The Expenditure Composition and trade-offs in Local Government Budgets

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Abstract

The fiscal behavior of local governments has gained significant attention from academia and policymakers due to decentralization reforms transferring power from central to lower levels of government. As local governments assume more responsibilities for public goods and services, understanding their expenditure composition and trade-offs becomes crucial. While existing literature has examined the factors influencing the size of local government budgets, less attention has been given to the decision-making mechanisms and trade-offs within budget allocations. This study investigates the expenditure composition of 300 Flemish municipalities, using an unsupervised clustering algorithm and a binary logistic regression framework. Our results are indicative of how local governments tend to prioritize specific policy areas in the design of their budgets, when they operate under strict institutional and fiscal constraints such as a balanced budget rule. We observe that municipalities prioritizing social care for the elderly allocate fewer resources to education, mobility, and environmental initiatives. Municipalities emphasizing administration services, mobility, safety, and social services sacrifice both care services for the elderly and primary education. The budget composition patterns are influenced by the age structure and ethnic diversity of local communities and the politico-ideological position of electorates.

JEL: H3; H4; H7; J18

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1. Introduction

The academic and policy-making interest for the fiscal behavior of local governments has grown dramatically over the last decades, in light of the proliferation of decentralization reforms that transfer political and fiscal power from central to lower levels of government (Kim & Warner, 2021). In many countries local governments increasingly assume more responsibilities with respect to the production and provision of public goods and services, and acquire fiscal and tax collection roles that previously lied upon the central government (Biase & Dougherty, 2022). The fundamental rationale behind this trend is Oates' (1999) thesis, which highlights the advantages of decentralizing public services to local governments. In the absence of externalities and scale economies, decentralization allows for a better alignment between local preferences and the provision of services. This alignment, in turn, fosters efficiency in resource allocation, accountability, and responsiveness.

Despite the fact that the relevant literature has emphasized the role of multiple factors on the expenditure size of local governments, both in total and per broad policy areas, there is a growing consensus in the literature that the complex nature of decision-making mechanisms and the within budget tradeoffs between policy areas and priorities have been relatively less studied (Adolph, Breunig, & Koski, 2020; Lipsmeyer, Philips, & Whitten, 2017). Indeed, whereas a strand in the literature of public finance recognizes various socio-economic, demographic, and political features as relevant for explaining changes in the – overall or per capita - size of local government budgets, it is not always clear which exact expenditure components are sacrificed or manipulated. Moreover, although existing evidence indicates that certain budgetary components undergo modifications in response to socio-economic, demographic, and political fluctuations, an avenue for further investigation lies in comprehensively examining the nature of these reallocations. Specifically, elucidating the policy priorities that are relinquished in favor of alternative priorities, either opportunistically or through strategic decision-making, warrants deeper exploration (Alegre, 2010; Sacchi & Salotti, 2016).

In this paper, we shed light on this issue by investigating the expenditure composition of local governments and the trade-offs between different expenditure categories. We focus on two central research questions. First, to what extent do municipalities demonstrate consistent patterns in allocating their budgetary resources to specific policy areas? Second, which demographic, social, economic, urban, and political factors are able to explain the observed budgetary tradeoffs between policy areas?

In order to answer these questions, we apply an unsupervised clustering algorithm to a unique dataset of highly disaggregated expenditure composition of local budgets for 300 Flemish municipalities. Flanders allows for an excellent testing ground for exploring fiscal behavior of local governments, as it is characterized by a high degree of fiscal autonomy, with tax collection power over income and property, whereas since 2014 a new fiscal framework has become operational, requiring all municipalities to effectively run a balanced budget. Thus, expenditure decision and tradeoffs between expenditure categories depend on political majorities at the level of local governments. Next, we employ a binary logistic regression analysis that allows us to identify those socio-economic and demographic variables that explain the observed patterns of cluster memberships.

We contribute to the existing literature in several directions. Although the respective literature offers valuable insights into the process of decision-making in local governments with respect

to the expenditure composition of local budgets, the distributional conflicts that the within budget tradeoffs imply are scarcely discussed. The impacts of political, as well as demographic and socio-economic factors on the composition of local budgets, is usually explored through the analysis of budget shares on either one or a small number of highly aggregated expenditure categories, losing in that way significant information about the distributional conflicts between different budgetary expenditures. This study leverages a unique dataset on the expenditure composition of local governments budgets at a very disaggregated level, with information about the allocation of fiscal resources for 149 expenditure categories. In that way, we are able to unveil the complexities of budgetary decision-making and highlight which expenditure categories are more likely to be sacrificed as the result of political manipulation of budgetary processes, reflecting either ideological-political priorities and biases or structural socio-economic characteristics.

Furthermore, existing literature underestimates the potential effects of the political and ideological biases of the electoral base, focusing exclusively on the political affiliations of elected officials in state and local governments. Following the approach of Hicks & Swank (1992) who tested for the 'contagion-from-the-left' hypothesis for social welfare expenses, we concentrate on the political leaning of local communities, taking into account their voting patterns for the Federal elections. Additionally, the findings of this paper also contribute to a wider debate on the merits and role of the decentralization of government, for which empirical results have been divergent and inconclusive (Hortas-Rico & Rios, 2020; Martinez-Vazquez, Lago-Peñas, & Sacchi, 2017).

Our results identify three distinct clusters of municipalities that favor certain expenditure categories while sacrificing others, suggesting that general tendencies in budgetary decision-making by local governments across municipalities, exist around three policy areas: a) social care for the elderly, b) education and c) general administration and urban planning[1]. The findings of our study reveal that municipalities prioritizing social care for the elderly tend to allocate fewer resources to education, mobility, and environmental initiatives. Conversely, municipalities focusing on primary education, mobility, environment, and social care for families allocate fewer resources to social care for the elderly. Lastly, municipalities emphasizing administration services, mobility, safety, social services (e.g., childcare), and urban planning sacrifice both care services for the elderly and primary education. The econometric analysis considers various factors that predict the budget composition patterns, underscoring the significant effects exerted by covariates such as, the age structure and ethnic diversity of local communities and the politico-ideological position of electorates.

The remainder of the paper is structured as follows. Section 2 examines the theoretical and empirical state of play of the literature with respect to the fiscal policy and composition of local government budgets. Section 3 presents background information on the institutional framework and the fiscal rules that apply in Flanders. Section 4 develops the methodological strategy and describes the data sources. Section 5 reports and discusses the empirical results of the papers. Lastly, Section 6 concludes.

[1] Urban Planning includes expenditure categories related to Spatial Planning, Area Development and the development of various utilities (e.g., water, gas, electricity, streetlights). The Appendix offers full decomposition of expenditure categories, along with detailed description of each category.

