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**Care Gaps under Unequal
Fiscal Capacity: Territorial
Inequalities in Municipal
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Abstract

Population ageing is increasing pressure on local welfare systems, but the capacity of municipalities to finance and provide services for older people differs substantially across territories. This paper studies municipal expenditure on older people in Italy, focusing on the large territorial disparities observed across municipalities and regions. Using municipality-level data for 2019, before the disruption caused by the COVID-19 pandemic, the paper investigates how cross-sectional differences in per capita expenditure are associated with indicators of local needs, fiscal resources and local policy orientation. We develop a parsimonious analytical framework linking municipal expenditure to potential financial needs, local policy orientation, and fiscal resources and co-financing. Under an explicit normalization, the framework allows us to construct model-based indicators of potential financial needs and their implied coverage by predicted municipal expenditure. The results document a marked territorial divide in spending on older people and suggest that municipal expenditure covers only a limited share of estimated needs and that unequal fiscal resources contribute substantially to territorial disparities. The findings highlight the importance of local fiscal capacity and intergovernmental financing arrangements in shaping access to local services for older people across territories.

Keywords

older people; long-term care; municipal expenditure; territorial inequality; fiscal capacity; Italy

JEL Codes

H72, H75, I38, J14, R58

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Abstract

Population ageing is increasing pressure on local welfare systems, but the capacity of municipalities to finance and provide services for older people differs substantially across territories. This paper studies municipal expenditure on older people in Italy, focusing on the large territorial disparities observed across municipalities and regions. Using municipality-level data for 2019, before the disruption caused by the COVID-19 pandemic, the paper investigates how cross-sectional differences in per capita expenditure are associated with indicators of local needs, fiscal resources and local policy orientation. We develop a parsimonious analytical framework linking municipal expenditure to potential financial needs, local policy orientation, and fiscal resources and co-financing. Under an explicit normalization, the framework allows us to construct model-based indicators of potential financial needs and their implied coverage by predicted municipal expenditure. The results document a marked territorial divide in spending on older people and suggests that municipal expenditure covers only a limited share of estimated needs and that unequal fiscal resources contribute substantially to territorial disparities. The findings highlight the importance of local fiscal capacity and intergovernmental financing arrangements in shaping access to local services for older people across territories.

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1 Introduction

Population ageing is placing increasing pressure on welfare systems across Europe. Italy is one of the countries most exposed to this challenge, due to the high and growing share of older people, the increasing number of individuals with long-term care needs, and the gradual weakening of informal family care. These trends raise important questions about the capacity of public systems to provide adequate support to older people, especially in a context of constrained public finances (European Commission, 2024; European Commission and Social Protection Committee, 2021; ISTAT, 2025b).

In Italy, public support for older people is provided through a multi-level system involving the State, regions and municipalities. The State plays a central role through regulation and financing (primarily through cash benefits), while Regions are responsible for organizing social and health care policies and for financing the latter. Municipalities complement the public provision for older people mainly through the provision of in-kind services.

To ensure the sustainability of the public care system for older people, substantial financial resources are being deployed. However, these resources remain lower than in many other European countries and insufficient to close a sizeable care gap. Yet in Italy, the problem is also one of significant intra- and inter-regional inequalities in public spending on older people across municipalities of different size and fiscal capacity. These inequalities concern not only the allocation of central government expenditure, where these depend on local claims assessments (Marenzi et al., 2023), but also spending by lower levels of government, particularly municipalities. Indeed, a distinctive feature of municipal expenditure on older people in Italy is its large territorial heterogeneity (Bocchino and Padovani, 2022, 2023; Marinuzzi and Tortorella, 2021, 2022; Casavecchia et al., 2023). In 2019, net municipal expenditure on older people was much higher in several northern and central regions than in many southern regions, while a non-negligible share of municipalities recorded no expenditure on older people at all.

This heterogeneity raises a relevant policy question: to what extent do territorial disparities in municipal expenditure reflect differences in local needs, differences in fiscal resources, or differences in local policy choices? This question relates to several strands of literature on local public expenditure, fiscal federalism and welfare provision.

A large literature studies the determinants of aggregate municipal expenditure across local governments, using both reduced-form specifications and more structured models of local public spending. These contributions relate local expenditure to population size, density, income, demographic structure and other socio-economic characteristics, with the aim of assessing whether expenditure differences reflect demand, scale economies or cost conditions (Aaberge and Langørgen, 2003; Deller and Maher, 2005; Holcombe and Williams, 2008, 2009; Tran et al., 2019, 2021). Other studies rely on theoretical frameworks such as the median voter model or local demand systems to derive municipal spending equations from assumptions on local preferences and budget constraints (Turnbull and Djoundourian, 1994; Mendes and Sampaio de Sousa, 2006; Binet, 2013). However, these approaches are often difficult to apply to specific expenditure items, especially when local governments provide multi-dimensional services and

operate within complex intergovernmental fiscal systems.

A second strand of research focuses more directly on ageing, health and long-term care expenditure. This literature shows that population ageing can increase demand for health, social care and long-term care services, but that the magnitude and composition of expenditure responses depend on local institutional responsibilities, the overall design of public provision, and the balance between public provision and informal family care. Studies on decentralized systems, such as the Finnish, are particularly relevant because they analyse expenditure on older people in contexts where municipalities have important responsibilities for service provision (Häkkinen and Luoma, 1995; Nguyen et al., 2009). More recent work on ageing and local government has also emphasized that demographic change affects both the demand for local services and the fiscal capacity of local authorities (Andrews and Dollery, 2021; Kopańska, 2023). This is especially important for Italy, where support for dependent older people relies heavily on national cash benefits, while in-kind services are largely organized and implemented at the local level.

A third strand emphasizes the role of fiscal capacity and intergovernmental finance in shaping local expenditure. Local governments differ in their ability to raise own revenues and in the transfers they receive from higher levels of government. These differences may affect not only total expenditure, but also the allocation of resources across specific policy areas. The literature on public grants and the so-called flypaper effect shows that intergovernmental transfers may influence local spending decisions, although the direction and magnitude of these effects depend on the design of the grant system and on local fiscal incentives (Knight, 2002; Dahlberg et al., 2008; Deller and Maher, 2005). For Italy, this issue is particularly relevant because municipalities differ widely in tax bases, own revenues and fiscal stress, and because regional arrangements affect the financing of social and socio-health services (Padovani et al., 2024).

Existing studies provide valuable evidence on correlates of local public spending, but two limitations are especially relevant for a narrowly defined service such as support for older people. Reduced-form specifications often do not distinguish potential-need factors from conditions affecting municipalities' ability to finance provision, while more structured local-spending models rely on assumptions that are difficult to apply in multi-level welfare systems. Using municipality-level data for Italy in 2019, we develop a parsimonious analytical framework that separates potential financial needs, local policy orientation, and fiscal-resource availability. The framework disciplines the empirical specification and, under an explicit normalization, decomposes predicted expenditure into model-based components and an implied coverage indicator. Because the data are cross-sectional and the scales of the needs and resource components are not separately identified without normalization, these indicators are not direct measures of actual care needs or unmet demand, and the estimated coefficients do not have a causal interpretation. Their contribution is comparative: they show how needs, resources, and implied coverage vary across municipalities and regions.

The contribution of the paper is threefold. First, it documents the extent of territorial inequalities in municipal expenditure on older people using detailed municipal data. Second, it investigates how expenditure is associated with the three above-mentioned groups of factors (need-related conditions, fiscal resources, and local policy orientation) and shows that territorial disparities

in municipal expenditure on older people are not only associated with demographic and socio-economic needs, but also with the unequal fiscal capacity of municipalities and with differences in co-financing arrangements. Third, it uses the analytical framework to decompose predicted expenditure into normalized model-based components and to compare the implied coverage of potential financial needs across municipalities and regions.

The results are consistent with the idea that municipal spending reflects both the demand factors and the capacity of municipalities to finance them, while the age-based proxy for local policy orientation has limited quantitative relevance. Under the adopted normalization, the implied coverage indicator is low on average and varies across territories, with lower values systematically associated with weaker fiscal-resource availability.

