

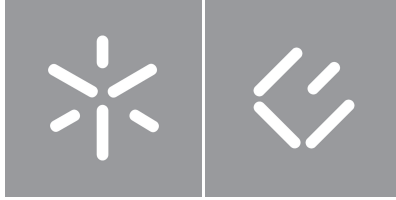
University of Minho

School of Economics and Management

Francisco Figueira Ribeiro

Should I stay or should I go?

An analysis of Portugal's intracountry migration.



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Master's Dissertation

Master in Economics

Dissertation supervised by

Professora Doutora Linda Veiga

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Statement of Integrity

I hereby declare having conducted this academic work with integrity.

I confirm that I have not used plagiarism or any form of undue use of information or falsification of results along the process leading to its elaboration.

I further declare that I have fully acknowledged the Code of Ethical Conduct of the University of Minho.

University of Minho, Braga, april 2025

Francisco Figueira Ribeiro

Abstract

Population flows have led to an uneven distribution of Portugal's population and certain municipalities and regions have become more developed than others. This study investigates which factors influence the attractiveness of a municipality. The empirical analysis uses a panel data set of Portuguese mainland municipalities from 2007 to 2023, estimating fixed effects and random effects regressions. Municipal net migration serves as dependent variable, while local government fiscal policy, socioeconomic and amenity variables as independent variables. The analysis found that while certain socioeconomic factors influence migration patterns, mostly those regarding the labour market, local government's fiscal policy and amenities did not exhibit a statistically significant impact. This may suggest there is a local governments' lack of influence due to the high degree of centralization of state activities in Portugal.

Keywords Internal Migration; Net Migration; Portuguese Municipalities; Tiebout Model.

Resumo

Os fluxos populacionais conduziram a uma distribuição desigual da população em Portugal e alguns municípios e regiões tornaram-se mais desenvolvidos do que outros. Este estudo investiga quais os factores que influenciam a atratividade de um município. A análise empírica utiliza um conjunto de dados em painel dos municípios de Portugal continental de 2007 a 2023, estimando regressões de efeitos fixos e de efeitos aleatórios. O saldo migratório municipal serve como variável dependente, enquanto as variáveis socioeconómicas, política fiscal do governo local e comodidades são variáveis independentes. A análise concluiu que, embora alguns fatores socioeconómicos influenciem o saldo migratório, principalmente os relacionados com o mercado de trabalho, a política fiscal e as comodidades locais não tiveram um impacto estatisticamente significativo. Isto pode indicar a pouca capacidade de influência dos governos locais dado o elevado grau de centralização das atividades do Estado em Portugal.

Palavras-chave Migração Interna; Saldo Migratório; Municípios Portugueses; Modelo de Tiebout.

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Acronyms

GDP Gross Domestic Product. 9

IMI Municipal Property Tax. 16

IMT Municipal Property Transfer Tax. 16

INE National Institute of Statistics. 19, 20, 21, 22, 24, 27, 28

IRC Corporate Income Tax. 16

IRS Personal Income Tax. 16

IUC Single Circulation Tax. 16

1 Introduction

Throughout Portugal's history migration flows have been considerably important, the maritime expeditions were the first sign of significant international migration flows. As for internal flows, during the 60s and 70s the underdeveloped agricultural dependent countryside led the youth to flee from the interior and rural regions of Portugal to urban areas within and beyond the Portuguese border. In the 21st century, the troubles faced with the sovereign debt crisis, harsh economic conditions, and historic maximum unemployment rates led to the economic and financial assistance plan. This time, the outflows of citizens to other countries were inevitable. In today's limelight ageing and desertification of the interior of Portugal constitute a serious concern when it's comes to territorial cohesion policies, being the long-term consequence of a lack of economic development and decades of outflows of the young population.

Apart from major events that can influence population flows, individuals naturally look for better opportunities, and the Portuguese have been doing so throughout their history. However, migration is a life-changing decision which is not light-hearted and may involve several considerations. Individual characteristics, job opportunities, land and housing market, state and local taxes (and the respective public goods), climate, environment, amenities, and life-cycle considerations (marital status, education, age, children), can affect an individual's migration decision (Greenwood, 1985).

According to the seminal work of Tiebout (1956), local governments' expenditures and revenues should reflect population preferences. The consumer voter picks the community that best satisfies his preference pattern for public goods and taxes, so people "vote with their feet" by relocating accordingly. Local government policies may also influence migration flows by attracting individuals who prefer that community over others. Even though Tiebout's assumptions were fragile, the main hypothesis may still be relevant to explore: whether local government policies affect intracountry migration flows (Tiebout, 1956). But from a general perspective, migration has often been seen as a consequence of heterogeneous economic conditions (wage differentials and labour market conditions) across the territory (Harris and Todaro, 1970; Krumm, 1983). Hence the role of economic factors such as wages and labour market conditions is worth

testing.

This work aims to test if population flows across Portuguese municipalities are Tiebout-like, by analysing which factors may influence municipalities' net migration. Section 2 presents the literature review, and section 3 provides a institutional setting of Portuguese municipalities, followed by a socio-economic context and policy measures, section 4.1 the data used, section 5 describes the empirical analysis, section 6 the main results, and section 7 concluding remarks.

2 Theoretical Framework

The prospects of a region or place have always been closely tied to its demographic structure. Demographics play a decisive role in shaping decisions made by central governments and businesses regarding resource allocation. This is why migration flows are so important for a region's economic, social and amenity development, in this line regional policy has been considered vital to attract migrants, through the promotion of a region or place (Rodríguez-Pose and Ketterer, 2012; Niedomysl, 2004). To prevent major population shifts, local governments must ensure their territories have good levels of economic activity, businesses, infrastructures, services and amenities to stabilize their population levels and improve the territory's attractiveness. While amenities have been considered to assume a relevant role in the appeal of places in the United States, the role of economic factors has been predominant in Europe (Rodríguez-Pose and Ketterer, 2012; Faggian et al., 2012). While local governments through public goods, services, tax and expenditure have also been considered relevant in influencing location decisions (Friedman, 1981; Day, 1992; Westerlund and Wyzan, 1995; Dahlberg et al., 2012).

From a microeconomic perspective, households/individuals have always been considered to maximise their utility under a budget constraint, taking into account both economic and non-economic aspects. While economic aspects often include expected income variables such as wages, unemployment rates and local tax rates. Non-economic include, natural and man-made amenities and public services (Faggian et al., 2012). The following two sections present a theoretical background, on local governments and migration and the third section on the main empirical studies.

2.1 Migration

The study of migration by economists has been mainly split into individual choice models and models of spatial equilibrium and optimal dynamic migration (Jia et al., 2023). Individual choice models started to consider the individual's decision to migrate under a cost-benefit framework, people choose to move where their future stream of benefits (mostly wages) is maximised. Still, they incur costs of travelling, finding work,

learning a new language and culture, and emotional attachment (Sjaastad, 1962). Incorporating these analytically and treating migration as an investment (similar to human capital investment), the individual decides to move from location i to j if the earnings and cost differentials over space are maximised and positive (Sjaastad, 1962). Let the present value of earnings stream in place j less than those in i be:

$$\sum_{t=1}^n \frac{(E_{jt} - E_{it})}{(1+r)^t}, \quad (2.1)$$

where r is the discount rate and E the earnings in each location.

And the present value of net costs between these two places is:

$$\sum_{t=1}^n \frac{(C_{jt} - C_{it})}{(1+r)^t}, \quad (2.2)$$

C stands for costs in each location.

Then the present value of the investment in migration from i to j is:

$$PV_{ij} = \sum_{t=1}^n \frac{E_{jt} - E_{it}}{(1+r)^t} - \sum_{t=1}^n \frac{C_{jt} - C_{it}}{(1+r)^t}. \quad (2.3)$$

Kennan and Walker (2011) extended individual choice models through a structural dynamic model, focusing on the relationship between income prospects and migration decisions. Individual migration decisions are based on an optimal search process, reacting to wage differentials across locations, by maximizing the expected lifetime income net of moving costs (Jia et al., 2023). Illustrated in the next equations, there are J locations, l being a vector of recent locations and l^0 the current location, ω a vector with information on wage and utility in each location, state vector x consisting of l , ω , and age. ζ_j being a random variable independent and identically distributed across locations, periods and individuals and independent of state vector (Jia et al., 2023). Accounting for recent locations is the vector l , accounting for wages w is a vector of wages and utility information across locations. For individuals whose home location is h the flow payoff is:

$$\tilde{u}_h(x, j) = u_h(x, j) + \zeta_j, \quad (2.4)$$

where

$$u_h(x, j) = \alpha_0 w(\ell^0, \omega) + \sum_{k=1}^K \alpha_k Y_k(\ell^0) + \alpha^H \chi(\ell^0 = h) + \xi(\ell^0, \omega) - \Delta_\tau(x, j). \quad (2.5)$$

The first term $w(\ell^0, \omega)$ in equation 2.5 represents wage in the current location (l^0), the second term $Y_k(l^0)$ consists of non-pecuniary variables (amenities) and the third the preference for the native location $\chi(\ell^0 = h)$. Then ξ is a random permanent component in each location, which is learned when the

location is visited. The term Δ_τ represents the moving cost from l^0 to l^j and a unexplained component ζ_j , capturing shocks to preferences or moving costs (Jia et al., 2023). Lastly moving costs (2.6) are function of distance $D(l^0, j)$ from the current location to j , and $\chi(j \in A(l_0))$ to represent a the set of locations adjacent to l_0 , and a previously known location $\chi(j = l_1)$, age a and population size η_j (Kennan and Walker, 2011).

$$\Delta_\tau(x, j) = (\gamma_{0\tau} + \gamma_1 D(l^0, j) - \gamma_2 \chi(j \in A(l^0)) - \gamma_3 \chi(j = l^1) + \gamma_4 a - \gamma_5 \eta_j) \chi(j \neq l^0). \quad (2.6)$$

Individuals maximise the expected present value of lifetime utility by moving from the current location, with moving costs, and accumulating utility in the next location, depending on the shocks to which they are exposed and the knowledge they have about opportunities elsewhere (Kennan and Walker, 2011).

Beyond individual choice models, Tiebout (1956) introduces a framework assuming no moving costs and complete information, resulting in a free movement of consumers toward the community that best satisfies their preferences. Building on the concept of migration, Harris and Todaro (1970) propose a two-sector model of rural-urban migration, where the urban minimum wage exceeds rural earnings, and migration flows take place. This process will eventually lead to equilibrium, as migration continues until both wages are equal (Jia et al., 2023).

Expanding the discussion to spatial equilibrium Roback (1982) presents a model with homogeneous and perfectly mobile workers where indirect utility depends on nominal wages, housing costs and local amenities. The model assumes a fixed land supply, due to limited housing elasticity and implies that any shock to the local economy is fully capitalized in land prices, leaving the utility of the worker unaffected. For instance, a positive productivity shock raises nominal wages and demand for housing, workers will consume less housing due to higher prices, which then facilitates in-migration. Moreover, areas with greater amenities attract more migrants, which lowers wages and raises prices of local goods, services and land (Jia et al., 2023). To account for dynamic migration patterns, Coen-Pirani (2010) develops a general equilibrium model of gross and net migration across locations, considering the unobserved heterogeneity of individuals in migration decisions. Gross migration flows are driven by idiosyncratic match shocks, between workers and locations, and net migration flows due to persistent productivity shocks. Workers are drawn to locations experiencing positive productivity shocks and discover their idiosyncratic match upon migration (Jia et al., 2023).