2. Fiscal Policy of Local Governments: Theory and Evidence

Fiscal behavior of local governments emerged in the – predominantly American – literature in the late 1950s and early 1960s, with the proliferation of studies that incorporated ad-hoc models of expenditure determination (Fabricant, 1952; Kurnow, 1963). These were a-theoretical models exploring the determinants of local government expenditures, mainly using ordinary least squares (OLS) regression models focusing on sub-national political units in the US and Canada. Their main empirical findings suggest that average per capita income, urbanization, population density and federal grants tend to increase per capita expenditures of sub-national governments, whereas population size produced mixed results which depend on the specific expenditure category (Bodkin & Conklin, 1971; Schmandt & Stephens, 1963).

Drawing on the Theory of Public Finance and Optimal Public Expenditure (Musgrave, 1939; Samuelson, 1954), a more theoretically robust approach emerged (Tiebout, 1956). This research considered voters as consumers who express their preferences through voting, leading to governments designing budgets that reflect those preferences. Tiebout's model, which proposed that individuals reveal their preferences by moving to communities that align with their desired public goods and services, became an influential reference framework. Inspired by the latter, subsequent scholarship focused on two empirical camps: the Median Voter Theorem (Bergstrom & Goodman, 1973; Borcherding & Deacon, 1972), where the quantity of publicly provided goods and services in a community reflect the demand (preferences) of the median (median income household) voter; and the Constrained Maximization Models, which assume that political actors and bureaucrats (employees and experts in public administration) are utility maximizers that tend to use spending as a tool to manipulate political support (Becker, 1983; Niskanen, 1975).

In the current form of the theoretical discussion, the issue of fiscal decentralization, defined as the transferring of fiscal power from the central to the sub-national levels of governments, has emerged with two theoretical generations identified (Martinez-Vazquez et al., 2017). The first generation (demand-side) emphasizes that decentralization leads to increased government spending as smaller jurisdictions better meet the needs and preferences of local communities. The more recent generation, known as the supply-side or *Leviathan hypothesis*, suggests that spending decreases due to competition (*race-to-the-bottom*) between municipalities, leading to lower taxes and expenditures (Roesel, 2017). Against the above theoretical background, an extant literature exploring the potential determinants of local governments fiscal policy has stressed the role of an array of economic, social, urban, institutional, demographic and political factors (Oates, 2005). These factors include average income, unemployment, poverty, tax base, fiscal transfers, regulations, and the political and ideological position of the electorate. Recent research has focused on the composition of public expenditures, revealing the trade-offs and priorities between expenditure categories (Adolph et al., 2020; Bremer, Di Carlo, & Wansleben, 2022). The remainder of this section reviews these channels that co-determine the composition of budgets.

2.1. Partisan Politics, Political Competition, and Ideological Position

The political and ideological position of governments has been identified as a key determinant of the budgetary composition by the partisan approach to fiscal policy, since the pioneering work of Hibbs (1977). The basic premise of this approach is that political parties compete for votes promising political measures and reforms that best serve the interests of the social groups that they represent. So, lower income working-class groups are in general in favor of left-

leaning parties that propose active market-regulating policies that lower unemployment, raise wages and social spending, and vice versa. Later contributions by Roubini & Sachs (1989) and Alesina & Perroti (1995) explored whether left-wing governments are keener to increase debt-financed spending compared to more conservative ones, finding mixed results (Seitz, 2000). Bräuninger (2005), in explaining these mixed results, argues that international financial integration and globalization have reduced the partisan differences in designing and executing macroeconomic policies, shifting his focus from the politico-ideological position of ruling parties to the political sign of their programmatic preferences.

If Bräuninger's work shifted the focus of the partisan approach from the politico-ideological position of ruling parties to their programmatic preferences, the work by Hicks & Swank (1992) highlights the dynamic, strategic and sometimes contradictory nature of political decision-making processes. The rationale of their argument was that opposition political parties have the ability to influence the policy behavior of ruling parties (a phenomenon they describe as 'Contagion from the Left'), leading even conservative governments to expand social welfare expenditures and vice versa, that is left-wing governments to moderating their policy priorities due to a strong right-wing opposition. Their empirical analysis suggests that the electoral turnout and the politico-ideological position of governments and oppositional political parties play a significant role for welfare expenditures, whereas political competition does not. Similar results were found by Baraldi (2008) for Italian regions who tested whether political competition and fragmentation (measured with Herfindahl index) undermines political and governmental stability making more difficult for a political conjuncture to form a ruling majority.

Among the first who shifted their research attention towards the sub-national level was the study by Alt & Lowry (1994) exploring the partisan control hypothesis for US states and finding empirical evidence in favor of the partisan hypothesis for bicameral political and fiscal framework. More recently, though, Bremer et al. (2022) investigate the variation of local per capita public investment in Germany between 1995-2018 and find a negative partisanship effect, with left-wing mayors – on average – reducing public investment, especially when their local governments are under fiscal stress and need to prioritize other spending categories; whereas the size of tax revenues and administrative capacity (number of technical employees) exert a statistically significant positive effect.

2.2. Demographic Structure of Local Communities

Beyond the political and ideological position of administration, the literature also emphasizes the role of the demographic structure of local communities for fiscal outcomes. Higher proportions of older population in a local community increase the number of citizens that demand specific categories of public goods and services that satisfy better their age-biased preferences, for instance care services for the elderly, pensions, health services, and so on (Herrero-Alcalde & Tránchez-Martín, 2017; Sacchi & Salotti, 2016). Similarly, the ethnic structure of a municipality might also affect the composition of local budgets that attempt to reduce the distance between locally provided public goods and citizens' preferences (Gerdes, 2011; Jofre-Monseny, Sorribas-Navarro, & Vázquez-Grenno, 2016).

However, the empirical literature provides mixed results as to the size and direction of the demographic structure of local communities on budget compositions. Sacchi & Salotti (2016) find support for the intergenerational competition hypothesis suggesting that the share of older citizens in total population exerts a negative effect on the expenditure categories of education

and housing, implying different preferences of this population group for local public goods. On the other hand, Herrero-Alcalde & Tránchez-Martín (2017) observe no evidence for the intergenerational competition hypothesis, with the coefficients of both older and younger population groups being negative and statistically significant for health, education and social services expenditure categories.

With respect to the ethnic heterogeneity, Gerdes (2011) suggests that the shares of immigrants have no statistically significant impact on the value of a bundle of locally provided public goods and services that consists of daycare, schools, healthcare, and care for the elderly. Contrary, the results presented by Jofre-Monseny et al. (2016) suggest a negative relationship between immigration density and local per capita social spending. These results are consistent with early work on the subject of ethnic fragmentation and fiscal behavior of local governments in the US, with Alesina et al. (1999) suggesting an negative relation between ethnic heterogeneity of US cities, metropolitan areas and urban countries, and spending shares on education, roads, and waste managements.