These findings have relevant implications for the debate on territorial equity in local welfare provision. If municipal expenditure on older people depends not only on needs but also on the availability of local fiscal resources, then equalization mechanisms and intergovernmental financing arrangements become central to reducing disparities in access to services. This is especially important in a country such as Italy, where demographic ageing is widespread but fiscal capacity is strikingly unevenly distributed across territories. The rest of the paper is organized as follows. Section 2 describes the institutional background of social assistance for older people in Italy. Section 3 presents descriptive evidence on municipal expenditure and its territorial distribution. Section 4 introduces the conceptual framework and the empirical specification. Section 5 presents the data and the estimation results. Section 6 presents the model-based decomposition of predicted expenditure into potential needs, local policy orientation and fiscal-resource availability, and examines the resulting expenditure gaps. Section 7 concludes.

2 Social assistance for older people in Italy

Italy has one of the oldest populations in Europe, and population ageing is expected to continue over the coming decades. Between 2013 and 2023, the number of people aged 65 and over increased by 11.3%. According to demographic projections, this trend will continue in the coming decades, with the share of older people expected to reach about one third of the population by 2070. Population ageing places growing pressure on long-term care and social assistance systems, especially because the number of older individuals with care needs is increasing while informal family care, historically a central pillar of the Italian welfare model, is gradually weakening (ISTAT, 2025b; European Commission, 2024; European Commission and Social Protection Committee, 2021; NNA, 2021).

Public expenditure on long-term care is sizeable but strongly oriented towards monetary transfers. In 2023, long-term care expenditure in Italy amounted to about 1.63% of GDP, corresponding to approximately 34.6 billion euros. Cash benefits represented just over half of total long-term care expenditure, while at-home care and institutional care accounted for smaller shares. This means that in-kind services remain comparatively less developed than monetary support, making the local provision of services particularly relevant for older people with care needs (Ministero dell'Economia e delle Finanze – RGS, 2024; European Commission, 2024; Casavecchia et al.,

2023).

Support for older people in Italy is provided through a multi-level system involving the State, regions and municipalities. The State defines the general framework of social rights and provides the main cash benefit for dependent individuals, the *indennità di accompagnamento* — a national, non-means-tested allowance for people with severe disability or dependency. At the end of 2023, around 2.04 million such benefits were being paid, corresponding to expenditure of about 0.7% of GDP. This makes the allowance the largest national intervention in support of dependent older people (Ministero dell'Economia e delle Finanze – RGS, 2024; Arlotti and Hendrickson, 2016; NNA, 2021).

Regions are responsible for planning and organizing social and socio-health policies within their territories. They define regional social plans, allocate resources to local areas, and regulate the organization of services. They also play an important role in the integration between social assistance and health care, which is particularly relevant for older people with long-term care needs. As a result, regional policy choices can influence both the level and the composition of services available across territories (Ministero del Lavoro e delle Politiche Sociali, 2021; Casavecchia et al., 2023).

Municipalities are responsible for the local implementation of social assistance policies. They provide, either individually or through inter-municipal associations and social districts, a range of services and interventions for older people. These include home care, social work, residential and semi-residential services, monetary contributions for residential care or personal services, and other forms of support aimed at promoting autonomy and social inclusion. Municipalities finance these services through their own budget resources, transfers from other levels of government, user co-payments and, in some cases, contributions from the National Health Service (ISTAT, 2025a; Ministero del Lavoro e delle Politiche Sociali, 2021; Bocchino and Padovani, 2022).

Although municipal expenditure represents only a relatively small component of the broader system of support for older people, it is crucial for understanding territorial inequality in access to local welfare services. Municipalities are the level of government closest to local needs, but their ability to finance services depends on fiscal capacity, transfers, co-financing arrangements and regional institutional frameworks. Consequently, differences in municipal expenditure may reflect both differences in local needs and differences in the resources available to meet them (Bocchino and Padovani, 2022, 2023; Marinuzzi and Tortorella, 2021, 2022; Casavecchia et al., 2023).

This institutional setting provides the motivation for the empirical analysis that follows. Since Italy's long-term care system remains strongly oriented towards cash benefits, municipal services represent an important local complement to national monetary transfers. Understanding how municipal expenditure varies across territories is therefore essential for assessing the local dimension of care provision for older people and the potential sources of unequal access to services (European Commission and Social Protection Committee, 2021; Ministero dell'Economia e delle Finanze – RGS, 2024; Casavecchia et al., 2023).

3 Municipal expenditure on older people: levels, composition and territorial disparities

Data on municipal expenditure on older people are collected annually by ISTAT through a specific survey carried out in collaboration with the Ministry of Economy and Finance (MEF) and the Regions (ISTAT, 2025a). Expenditure refers to current expenditure on an accrual basis and is reported both gross and net of user co-payments and National Health Service contributions.

In 2019, gross municipal expenditure on older people amounted to approximately 2.37 billion euros, while net expenditure amounted to about 1.27 billion euros (Table 1). User co-payments and National Health Service contributions financed around 46.5% of gross expenditure. This share was particularly high for cash benefits and residential structures, while it was lower for several in-kind services. Net expenditure was concentrated in three main areas: services, which accounted for 46.6% of the total; cash benefits, accounting for 27.2%; and structures, accounting for 26.2%. Within services, social home care represented the largest item, with 22.2% of total net expenditure. Residential structures also absorbed a substantial share of municipal resources, either through direct expenditure or through contributions for residential care (ISTAT, 2025a).

Municipal expenditure on older people is highly uneven across territories. In 2019, average net expenditure in Italy was 21.2 euros per capita and 92.5 euros per older resident, but regional averages differed widely (Table 2). The highest levels were recorded in Special Statute Regions¹ such as Aosta Valley and Trentino-Alto Adige, where expenditure was much higher than the national average. This reflects, at least in part, their specific institutional and financial arrangements.

Among Ordinary Statute Regions, expenditure was generally higher in the North and Centre than in the South. Tuscany, Liguria, Emilia-Romagna and Lazio recorded expenditure levels above or close to the national average, while several southern regions displayed much lower values. Calabria, Molise, Basilicata, Campania and Abruzzo were among the regions with the lowest per capita expenditure. Similar differences emerge when expenditure is measured per older resident rather than per capita. These figures document a clear territorial divide in the local provision of services and interventions for older people (ISTAT, 2025a; Bocchino and Padovani, 2022, 2023; Marinuzzi and Tortorella, 2021, 2022; Casavecchia et al., 2023).

Territorial differences are not limited to the level of spending. They also concern the way municipal expenditure is financed. The share of gross expenditure covered by user co-payments and National Health Service contributions varies substantially across regions. For example this share was particularly high in Veneto, mainly because of the contribution of the health system, reaching 85% while in several southern and central regions that share is less than 10% (Sicily, Lazio, Puglia and Molise). It is worth stressing that these differences reflect both regional policy

¹Italy is divided into 20 regions. Fifteen are Ordinary Statute Regions, while five are Special Statute Regions: Sicily, Sardinia, Valle d'Aosta/Vallée d'Aoste, Trentino-Alto Adige/Südtirol and Friuli-Venezia Giulia. Special Statute Regions enjoy broader legislative, administrative and financial autonomy, reflecting specific historical, geographical and linguistic features. For this reason, their institutional and financing arrangements are not fully comparable with those of Ordinary Statute Regions.

choices and the varying capacity of local systems to mobilize co-financing for services targeted at older people (ISTAT, 2025a; Casavecchia et al., 2023).

The municipal-level distribution confirms and reinforces the evidence from regional averages. Figure 1 maps net municipal expenditure on older people, measured both per capita and per older resident. The maps show substantial heterogeneity across municipalities, with visible differences between northern and southern areas and within individual regions. They also show that a non-negligible share of municipalities records no expenditure on older people. This feature is important for the empirical analysis, as it implies that territorial inequality concerns both the intensity of expenditure among spending municipalities and the extensive margin of whether municipalities report any expenditure at all (ISTAT, 2025a; Bocchino and Padovani, 2023).