Based on the work of Roback (1982); Beeson and Eberts (1989); Rappaport (2004); Faggian et al. (2012), Rodríguez-Pose and Ketterer (2012) present a simple locational choice spatial equilibrium model to analyse the attractiveness of different territories. In which net migration is modelled as being determined by firms' and households' reactions to differences in productivity and utility attributes across the territory

(Rodríguez-Pose and Ketterer, 2012). Firms and households are assumed to be mobile and their location preferences depend on profit and utility maximization across different places. Shaping the behaviour of firms, the net present returns between any region j and i are:

$$\frac{1}{(1+d)^t} \int_t^\infty \Pi_t^j \geq \frac{1}{(1+d)^t} \int_t^\infty \Pi_t^i. \quad (3)$$

Companies are expected to maximize current and expected profits (π) across different locations discounted by d . Profits depend on wages, rental costs of land and exogenous natural or socioeconomic features of each place. Firms are located in areas with higher profits (j) until the long run, where current and expected profits are equal across all possible locations. The location decision made by companies will shape the economic characteristics and attributes across the territory (Rodríguez-Pose and Ketterer, 2012).

On the other hand, the place-specific utility derived by each individual will depend on the consumption of goods, non-traded housing services and non-economic place-based natural or (man-made) cultural amenities, giving rise to net present utility (Rodríguez-Pose and Ketterer, 2012):

$$V^i = \frac{1}{(1+d)^t} \int_t^\infty V_t^i(G_t^i, D_t^i, Z_t^i), \quad (4)$$

G_t^i , D_t^i and Z_t^i represent the consumption of goods, housing and amenities respectively. A lifetime budget constraint (Equation 5) dictates the mover decision taking into account rental and housing prices p_t^i , average wages w_t^i and the probability of becoming employed in any given place e_t^i (Rodríguez-Pose and Ketterer, 2012).

$$\frac{1}{(1+d)^t} \int_t^\infty (G_t^i + p_t^i D_t^i) \leq \frac{1}{(1+d)^t} \int_t^\infty w_t^i e_t^i. \quad (5)$$

With the maximisation of Equation (5) under the budget constraint, the following indirect utility function is achieved, framing regional net migration as the structural outcome of a set of factors (Rodríguez-Pose and Ketterer, 2012):

$$U^n(p^n, Z^n, w^n, e^n, S^n, N^n), n : i, j. \quad (6)$$

The indirect utility is positively related to natural and sociocultural or general amenities Z^n , household income w^n , the probability of finding a job e^n , and although not considered in the empirical part of this work, the territory embedded socioeconomic regional features S^n , presence of migrant communities N^n and housing costs p^n (Rodríguez-Pose and Ketterer, 2012).

The migration decision will be triggered by the indirect utility difference between region i and region j ($\Delta U^{ji} = U^j - U^i$), and the possible psychological and pecuniary utility costs of moving C^{ij} . The individual moves from i to j if the utility differential between the two places minus the costs of moving

is higher than zero ($\Delta U^{ij} - C^{ij} > 0$), meaning that the benefits of moving to j outweigh the costs (Rodríguez-Pose and Ketterer, 2012). Hence, according to (Ferguson et al., 2007, p.82) people "vote with their feet", one can assess the attractiveness of a region by analysing the in and out-flows of economic agents (Rodríguez-Pose and Ketterer, 2012). The population stock in region i at time t_0 is expressed as:

$$P_{t_0}^i = P_{t_1}^i + M_{t_1}^{ij} - M_{t_1}^{ji} + d_{t_1}^i - b_{t_1}^i \quad (7)$$

in which $P_{t_1}^i$ stands for individuals who did not move between t_0 and t_1 , $M_{t_1}^{ij}$ the migrants moving away from region i to any region j , $M_{t_1}^{ji}$ migrants coming from any region j to region i , lastly $d_{t_1}^i$ and $b_{t_1}^i$ which are deaths and births respectively Rodríguez-Pose and Ketterer (2012). The population change in region i over the period t_0 and t_1 is (Rodríguez-Pose and Ketterer, 2012):

$$P_{t_1}^i - P_{t_0}^i = M_{t_1}^{ji} + b_{t_1}^i - M_{t_1}^{ij} - d_{t_1}^i \quad (8)$$

Rearranging and standardising equation 8 by the population stock at t_0 , an expression of the net migration rate of the region i is achieved, which indirectly depends on the utility differential across different places (Rodríguez-Pose and Ketterer, 2012).

$$Mig_{t_1}^i = \frac{M_{t_1}^{ji} - M_{t_1}^{ij}}{P_{t_0}^i} = \frac{(P_{t_1}^i - P_{t_0}^i - b_{t_1}^i + d_{t_1}^i)}{P_{t_0}^i}. \quad (9)$$

2.2 Tiebout Hypothesis

The main problem in determining the optimal supply of a public good is the mechanism by which consumer voters register their preferences. From the government's perspective, it must find the population's preferences and tax them accordingly. If this happens, public revenues and expenditures reflect consumer-voter preferences, but consumers can understate their preferences and free-ride (avoid tax).

Hence no local mechanism is put in place, to ensure the expenditure on public goods is at a proper level. If a resident is about to move to another jurisdiction, what variables will he consider relevant to conduct his move? It depends on his preferences, if he has children, certainly he is moving to a municipality with a considerable level of expenditure on schools. However, if he is retired, that would not be important as he would prefer expenditure on nursing homes and health services. Therefore, the supply and quality of infrastructure and services, parks, police stations, firefighter stations, roads, and parking lots, will enter an individual's decision (Tiebout, 1956).

Following the argument on local expenditures, Tiebout (1956) develops a Local Government Model, yielding a solution for the level of expenditures for public goods based on the following assumptions: (1)

consumer voters are fully mobile and will move to that community where their preference patterns, which are set, are best satisfied; (2) consumer voters are assumed to have full knowledge of differences among revenue and expenditure patterns and to react to these differences; (3) there is a large number of communities in which the consumer-voters may choose to live; (4) restrictions due to employment opportunities are not considered; (5) the public services supplied exhibit no external economies or diseconomies between communities; (6) for every pattern of community services set by a city manager, who follows the preferences of older residents of the community, there is an optimal community size (the number of residents for which the bundle of services can be produced at the lowest average cost); (7) communities below the optimum size seek to attract new residents to lower average costs, those above do the opposite, and those at the optimum try to keep their population constant.

Given the full mobility assumption and the remaining, flows take place between communities that are not at the optimal community size. Each city manager has a demand for n local public goods, $m - 1$ other city managers go into a national market and bid for adequate units of public service of each kind. The demand for each public good n will be the sum of the demand for all communities m . This demand will approximate the demand that represents the true preferences of consumer voters (as if they revealed their true preferences) (Tiebout, 1956).

However, the model is considered to fall short of the optimum, because if a given community is at the optimum population level, and some consumer-voter considers it the best preference fit, he/she cannot move there and must look for a perfect substitute. If that substitute isn't available, the optimal preference position is not reached, and ultimately the solution will approximate the optimum. Two additional points are highlighted; firstly, changes in the costs of one public service will cause changes in the quantity produced and secondly, the costs of moving between communities should be recognised. (Tiebout, 1956).

While some assumptions may not be realistic, Tiebout stated "The consumer-voter may be viewed as picking the community which best satisfies his preference pattern for public goods" (Tiebout, 1956, p. 418). Hence, Local governments being responsible for supplying public goods and services, and collecting the respective taxes, may be able to affect the consumer-voter community choice (migration flows).

2.3 Empirical Studies

Beyond the theoretical sphere, extensive empirical literature addresses migration, Table 1 presents a summary of empirical findings on migration flows and community selection, that make use of aggregate data analyses. While Table 2, household-level analyses. In general these studies consider the role of socioeconomic, local government and amenity variables.

Commonly used variables to represent job market opportunities include unemployment, employment rates, and distribution of employment across sectors. Economic opportunities, Gross Domestic Product (GDP) per capita, average wages, and the shares of highly educated population/workers, a skilled labour force, can help to attract businesses and companies to a given community, making it more attractive to potential migrants. Highly skilled workers can also contribute positively to a community through knowledge spillovers, which can increase the general productivity of a place Rodríguez-Pose and Ketterer (2012).

Amenities also play a significant role in shaping the attractiveness of places, contributing to their overall convenience, comfort, and enjoyment. Natural amenities such as maximum, minimum, and average temperatures, precipitation, cloudiness, coastal communities, and natural landscapes are frequently highlighted ((Graves, 1976, 1980; Rodríguez-Pose and Ketterer, 2012; Ketterer and Rodríguez-Pose, 2015)). Similarly, man-made amenities such as theatres, museums, housing and access to transportation (Sasser, 2010; Rodríguez-Pose and Ketterer, 2012; Dahlberg et al., 2012; Buch et al., 2014). Conversely, factors such as crime, traffic, low environmental quality, pollution, and high population density tend to decrease a region's desirability (Buch et al., 2014; Banzhaf and Walsh, 2008; Germani et al., 2021).

Local governments can also influence migration flows through public goods, services, and local taxes, as explored through the lens of community choice and migration. Most studies have employed discrete choice models using household data (Friedman, 1981; Quigley, 1985; Westerlund and Wyman, 1995; Bayoh et al., 2006; Dahlberg et al., 2012). However, results have been mixed: while Friedman (1981) and Bayoh et al. (2006) found that public services attract new residents (albeit with small effects in the former and large in the latter), Quigley (1985) reported a negative impact. These differences may stem from differences in household characteristics and estimation approaches (Dahlberg et al., 2012). Other studies have used aggregate data, primarily finding a link between local government services, expenditure, and net migration (Cebula, 2024; Cebula and Clark, 2013; Cebula and Nair-Reichert, 2012; Brueckner and Št'astná, 2020; Yu et al., 2019; Day, 1992).

Table 1: Empirical Studies on Migration (aggregate data)

Reference	Dependent Variable	Independent Variables (Sign)	Methodology	Sample
Cebula (2024)	gross in-migration rate	(-)unemployment,(-)cost of living,(-)population density,(+)median family income,(+)average January temperature,(+)tax freedom indices.	Panel 2SLS	State level USA [2010-2017]
Germani et al. (2021)	net migration rate	(-)unemployment,(+)income,(+)education,(+)air pollution,(+)value of real estate properties,(+)number of firms,(+)infrastructures.	OLS and 2SLS	Italy provincial-level data [2011-2015]
Brueckner and Št'astná (2020)	log difference between shares of population migrating and not migrating	(+)prior interregional commuting,(-)job seekers per job vacancy/college graduates per job vacancy,(+)high educated population,(+)Govt Spending on transportation,culture and sports,(-)Govt Spending on industry and housing support,(-)population density.	2SLS	Regional level Czech Republic [2011-2015]

Continued on the next page

(Table 1 – Continued.)

Reference	Dependent Variable	Independent Variables (Sign)	Methodology	Sample
Yu et al. (2019)	net migration rate	(+)GDPpc, (-)unemployment, (+)education, (+)buses, (+)temperature, (-)humidity.	Bootstrap linear regression	Chinese city-level data [2010]
Barreira et al. (2017)	% population change between censuses	(-)unemployment, (+)employment share (secondary and tertiary sector), (+)average maximum temperatures, (+)higher proportion of middle-aged vacant houses.	Random Effects	Portuguese city-level [1991-2011]
Ketterer and Rodríguez-Pose (2015)	net migration rate	(-)unemployment, (-)agricultural share, (+)quality of government.	Fixed effects and GMM	EU NUTS-2 regions [1995-2009]
Buch et al. (2014)	net migration rate (of workers)	(+)employment growth, (-)tourist stays, (-)crime rate, (+)recreation areas, (+)average flat size.	Pooled OLS and Fixed Effects	German cities [2000-2007]

Continued on the next page

(Table 1 – Continued.)