Furthermore, evidence shows that population density has a negative effect on investments on infrastructure (transportation, waste management, utilities, etc.), with Mattson (2021) finding empirical evidence for a negative relationship between population density and per capita expenditure for the budget categories of fire public safety (fire protection), environment (parks and recreations), waste management and water infrastructure. Sacchi & Salotti (2016) also find a negative effect of population density on transportation expenses, but also on social services; whereas they find that population density positively affects expenditure shares on education and to a lesser extent on health and housing.

2.3. Socio-Economic Factors and the Fiscal Framework of Local Governments

Socioeconomic factors (e.g., income, unemployment) have also be considered by the literature as important covariates that influence the composition of budgets. Following a welfare state approach (Esping-Andersen, 1990; Korpi & Palme, 1998), we could argue that additionally to the central government, local governments share the same goal in taming the economic fluctuations during the business cycles, thus increasing expenditures in certain policy areas and – in the absence of fiscal capacity – reducing in others.

In early work by Potrafke (2011b) the growth in unemployment rate and the average income were utilized as proxies of the level of economic development and the position of the business cycle, finding a strong compensatory effect from local governments. This is consistent with the findings of Baraldi (2008). More recently, Adolph et al. (2020) pointed out that higher unemployment rates strongly increase the budgetary expenditures of US states for welfare, at the expense of reductions in education, public order and the environment. Similarly, per capita income makes US states to prioritize welfare expenditures over investments in highways.

Moving on, the literature suggests different channels through which the sub-national fiscal framework of a country affects the composition of budgetary expenses. The theoretical debate follows the argument made by Bradford & Oates (1971) regarding the crowding-out effect of inter-governmental transfers from federal and regional level to local governments. Their argument underlines that as high-level governmental units provide financial transfers to local governments for the production of public goods, the latter tend to favor their local electorate with lowering municipal taxes, undermining in that way local revenue generation and ultimately the fiscal autonomy itself. Others, like Hines & Thaler (1995), propose that the effect

of intergovernmental transfers, instead of influencing the local revenue efforts, tend to increase government spending (*flypaper effect*). The empirical literature, however, has not reached a consensus on that matter, with many studies supporting the flypaper effect (Goeminne, Smolders, & Vandorpe, 2017; Sacchi & Salotti, 2016) and others even suggesting the existence of a crowding-out effect for local revenues (Masaki, 2018).

3. The Flemish Fiscal Policy Institutional Framework

This section presents background information on the institutional framework and the fiscal rules that apply in Flanders, the Dutch-speaking region of the Federal State of Belgium. Flanders has its own regional parliament and government, with extensive political, administrative, and fiscal powers. Within Flanders, we find 300 municipalities that are characterized by a high degree of autonomy, with respect to tax collection and the production and provision of public goods and services. The political structure of Flemish municipalities consists of the Local Council, which is elected directly by the people of a municipal jurisdiction, and the College of Mayor and Alderman, which serves as the executive branch of the municipality (De Witte & Geys, 2011, 2013; D'Inverno, Moesen, & De Witte, 2022). Since political decisions are taken by the Local Council with majority voting, coalitions of political parties are formed in order to support a local government.

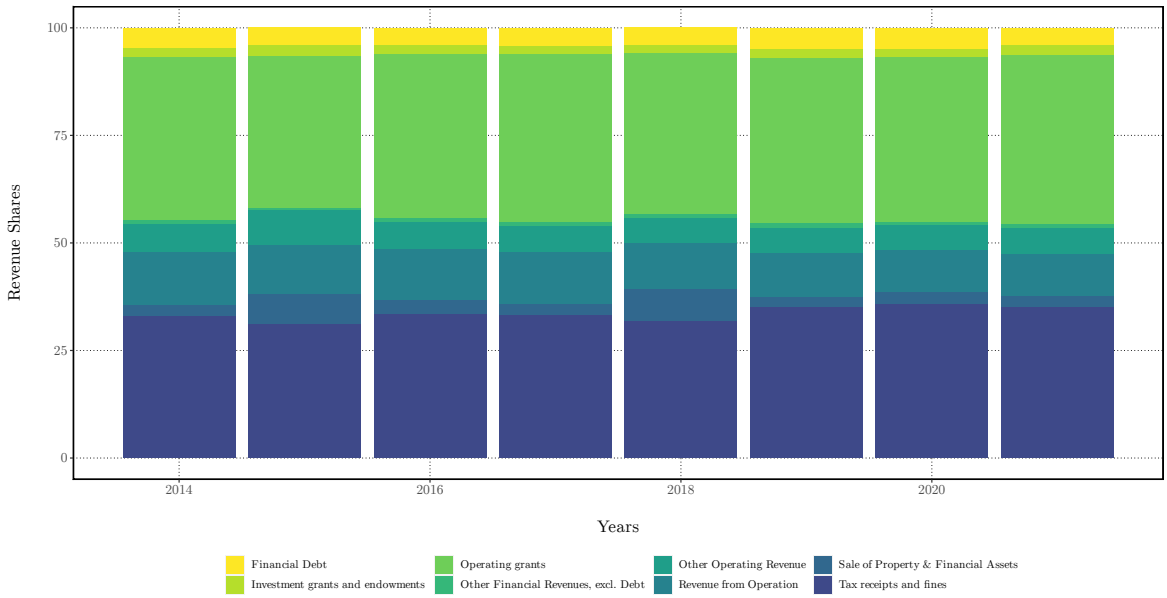

Figure 1 – Revenue Sources of Flemish Municipalities
Source: Own Illustration. Data: BBC, 2023

Flemish municipalities are responsible for providing an array of services ranging from general administrative services to education, social care and welfare, infrastructure, and urban planning and housing (D'Inverno & De Witte, 2020). Their main revenue sources (see **Figure *1***) come from intergovernmental transfers from regional, provincial, and federal levels of government (on average 38% of revenues) and own-resources revenue stream based on local income, property, and other taxes, as well as operating revenues (on average 33.5% and 11%, respectively). Since 2014 a new budgetary fiscal framework was introduced, the Policy and Management Cycle (BBC: Beleids- en Beheerscyclus), requiring all municipal units to run a balanced budget both in annual and in long-run structural terms (D'Inverno, Vidoli, & De Witte, 2023).

This new framework has significantly restricted the fiscal space of local governments, shifting the terrain of political, ideological, and economic conflicts into the composition of local budgets. Given the new fiscal framework, local governments need to prioritize certain expenditures over others. This leads to changes in the budget compositions, with a greater emphasis on essential services and a reduction in discretionary spending. Furthermore, the restricted fiscal space could potentially intensify political and distributional conflicts with respect to budget priorities. Different stakeholders and social groups might have competing preferences regarding the allocation of resources. Consequently, an empirical analysis of the fiscal behavior of local governments would need to consider the reallocation of resources and its impact on different policy areas.