Overall, the descriptive evidence points to three main facts. First, municipal expenditure on older people represents a relatively small but important component of the Italian long-term care and social assistance system. Second, expenditure is strongly concentrated in in-kind services, residential support and related contributions. Third, and most importantly for the purpose of this paper, spending levels differ sharply across territories. These disparities may reflect differences in demographic and socio-economic needs, but they may also depend on fiscal capacity constraints, as well as political preferences for specific expenditure components.

4 Conceptual framework and empirical specification

The descriptive evidence presented above shows large territorial differences in municipal expenditure on older people. These differences may arise for several reasons. Municipalities may face different levels of potential demand because of their demographic, social and economic characteristics. They may also differ in the financial resources available to provide services. Finally, local policy orientation may affect the extent to which municipalities allocate resources to services for older people.

This section introduces a parsimonious analytical framework to organize these channels and derive the empirical specification. The framework is not intended to provide a full structural model of municipal decision-making. Rather, it offers a transparent way to interpret cross-sectional differences in expenditure as the result of three components: potential financial needs, fiscal resource availability, and local policy orientation.

Let E_i denote municipal expenditure on older people in municipality i . Suppose that local decision makers have in mind a target level of expenditure related to the potential financial needs of older residents. Let N_i denote these potential financial needs. Since not all potential needs may be translated into municipal spending, the target level of expenditure, denoted by E_i^T , is assumed to be proportional to needs:

$$E_i^T = \varphi_i N_i, \tag{1}$$

where φ_i captures the extent to which local decision makers are oriented towards satisfying potential needs for services for older people. If $\varphi_i = 1$, the municipality aims to cover the full

level of potential needs. If $0 < \varphi_i < 1$, the target expenditure is lower than potential needs.

We represent the municipality's objective through a quadratic loss function, which links actual expenditure to the target implied by potential financial needs and local policy orientation. In the absence of financing costs, the municipality would choose expenditure so as to minimize the distance between actual expenditure and the target:

$$L_i = (E_i - \varphi_i N_i)^2. \quad (2)$$

This loss is minimized when $E_i = \varphi_i N_i$. The expression therefore provides a simple motivation for why expenditure should be related to both potential needs and local policy orientation.

The local policy orientation component is not directly observed. We assume that it can be represented as a function of an observable proxy, denoted by P_i :

$$\varphi_i = P_i^\omega, \quad (3)$$

where ω measures the association between the proxy and the policy orientation component. In the empirical analysis, P_i is constructed from observable characteristics of local administrators and council members. This variable should be interpreted cautiously: it is not a direct measure of political preferences, but a proxy for local policy orientation.

Potential financial needs are also not directly observed. They are assumed to depend on a set of demographic and socio-economic characteristics of the municipality. Let X_{ki} denote the k -th indicator of potential needs. These variables include, for example, population size, the old-age dependency ratio, household size, income, education, and indicators related to state social benefits. We represent potential needs as:

$$N_i = \theta_0 \prod_{k=1}^K X_{ki}^{\theta_k}, \quad (4)$$

where θ_k measures the elasticity of potential needs with respect to the variable X_{ki} .

If municipalities faced no financing costs, expenditure would be expected to move towards $\varphi_i N_i$. In practice, however, increasing expenditure requires financial resources and may involve fiscal, administrative and political costs. These costs are expected to be lower where municipalities have greater fiscal capacity, higher revenues, larger transfers, or greater co-financing from users and other public institutions.

To capture this idea, let T_i denote an index of the cost of financing expenditure. Higher values of T_i correspond to higher financing costs, while lower values correspond to greater resource availability. The cost of expenditure is represented as:

$$C_i = (T_i - 1) E_i^2, \quad (5)$$

with $T_i > 1$, so that the cost of expenditure is positive. The index T_i is assumed to depend negatively on fiscal resources. Let Z_{hi} denote the h -th indicator of fiscal resources or co-financing

arrangements. We write:

$$T_i = \beta_0 \prod_{h=1}^H Z_{hi}^{-\beta_h}. \quad (6)$$

If $\beta_h > 0$, an increase in Z_{hi} reduces T_i , thereby lowering the cost of expenditure. Equivalently, greater fiscal resource availability increases T_i^{-1} .

The municipality is then assumed to choose expenditure by taking into account both the distance from the target and the cost of financing expenditure. The objective function can be written as:

$$\min_{E_i} \mathcal{L}_i(E_i) = (E_i - \varphi_i N_i)^2 + (T_i - 1) E_i^2. \quad (7)$$

The first term captures the loss associated with expenditure falling short of the target implied by potential needs and local policy orientation. The second term captures the cost of financing municipal expenditure.

The first-order condition of this problem is:

$$2(E_i - \varphi_i N_i) + 2(T_i - 1) E_i = 0. \quad (8)$$

Rearranging gives:

$$T_i E_i = \varphi_i N_i, \quad (9)$$

and therefore:

$$E_i^* = \varphi_i N_i T_i^{-1}. \quad (10)$$

This expression shows that the expenditure level implied by the framework increases with potential financial needs, with the local policy orientation component, and with fiscal resource availability.

Substituting the expressions for φ_i , N_i and T_i^{-1} gives:

$$E_i^* = P_i^\omega \theta_0 \prod_{k=1}^K X_{ki}^{\theta_k} \frac{1}{\beta_0} \prod_{h=1}^H Z_{hi}^{\beta_h}. \quad (11)$$

Equivalently:

$$E_i^* = \gamma_0 P_i^\omega \prod_{k=1}^K X_{ki}^{\theta_k} \prod_{h=1}^H Z_{hi}^{\beta_h}, \quad (12)$$

where:

$$\gamma_0 = \frac{\theta_0}{\beta_0}. \quad (13)$$

Taking logarithms leads to the empirical specification:

$$\ln(E_i) = \ln(\gamma_0) + \omega \ln(P_i) + \sum_{k=1}^K \theta_k \ln(X_{ki}) + \sum_{h=1}^H \beta_h \ln(Z_{hi}) + e_i, \quad (14)$$

where e_i is an error term.

The coefficients of this log-linear specification can be interpreted as conditional associations between municipal expenditure and the explanatory variables. The coefficients θ_k capture the association between expenditure and indicators of potential needs; the coefficients β_h capture the association between expenditure and fiscal resource availability or co-financing arrangements; and ω captures the association between expenditure and the proxy for local policy orientation. These coefficients should not be interpreted as causal effects.

The empirical model is estimated using cross-sectional municipal data. The specification provides the basis for assessing whether territorial disparities in municipal expenditure on older people are more closely associated with differences in local needs, differences in fiscal resources, or differences in local policy orientation. The framework is useful not only for identifying the factors associated with municipal expenditure on older people, but also for providing a preliminary, model-based estimate of potential spending needs at the municipal level and of the gap between these needs and predicted municipal expenditure across Italy.

5 Data and estimation results

5.1 Data and variables

The empirical analysis uses municipality-level data for Italy. The dependent variable is net municipal expenditure on older people in 2019, expressed in per capita terms. The year 2019 is used because it is the last year before the disruption caused by the COVID-19 pandemic, which affected both social needs and the organization of local services. Expenditure data are taken from the ISTAT survey on social interventions and services provided by single and associated municipalities (ISTAT, 2025a). Net expenditure excludes user co-payments and National Health Service contributions and therefore measures the expenditure that municipalities finance through their own resources and transfers.

The dependent variable is expressed in per capita terms, which is the standard metric in the literature on municipal expenditure, although alternative normalizations such as expenditure per older resident or per household may also be informative (Tran et al., 2021). The analysis focuses on municipalities located in Ordinary Statute Regions. Municipalities in Special Statute Regions are excluded because they operate under different institutional and financial arrangements, which make them difficult to compare with the rest of the country. The estimating sample therefore includes 6,495 municipalities². Since a small but non-negligible share of municipalities reports no expenditure on older people, the empirical analysis considers two approaches. The first includes all municipalities and adds a dummy variable identifying municipalities with zero expenditure. The second restricts the sample to municipalities with positive expenditure. The latter specification is used as the reference model, because it focuses on the intensive margin of spending and avoids making the zero-expenditure dummy central to the interpretation of the results.