Reference	Dependent Variable	Independent Variables (Sign)	Methodology	Sample
Cebula and Clark (2013)	net migration rate	(+)employment growth,(+)median family income,(-)cost of living,(+)mean january temperature,(-)population density,(-)state personal income tax,(-)property tax,(+) per pupil education expenditure,(+)medicaid expenditure per recipient.	2SLS	State level USA [2000 and 2008]
Cebula and Nair-Reichert (2012)	net migration	(-)unemployment,(-)cost of living,(+)median family income,(+)employment growth,(-)state income and local property tax,(+)per pupil education expenditure.	OLS and 2SLS	State level USA [july2000-july2008]
Rodríguez-Pose and Ketterer (2012)	net migration rate	(+)GDPpc,(-)unemployment,(-)share of young,(+)social filter index ¹ ,(+)recreation and tourism,(+)January temperatures.	Fixed effects, IV and GMM	EU Regions [1990-2006]

Continued on the next page

¹ accounts for territory innovation enhancing features, built using regional educational attainments and the composition of productive resources

(Table 1 – Continued.)

Reference	Dependent Variable	Independent Variables (Sign)	Methodology	Sample
Sasser (2010)	log out-migration rate	(+)unemployment insurance claims,(-)per capita income,(-)housing affordability index.	logistic regression	State level USA [1977-2006]
Day (1992)	log odds of migration rates to province j relative to k	(+)wages,(-)unemployment rate,(+)per capita health spending, (+)per capita education spending.	Generalized Least Squares	Canada Province level [1962-1981]

Table 2: Empirical Studies on Migration (micro data)

Reference	Dependent Variable	Independent Variables (Sign)	Methodology	Sample
Su et al. (2019)	probability of choosing city i	(-)unemployment,(+)per capita GDP,(+)population,(-)temperature variation,(-)rainfall.	Conditional logit	2005 China Census and 2014 China Migrants Dynamic Survey
Dahlberg et al. (2012)	probability of choosing municipality i	(-)unemployment,(+)childcare expenditure,(+)other purposes expenditure,(+)housing vacancies,(-)income tax.	Conditional and mixed logit	Longitudinal Individual Data for Sweden
Finnie (2004)	probability of changing province of residence	(+)provincial unemployment insurance,(-)age.	Panel logit	Tax based longitudinal data [1982-1995]
Davies et al. (2001)	probability of moving from state i to state j	(+)state per capita income,(-)unemployment,(+)population (Destination to origin ratios).	Conditional logit	Area to Area migration flow data State level USA [1986-1987 to 1996-1997]

Continued on the next page

(Table 2 – Continued.)

Reference	Dependent Variable	Independent Variables (Sign)	Methodology	Sample
Westerlund and Wyzan (1995)	staying(reference alternative), moving to another municipality within the county, and moving to another county	(+)unemployment (short distance moves and among metropolitan and non metropolitan areas),(+) local tax rate, (+) housing prices (short distance moves among metropolitan areas), (-)local tax base and (-)tax equalization grants (short distance moves among non metropolitan areas).	Multinomial logit	Swedish households [1981-1984]

3 The Portuguese Case

This part of the work introduces the specific features of the Portuguese territory. Firstly, a short description of the institutional setting of Portuguese municipalities. Secondly an analysis of the socioeconomic context of mainland municipalities from 2001 to 2021. Thirdly, a exemplification of measures applied by municipalities in order to attract citizens and families. And lastly, the case of the municipality of São João da Pesqueira.

3.1 Institutional Framework

Portugal is composed of the mainland and two island groups, that form the Autonomous Regions of the Azores and Madeira. While the Portuguese constitution allows for the establishment of administrative regions on the mainland, their implementation is contingent on approval by a majority of citizens in a referendum. The country is divided into 308 municipalities: 278 on the mainland and 30 in the island regions. At a more local level, Portugal comprises 3,091 parishes—2,882 on the mainland and 209 in the islands.

Municipalities manage their assets and finances through local taxes and other revenues. Some tax rates are set locally, the Municipal Property Tax (IMI) is set before each year by municipalities (currently, between 0.3 and 0.45 % for urban property and 0.8% for a rustic property), the Personal Income Tax (IRS) is between 0 and 5 %, the municipal surcharge on Corporate Income Tax (IRC) chosen by each municipality to levy on taxable profit up to a maximum of 1.5%. The remaining taxes received by municipalities are already set, the Municipal Property Transfer Tax (IMT) for urban property 6.5% (not housing) and rural property 5%, for housing the rate is progressive, depending on the value of the property. Lastly Single Circulation Tax (IUC) which is a tax levied on vehicles.

Beyond local taxes, a considerable portion of revenue comes in the form of grants either from the central government or the European Union. The Financial Equilibrium Fund is the amount each municipality receives from the state budget, which aims to correct socio-economic asymmetries amongst the territory and correct financial distortions resulting from municipalities' different fiscal potential. These grants come

from the Financial Equilibrium Fund and the Municipal Cohesion Fund. The Financial Equilibrium Fund aims to provide municipalities with adequate financial conditions to carry out their duties and the Municipal Cohesion Fund intent is to strengthen municipal cohesion encouraging the correction of asymmetries, to the benefit of less developed municipalities facing inequality concerning national averages. Beyond the formula-determined transfers, municipalities can also receive non-formula grants, which result from negotiation and bargaining, between mayors and the central government towards a given issue.

Ultimately Municipalities are the local presence of the government, closely listening to citizens' needs and worries, and acting accordingly. But in what fields do municipalities act in a decentralized manner? There have been some developments towards the decentralization process of Portugal which translates into a transfer of duties and functions from the central to local governments.

Table 3: Decentralized functions of the state.

Decentralized Functions
Public Security
Municipal Police (optional)
Education
Construction and Maintenance of pre-school and basic school buildings
Non-teaching staff
Social action for schools
School transport
Curricular enriching activities
Health
Planning of the health centre network
Housing
Provide land for social housing
Affordable housing programs and urban renovation
Social Action and Security
Cooperation with solidarity institutions
Partnership with the central government in projects of municipal social action, regarding poverty and social exclusion
Cultural and Recreational Services
Construction of sports and recreational facilities, culture, science

centres, libraries, museums;
Cultural, scenic and urban heritage

Industry and Energy

Low-voltage electricity distribution
Urban and rural public lighting

Transports and communications

Viaducts, roads and complementary work
Municipal road network

Water, sanitation and waste

Water supply
Solid waste treatment
Sewage systems

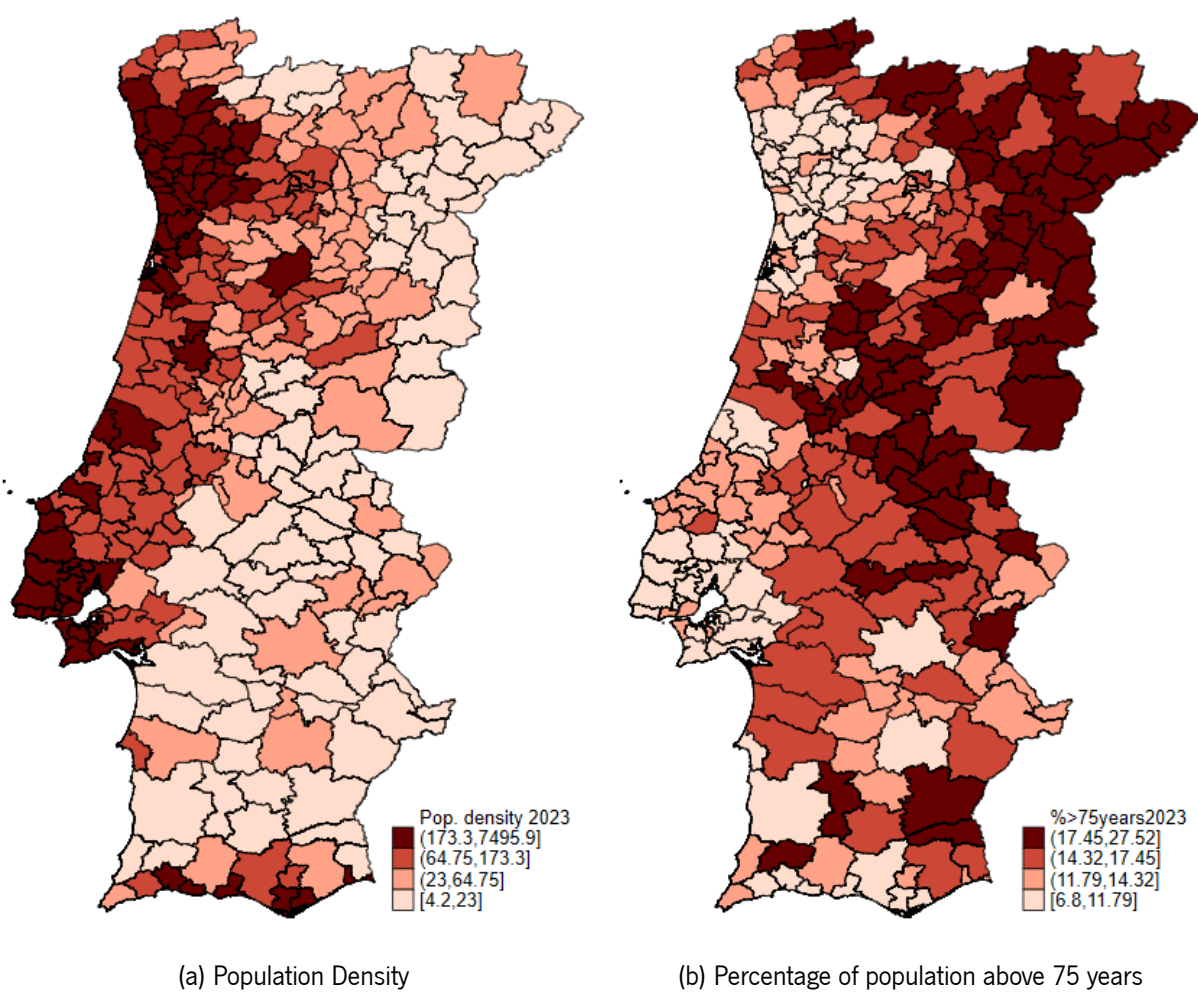
Source: Pereira et al. (2012)

In addition to those listed in Table 3, with Law no.50/2018 additional powers in the fields of Education, Social Action, Health, Civil Protection, Culture, Heritage, Housing, Territory management, Natural Resources and Transportation were transferred to municipalities, in order to promote subsidiarity, administrative decentralization and municipal autonomy.

3.2 General socio-economic context

The Portuguese territory has been facing the process of "coastalisation", due to the persistent movements of the population away from the interior towards coastal municipalities. For several decades this phenomenon has been given much attention, and nowadays it is a central feature of territorial cohesion policy. The population distribution pattern not only is asymmetric but also the Portuguese population mostly lives in a vertical stripe that starts in Viana do Castelo and finishes around Setúbal and Sesimbra, leaving 2/3 of the remaining territory vaguely populated (Figure 1a) (Unidade de Missão para a Valorização do Interior, República Portuguesa, 2017). This asymmetry is a danger for the abandonment of rural municipalities, leading to a generational crisis and the ageing of the interior and rural regions. As Figure 1b shows, the municipalities with the highest shares of population above 75 years old, are the less densely populated.