4. Research Methodology and Data Sources

4.1. Data Sources

The unit of analysis for this paper is the 300 municipalities of the Flemish region of Belgium. For the clustering analysis we relied on budget allocation of Flemish municipalities data, from the Policy and Management Cycle dataset provided by the Flemish regional government (BBC, 2023). The BBC dataset gives information about the accounting structure of Flemish municipalities with respect to the revenue and expenditure sides, for 2014-2023, in three configurations: the budget configuration (types of revenues/expenditures); the institutional configuration (institutional sources/targets); and the functional configuration (revenues/expenditures categories and policy areas). In the present study we rely on the functional configuration, concentrating on the expenditure-side.

Table A.2 in the Appendix shows the structure of the expenditure-side of the functional configuration in three dimensions. The first dimension consists of 10 aggregated groups of expenditure categories: General Financing; General Administration; Mobility; Environment; Public Safety; Business & Work; Housing & Urban Planning; Culture & Leisure; Education; Care Services. These 10 policy areas are further subdivided into 58 and in turn into 149 expenditure categories. Based on the most disaggregated dimension of the BBC dataset, we constructed a time-series of municipal *expenditure matrices*, consisting of 300 municipalities and 149 expenditure categories, which are used as an input for the clustering analysis described in the previous sub-section. In the Appendix, we provide a background discussion about our choice to analyze the high-dimensional configuration of the BBC dataset (300x149) and how we managed to overcome potential problems arising from the so-called *curse of dimensionality*.

For the rest of the (explanatory) variables used in the regression analysis, we rely on the Municipal City-Monitor database (ABB, 2022), the Belgian Statistical Office (StatBel, 2019) and the Comparative Manifestos Project (Lehmann et al., 2023). In particular, we denote with $\boldsymbol{demo}_i'$ the set of demographic indicators that reflect the population size, as well as the age and ethnographic structure of Flemish municipalities. In this study, the demographic group of indicators consists of variables that reflect the age and ethnographic structure of the Flemish municipalities, such as the share of *older (80+)* and *school-aged* population in total population, the share of *foreigner-origin* population, as well as the *population* size of each municipal unit.

The urban structure of municipalities is described by $\boldsymbol{urban}_i'$, which includes the *house price-to-income ratio*, computed as the ratio of the median of house prices to per capita income (in gross value-added terms) and the *built-up area*, which measures the share of building area in

relation to the total area of the municipality. $\boldsymbol{econ}_i'$, groups socio-economic variables such as the *net average income*, the share of *manufacturing sector firms* in the total number of firms in each municipality, the *unemployment rate*, and the share of people with annual *tax income below the critical limit*, set-up at 10,000 euros for an individual declaration and 20,000 euros for joint declarations.

The variables that belong to the fiscal group ($\boldsymbol{fisc}_i'$) are *municipal debt* (as a share of gross value added), the *income-tax* and *property-tax* shares in total revenues, as well as the total *operational subsidies* from higher levels of government (provincial, regional and federal) in total revenues and *fiscal effort*, which is defined as the ratio of own resources (total revenues minus total subsidies) divided by the total income of each locality (Hy, Boland, Hopper, & Sims, 1993; Warner & Pratt, 2005), as in :

$$fiscal\_effort_{it} = \frac{Revenues_{it} - Subsidies_{it}}{GVA_{it}} \quad (1)$$

In the group of political indicators ($\boldsymbol{pol}_i'$), we define two variables, the *political competition* of Flemish political parties and the *politico-ideological position* of the electorate. For the construction of both variables, we relied on the results of the 2014 and 2019 Belgian federal elections, per municipality, the data of which were taken by Catalano and De Witte (2023). Contrary to most studies in the literature (Baraldi, 2008; Bremer et al., 2022) which measure the ideological-political position of local governments and administrators (municipal councils, mayors, etc.), we concentrate on the politico-ideological position of the electorate, measured by their voting patterns in Federal elections.

The rationale behind our choice, follows the logic of Hicks and Swank (1992) and their conceptualization of the 'contagion-from-the-left/right' effects. Specifically, municipal leaders and administrations do not need to solely follow the politico-ideological imperatives of their own political families, but they have to take into account and accommodate the political opinions and ideological positions of the average cis of budget composition. The political competition of the Flemish political parties is proxied by the *Herfindahl-Hirschman Index* of market concentration (Baraldi, 2008), calculated as the sum of squared vote shares of each political party (*p*), in every municipality:

$$HHI\_political = \sum_{p=1}^{P} (percent.\,votes_p)^2 \quad (2)$$

Low scores of HHI imply higher competition between political parties, whereas higher scores reflect more concentrated political markets. For the politico-ideological position of the Flemish electorates, we modified the Ideological Complexion of the Local Government (ICG) index proposed by De Witte & Geys (2011, p. 324), defined as $ICG = \sum_{i=1}^{n} p_i Complexion_i$, with p_i measuring the number of seats earned by political party *i* in the municipal councils, and $Complexion_i$, being a Right-Left scale of ideological position[2] of each political party, from 0 (Left) to 10 (Right). Our modifications consist of substituting the number of seats in municipal councils with the votes shares of political party *i* in the two federal elections, and the right-left scale with the ideological scale of Comparative Manifestos Project (Lehmann et al., 2023),

[2] The ideological scale was based on Buelens et al. (2008) study who conducted self-placement surveys of presidents and spokespersons of political parties in the Flemish municipalities for 2006.

which analyzes the electoral programs of national political parties in over 50 countries and thus provides a more objective categorization of political parties along the right-left scale:

$$political\_position = \sum_{p=1}^{P} vote\_shares_p \cdot ideological\_scale_p \quad (3)$$

Whereas the ICG ideological score of De Witte & Geys (2011) takes into account all the political parties that earned a seat in the local municipal council, the Comparative Manifestos Project's right-left scale, considers only the most important nation-wide political parties, excluding marginal political initiatives that took place in the elections only in certain municipalities. Consequently, for the construction of our index of politico-ideological position of the electorate, we had to exclude those smaller political parties (the vote shares of the excluded parties are 0.13% for the 2014, and 0.20% for the 2019 federal elections). The descriptive statistics for all variables are reported in **Table 1**, along with the data sources.

4.2. Research Methodology

4.2.1. Clustering Analysis

In order to identify the municipalities that share similar patterns of budgetary expenditure compositions, we apply the clustering algorithm *k-means*. Given the nature of our highly disaggregated data on municipal budget accounts, clustering analysis is considered as the most appropriate methodological approach in identifying, on the one hand, dissimilarities between municipalities with respect to the resources they allocate on different expenditure categories; and on the other key expenditures made by local governments. Utilizing the budgetary data on the expenditures of Flemish municipalities, we aim to group municipalities based on the similarities in their budget allocation patterns through maximizing the within-group similarities and the between-group dissimilarities.