The explanatory variables are organized into the three groups introduced in the conceptual

²The initial dataset includes 6,504 municipalities in Ordinary Statute Regions. After excluding observations with missing values in the variables used in the regression, the estimating sample includes 6,495 municipalities.

framework: indicators of potential needs, indicators of fiscal resources, and a proxy for local policy orientation.

The first group includes demographic and socio-economic variables that are expected to be associated with potential needs for municipal services targeted at older people. Population size is included because municipal responsibilities, administrative capacity and scale conditions may differ across municipalities of different size. The old-age dependency ratio captures demographic pressure. Household size is included because larger families may provide more informal care, reducing the demand for municipal services. Per capita income captures the economic conditions of residents and may affect both demand for public services and access to private alternatives. The share of the population with tertiary education is included because education is associated with health status and patterns of service use (Nguyen et al., 2009). Finally, the ratio between the number of older residents receiving state social benefits and the older population is included to account for the relationship between national forms of support and local expenditure³. Finally, altitude-class dummies are included to account for territorial and environmental characteristics that may affect both service needs and the cost of service provision.

The second group of variables measures the financial resources available to municipalities. These include tax revenues, grants and non-tax revenues, all expressed in per capita terms. To reduce annual fluctuations and to limit simultaneity with 2019 expenditure, municipal revenue variables are measured as averages over the period 2016–2018. The specification also includes user co-payments and National Health Service contributions, expressed in per capita terms and measured in 2019. These variables capture co-financing arrangements that are directly linked to the provision of services for older people and may support higher levels of local service provision. Finally, the fiscal stress index, defined as the ratio between current revenues and current expenditures, is included to capture the overall budgetary position of the municipality (Deller and Maher, 2005). Higher values of this index indicate a stronger current budget position, while lower values indicate greater fiscal pressure. Overall, these variables are intended to capture the capacity of municipalities to finance services and interventions for older people.

The third group captures local policy orientation. Since direct information on political preferences, party platforms or policy priorities is not available for all municipalities, this component is proxied using information on the average age of municipal administrators and city council members. This choice is motivated by evidence that the age composition of local political bodies can be related to political behaviour and municipal spending priorities (Alesina et al., 2019; Baskaran et al., 2024; Jung, 2023). A principal component analysis is used to summarize the two age variables into a single indicator.⁴ This proxy should be interpreted with caution: it is not a direct measure of political preferences, but only an indirect indicator of local policy orientation.

All continuous variables enter the empirical specification in logarithmic form⁵. The model is estimated using ordinary least squares with robust standard errors. Appendix B reports variable

³The ratio between older residents receiving state social benefits and the older population is measured at the regional level and assigned to municipalities within the same region.

⁴The resulting component is rescaled to be strictly positive before entering the logarithmic specification.

⁵A small positive value of 0.00001 is assigned before applying the logarithmic transformation

definitions and summary statistics.

5.2 Estimation results

Table 3 reports the estimation results for four alternative specifications. The reference specification is Model II, which is estimated on municipalities with positive expenditure on older people and therefore focuses on the intensive margin of spending. Models I, III and IV include all municipalities and control for zero expenditure through a dummy variable. The comparison across specifications shows that the main associations are stable across alternative samples and alternative measures of municipal fiscal resources.

For variables entering the specification in logarithmic form, the estimated coefficients can be interpreted as elasticities. The need-related variables are systematically associated with municipal expenditure on older people. Population size has a positive and statistically significant coefficient, suggesting that larger municipalities tend to spend more per capita on older people. This may reflect more complex social needs, greater administrative capacity, or the provision of a wider range of services. The old-age dependency ratio is also positively associated with expenditure, as expected: municipalities with a larger older population relative to the working-age population tend to spend more on services and interventions targeted at older people.

Household size has a negative coefficient. This result is consistent with the idea that informal family care may partly substitute for municipal services. In municipalities where households are larger, older people may be more likely to receive support from family members, reducing the demand for publicly provided local services. This interpretation is consistent with the relevance of family care in the Italian welfare model, although the cross-sectional nature of the analysis does not allow a causal interpretation.

Income is positively associated with municipal expenditure on older people. The estimated elasticity in the reference model is below one, suggesting that municipal expenditure increases with income but less than proportionally. This result is consistent with the interpretation of municipal services for older people as normal goods, although income may also capture broader differences in fiscal capacity, social demand, administrative capacity and local service infrastructure.

The coefficient on tertiary education is negative and statistically significant. This association may reflect the fact that higher educational attainment is correlated with better health status and lower need for some forms of social and care support. It may also capture differences in the propensity to use private alternatives or in the composition of local demand. The ratio of older residents receiving state social benefits is instead positively associated with municipal expenditure. This suggests that national social benefits and municipal expenditure are not substitutes in the data; rather, they tend to be higher in the same territories. One possible interpretation is that both variables reflect underlying care needs or a greater propensity to access public support.

The variables measuring municipal fiscal resources are central to the analysis. User co-payments and National Health Service contributions are positively and significantly associated with net

municipal expenditure⁶. This result is consistent with the idea that co-financing arrangements can support higher levels of local service provision. Tax revenues and non-tax revenues are also positively associated with expenditure. The coefficient on tax revenues is larger than that on non-tax revenues, suggesting that own fiscal capacity is an important correlate of municipal spending on older people. By contrast, grants do not show a statistically significant association with expenditure in the reference specification. This may reflect the fact that many transfers are earmarked for other purposes or do not translate directly into higher expenditure on services for older people. This result suggests that not all intergovernmental transfers are equally relevant for reducing inequalities in services for older people. What appears to matter is not only the amount of transfers received by municipalities, but whether financing arrangements are linked to the provision of care and social services.

The fiscal stress index has a negative coefficient. Since the index is defined as the ratio between current revenues and current expenditures, this result indicates that expenditure on older people tends to be higher in municipalities with a weaker current budget balance. This association should be interpreted cautiously. It may reflect the fact that municipalities facing stronger social pressure spend more despite tighter budgetary conditions, or that expenditure on social services contributes to weaker fiscal balances.

The local policy orientation indicator has a negative and statistically significant coefficient. Since the indicator increases with the average age of municipal administrators and council members, this result implies that municipalities with older local political bodies tend to spend less on older people, conditional on the other variables included in the model. This association is not necessarily inconsistent with the interpretation of the variable as a proxy for local policy orientation. The age composition of local political bodies may capture differences in policy style, administrative dynamism, fiscal attitudes, or the propensity to activate and expand local service provision. Younger local politicians may be more inclined to promote new programmes, mobilize co-financing opportunities, or expand discretionary in-kind services, while older political bodies may be more cautious, more fiscally conservative, or more closely associated with municipalities characterized by lower administrative dynamism. Moreover, support for older residents may be channelled through other policy instruments, such as national cash benefits, health care provision or family-based care, rather than through higher municipal service expenditure. This interpretation is consistent with recent evidence showing that the age of local politicians can be related to political behaviour and municipal spending priorities (Alesina et al., 2019; Baskaran et al., 2024; Jung, 2023). The coefficient should therefore be interpreted as evidence that the age composition of local political bodies is conditionally associated with expenditure, not as evidence on substantive preferences for older residents.

A comparison of coefficient magnitudes suggests that the largest associations are found among the need-related variables. In the reference specification, the old-age dependency ratio and income have relatively large positive elasticities, while household size and tertiary education have sizeable

⁶These variables should be interpreted as indicators of co-financing arrangements associated with service provision rather than as exogenous sources of municipal resources. Their positive coefficients may reflect both the capacity to mobilize additional funding and the fact that municipalities providing more intensive or more costly services generate larger co-payments and NHS contributions.

negative elasticities. Fiscal-resource variables also matter, although their individual elasticities are generally smaller: tax revenues have a positive and significant coefficient, larger than that of non-tax revenues, while user co-payments and National Health Service contributions are positively associated with expenditure but with a smaller elasticity. Grants are not statistically significant. By contrast, the coefficient on the local policy-orientation proxy is small in absolute value. This comparison should be interpreted as suggestive, since the quantitative relevance of each variable also depends on its dispersion. Nevertheless, it reinforces the view that needs and fiscal resources are the main dimensions associated with municipal expenditure on older people.