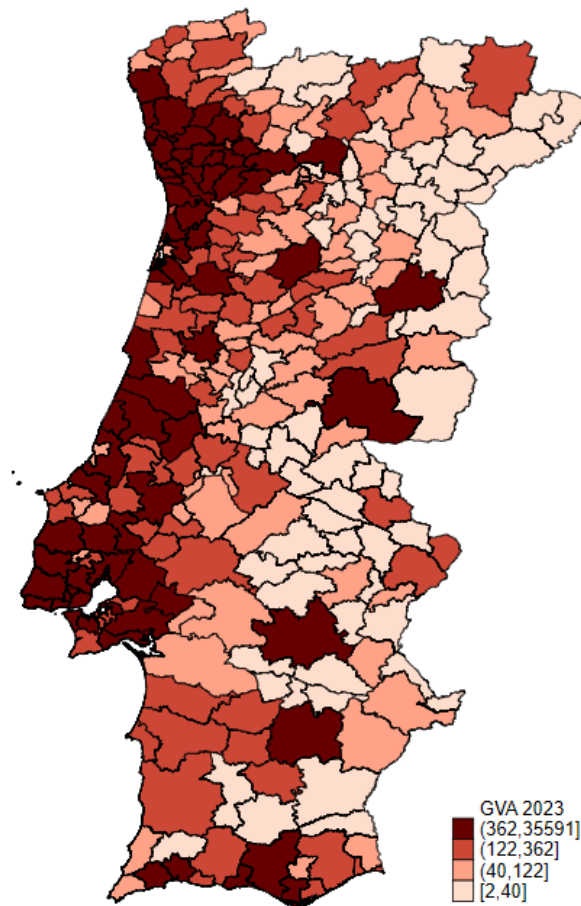
Figure 1: Population Density and Percentage of Population Above 75 Years



Data source: National Institute of Statistics (INE)

Beyond the phenomenon of population ageing, the decline in economic activity is also becoming increasingly prevalent, evidenced by a reduction in employment opportunities and business presence, diminished investment levels, a stagnation in innovation, ageing infrastructure, shortage of human capital, and low productivity. These factors reflect a broader inability of these regions to generate value added (Figure 2) and to remain competitive both nationally and globally (Unidade de Missão para a Valorização do Interior, República Portuguesa, 2017).

Figure 2: Gross Value Added (millions of euros) 2023



Data source: INE

All these asymmetries led to substantial variations in the distribution of population. Figure 3a is proof that citizens have been moving towards urbanised areas, mostly across the coastline. In relative terms the municipalities of Mafra, Montijo, Moita and Albufeira have had a significant population growth. While Arruda dos Vinhos, Benavente, Palmela, Sesimbra, Cascais, Lagos, Portimão and Loulé exhibit more moderate population growth, characterized by lower growth rates.

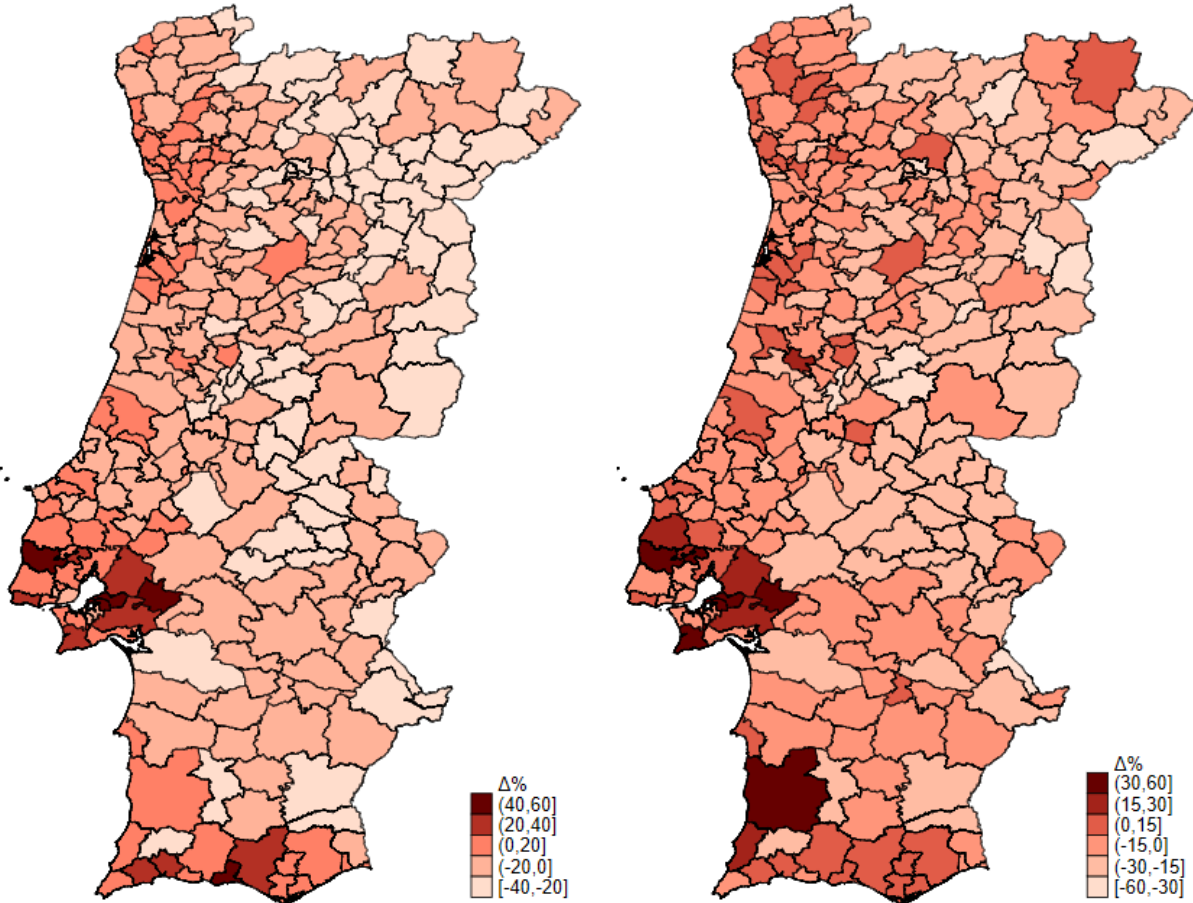
On the other hand, rural regions either closer to the coastline or in the hinterland, have been expe-

riencing sharp and significant population decreases, some exceptions include the interior district capital cities, which experienced slight growth, reflected in small positive growth rates.

Figure 3: Population and employment variation at the municipal level

(a) Municipal population variation 2001-2021

(b) Municipal employment variation 2001-2021



Data source: INE

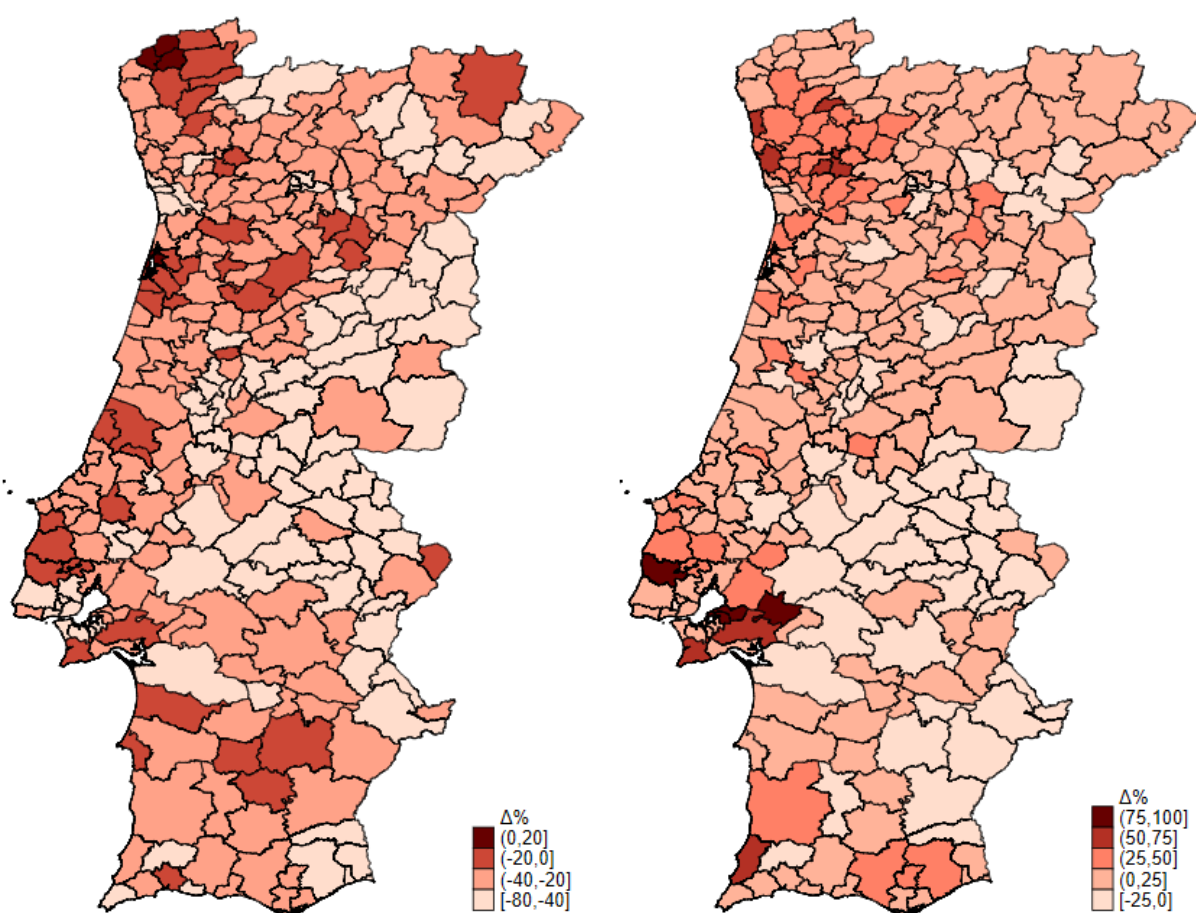
From 2001 to 2021 (Figure 3b), the variation in municipal employment aligns with what was expected. Urban municipalities located along the coastline exhibited a greater percentage change in employment. The most pronounced positive growth rates were observed in the municipalities of Torres Vedras, Mafra, Arruda dos vinhos, Sobral de Monte Agraço, Sesimbra, Alcochete benavente, Montijo, Palmela, Odemira and Aljezur.

An analysis of employment variation across economic activity sectors between 2001 and 2021 reveals a significant shift in job opportunities, moving away from the primary and secondary sectors toward a predominance in the tertiary sector (Figure4 and A.1). Primary sector employment grew significantly in relative terms in the municipality of Odemira, with more moderate increases observed in Lousã and

Sardoal. In contrast, the vast majority of the remaining municipalities experienced a decline in primary sector employment. While employment growth in the secondary sector was negative in the majority of municipalities. Tertiary sector employment growth was positive across most of the territory. However, several municipalities in Alto and Baixo Alentejo registered declines in this sector. Unsurprisingly, these sub-regions also experienced population decreases, as illustrated in figure 3a.