Among the many types of clustering algorithms that exist in the theoretical and empirical literature, the *k-means* algorithm (unsupervised learning approach) is one of the most widely used clustering algorithm in academic literature (MacQueen, 1967). The main advantages of the *k-means* algorithm are the following: a) it is computationally less intensive compared to other clustering algorithms and thus is more efficient; b) its clustering methodology is able to handle non-categorical data, prevalent in socio-economic datasets; c) is more robust to the presence of outliers; d) produces cluster outcomes whose data points are closer and tighter together; e) the algorithm has been designed to cluster entities – like in our case the Flemish municipalities – instead of variables, thus it fits better our present research context (Johnson & Wichern, 2007; Kovács, 1985).

The logic underlying the *k-means* algorithmic approach is to group data points into *k* number of clusters, by minimizing the distance of each data point within a prespecified cluster from the center (centroid) of the cluster, that is by minimizing the within-cluster variation. The total within-cluster variation (see Equation (4)) is approached as the sum of squared Euclidean distance between each data point and the centroid (mean value) of the cluster under investigation (Johnson & Wichern, 2007):

$$WCSS = \sum_{k=1}^{k} \sum_{x_i \in C_k} (x_i - \mu_k)^2 \quad (4)$$

In the Appendix, we describe in more detail the various steps followed in the application of the k-means algorithm, as well as the results of the various evaluation techniques employed.

4.2.2. Econometric Approach

Given that the cluster memberships identified in the previous step are categorical variables we utilize a logistic regression framework (Train, 2001; Wooldrige, 2011), estimating separate logit models, each for every cluster membership. Consequently, the target variable of our logit models is binary and takes two values; 1 when the municipality into consideration belongs to the targeted cluster, and 0 otherwise. Estimating separate binary logit models has the advantage to produce results that are easier to interpret, compared to a multinomial logit model, which designates one category of the dependent variable as the 'reference' category and estimates the probabilities of the other categories *vis-à-vis* the reference category.

In order to further make sense of our results we calculated the Average Marginal Effects (AME) of each independent variable, which measures the average change in the probability of observing an event, precipitated by the average change in the values of the independent variable. Moreover, with the multiple binary logit regressions setup we do not need to rely on the restrictive assumption of the *Independence of Irrelevant Alternatives*, which in the context of our study seems to be unrealistic and unnecessary.

Logistic regression models are widely used in empirical studies of clustering behavior of spatial units, including central and local governments' fiscal policies (Ketelhöhn, 2006; Perafita & Saez, 2022). In order to account for the unobserved heterogeneity of our sample and control for omitted variable bias, we implement a fixed effects specification of the binary logistic regression (Pforr, 2014). The formal logit model is presented in equation (5), which we ran separately three times with each cluster membership (A, B, and C) as the binary response dependent variable $\boldsymbol{y}_{it}$ of unit $i = 1, \dots, N$ at time $t = 1, \dots, T$:

$$logit(\ \Pr[\boldsymbol{y}_{it} = 1 \mid \boldsymbol{x}_{it-1}, \boldsymbol{\alpha}, \boldsymbol{\gamma}, \boldsymbol{\beta}]\ ) = \boldsymbol{x}'_{it-1} \cdot \boldsymbol{\beta} + \ \boldsymbol{\alpha}_i + \boldsymbol{\gamma}_t + \boldsymbol{\varepsilon}_{it} \tag{5}$$

The vector of covariates $\boldsymbol{x}_{it-1}$ includes our explanatory variables for individual municipality *i* at time *t – 1*; $\boldsymbol{\beta}$ is the vector of parameters to be estimated, whereas the unobserved individual-specific effects are captured by vectors $\boldsymbol{\alpha} = (\alpha_1, \dots, \alpha_N)$ and $\boldsymbol{\gamma}_t$ are binary time dummies for local municipal elections. The model is estimated using the maximum likelihood method, while the time-varying regressors were lagged by one year in order to address issues of simultaneous endogeneity. The basic specification of the estimated equation has the following form:

$$\begin{aligned} logit_{P_{y_{it} \mid j=1}} = {} & \boldsymbol{demo}'_{it-1} \cdot \boldsymbol{\beta_1} + \boldsymbol{urban}'_{it-1} \cdot \boldsymbol{\beta_2} + \boldsymbol{econ}'_{it-1} \cdot \boldsymbol{\beta_3} \\ & + \boldsymbol{fisc}'_{it-1} \cdot \boldsymbol{\beta_4} + \boldsymbol{pol}'_{it-1} \cdot \boldsymbol{\beta_5} + \ \boldsymbol{\alpha}_i + \boldsymbol{\gamma}_t + \boldsymbol{\varepsilon}_{it} \end{aligned} \tag{6}$$

where $logit\_P_{y_{it} \mid j=1}$ is the probability of municipality *i* at time *t*, to be associated with the cluster memberships as identified by the *k-means* clustering algorithm taking into account the similarity of expenditure patterns, whereas the independent variables are the set of socio-economic, political and demographic covariates described in the previous subsection.

Building on the critical review of the theoretical and empirical literature on the determinants of local government fiscal policies, we expect that changes in the political and ideological position of the local population, as well as in the demographic, urban and socio-economic structure of each locality, to influence budgetary decision-makers and consequently the composition of municipal budgets and their cluster membership. Taking, for example, the age structure of a local community, the older the median voter in a local community, the higher the probability for the municipality to spend relatively more on social services for the elderly.

5. Empirical Results

The results of the *k-means* clustering algorithm applied on the 149 expenditure categories of municipal budgets show that three distinct clusters of municipalities are formed, with respect to the similarities and differences in the expenditure composition of their budgets. In **Figure *2*** we map the clustering outcome, assigning each cluster to a specific color. **Table 2** describes the profiles of the three clusters, regarding the most important expenditure categories that contribute to the classification of each municipality into the clusters (Panel A), a set of socio-economic and fiscal variables (Panel B), as well as the population size of each municipality (Panel C). In Panel A of **Table 2**, we report the expenditure categories with within-cluster mean values that are statistically different between clusters and also represent more than 1% of the total budget (on average) of our sample. In Table 3, the average marginal effects that the demographic, political and socio-economic variables with the clusters are analysed.

Our results suggest that there is an important variation between municipalities regarding the political decisions of local governments to favor specific expenditure categories with more budgetary resources, sacrificing in the meantime other policy priorities. The policy priorities that show the highest variation in budgetary allocations are those of Residential and Care Centers for the Elderly, Primary Education, Care Services for Families, General Administration, Urban Planning and Mobility[3]. In particular, the municipalities that belong to '*Cluster A: Elderly-Centric Care'* tend to prioritize social care services for the elderly, sacrificing resources that could have been spent upon education, mobility, environment, and other policy areas. On the contrary, in the second cluster ('*Cluster B: Balanced Education and Social Care'*) we observe a tradeoff between high budget shares for primary education, mobility, environment, social care services for families and significantly lower budget shares for social care services for the elderly. Finally, in '*Cluster C: Administrative and Urban Development'*, municipalities sacrifice both policy areas of care services for elderly and primary education, in order to support administration services, mobility, safety, other social services (childcare), and urban planning.

