaller gap than in emerging economies (Bucci, 1993; Nguyen et al., 2007; Sicular et al., 2008). Moreover, we document the existence of an uneven urban–rural gap along individuals’ income distribution. The gap further deteriorates for households in the lowest deciles of the income distribution and improves for highest earning individuals. Regarding market income, individuals in the lowest deciles of the income distribution experience a 9 % urban-rural income gap; for the highest deciles, this same indicator falls to 4 %. These differences persist with smaller magnitudes after fiscal interventions. (4 % for market income and 3 % for final income). As far as our knowledge goes, these are novel results that point out to promising areas of research on the interplay between fiscal redistribution and the magnitude of the urban-rural gap.

Finally, we explore regional differences and find heterogeneous urban–rural gaps across regions in which fiscal regional policies have a positive role in reducing these gaps. This redistribution process is not contingent to the economic performance of a region. On the contrary, our results show that low-income regions have similar or even stronger redistributive capacity as high-income regions. In a fiscal system in which taxes and transfers do not explicitly differentiate depending on the territorial typology in which the individual lives, a so-called “place-blind” fiscal system (Nurse and Skyes, 2020), our results shed light on the narrowing impact of fiscal redistributive policies on the urban–rural gap.

Specific policies designed to reduce the urban-rural gap remain understudied. The findings in this paper open the door to future analyses on the cost effectiveness of fiscal policies in tackling such gap.

## Appendix A. Supporting information

Supplementary data associated with this article can be found in the online version at [doi:10.1016/j.rspp.2024.100045](https://doi.org/10.1016/j.rspp.2024.100045).

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