Figure 4: Secondary and tertiary sector employment variation at the municipal level

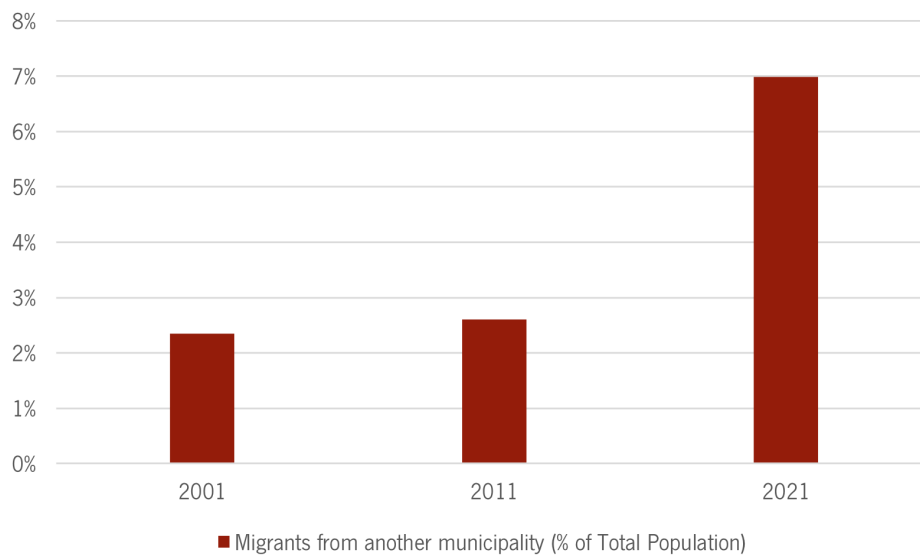
(a) Municipal secondary sector employment variation 2001-2021 (b) Municipal tertiary sector employment variation 2001-2021



Data source: INE

Overall, economic activity experienced significant growth and expansion in the coastal and surrounding municipalities of the districts of Braga, Porto, Lisbon, Setúbal and Faro (figures 2,3b and 4). This development contributed to the increased attractiveness of these regions, leading to a concentration of population, human capital, and higher wages.

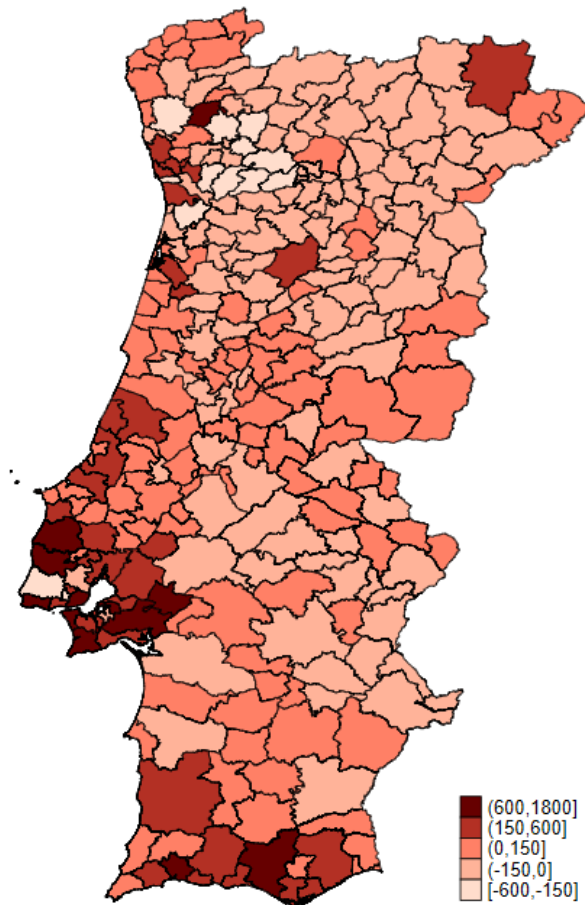
Figure 5: Percentage of population from another municipality.



Data source: Sales Index

Regarding migration flows, the movement of population between municipalities is illustrated in 5. In 2001, just over two percent of the population migrated between municipalities, with this percentage showing a slight increase by 2011. Furthermore, in the most recent census, the registered percentage of citizens from another municipality reached nearly seven percent. One can conclude that inter-municipal relocation increased over the period from 2001 to 2021; however, this dynamic was not uniform, as several municipalities did not register net positive migration flows. Those belonging to the districts of Leiria, Lisbon, Setúbal and Faro were, in general, more attractive exhibiting positive average net migration. Similarly, municipalities surrounding Porto—such as Vila do Conde, Matosinhos, Maia, and Vila Nova de Gaia—as well as Aveiro, Oliveira do Bairro, and the district capitals municipalities Braga, Viseu, and Bragança also recorded positive average net migration.

Figure 6: Average net migration [2001-2021]



Data source: INE

3.3 Local government policy action to attract population

Municipalities facing population decline and economic stagnation have not remained passive. In response to these challenges, many have adopted measures aimed at attracting both new residents and businesses to their territories.

One of the simplest instruments at their disposal is the setting of local tax rates. Adjustments to the Personal Income Tax and Local Property Tax rates can serve as incentives for individuals.

In 2024, according to Associação Portuguesa de Famílias Numerosas (2025) 274 municipalities adopted a special Local Property Tax regime targeting families. This measure allows for a reduction in the tax amount based on the number of dependents: 30 euros for one dependent, 70 euros for two, and 140 euros for three.¹

¹ <https://www.apfn.com.pt/IMI2025.php>

Further incentives are specifically directed at younger populations. For instance, in Arcos de Valdevez, young individuals purchasing a property intended solely as their permanent residence are granted exemptions from both the Local Property Tax and the Property Transfer Tax. The Local Property Tax exemption is valid for an initial period of three years and may be renewed for an additional two years.²

Some municipalities provide birth and adoption allowances, often conditional on the funds being spent within the local economy. Notable examples include Chaves, Alcobaça, Montemor-o-Velho and São João da Pesqueira, which have implemented these incentives as part of broader strategies to promote demographic sustainability.³

In the field of education, municipalities are offering a range of supports: annual school vouchers redeemable in the local economy, free or subsidized school transport and scholarships for students in public higher education, as well as merit-based awards for top-performing 12th grade students.⁴

In addition to attracting new residents, fostering local economic development through business activity and investment has become a strategic priority. However, the structural characteristics of many interior Portuguese regions may pose significant challenges to private sector investment.

To address these challenges, municipalities have implemented a range of incentives aimed at attracting business investment. These include reductions or exemptions in the local corporate income tax surcharge, often determined by factors such as business volume, economic activity sector, company size and jobs. As well as local property tax minimum rates, reduction or exemption. Additional support measures include the provision of infrastructures and industrial lots, microcredit programs for entrepreneurs, and the simplification of bureaucratic processes.⁵

3.3.1 Municipality of São João da Pesqueira

São João da Pesqueira is located in the interior of Portugal, in the northern part of the Viseu district, within the Douro Demarcated Region. Like many other interior municipalities, it has faced a consistent population decline over the past two decades.

The selection of São João da Pesqueira is driven not only by personal affiliations but also by its historical and cultural significance. Recognized as the oldest municipality in Portugal, it is situated within

² <https://www.cmav.pt/pages/2604>

³ <https://www.chaves.pt/pages/966> <https://portaldomunicipio-cm-alcobaca.pt/50697/incentivo-a-natalidade>
<https://www.sjpesqueira.pt/p/apoioanatalidadeeadocao> <https://www.cm-montemorvelho.pt/index.php/incentivo-a-natalidade>

⁴ <https://www.sjpesqueira.pt/servicos/educacao> <https://www.cm-carracedadeansiaes.pt/servicos/educacao/bolsas-de-estudo> <https://cm-feira.pt/-/ano-letivo-2024-2025-vale-oferta-de-material-escolar>

⁵ <https://www.sjpesqueira.pt/noticia-17/informacao-apoios-incentivos> <https://www.cm-nelas.pt/investir/apoios/incentivos-do-municipio/> <https://cm-proencanova.pt/1030/incentivos-ao-investimento>

the culturally rich Douro wine region, which is presently experiencing a period of notable socioeconomic adversity. Similar to other interior municipalities, it is undergoing sustained demographic and economic decline, driven in part by its geographic isolation from major economic hubs and exacerbated by limited accessibility, due to underdeveloped road infrastructure and challenging topography. Nevertheless, tourism has been experiencing growth, as in other regions of Portugal. While it may offer an opportunity to counteract out-migration by creating employment, it remains uncertain whether it can ensure long-term demographic stability.

São João da Pesqueira recorder negative net migration rates from 1991 to 2019. However, from 2019 onwards, this trend reversed, with the municipality registering positive, albeit modest, net migration rates (Figure 7). Despite this shift, the overall population trend remained negative: the population declined from 9581 in 1991 to 6772 in 2023. This decline is primarily driven by persistent negative demographic change, with deaths consistently outnumbering births, and by the long-term effects of outward migration.

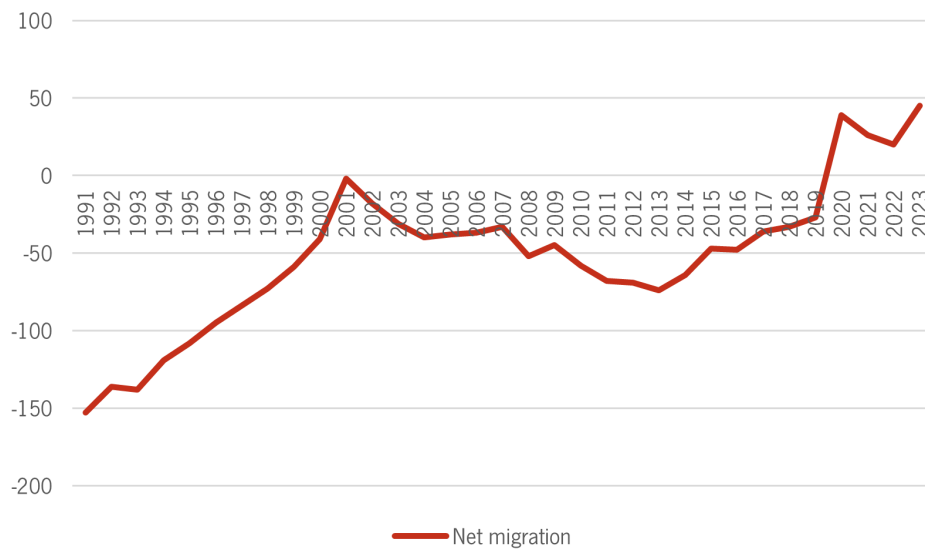
A breakdown of the population by age groups provides a more nuanced understanding of demographic dynamics. Between 1991 and 2023 the number of residents aged 65 and over increased steadily, while younger age groups, 14 years old and under experienced a sharp decline, reflecting a sustained drop in birth rates. The working-age population (25-64) remained relatively stable at around 4000 until 2011. However, from 2012 onwards, a downward trend emerged, likely associated with the effects of the sovereign debt crisis, stabilizing at approximately 3500 by 2019.

The municipality experienced a significant decrease in its youngest age groups, driven by outmigration and persistently low birth rates. Meanwhile, those who remained have contributed to the growth of the older population segment. In 1991, the two youngest age groups accounted for 40% of the total population; by 2023 their share had fallen to 20%. Conversely, the proportion of the oldest age group increased from 16% in 1991 to 29% in 2023. This demographic shift puts at risk the municipality's capacity to replenish its population, further exacerbating the overall decline.