[3] Mobility expenditures include expenses on Roads, Public Transport, Parking, and Other Mobility and Traffic Management initiatives. The Appendix offers full decomposition of expenditure categories, along with detailed description of each category.

Table 1 - Descriptive Statistics

Variable	Observations	Mean	Std. Dev.	Min	Max	Source
Population	1,800	21,661	35,334	83	525,935	(Gemeente-Stadsmonitor, 2022)
Older (80+) Population (% Total)	1,800	5.94	1.02	3.54	10.88	
School-Age Population (% Total)	1,794	16.09	2.18	2.90	19.92	
Foreign-Origin Population (% Total)	1,800	15.29	11.50	2.47	69.93	
House Price-Income Ratio	1,764	10.36	4.51	1.18	32.65	
Built-Up Area	1,800	29.95	14.98	6.10	85.97	
Manufacturing Sector Firms (% Total)	1,800	21.10	6.87	0.00	39.86	
Unemployment Rate	1,800	6.20	2.06	2.35	17.21	
Fiscal Effort	1,800	6.61	3.21	1.01	26.93	
Income Taxes (% Revenues)	1,800	16.91	5.82	0.00	34.42	
Property Taxes (% Revenues)	1,800	5.62	3.43	0.69	30.11	
Debt (% GVA)	1,800	5.04	3.42	0.00	23.84	
Total Subsidies (% Revenues)	1,800	17.10	4.32	3.91	36.64	
Tax Income Below Critical Limit (% Total)	1,788	1.58	0.62	0.48	4.85	
Average Net Income	1,800	20,106.25	2,277.69	13,509.60	31,698.30	(StatBel, 2019)
Politico-Ideological Position	1,800	5.32	0.16	3.67	5.56	CMP (Lehmann et al., 2023)
Political Competition (HHI)	1,800	2,137.39	294.95	1,370.35	3,369.63	Catalano & De Witte (2023)

Source: Own Calculation.