Overall, the estimation results support the descriptive evidence presented in the previous sections. Municipal expenditure on older people is systematically associated with demographic pressure, household structure, income, education and state social benefits. At the same time, fiscal resources and co-financing arrangements are strongly associated with spending levels. The proxy for local policy orientation is statistically significant, but its magnitude is small and its interpretation remains exploratory. Taken together, the results suggest that territorial disparities in municipal expenditure are more clearly associated with differences in potential needs and fiscal-resource availability than with the age-based proxy for local policy orientation.

6 A model-based decomposition of predicted municipal expenditure: potential needs, resource availability, and implied coverage

This section uses the estimates from the reference specification to construct a set of model-based indicators and to interpret the sources of territorial disparities in municipal expenditure on older people. Building on the conceptual framework developed above, predicted expenditure is decomposed into three components: potential financial needs, local policy orientation and fiscal resource availability.

Let $\hat{E}_i$ denote predicted municipal expenditure on older people in municipality i . From the estimated log-linear specification of equation 12, predicted expenditure can be written as:

$$\hat{E}_i = \hat{\gamma}_0 \hat{P}_i^{\hat{\omega}} \prod_{k=1}^K \hat{X}_{ki}^{\hat{\theta}_k} \prod_{h=1}^H \hat{Z}_{hi}^{\hat{\beta}_h}, \quad (15)$$

where P_i is the proxy for local policy orientation, X_{ki} are the need-related variables and Z_{hi} are the fiscal-resource variables.

Predicted expenditure $\hat{E}_i$ can therefore be decomposed into three model-based components:

$$\hat{E}_i = \hat{\varphi}_i \tilde{N}_i \tilde{R}_i. \quad (16)$$

In this expression, $\hat{\varphi}_i$ is the model-based local policy orientation component, $\tilde{N}_i$ is the model-based indicator of potential financial needs, and $\tilde{R}_i$ is the fiscal resource availability component.

The first component is local policy orientation (see eq.3), obtained from:

$$\widehat{\varphi}_i = P_i^{\widehat{\omega}} = \exp(\widehat{\omega} \ln(P_i)). \quad (17)$$

Since P_i is constructed from observable characteristics of local political bodies, this component captures an indirect dimension of local policy orientation.

The second component is potential financial needs. These are not directly observed. They are constructed using the estimated coefficients on the need-related variables (eq.4):

$$\ln(\widetilde{N}_i) = \ln(\widehat{\theta}_0) + \sum_{k=1}^K \widehat{\theta}_k \ln(X_{ki}). \quad (18)$$

Here, $\widehat{\theta}_0$ is the constant associated with the potential-needs component. Its value cannot be identified separately from the constant associated with fiscal resource availability without an additional normalization, described in Appendix A.

The third component is fiscal resource availability. It is constructed using the estimated coefficients on the fiscal resources and co-financing variables:

$$\ln(\widetilde{R}_i) = -\ln(\widehat{\beta}_0) + \sum_{h=1}^H \widehat{\beta}_h \ln(Z_{hi}). \quad (19)$$

The component $\widetilde{R}_i$ corresponds to the model-based counterpart of T_i^{-1} in the conceptual framework: higher values indicate greater fiscal resource availability and therefore a greater capacity to translate potential needs into expenditure.

This breakdown of expected expenditure into its three components, allows to obtain some novel indicators. Dividing both sides of the decomposition given in eq.16 by $\widetilde{N}_i$, it is possible to obtain the coverage ratio:

$$\Phi_i = \frac{\widehat{E}_i}{\widetilde{N}_i} = \widehat{\varphi}_i \widetilde{R}_i. \quad (20)$$

The coverage ratio Φ_i indicates the share of model-based potential financial needs that is covered by predicted municipal expenditure. Values below one indicate that predicted expenditure is lower than the model-based indicator of potential financial needs.

It is also useful to define the inverse of the coverage ratio:

$$G_i = \frac{\widetilde{N}_i}{\widehat{E}_i} = \frac{1}{\Phi_i}. \quad (21)$$

Values of G_i above one indicate that model-based potential financial needs exceed predicted expenditure. The symbol G_i is used to avoid confusion with the financing-cost index T_i introduced in the conceptual framework.

Both $\widetilde{N}_i$ and $\widetilde{R}_i$ are constructed under the normalization described in Appendix A, because the estimated model identifies only the ratio $\gamma_0 = \theta_0/\beta_0$, not θ_0 and β_0 separately. As a result, the absolute levels of $\widetilde{N}_i$, $\widetilde{R}_i$ and Φ_i depend on the chosen reference values. The indicators should

therefore not be interpreted as direct measures of actual unmet demand or actual resource gaps. Their main purpose is comparative: they provide a structured way to compare municipalities and regions in terms of predicted expenditure, model-based potential needs and fiscal resource availability.

Table 4 reports the distribution of the main indicators across municipalities in Ordinary Statute Regions. The average coverage ratio is 0.205. Under the normalization adopted, predicted municipal expenditure corresponds on average to about one fifth of the model-based indicator of potential financial needs. The distribution is also relatively compressed, with values ranging from 0.080 to 0.404. These values point to a large distance between predicted expenditure and model-based potential needs across the municipal distribution. This evidence is consistent with broader evidence on unmet needs and territorial inequalities in long-term care provision in Italy and Europe (European Commission and Social Protection Committee, 2021; Eurostat, 2025; Casavecchia et al., 2023).

The local policy orientation component has an average value of 0.869 and shows limited dispersion across municipalities. This suggests that, within the underlying assumptions, differences in local policy orientation are not the main source of variation in the coverage ratio. This result should be interpreted cautiously, given that local policy orientation is proxied indirectly and does not capture actual political preferences or policy platforms.

By contrast, the fiscal resource availability component displays greater variation. Its average value is 0.236, with values ranging from 0.092 to 0.482. Since the coverage ratio can be written as $\Phi_i = \hat{\Pi}_i \tilde{R}_i$, this greater variation in $\tilde{R}_i$ implies that differences in resource availability are more strongly associated with differences in the coverage of model-based needs than differences in the policy-orientation component.

Table 5 reports regional averages of predicted expenditure, model-based potential needs, the coverage ratio, local policy orientation and fiscal resource availability. The coverage ratio varies substantially across regions. It is lower in several southern regions, including Calabria, Campania, Apulia and Molise, and higher in regions such as Veneto, Tuscany, Emilia-Romagna and Piedmont. These differences are not mechanically determined by expenditure levels alone. For example, a relatively high coverage ratio may reflect higher predicted expenditure, lower model-based potential needs, or greater fiscal resource availability.

The regional comparison also shows that local policy orientation varies little across regions, while the fiscal resource availability component displays more pronounced territorial differences. This suggests that regional differences in the coverage ratio are mainly associated with differences in fiscal resources rather than with the proxy for local policy orientation. This finding is consistent with the estimation results, which show that revenues and co-financing arrangements are important correlates of municipal expenditure on older people.

To assess how the territorial distribution of predicted expenditure would change under more uniform financial conditions, we consider a scenario in which each fiscal-resource and co-financing variable is set equal to its national mean. Let $\bar{Z}_h$ denote the average value of the fiscal-resource

variable Z_h . Predicted expenditure under average fiscal resources is defined as:

$$\ln(\bar{E}_i) = \ln(\hat{\gamma}_0) + \hat{\omega} \ln(P_i) + \sum_{k=1}^K \hat{\theta}_k \ln(X_{ki}) + \sum_{h=1}^H \hat{\beta}_h \ln(\bar{Z}_h). \quad (22)$$

This simulation keeps the need-related variables and the policy-orientation proxy at their observed municipal values, while replacing fiscal-resource variables with their average values. It is not intended to estimate the causal effect of a specific policy reform. Rather, it provides an indication of how the territorial distribution of predicted expenditure would change if differences in fiscal resource availability were removed from the framework.