Economically, the municipality has traditionally relied on primary sector activities, particularly wine and olive oil production. However, employment in this sector has declined, reflecting the impact of mechanization. At the same time, employment in the tertiary sector has grown modestly, likely due to the growth of tourism and agricultural support industries, this growth has not been enough to compensate the job losses in the primary sector since 2001. Employment in the secondary sector has also experienced a slight decline over the same period.

Over the last three decades, agricultural activities have faced increasing competition at both the global and European Union levels. Small family-owned businesses struggled to remain competitive and ultimately

Figure 7: Net migration (São João da Pesqueira)



Data source: INE

exited the market, contributing to the employment decline in the primary sector, as shown in Figure 9. This may have also been the case for other municipalities heavily reliant on agriculture, particularly in the context of globalization and market liberalization.

On March 21st, a semi-structured interview was conducted via email with the current mayor of São João da Pesqueira, Manuel Natário Cordeiro. The interview was focused on the municipality's strategies to stimulate economic activity and attract new residents.

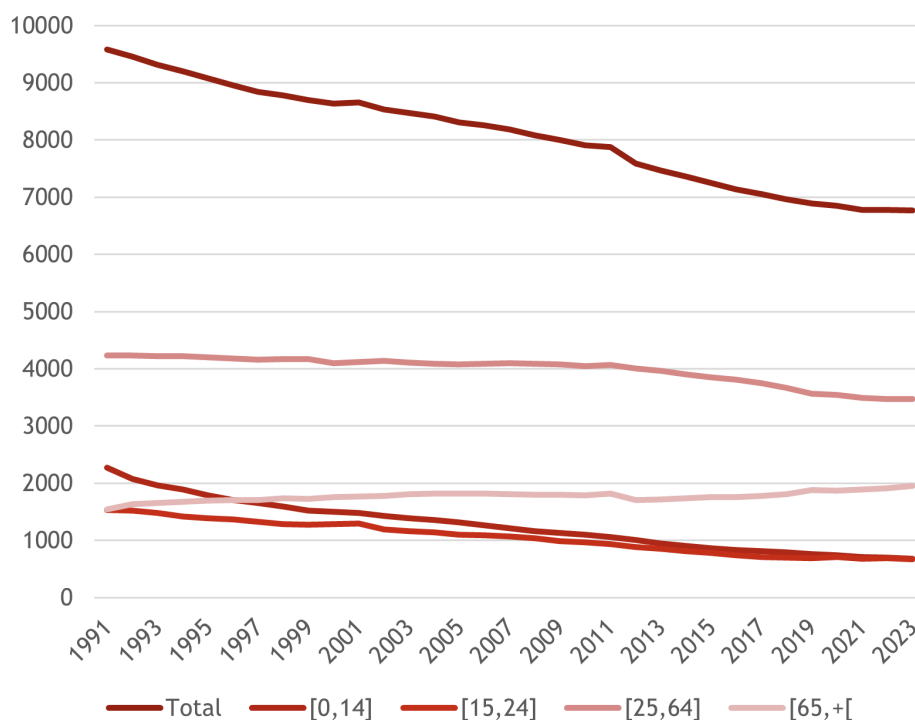
1. Has the transfer of new powers to the municipality under Law 50/2018 been favourable? Has it provided the municipality with new tools to attract population?

The mayor responded that Law 50/2018 has contributed to a greater proximity and interest in local development. He emphasized that, in the area of Education, although the municipality spends more than it receives from the central government, this commitment to education will eventually pay off. The areas of Health and Social Action have also benefited, with municipalities better positioned to improve and expand their services

2. Given the challenges posed by population decline in the interior of Portugal, what initiatives has the municipality promoted to retain young people and attract families? Have these initiatives been successful?

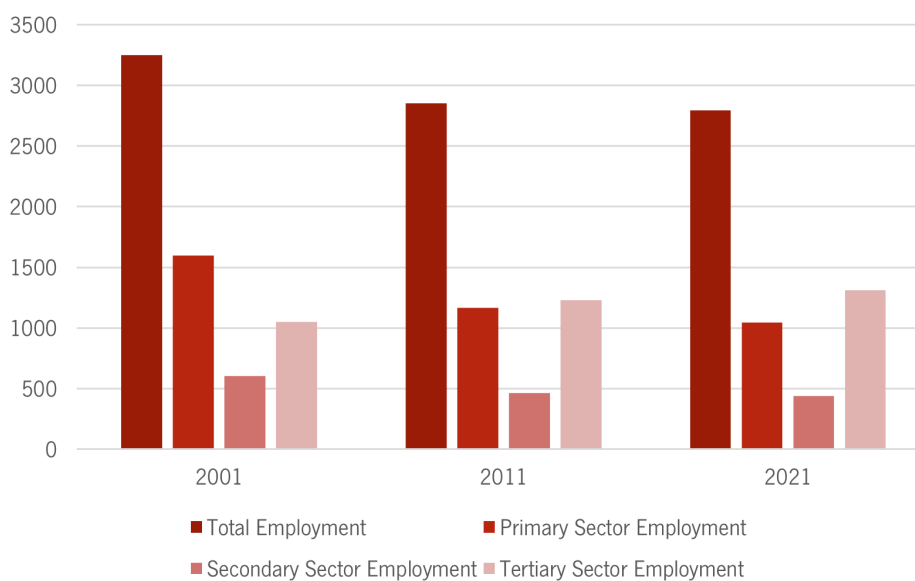
The mayor emphasized that the municipality is committed to creating conditions that ensure the

Figure 8: Population by age groups (São João da Pesqueira)



Data source: INE

Figure 9: Employment by sector (São João da Pesqueira)



Data source: INE

well-being of families and young people, particularly in the areas of culture and sports, by providing activities, infrastructure, as well as financial support for cultural and sport associations. He highlighted the FAME program⁶, which provides non-refundable subsidies, provided that jobs are created, to support the establishment of businesses (including one-person businesses). Additional measures include the support for doctors to ensure that family doctors are available for all residents. He also added that the municipality offers birth incentives through the provision of subsidies.

3. Population ageing is a common issue in many inland municipalities. How is the municipality addressing social and health needs of the elderly?

The mayor acknowledged that São João da Pesqueira faces the same demographic challenge, emphasizing that a level of commitment never seen before is being directed toward this issue. Initiatives include housing rehabilitation support, medicine support and the employment of 5 doctors to ensure adequate healthcare coverage. Social initiatives include the Social Radar (which operates in all villages and identifies vulnerable individuals), the Vulnerable Groups Project, the Inclusion Desk and the Local Social Development Contracts, all with a strong focus on the social inclusion and well-being of the elderly.

4. What are the main challenges currently facing the municipality in terms of infrastructure, housing and services?

The mayor identified road infrastructure as the primary challenge, specifically the urgent need for the rehabilitation of Estrada Nacional 222 (Pesqueira-Bateiras), which is currently out to tender, with work expected to begin this year. Regarding housing, the municipality plans to begin the construction of new houses as part of its local housing strategy. In terms of services, the mayor believes that the current offer has been adequate.

5. How does the wine sector, combined with tourism, create job opportunities and contribute to population settlement?

While recognizing the potential of the wine sector to contribute to local development, the mayor expressed concern regarding the current challenges faced by winegrowers. Due to global decline in wine consumption and high levels of wine stock, small and medium sized wine growers are struggling to sell their production at fair prices. The situation is exacerbated by foreign wine imports, which could lead to the abandonment of vineyards and youth out-migration. The mayor stressed the urgent need for a sectoral reform.

⁶ <https://www.sjpesqueira.pt/pages/1031>

6. What key initiatives has the municipality implemented to create job opportunities and attract investment that will enable qualified professionals to settle?

The mayor stated that a major focus has been on attracting doctors to ensure family doctors and health services are adequate. He also acknowledged the difficulty of attracting a younger qualified segment of population. Importantly, he emphasized that this should not be solely a local government initiative, but also an initiative of the private sector, provided that the municipality creates favourable conditions.

4 Data and Descriptive Statistics

4.1 Data and Descriptive Statistics

The work is based on a panel data set built for 308 Portuguese municipalities, covering the period from 2007 to 2023. Although the data set covers all municipalities, several factors led to the drop of the 30 municipalities belonging to the autonomous regions. Firstly, these municipalities are naturally limited in terms of migration, citizens living in the archipelagos inherently face higher moving costs if deciding to migrate to municipalities outside the islands, second, municipalities are subject to the regional government which does not exist in the mainland, and last, the scarcity of data. After these exclusions, the final data set only includes the 278 mainland municipalities.

The dependent variable for the main regressions is the net migration rate *nmr*, which is the difference between the inflows and outflows of residents towards a given municipality in percentage of total municipal population. Furthermore several independent variables are included to capture the municipality's characteristics, the socioeconomic situation, amenities, and local government's policy choices.

The following socioeconomic variables were considered in the analysis as explanatory variables:

- average monthly salary (private companies) at 2022 price (*avgsalary*);
- beneficiaries of social integration income in % of total population used as a proxy for the poverty level (*SIIbenef*);
- unemployment insurance beneficiaries used as a proxy for unemployment rate in % of those between 15 and 64 years old (*UIbenef*);
- workers with higher education in % of population between 15 and 64 years (*HEworkers*);
- median value of houses at 2022 prices (*mvhousing*).

Apart from economic factors, the local government can also be a relevant element either through setting local tax rates, expenditure items, debt and services:

- Participation in personal income tax rate (*pPIT*);
- Local property tax rate (*LPT*);
- Total municipal expenditure per capita at 2022 prices (*TotExp*);
- Total municipal debt in per capita at 2022 prices (*DebtMun*);
- Municipal expenditure in culture per capita at 2022 prices(*CultExp*);
- Municipal expenditure in environment protection: per capita at 2022 prices(*EnvExp*).

Amenities or quality of life factors, have also been found to be influential when it comes to the appeal of a place:

- number of hotel guests in percentage of total population serving as a proxy for the quality of life in the municipality (*hotelguests*);
- crime rate captures the effect of crime activity (*tcrim*).

Table 4 presents the descriptive statistics for all the variables used in the empirical framework, and 5 describes the source of each variable.

Table 4: Descriptive Statistics (mainland municipalities)

Variable	Obs	Mean	Std. dev.	Min	Max
nmr	4726	.242	.882	-2.224	5.152
avgsalary	4448	1040.82	190.089	707.864	2581.458
CultExp	4170	.126	.099	.005	1.003
DebtMun	2194	.759	.831	0	8.723
EnvExp	4448	.075	.061	0	2.339
Heworkers	4165	3.602	3.308	0	48.377
hotelguests	3763	168.921	309.305	0	3940.806
LPT	4170	.345	.056	.2	.5
mvhousing	1413	.944	.364	.516	3.495
pPIT	3731	4.086	1.485	0	5
SIlbenef	4726	3.044	2.09	.276	17.629
tcrim	4170	29.425	11.004	6.9	152.41
TotExp	3333	1.291	.65	.361	7.89
UIbenef	4726	6.744	2.548	1.441	23.678

Table 5: Data description and source

Label	Description	Source
nmr	Net flows of citizens of the municipality in percentage of total population	Instituto Nacional de Estatística (INE)
avgsalary	Average monthly salary at 2022 prices	INE
CultExp	Culture municipal expenditure (thousands) per capita at 2022 prices	Sales Index
DebtMun	Municipal debt (thousands) per capita at 2022 prices	Sales Index
EnvExp	Environment protection municipal expenditure (thousands) per capita at 2022 prices	Sales Index
HEworkers	Workers with superior education in percentage of total population	Sales Index
hotelguests	Guests of hotel facilities in percentage of total population	Sales Index
LPT	Local property tax	Autoridade Tributária
mvhousing	Median value of housing (thousands) at 2022 prices <i>euro/m²</i>	Sales Index
pPIT	Personal income tax municipal participation	Autoridade Tributária
siibenef	Beneficiaries of social integration income in percentage of total population	Sales Index
tcrim	Crime rate	Sales Index
TotExp	Total municipal expenditure (thousands) per capita at 2022 prices	Sales Index
uibenef	Beneficiaries of unemployment insurance in percentage of population between 15 and 64 years	Sales Index

5 Empirical Framework

5.1 Estimation Strategy

The estimation strategy consists of a panel data econometric analysis. A panel data set is characterised by repeated observations of the same units (Portuguese mainland municipalities) across time. Several advantages can be exploited when using panel data, one is avoiding/overcoming the bias caused by unobserved heterogeneity.

$$Y_{it} = \beta_0 + \sum_{j=1}^k \beta_j X_{jit} + \epsilon_{it} \quad (10)$$

This equation represents a panel data econometric model in which explanatory variables are contained in the vector X_{jit} for municipality i , year t , and j for each variable. The coefficient β measures the effect of each variable on the dependent variable (Y), and the disturbance term ϵ_{it} . However, if X_{jit} variables are not successful enough in explaining Y there may be unobserved effects, usually added to the model as α_i . To tackle unobserved effects, two methods can be used, Fixed Effects or Random Effects each method handles the unobserved effect differently.