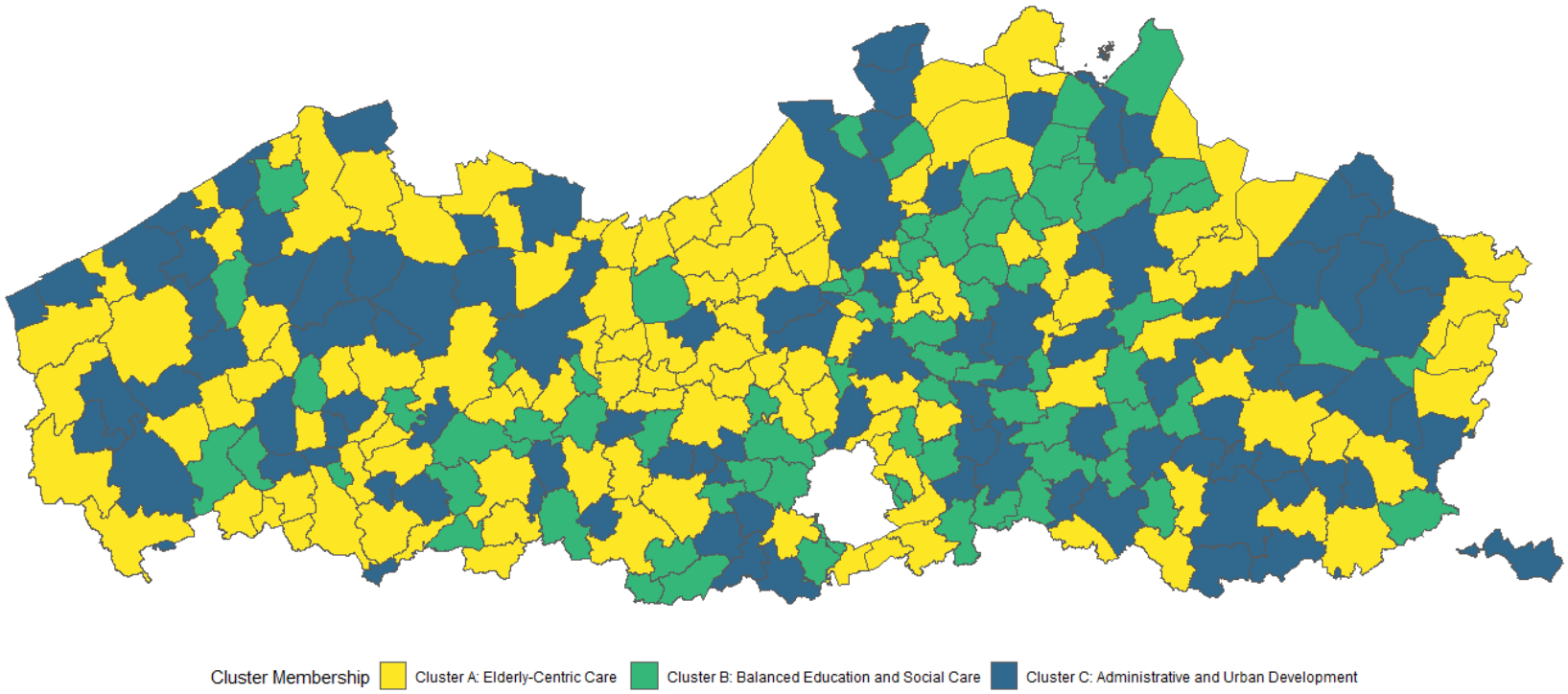

Figure 2 - Cluster Memberships of the Flemish Municipalities

Source: Own Illustration. Data: BBC, 2023

Table 2 – Cluster Profiles

	Total Mean	Cluster A: Elderly-Centric Care		Cluster B: Balanced Education and Social Care		Cluster C: Administrative and Urban Development		F-Statistic (p-value)
		Cluster Average	*Deviation %*	Cluster Average	*Deviation %*	Cluster Average	*Deviation %*	
Panel A (Budgetary Shares)								
Care Services: Resid./Care Centers (Elderly)	6.43	14.60	127%	0.87	-86%	1.32	-79%	0.000
Education: Ordinary Primary Education	5.84	4.82	-17%	12.23	110%	2.19	-62%	0.001
Care Services: Cleaning Services (Families)	1.26	0.86	-32%	1.81	44%	1.31	4%	0.007
General Administration: Political Bodies	2.28	1.71	-25%	2.44	7%	2.81	23%	0.000
Housing and Urban Planning: Spatial Planning	1.15	0.88	-24%	1.34	16%	1.32	15%	0.000
General Administration: Secretariat	2.67	2.13	-20%	3.25	22%	2.84	7%	0.032
General Administration: Administrative Services	1.73	1.38	-20%	1.78	3%	2.08	21%	0.000
Mobility: Roads	7.02	5.59	-20%	8.21	17%	7.74	10%	0.000
Public Safety: Fire Brigade	2.43	2.07	-15%	2.58	6%	2.74	13%	0.000
Environment: Household Waste	3.09	2.67	-14%	3.65	18%	3.15	2%	0.006
Care Services: Childcare	1.92	1.67	-13%	1.76	-9%	2.33	21%	0.005
General Administration: Other General Services	8.77	8.10	-8%	8.24	-6%	9.92	13%	0.001
Culture and Leisure: Public Libraries	1.50	1.33	-11%	1.64	9%	1.59	6%	0.002
General Administration: Tax/Financial Services	1.70	1.52	-11%	1.80	6%	1.82	7%	0.001
Housing and Urban Planning: Streetlights	1.44	1.31	-9%	1.58	9%	1.50	4%	0.029
Public Safety: Police Services	5.56	5.13	-8%	5.90	6%	5.80	4%	0.001
Panel B								
Income Per Capita (GVA)	27909	30552	9%	26249	-6%	26156	-6%	0.081
Fiscal Capacity	6.61	7.41	12%	5.97	-10%	6.17	-7%	0.002
Income Taxes (% Revenues)	17.09	14.58	-15%	20.23	18%	17.58	3%	0.000
Property Taxes (% Revenues)	16.70	15.38	-8%	16.77	0%	18.15	9%	0.000
Other Taxes (% Revenues)	5.61	5.15	-8%	5.31	-5%	6.37	13%	0.008

Total Subsidies (% Revenues)	16.96	14.20	-16%	19.47	15%	18.22	7%	0.049
Municipal Debt (% GVA)	5.04	5.97	19%	3.88	-23%	4.85	-4%	0.007
Population	21669	22728	5%	13960	-36%	26248	21%	0.062
Kindergarten Population	827	853	3%	506	-39%	1040	26%	0.087
Primary School Population	1334	1381	4%	848	-36%	1648	24%	0.078
Secondary School Population	1353	1415	5%	876	-35%	1642	21%	0.059
Elderly 80+ (% Total)	5.90	5.90	0%	5.78	-2%	5.99	2%	0.349
Panel C								
Rural Communities (< 5k)		0		3		9		
Small Towns (5k - 10k)		19		23		28		
Large Towns (10k - 20k)		45		42		41		
Small Cities (20k - 50k)		49		10		19		
Medium Cities (50k - 100k)		4		0		5		
Large Cities (> 100,000)		1		0		2		
Municipalities per Cluster		118		78		104		

Source: Own Calculations. Data: (ABB, 2022; BBC, 2023). Notes: The typology of municipalities follows the classification of cities, towns and rural municipalities of the Federal Institute for Building, Urban and Spatial Research of Germany (BBSR, 2020). The F-statistic column shows the p-values of the ANOVA F-statistic comparing the means of all clusters. Panel C presents the number of Flemish municipalities that falls within each typology.

Next, we explore the average marginal effects that the demographic, political and socio-economic variables have on the probability of observing the expenditure composition patterns described by the three clusters. The results in **Table 3** suggests that population size and average net income have negligible effects on the likelihood to observe any of the budget composition patterns, whereas unemployment rate and the share of manufacturing firms are statistically insignificant and the proxy for poverty is statistically significant for the regressions of the '*Balanced Education and Social Care'* and the '*Administrative and Urban Development'* clusters. The latter raises the likelihood of observing a budget composition that prioritizes education over caregiving services for the elderly by 36.4% and lowers the probability of observing a budget that sacrifices both policy areas by 22.9%.

Table 3 – Binary Logistic Regressions with Fixed Effects for Cluster Memberships

	Average Marginal Effects		
Independent Variables (t-1)	*Cluster A: Elderly-Centric Care*	*Cluster B: Balanced Education and Social Care*	*Cluster C: Administrative and Urban Development*
Population	-3e-04***	1e-04*	1e-04**
Older (80+) Population (% Total)	0.103	-0.259***	0.138***
School-Age Population (% Total)	-0.058	-0.034	0.082**
Foreign-Origin Population (% Total)	0.051**	-0.076***	0.001
House Price-Income Ratio	-0.015	0.012	0.020*
Built-Up Area	-0.015	0.017	-0.011
Average Net Income	1e-04*	-2e-04***	-1e-04**
Manufacturing Sector Firms (% Total)	0.008	-0.007	-0.007
Unemployment Rate	0.020	0.020	0.017
Fiscal Effort	0.003	-0.012	0.015**
Income Taxes (% Revenues)	0.001	-0.021***	0.038***
Property Taxes (% Revenues)	0.015	-0.005	-0.014**
Debt (% GVA)	0.011	0.008	-0.001
Operational Subsidies (% Revenues)	-0.010	0.009	-0.009**
Politico-Ideological Position	0.640***	-0.469***	-0.086
Political Competition	0.0001	0.0001	0.0001
Tax Income Below Critical Limit (% Total Declarations)	-0.043	0.364***	-0.229***
Observations	1,462	1,462	1,462
Fixed Effects	Yes	Yes	Yes
Time Dummies: Local Election Year	Yes	Yes	Yes
AIC	1941.5	1756.1	1008.2
Log Likelihood	-654.726	-562.050	-188.081
Nagelkerke R2	0.504	0.464	0.800
Cox-Snell R2	0.375	0.317	0.475
Likelihood Ratio χ^2	687.7***	557.6***	942.4***

Source: Own Calculations. Notes: Binary Logistic Regression with unit and time fixed effects. The fixed effects are not reported. Statistical significance: *p<0.1; **p<0.5; ***p<0.01.

Interestingly, these results come into stark contradiction with the theoretical expectations of the welfare state approach which predicts that variables reflecting the economic development of an area and the business cycle, should influence the composition of budgetary expenditure patterns (Baraldi, 2008; Potrafke, 2011b). Likewise, according to one interpretation of Wagner's Law (Adolph et al., 2020), it is anticipated that as municipalities become wealthier, they allocate more funds towards welfare programs, whereas underdeveloped ones tend to focus on fostering economic growth through diverting more resources towards public investments and tax credits. Interpreting our results through these two dimensions, we can argue that Flemish municipalities assume a limited role with respect to the tasks of macroeconomic stabilization and countercyclical policies, focusing on social services and human capital.