The results indicate that equalizing fiscal resource availability would reduce territorial disparities in predicted expenditure. The Gini coefficient of predicted expenditure under average resources is lower than the Gini coefficient of baseline predicted expenditure. Regional averages show a clear rebalancing pattern: predicted expenditure would increase in several southern regions, such as Calabria, Campania, Apulia and Molise, while it would decrease in some northern and central regions where fiscal resource availability is currently higher.

This result reinforces the main message of the paper. Territorial disparities in municipal expenditure on older people are associated not only with differences in demographic and socio-economic needs, but also with unequal fiscal resources and co-financing arrangements. From a policy perspective, this suggests that reducing inequalities in local provision for older people requires attention not only to needs assessment, but also to the financial capacity of municipalities and to the design of intergovernmental financing mechanisms (Bocchino and Padovani, 2022, 2023; Casavecchia et al., 2023; Padovani et al., 2024).

Overall, the simulated scenario provides a structured interpretation of the empirical results. It suggests that model-based potential needs are only partly covered by predicted municipal expenditure and that unequal fiscal resources are an important component of territorial disparities. These findings should not be read as direct estimates of actual unmet demand, but as evidence that the local financing structure is closely associated with inequalities in municipal expenditure on older people.

7 Conclusions

Population ageing is increasing the demand for local welfare services and makes territorial equity in access to support for older people an increasingly important policy issue. In Italy, this challenge is particularly relevant because the long-term care system remains strongly oriented towards national cash benefits, while many in-kind services are organized and partly financed at the local level. Municipalities therefore represent a crucial point of observation for understanding whether public support for older people is evenly distributed across territories.

This paper has studied municipal expenditure on older people in Italy, using municipality-level data for 2019. The analysis documents substantial territorial disparities in expenditure, both across regions and across municipalities. Spending levels are markedly higher in many northern

and central areas than in several southern regions, and a non-negligible share of municipalities reports no expenditure on older people at all. These differences are visible both when expenditure is measured per capita and when it is measured per older resident, and they also concern the composition and financing of expenditure.

The empirical analysis relates municipal expenditure to three groups of factors: indicators of potential needs, indicators of fiscal resources, and a proxy for local policy orientation. Regarding the first group of factors, the results show that expenditure is systematically associated with demographic and socio-economic characteristics. Municipalities with greater demographic pressure, higher income and a higher share of older residents receiving state social benefits tend to spend more on older people. By contrast, larger household size and higher levels of tertiary education are associated with lower expenditure. These findings are consistent with the idea that municipal spending reflects both the demand for local services and the availability of informal or private alternatives.

Fiscal resources emerge as a central dimension of the analysis. Municipalities with higher own revenues and greater co-financing through user co-payments and National Health Service contributions tend to spend more on services and interventions for older people. This suggests that the capacity to finance local services matters for the level of municipal provision. By contrast, grants are not significantly associated with expenditure in the preferred specification, possibly because many transfers are not specifically targeted at services for older people or do not translate directly into higher expenditure in this area of intervention.

The role of local policy orientation appears more limited. The age-based proxy used in the analysis is statistically associated with expenditure, but its magnitude is small. The analysis also suggests that the local policy orientation component varies much less across regions than the fiscal resource availability component. Taken together, these results indicate that territorial disparities in municipal expenditure on older people are more clearly associated with differences in potential needs and, especially, fiscal-resource availability than with the proxy for local policy orientation.

Beyond documenting the conditional correlates of municipal spending, the paper contributes an analytical decomposition that links predicted expenditure to three conceptually distinct components: potential financial needs, local policy orientation, and fiscal-resource availability. Methodologically, the framework disciplines the empirical specification and makes explicit the identification problem arising because the regression intercept does not separately identify the scale of the needs and resource components. Under the adopted normalization, it nevertheless yields model-based indicators whose principal value is comparative. Empirically, these indicators show that implied coverage ratio, while relatively low on average, varies substantially across territories and is more closely associated with resource availability than with the policy-orientation proxy. The decomposition therefore adds to a standard determinants regression by organizing estimates around the territorial distribution of needs, resources, and implied coverage, without treating these constructs as observed unmet demand or the estimated associations as causal effects.

These findings have important policy implications. If the local provision of services for older people depends strongly on municipal fiscal capacity and co-financing arrangements, then territorial inequalities cannot be addressed only by assessing needs or improving local planning. They also require attention to the financing structure of local welfare provision. Equalization mechanisms, intergovernmental transfers and the design of co-financing arrangements are therefore central to any strategy aimed at reducing disparities in access to services for older people.

The paper has some limitations. The analysis is cross-sectional and identifies conditional associations rather than causal effects. The decomposition is model-based and depends on the assumptions and normalization used to construct the potential-needs and fiscal-resource components. The proxy for local policy orientation is indirect and should not be interpreted as a direct measure of political preferences. Finally, the paper focuses on expenditure and does not measure the quality, adequacy or outcomes of the services provided.

Despite these limitations, the paper provides evidence on an important and underexplored dimension of territorial inequality in ageing societies. Municipal expenditure on older people is a key component of local welfare provision, especially in a system where national support is largely based on cash transfers and in-kind services are unevenly developed across territories. The evidence presented here suggests that fiscal capacity is closely associated with the ability of municipalities to respond to the needs of older residents. Strengthening the link between needs, financing arrangements and local service provision is therefore essential if population ageing is not to translate into deeper territorial inequalities in care and support.

Table 1 – Composition of municipal expenditure on older people, 2019

Year 2019 – Euro $\times 1,000$

Category of social actions and services	Gross expenditure	User co-payments and NHS contrib.	Net expenditure	%
Services – <i>of which:</i>	760,122	169,999	590,123	46.6%
Social home care	320,122	38,720	281,402	22.2%
Professional social work	95,200	2,545	92,655	7.3%
Social and health vouchers	112,095	45,744	66,351	5.2%
Home care integrated with health services	105,222	46,435	58,787	4.6%
Cash benefits – <i>of which:</i>	700,184	355,500	344,684	27.2%
Contributions for residential structures	564,583	348,789	215,794	17.0%
Contributions for personal services	49,383	0	49,383	3.9%
Contributions to support the family income	20,246	0	20,246	1.6%
Contributions to the third sector	17,544	0	17,544	1.4%
Structures – <i>of which:</i>	907,277	575,469	331,808	26.2%
Residential structures	823,429	545,090	278,339	22.0%
Day centers	55,992	25,948	30,044	2.4%
Total items	2,367,583	1,100,968	1,266,616	100%

Source: our elaborations on ISTAT data (2025a).

Table 2 – Regional averages of net municipal expenditure on older people, 2019

Region	Net expenditure (euro)		Share of co-payments and contributions in gross expenditure %
	per capita	per older resident	
Aosta Valley*	155.8	654.1	36.8%
Trentino Alto Adige*	148.6	711.8	42.4%
Friuli-Venezia Giulia*	76.9	293.1	34.6%
Sardinia*	36.1	152.0	15.3%
Tuscany	31.0	121.8	46.1%
Liguria	25.5	89.1	28.2%
Emilia-Romagna	22.6	93.9	44.6%
Latium	21.4	98.0	5.9%
Italy	21.2	92.5	46.5%
Piedmont	19.4	75.9	35.4%
Veneto	19.0	83.0	84.9%
Lombardy	18.7	82.5	32.2%
Marche	12.7	51.1	60.0%
Apulia	11.4	51.8	6.0%
Umbria	11.1	43.2	21.9%
Sicily*	9.1	42.9	4.8%
Abruzzo	8.9	37.3	25.7%
Campania	8.4	44.8	16.8%
Basilicata	8.0	34.7	13.0%
Molise	7.0	28.4	7.8%
Calabria	4.1	18.9	13.2%

*Note: * Special Statute Region.*

Source: our elaborations on ISTAT data (2025a).