The fixed effects model allows for a correlation between α_i and independent variables to exist, it can be applied using several methods. One of which is the Least Squares Dummy variable (LSDV) method. This assumes that the unobserved effect α_i is a parameter to be estimated for each i , incorporating each individual unobserved effect into the model, by including a dummy variable for each i , to avoid the dummy variable trap the constant is dropped. Other methods, such as the First Differences or Within Groups are also used, the latter being the chosen fixed effects method by stata.

On the other hand, the random effects model treats the unobserved effect α_i as being a random variable, relying firstly on the condition that unobserved variables are drawn from a given distribution. Allowing α_i to be included in a compound disturbance term $u_{it} = \alpha_i + \epsilon_{it}$. And the second condition is that α_i must be uncorrelated with observed variables X_{jit} .

To choose between random effects and fixed effects the Hausman test is used. If the null hypothesis

is rejected the key assumption of the random effects is violated (α_i must be uncorrelated with observed variables X_{jit}) and fixed effects is the appropriate specification. If we fail to reject the null hypothesis, random and fixed effects are valid, but fixed effects will be inefficient.

5.2 Baseline model

The baseline empirical model for net migration is presented in the following equation:

$$nmr_{it} = \alpha \mathbf{socioeconomic}_{it-1} + \beta \mathbf{localgovernment}_{it-1} + \gamma \mathbf{amenity}_{it-1} + \mu_i + \nu_t + \varepsilon_{it} \quad (11)$$

$$i = 1, \dots, 278; \quad t = 2006, \dots, 2023^1$$

where nmr_{it} is the net migration rate for municipality i in year t . Independent variables are distributed among three vectors for notation purposes and lagged one period due to endogeneity issues (Rodríguez-Pose and Ketterer, 2012). Being the *socioeconomic* and *local government* vectors of most interest, and *amenity* as controls. The first vector including socioeconomic variables ($\mathbf{economic}_{i,t-1}$), is composed of five independent variables, to account for the socioeconomic conditions of each municipality:

1. *avgsalary*: Average salary in each municipality, at 2022 prices;
2. *Ulbenef*: Unemployment insurance beneficiaries to capture the local labour market impact;
3. *Sllbenef*: The beneficiaries of social integration income, to measure the poverty level of municipalities;
4. *HEworkers*: Percentage of workers with higher education, as these may contribute positively to the community;
5. *mvhousing*: Median value of housing at 2022 prices.

The second vector ($\mathbf{localgovernment}_{i,t-1}$) includes expenditure, debt and local taxes, that are within the reach of the municipality's executive:

1. *LPT*: Local property tax;
2. *pPIT*: Local personal income tax participation;
3. *TotalExp*: Logged per capita total expenditure at 2022 prices;

¹ The period covered changes across specifications.

4. *DebtMun*: Logged per capita debt, at 2022 prices;
5. *EnvExp*: Logged per capita expenditure in environment protection, at 2022 prices;
6. *CultExp*: Logged per capita expenditure in culture, at 2022 prices.

The third vector (**amenity**_{*i,t-1*}), measures the appeal of municipalities from a non-pecuniary perspective, amenities which contribute to convenience and quality of life.

1. *hotelguests*: Places with more tourism activity may be more pleasant and appealing, while on the contrary they can contribute to decreasing housing supply, this variable measures the number of hotel guests in the percentage of the total population;
2. *tcrim*: Places with a higher level of crime activity may be less attractive.

Finally, μ_i and ν_t account for municipal fixed effects and time fixed effects, and ϵ_{it} the error term.

The average salary *avgsalary*, local property tax *LPT*, expenditure on environment protection *EnvExp* and culture *CultExp*, crime rate *tcrim* and median value of housing *mvhousing* turned out to have high VIF values, indicating the presence of multicollinearity. To address it, the decision was to drop these variables, and the logged average salary was replaced by annual average salary growth. The initial baseline model is estimated lagging independent variables by one year, additionally alternative models are estimated lagging independent variables by two and three years. To capture longer term effects, additional models are estimated with variables computed in five, four and three year period averages.

Before proceeding to discuss empirical results, a analysis regarding the Hausman test was performed, both the baseline and period models presented a p-value lower than 0.05, leading to the rejection of the null hypothesis and indicating that fixed effects are the appropriate specification.

6 Empirical Results

6.1 Baseline model

The results of the baseline model are present in Table 6. As expected, wage growth exhibits a positive coefficient but never achieving statistical significance. Local labour market conditions, specially the percentage of unemployment insurance beneficiaries, has a negative and significant impact on the dependent variable in most model specifications, in the fourth column a one percentage point increase in unemployment insurance beneficiaries is associated with a 0.0408 percentage point decrease of the net migration rate. The percentage of employed individuals with high education for the last three columns has the expected positive sign and a negative sign for the first column, never reaching statistical significance. Similarly, the percentage of beneficiaries of social integration income generally displays the expected negative sign across most specifications but fails to attain statistical significance. The percentage of hotel guests exhibits mixed results, with no statistical significance. Regarding local government variables, neither the personal income tax nor debt, both of which exhibit positive coefficients, demonstrate a significant effect on net migration. Likewise, total expenditure per capita which has a negative coefficient, does not achieve statistical significance.

The attractiveness of a municipality may not be solely influenced by the prior year conditions, but those from two or three years ago. To account for this, additional models were estimated using two-year lagged and three-year lagged independent variables in the Tables 7 and 8.

The negative and significant effect of labour market conditions persists (*Ulbenef*) for the majority of the columns as in Table 6. Additionally poorer municipalities (with a higher percentage of *Sllbenef*) are less attractive, significant at the 5% level in the first column of Table 7. Moreover, salary growth exhibits a positive and significant effect on net migration in the first, second and fourth column of Table 7 and the fourth column of Table 8 at the 5% significance level. The percentage of hotel guests has a negative and significant impact on the attractiveness of municipalities in the first and second column of Table 7, and a positive effect in the third column of Table 8.

Table 6: Baseline model regressions

Variables	(1) nmr	(2) nmr	(3) nmr	(4) nmr
<i>salarygrowth_{t-1}</i>	0.00354 (0.00421)	0.00189 (0.00288)	0.000620 (0.00252)	0.00204 (0.00210)
<i>HEworkers_{t-1}</i>	-0.0307 (0.0284)	0.00466 (0.0219)	0.00577 (0.0196)	0.00980 (0.0176)
<i>UIbenef_{t-1}</i>	-0.0450 (0.0281)	-0.0473** (0.0184)	-0.0511*** (0.0151)	-0.0408*** (0.0150)
<i>SIIbenef_{t-1}</i>	-0.0776 (0.0484)	0.00838 (0.0244)	-0.00983 (0.0207)	-0.00602 (0.0172)
<i>hotelguests_{t-1}</i>	5.50e-05 (0.000197)	-1.52e-05 (0.000162)	8.33e-05 (0.000177)	
<i>pPIT_{t-1}</i>	0.0327 (0.0219)	0.0236 (0.0169)		
<i>logTotExp_{t-1}</i>	-0.0198 (0.0881)			
<i>logDebtMun_{t-1}</i>	0.0255 (0.0740)			
Constant	0.412 (0.329)	0.281 (0.205)	0.528*** (0.142)	0.437*** (0.130)
Observations	1,865	2,725	3,483	4,443
R-squared	0.562	0.666	0.662	0.662
No. of municipal- ities	278	278	278	278
Adj. R ²	0.558	0.663	0.660	0.661

Notes: All regressions include municipal and year-fixed effects, and cover 278 mainland Portugal municipalities.

First column covers the period from 2015 to 2022, second column from 2009 to 2023, third and fourth column from 2007 to 2023.

Robust standard errors clustered by municipality in parentheses.

Significance level: *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$.

Table 7: Baseline model regressions two year lags

Variables	(1) nmr	(2) nmr	(3) nmr	(4) nmr
<i>salarygrowth_{t-2}</i>	0.00818** (0.00392)	0.00697** (0.00294)	0.00483* (0.00258)	0.00447** (0.00226)
<i>HEworkers_{t-2}</i>	-0.000744 (0.0272)	0.00396 (0.0257)	0.00364 (0.0225)	0.00197 (0.0197)
<i>UIbenef_{t-2}</i>	-0.0381 (0.0253)	-0.0377** (0.0174)	-0.0484*** (0.0127)	-0.0401*** (0.0133)
<i>SIIbenef_{t-2}</i>	-0.109** (0.0476)	0.00717 (0.0235)	-0.0104 (0.0193)	-0.000523 (0.0158)
<i>hotelguests_{t-2}</i>	-0.000953*** (0.000228)	-0.000420** (0.000202)	-0.000192 (0.000248)	
<i>pPIT_{t-2}</i>	0.0290 (0.0227)	0.0319* (0.0175)		
<i>logTotExp_{t-2}</i>	0.0548 (0.101)			
<i>logDebtMun_{t-2}</i>	-0.0610 (0.0832)			
Constant	0.470 (0.300)	0.112 (0.203)	0.416*** (0.137)	0.297** (0.121)
Observations	1,865	2,466	3,205	4,165
R-squared	0.581	0.657	0.664	0.670
No. of municipal- ities	278	278	278	278
Adj. R ²	0.577	0.655	0.662	0.669

Notes: All regressions include municipal and year-fixed effects. All models cover 278 mainland Portugal municipalities except the fourth.

First column covers the period from 2016 to 2023, second column from 2010 to 2023, third and fourth column from 2008 to 2023.

Robust standard errors clustered by municipality in parentheses.

Significance level: *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$.