As reported in **Table 3**, the political and ideological position of local communities matters considerably for the decisions of elected officials with respect to the budget priorities and the internal trade-offs between expenditure categories. Looking at the first regressions, we observe that a 1% increase in the voting shares of right-wing - that is a one-unit shift of the politico-ideological position of local electorates to the right - raises the probability to observe municipalities that prioritize caregiving services for the elderly by 64%. Similarly, it reduces by 46.9% the probability to observe municipalities that prioritize expenditures towards education, mobility, and the environment. These results give an alternative support to the partisan politics hypothesis, highlighting the effects of the politico-ideological position of the electorates á la Hicks & Swank (1992). A common concern in the empirical partisan approach is the issue of endogeneity and reverse causality between fiscal policy and ideology, which obliges us to interpret the above results with caution. However, we should underline that the presence of reverse causality is unlikely in the context of the present specification, since the time it takes for the political decisions of local politicians to influence the ideological and political stance of their electorates is far longer than a single year, and usually transcends multiple elections to become effective. Consequently, from a theoretical perspective, reverse causality is implausible to bias our results.

Even though empirical research provides mixed results about the link between ageing and voting patterns (Geys, Heggedal, & Sørensen, 2022; Peterson, Smith, & Hibbing, 2020), the above results indicate that more conservative and right-wing electoral base is correlated with the decision of local governments to support facilities and caregiving services for the elderly. Similarly, as the electorates become less conservative, the chances to observe municipal budgets that invest more on education and mobility rise. This result seems to be in line with those studies in the empirical literature that support the positive link between centre-left and left-wing decision-makers and higher expenditure in education (Busemeyer, 2009; Herrero-Alcalde & Tránchez-Martín, 2017; Potrafke, 2011a). On the other hand, the variable of political competition lacks statistical significance in line with findings from other studies in the empirical literature (Baraldi, 2008; Hicks & Swank, 1992).

With respect to the social and demographic factors, we observe in the regression equation of the *Balanced Education and Social Care* cluster that the Average Marginal Effect (AME) of the older population share is statistically significant and negative (-25.9%), providing a strong support for intergenerational competition hypothesis that suggests that older citizens exert a negative effect on the expenditure towards education (Potrafke, 2011a; Sacchi & Salotti, 2016). Contrariwise, the sign and size of the AME in the regression equation of the *Administrative and Urban Development* cluster, as well as the fact that the coefficients of the share of older and the share of the school-aged populations in the *Elderly-Centric Care* and *Balanced*

Education and Social Care regression, are not statistically significant, implies a significant mismatch between the age structure of local populations and the policy priorities of their municipalities, with the share of older population over 80 years old and the share of student population increasing the likelihood of observing budgets that sacrifice caregiving services for elderly and education policies, by 13.8% and 8.2%, respectively. Finally, the effect of the poverty variable (tax income below critical limit) on *Balanced Education and Social Care* cluster which includes higher expenditure shares for social services as well as public safety (police force), is consistent with empirical studies examining the nexus between income inequality, crime and expenditures on police services (Bethencourt, 2022; Boustan, Ferreira, Winkler, & Zolt, 2013).

Given the fact that the municipalities that belong to the *Administrative and Urban Development* cluster have low fiscal capacity (own-resources revenues) and low per capita net incomes compared to the other two groups (see **Table 2**), the above results potentially reflect the outcomes of the trade-offs in the allocation of limited fiscal resources. Regarding the ethnic background of local population, we observe that the higher the share of foreign-origin population the higher is the probability to observe budgetary allocation that support proportionally higher expenses on caregiving services. This result is highly consistent with the well-documented observation in the literature that foreigners typically fill the caregiving workers deficit in many countries (Atanackovic & Bourgeault, 2013; Van Hooren, 2021).

6. Conclusions

In this paper we investigated the budgetary trade-offs between policy areas at the local level, identifying general patterns in the political decisions of local politicians to prioritize certain expenditures over others. We find rigorous empirical evidence that local governments decision-making bodies differentiate in their budgetary priorities with respect to the allocation of resources to social care for the elderly, education, and general administration/urban planning. To identify the budgetary priorities of local governments we applied an unsupervised k-means clustering algorithm to a unique and rich dataset of budgetary accounting data from 2014 to 2019, for 300 municipalities in Flanders, whereas we explored whether socio-economic, demographic, and political factors predict the cluster memberships, utilizing a binary logistic regressions framework.

Our econometric findings highlight specific elements of the socio-economic and political profile of local communities in predicting the budgetary policy priorities. Local government budgets that prioritize caregiving social services for the elderly are more likely to be found in communities with more conservative electoral bases and a larger ethnic diversity, whereas policymakers tend to favor expenditures on education, when the politico-ideological position of local communities is less conservative, the age structure is tilted towards younger generations and there are higher shares of poverty. Finally, expenditures that support general administration services and urban planning are prioritized by municipalities with higher fiscal self-reliance (fiscal effort) and more equal communities in terms of poverty rates.

Surprisingly, our results diverge from the theoretical expectations of the welfare state approach (Esping-Andersen, 1990; Korpi & Palme, 1998) and the predictions of Wagner's Law (Adolph et al., 2020). Instead, the findings suggest that Flemish municipalities assume a limited role in macroeconomic stabilization and countercyclical policies, prioritizing social services and human capital. Furthermore, our analysis reveals the considerable impact of the political and ideological position of local communities on budget priorities and internal trade-offs, in line

with the theory of partisan politics (Baraldi, 2008; Bremer et al., 2022). A shift towards the right in the politico-ideological position of local electorates increased the likelihood of municipalities prioritizing caregiving services for the elderly while decreasing the probability of prioritizing education, mobility, and the environment. Moreover, we found support for the intergenerational competition hypothesis, with our models predicting a significant divergence and distributional conflicts between elderly and younger cohorts. Finally, as the percentage of foreign residents increases, so does the likelihood of funding allocations favoring greater spending on caregiving services, an observation that aligns with existing research showing that foreigners often help address caregiving workforce shortages.

Overall, our research sheds light on the complex dynamics of budgetary decision-making at the municipal level, emphasizing the role of political, demographic, and socio-economic factors. The findings contribute to the understanding of expenditure composition patterns, informing policymakers about the trade-offs involved and the implications for different policy areas. The implications of this study have noteworthy policy considerations. Local government expenditure decisions reflect policy priorities which in turn result from the complex interaction of factors (e.g., socio-demographic, economic, institutional, politico-ideological). Shifting budget resources involves a political trade-off, thus making the decision to allocate more or less in a policy a form of representation. Introducing new forms of democratic participation for under-represented social groups reduces the gap between citizens' needs and municipalities' provision of goods and services. It also empowers marginalized groups, contributing to their social and political advancement. Another recommendation is reevaluating the distribution of responsibilities for critical public goods, like education and social care, among local, regional, and central governments. This approach can address fiscal pressures and ideological biases at the local level.

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