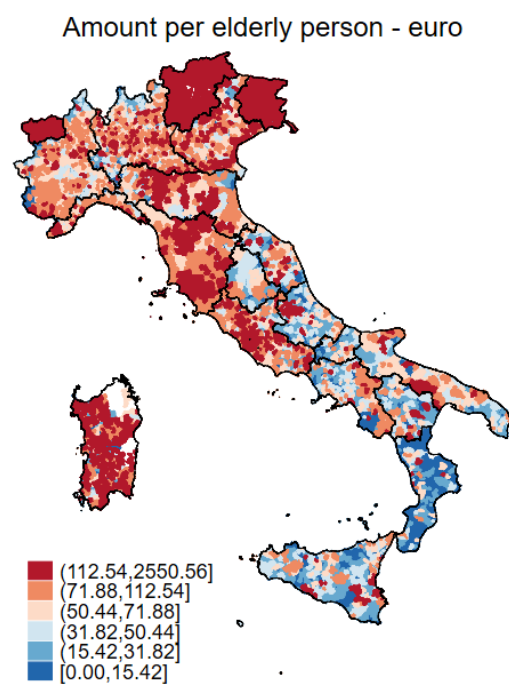
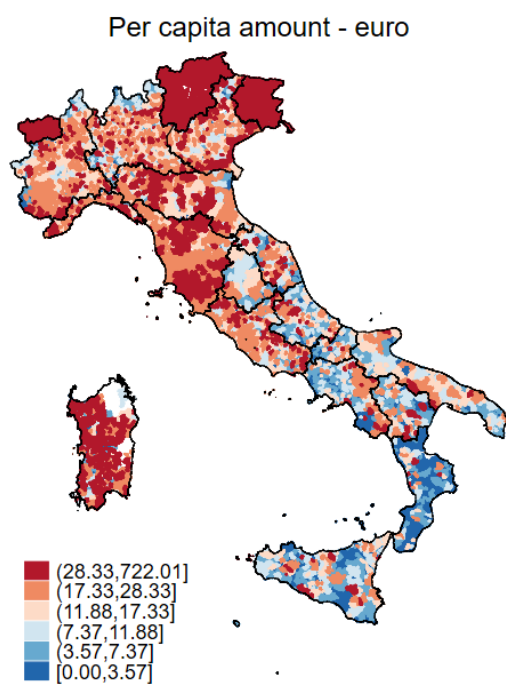


Table 3 - Estimation results: municipal expenditure on older people

Explanatory variables	Type	(I)	(II)	(III)	(IV*)
Inhabitants	X	0.184*** (0.00998)	0.191*** (0.0104)	0.188*** (0.01000)	0.187*** (0.00998)
Dependency ratio	X	0.755*** (0.0619)	0.809*** (0.0657)	0.743*** (0.0624)	0.754*** (0.0624)
Family size	X	-0.400** (0.185)	-0.426** (0.199)	-0.478*** (0.181)	-0.436** (0.180)
Income	X	0.647*** (0.0634)	0.659*** (0.0666)	0.730*** (0.0609)	0.663*** (0.0631)
Tertiary education	X	-0.364*** (0.0442)	-0.379*** (0.0470)	-0.395*** (0.0439)	-0.369*** (0.0443)
State benefits_65	X	0.0968*** (0.0157)	0.0995*** (0.0160)	0.0942*** (0.0156)	0.0936*** (0.0156)
Local policy orientation	P	-0.0218** (0.00895)	-0.0209** (0.00946)	-0.0218** (0.00895)	-0.0226** (0.00896)
Co-payments	Z	0.0522*** (0.00216)	0.0531*** (0.00219)	0.0522*** (0.00216)	0.0521*** (0.00216)
Fiscal stress index	Z	-0.251** (0.126)	-0.256* (0.136)	-0.238* (0.126)	-0.251** (0.126)
Tax revenues	Z	0.167*** (0.0403)	0.161*** (0.0424)		
Grants	Z	-0.0168 (0.0119)	-0.0171 (0.0127)		-0.0154 (0.0119)
Extra-tax revenues	Z	0.0822*** (0.0173)	0.0839*** (0.0182)		
D_zero	X	-13.09*** (0.0339)		-13.10*** (0.0335)	-13.09*** (0.0338)
D_Alt_zone1	X	-0.0594 (0.0394)	-0.0676 (0.0415)	-0.0638 (0.0392)	-0.0677* (0.0391)
D_Alt_zone2	X	-0.119*** (0.0379)	-0.128*** (0.0403)	-0.118*** (0.0379)	-0.124*** (0.0378)
D_Alt_zone3	X	-0.0382 (0.0368)	-0.0509 (0.0396)	-0.0368 (0.0367)	-0.0436 (0.0367)
D_Alt_zone4	X	-0.00291 (0.0353)	-0.00492 (0.0382)	-0.00440 (0.0353)	-0.00517 (0.0352)
Current revenues	Z			0.210*** (0.0373)	
Autonomous revenues	Z				0.241*** (0.0363)
Constant		-3.861*** (0.626)	-3.869*** (0.663)	-4.555*** (0.621)	-4.117*** (0.618)
Observations		6,495	6,153	6,495	6,495
R-squared		0.938	0.269	0.937	0.938
Root MSE		0.806	0.824	0.807	0.806
F		28136.6	124.2	31384.2	30032.9
Prob>F		0.000	0.000	0.000	0.000
VIF (max)		3.672	3.724	3.504	3.566

Robust standard errors in parentheses.

*** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$

Table 4: **Distribution of the model-based indicators for Ordinary Statute Regions**

Indicator	Mean	SD	Min	Max
Coverage ratio of model-based potential needs (Φ_i)	0.205	0.058	0.080	0.404
Local policy orientation component ($\hat{\varphi}_i$)	0.869	0.016	0.802	1.000
Fiscal resource availability component ($\tilde{R}_i$)	0.236	0.067	0.092	0.482

Note: Φ_i denotes the coverage ratio; $\hat{\varphi}_i$ denotes the model-based local policy orientation component; $\tilde{R}_i$ denotes the fiscal resource availability component. Values are weighted by population.

Table 5 – Regional averages of predicted expenditure, model-based needs and fiscal resources

Region	$\widehat{E}_i$	$\widetilde{N}_i$	Φ_i	$\widehat{\varphi}_i$	$\widetilde{R}_i$	$\overline{E}_i$	$\overline{E}_i/\widehat{E}_i$
Abruzzo	13.438	81.383	0.165	0.869	0.190	15.105	1.236
Basilicata	12.197	69.311	0.172	0.876	0.196	12.979	1.197
Calabria	10.695	69.928	0.146	0.877	0.167	13.086	1.404
Campania	11.298	77.163	0.150	0.871	0.173	14.313	1.370
Emilia-Romagna	27.417	118.559	0.227	0.874	0.260	22.164	0.899
Lazio	35.283	167.447	0.195	0.869	0.224	31.198	1.041
Liguria	38.972	170.623	0.226	0.860	0.263	31.392	0.855
Lombardy	26.179	110.555	0.220	0.866	0.254	20.424	0.906
Marche	19.420	90.645	0.210	0.868	0.241	16.808	0.954
Molise	10.643	65.376	0.157	0.871	0.181	12.149	1.307
Piedmont	28.292	126.161	0.220	0.863	0.255	23.333	0.876
Apulia	13.158	86.058	0.152	0.872	0.175	16.045	1.341
Tuscany	29.750	121.985	0.242	0.874	0.277	22.808	0.806
Umbria	22.353	109.813	0.197	0.871	0.226	20.454	1.025
Veneto	20.832	78.109	0.259	0.868	0.298	14.476	0.726
Total	23.731	109.978	0.205	0.869	0.236	20.426	1.009
C.V. (regional)	0.420	0.320	0.180	0.010	0.180	0.310	0.210

Note: $\widehat{E}_i$ denotes predicted expenditure; $\widetilde{N}_i$ denotes model-based potential financial needs; Φ_i denotes the coverage ratio; $\widehat{\varphi}_i$ denotes the model-based local policy orientation component; $\widetilde{R}_i$ denotes the fiscal resource availability component; $\overline{E}_i$ denotes predicted expenditure under average fiscal resources. Values are weighted by population.

A Normalization of the model-based components

The analysis in Section 6 decomposes predicted municipal expenditure into three model-based components: potential financial needs, local policy orientation and fiscal resource availability. Starting from the estimated log-linear specification,

$$\ln(E_i) = \ln(\gamma_0) + \omega \ln(P_i) + \sum_{k=1}^K \theta_k \ln(X_{ki}) + \sum_{h=1}^H \beta_h \ln(Z_{hi}) + e_i, \quad (23)$$

predicted expenditure can be written as:

$$\hat{E}_i = \hat{\gamma}_0 \hat{P}_i^\omega \prod_{k=1}^K X_{ki}^{\hat{\theta}_k} \prod_{h=1}^H Z_{hi}^{\hat{\beta}_h}. \quad (24)$$

The conceptual framework implies:

$$\hat{E}_i = \hat{\varphi}_i \tilde{N}_i \tilde{R}_i, \quad (25)$$

where $\hat{\varphi}_i$ is the model-based local policy orientation component, $\tilde{N}_i$ is the model-based indicator of potential financial needs, and $\tilde{R}_i$ is the fiscal resource availability component.

The local policy orientation component is obtained directly from the estimated coefficient on the proxy P_i :

$$\hat{\varphi}_{ii} = \hat{P}_i^\omega = \exp(\hat{\omega} \ln(P_i)). \quad (26)$$

The remaining two components are:

$$\tilde{N}_i = \hat{\theta}_0 \prod_{k=1}^K X_{ki}^{\hat{\theta}_k}, \quad (27)$$

and:

$$\tilde{R}_i = \hat{\beta}_0^{-1} \prod_{h=1}^H Z_{hi}^{\hat{\beta}_h}. \quad (28)$$

The difficulty is that the estimation of the log-linear specification identifies $\hat{\gamma}_0$, but not $\hat{\theta}_0$ and $\hat{\beta}_0$ separately. Since:

$$\gamma_0 = \frac{\theta_0}{\beta_0}, \quad (29)$$

we have:

$$\ln(\gamma_0) = \ln(\theta_0) - \ln(\beta_0). \quad (30)$$

An additional normalization is therefore required to construct $\tilde{N}_i$ and $\tilde{R}_i$ separately.

The normalization used (see Aiken and West, 1991) sets the fiscal resource availability component equal to one at pre-defined reference values of the fiscal-resource variables. Let m_h denote the reference value for $\ln(Z_{hi})$. In the baseline analysis, m_h is set equal to the maximum observed value of $\ln(Z_{hi})$:

$$m_h = \max_i \ln(Z_{hi}). \quad (31)$$

This choice means that resource availability is normalized relative to the most favourable observed value of each fiscal-resource variable.

For each resource variable, define the centred log variable:

$$z_{hi}^c = \ln(Z_{hi}) - m_h. \quad (32)$$

The estimated log-linear specification can then be rewritten as:

$$\ln(E_i) = \ln(\theta_0) + \omega \ln(P_i) + \sum_{k=1}^K \theta_k \ln(X_{ki}) + \sum_{h=1}^H \beta_h z_{hi}^c + e_i, \quad (33)$$

where the new constant is:

$$\ln(\theta_0) = \ln(\gamma_0) + \sum_{h=1}^H \beta_h m_h. \quad (34)$$

This transformation leaves the estimated slope coefficients and predicted values unchanged. Only the interpretation of the constant changes.

Using the estimated coefficients, the model-based indicator of potential financial needs is therefore constructed as:

$$\ln(\tilde{N}_i) = \ln(\hat{\theta}_0) + \sum_{k=1}^K \hat{\theta}_k \ln(X_{ki}). \quad (35)$$

The corresponding value of $\hat{\beta}_0$ is obtained from:

$$\ln(\hat{\beta}_0) = \ln(\hat{\theta}_0) - \ln(\hat{\gamma}_0). \quad (36)$$

Equivalently, under the chosen normalization:

$$\ln(\hat{\beta}_0) = \sum_{h=1}^H \hat{\beta}_h m_h. \quad (37)$$

The fiscal resource availability component is then:

$$\ln(\tilde{R}_i) = -\ln(\hat{\beta}_0) + \sum_{h=1}^H \hat{\beta}_h \ln(Z_{hi}), \quad (38)$$

or, equivalently:

$$\ln(\tilde{R}_i) = \sum_{h=1}^H \hat{\beta}_h [\ln(Z_{hi}) - m_h]. \quad (39)$$

By construction, $\tilde{R}_i = 1$ when all fiscal-resource variables are equal to their reference values. Values below one indicate lower fiscal resource availability relative to the reference values.

The decomposition of predicted expenditure is therefore:

$$\hat{E}_i = \hat{\varphi}_i \tilde{N}_i \tilde{R}_i. \quad (40)$$

Dividing both sides by $\tilde{N}_i$ gives the coverage ratio:

$$\Phi_i = \frac{\hat{E}_i}{\tilde{N}_i} = \hat{\varphi}_i \tilde{R}_i. \quad (41)$$

The normalization affects the level of $\tilde{N}_i$, $\tilde{R}_i$ and, consequently, Φ_i . For this reason, these indicators should not be interpreted as direct measures of actual needs, actual unmet demand or actual resource gaps. Their main purpose is comparative: they provide a structured way to compare municipalities and regions in terms of predicted expenditure, model-based potential financial needs and fiscal resource availability. The empirical results in Section 6 should therefore be read as a scenario simulated conditional on the chosen reference values.

B Summary statistics

Data refer only to municipalities in Ordinary Statute Regions (OSR) – N=6,504.

Variable	Description	Mean	Std. dev.	Min	Max
Dependent variables					
E per older resident	Spending on older people – 2019 (euros per older resident)	55.488	63.85	0.00	2,289.92
E per capita	Spending on older people – 2019 (euros per capita)	13.671	19.02	0.00	722.01
Need variables					
Inhabitants	Number of inhabitants – total population	7,799.285	45,387.72	33.00	2,806,670
Dependency ratio	Old-age dependency ratio – 65+ / population 15–64	0.396	0.12	0.10	2.05
Family size	Average number of family members	2.278	0.25	1.12	3.17
Income	IRPEF taxable income (euros per capita)	12,604.714	3,112.22	3,141.78	33,056
Tertiary education	% of the population with tertiary education	19.873	5.41	0.00	48.91
State benefits_65	Welfare pensioners aged 65+ / population aged 65+ (regional)	0.043	0.03	0.00	0.11
D_zero	Dummy variable = 1 if expenditure on older people is zero	0.053	0.22	0.00	1.00
Alt_zone_1	Altitude class: 0–83 metres	0.201	0.40	0.00	1.00
Alt_zone_2	Altitude class: 83–226 metres	0.210	0.41	0.00	1.00
Alt_zone_3	Altitude class: 226–365 metres	0.211	0.41	0.00	1.00
Alt_zone_4	Altitude class: 365–588 metres	0.199	0.40	0.00	1.00
Policy-orientation variables					
Local policy orientation	Average age of municipal administrators	49.560	7.12	22.00	78.33
	Average age of city councillors	46.752	4.81	23.00	67.00
Resource variables					
Co-payments	Co-financing and contributions – 2019 (euros per capita)	19.453	68.19	0.00	1,899.66
Fiscal stress index	Fiscal stress index	1.126	0.12	0.55	2.67
Tax revenues	Tax revenues (euros per capita)	619.130	322.14	139.74	7,528.88
Grants	Transfers (euros per capita)	123.073	267.67	0.33	10,820.73
Extra-tax revenues	Extra-tax revenues (euros per capita)	221.930	350.35	11.16	8,235.76
Other variables tested					
Share 65–84	% population aged 65–84 on total population	0.204	0.04	0.07	0.48
Share 85+	% population aged 85 and over on total population	0.041	0.02	0.00	0.21
Share 65+	% population aged 65 and over on total population	0.245	0.06	0.07	0.66
Share women 40–64	% of women aged 40–64 on total population	0.183	0.02	0.06	0.32
Density	Population density – population per square kilometre	329.731	682.00	0.76	12,041.24
Average age	Average age of the population aged 18+	46.495	3.39	34.84	66.77
Unemployment rate	Unemployment rate, population aged 15+ – 2018	0.128	0.06	0.00	0.43
Employment rate	Employment rate, population aged 15+ – 2018	0.450	0.07	0.22	0.68

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