Table 8: Baseline model regressions three year lags

Variables	(1) nmr	(2) nmr	(3) nmr	(4) nmr
<i>salarygrowth_{t-3}</i>	0.00618 (0.00536)	0.00608 (0.00376)	0.00398 (0.00293)	0.00569** (0.00257)
<i>HEworkers_{t-3}</i>	0.0248 (0.0247)	-0.00421 (0.0252)	-0.00115 (0.0214)	-0.00724 (0.0197)
<i>UIbenef_{t-3}</i>	-0.0620** (0.0265)	-0.0347* (0.0181)	-0.0471*** (0.0114)	-0.0366*** (0.0126)
<i>SIIbenef_{t-3}</i>	-0.0753 (0.0550)	0.0298 (0.0245)	0.00612 (0.0185)	0.0141 (0.0144)
<i>hotelguests_{t-3}</i>	-4.30e-07 (0.000109)	0.000189 (0.000121)	0.000275** (0.000132)	
<i>pPIT_{t-3}</i>	0.0109 (0.0294)	0.0205 (0.0183)		
<i>logTotExp_{t-3}</i>	0.156* (0.0836)			
<i>logDebtMun_{t-3}</i>	-0.0556 (0.0956)			
Constant	0.621** (0.308)	-0.260 (0.193)	0.377*** (0.116)	0.294*** (0.110)
Observations	1,629	2,211	2,934	3,888
R-squared	0.514	0.657	0.670	0.682
No. of municipal- ities	278	278	278	278
Adj. R ²	0.510	0.655	0.668	0.681

Notes: All regressions include municipal and year-fixed effects. All models cover 278 mainland Portugal municipalities.

First column covers the period from 2017 to 2023, second column from 2011 to 2023, third and fourth column from 2009 to 2023.

Robust standard errors clustered by municipality in parentheses.

Significance level: *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$.

Overall, strong economic prospects in the short term (1 to 3 years prior), such as wage growth enhance the attractiveness of municipalities. However the effect is only significant when considering second and third-order lags, suggesting that individuals may not base migration decisions on immediate wage growth changes as they may not know them, but rather on wage growth from two or three years prior. Labour market conditions are also a consistent predictor, always presenting a negative coefficient, while hotel guests exhibit mixed results. In short it is possible to conclude that net migration is not solely influenced by the previous year conditions, but shaped by factors over at least the past three years. However, not every variable reached a significant result, this may indicate that the short term is not enough to predict the net migration of just a single year.

The process of migration is continuous and information that individuals consider may not only be based on the preceding year (1st 2nd or 3rd order lags), but on an average of previous years, that captures a wider view of the development of a place. An increase in the number of unemployed may not only affect the next year net migration but the following years, the same applies for salary growth that may not only contribute to increasing net migration for a single year but several. Hence additional regressions were estimated using five, four and three year periods with averaged variables.

6.2 Five-year period model

In order to capture long run effects of independent variables on net migration, fixed effects models with 5 year-period averaged variables were estimated. The effects of salary growth are in line with the previous results, having a positive coefficient for all the columns, but failing to achieve statistical significance at least at the 5% level. The percentage of unemployment insurance beneficiaries, has a negative coefficient significant at the 1% and 5% level, for the last three columns. The percentage of hotel guests has a positive and significant coefficient and lastly total expenditures of municipalities has a negative and significant coefficient. This may possibly mean that on a longer term perspective municipalities with better job market conditions, and amenities are more attractive. While those where the local government spends more are less attractive, as the higher spending may require higher local taxes.

In addition to the previous, additional regressions were estimated using 4 and 3 year periods in the appendix tables B.1 and B.2. For the four year period models, the percentage of unemployment insurance beneficiaries keeps the negative coefficient and significance for all columns, salary growth has a positive coefficient, but never reaching statistical significance. In the case of the percentage of hotel guests, presenting a positive and significant coefficient for all the columns. The logged municipal total expenditure, presents a negative and significant coefficient, lower than the five year period model. Contrary to the

Table 9: Five-year period regressions

Variables	(1) nmr	(2) nmr	(3) nmr	(4) nmr
<i>salarygrowth</i>	0.0100 (0.0155)	0.0131 (0.0131)	0.0158 (0.0118)	0.0223* (0.0118)
<i>Heworkers</i>	-0.0477* (0.0285)	-0.01000 (0.0218)	-0.0145 (0.0208)	-0.00978 (0.0200)
<i>UIbenef</i>	-0.0547* (0.0309)	-0.0738*** (0.0219)	-0.0542** (0.0226)	-0.0462** (0.0201)
<i>SIIbenef</i>	0.00990 (0.0379)	0.0248 (0.0242)	0.00634 (0.0241)	0.00704 (0.0220)
<i>hotelguests</i>	0.000400** (0.000175)	0.000451*** (0.000170)	0.000424*** (0.000155)	
<i>pPIT</i>	0.0203 (0.0310)	0.00539 (0.0221)		
<i>logTotExp</i>	-0.617*** (0.235)			
<i>logDebtMun</i>	0.0360 (0.104)			
Constant	0.224 (0.330)	0.494** (0.219)	0.422** (0.187)	0.370** (0.164)
Observations	718	877	971	1,112
R-squared	0.801	0.751	0.742	0.735
No. of municipal- ities	278	278	278	278
Adj. R ²	0.798	0.749	0.740	0.734

Notes: All regressions include municipal and period-fixed effects, and cover 278 mainland Portugal municipalities.

Robust standard errors clustered by municipality in parentheses.

Significance level: *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$.

expected the percentage of workers with high education presents a negative coefficient significant at the 5% level for the first column.

Despite being in line with the previous tables, table B.2 only achieved significant results for the unemployment insurance beneficiaries (second and third column), the percentage of hotel guests for all columns, and the percentage of highly educated workers, again having a negative and significant coefficient in the first column.

The labour market variable, unemployment insurance beneficiaries, was the most consistent across the different periods used. Similarly, the percentage of hotel guests, hotel activity seems to contribute positively to the attractiveness of municipalities, in a longer term perspective, contrary with what was found in some of the baseline lagged models. The municipal total expenditure has a negative and significant coefficient for the 2 longest periods considered. Which may support the possibility that high spending may lead to higher local taxes, making the municipality less attractive, or that municipalities that are facing population decline are increasing expenses to counteract it.

7 Conclusion

When it comes to migration flows, Portugal presents two opposite cases. Firstly, the municipalities across the coast and district capitals were by far more attractive than the remaining, and secondly those across the interior that were less able to attract population in net terms, due to their lack of economic activity.

The empirical evidence suggests that the proxy for the unemployment rate exerts a negative impact on the net migration of municipalities. Being the most consistent across different specifications. Hotel guests in percentage of population exhibited mixed results, having a negative coefficient in the baseline models only vaguely significant, while in the period regressions always achieving a positive and significant effect. On the other hand local government fiscal policy variables mostly failed to consistently reach any statistical significance, the only exception is total expenditure in the five-year and four-year period regressions.

Beyond that, results suggest that net migration is not only influenced by the immediate previous year local conditions, but by those of two and three years ago. Additionally long run effects were verified when using five-year period averaged variables, where the proxy for unemployment rate reached statistical significance for most models.

While some of the results were in line with literature, some limitations, namely multicollinearity, didn't allow to further explore the effect of other factors. Further work could be towards the use of different municipal expenditure components, explore municipal attractiveness by age groups, and create a measure of local government quality, due to its inexistence at the local level.

Additionally, the use of aggregate data is always a limitation when trying to extrapolate conclusions to a micro level. Using a database of individuals and their migration patterns could lead to a better understanding of the role of socioeconomic, local government and amenity factors.

Lastly, the specificities of the Portuguese context may also play a role. Over the past two decades, Portugal has generally been perceived as an unattractive destination. The state activities remain highly centralized, and the devolution of responsibilities and powers to municipalities has progressed at a slow pace. This gradual shift may signal an emerging capacity for local governments to attract new residents,

although the full impact may take time to materialize. Therefore, assessing whether local governments are effectively attracting citizens could become more relevant in the coming years.

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A Appendix - Figures

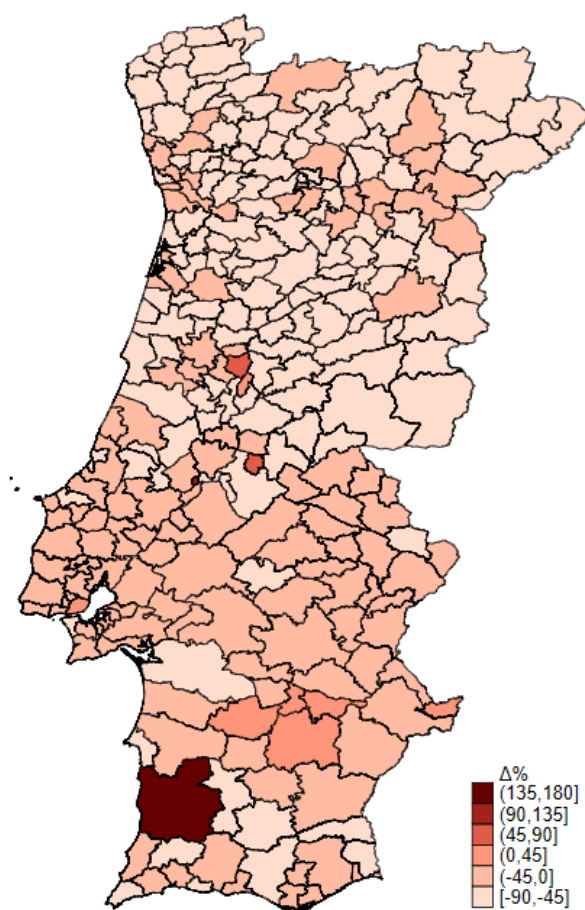


Figure A.1: Municipal primary sector employment variation 2001-2021

B Appendix - Tables

Table B.1: Four-year period regressions

Variables	(1) nmr	(2) nmr	(3) nmr	(4) nmr
<i>salarygrowth</i>	0.0192 (0.0132)	0.00708 (0.0133)	0.0158 (0.0101)	0.0159* (0.00878)
<i>Heworkers</i>	-0.0571** (0.0270)	-0.0211 (0.0223)	-0.00896 (0.0185)	0.00150 (0.0180)
<i>UIbenef</i>	-0.0620** (0.0281)	-0.0698*** (0.0222)	-0.0531*** (0.0159)	-0.0387** (0.0168)
<i>SIIbenef</i>	0.0178 (0.0427)	0.0221 (0.0246)	0.00118 (0.0202)	-0.00789 (0.0189)
<i>hotelguests</i>	0.000412** (0.000202)	0.000455*** (0.000165)	0.000424*** (0.000163)	
<i>pPIT</i>	0.0193 (0.0279)	0.00338 (0.0221)		
<i>logTotExp</i>	-0.454** (0.202)			
<i>logDebtMun</i>	0.0247 (0.0992)			
Constant	0.254 (0.302)	0.370 (0.234)	0.454*** (0.140)	0.396*** (0.139)
Observations	806	974	1,222	1,390
R-squared	0.813	0.779	0.733	0.710
No. of municipal- ities	278	278	278	278
Adj. R ²	0.810	0.777	0.731	0.708

Notes: All regressions include municipal and period-fixed effects, and cover 278 mainland Portugal municipalities. Robust standard errors clustered by municipality in parentheses. Significance level: *** p<0.01, ** p<0.05, * p<0.1.

Table B.2: Three-year period regressions

Variables	(1) nmr	(2) nmr	(3) nmr	(4) nmr
<i>salarygrowth</i>	-0.000350 (0.0111)	-0.000739 (0.00641)	0.00387 (0.00538)	0.00778 (0.00561)
<i>Heworkers</i>	-0.0859** (0.0384)	0.00976 (0.0180)	0.00829 (0.0166)	0.0160 (0.0166)
<i>UIbenef</i>	-0.0471* (0.0283)	-0.0585** (0.0236)	-0.0421** (0.0179)	-0.0290* (0.0170)
<i>SIIbenef</i>	0.00353 (0.0473)	0.0253 (0.0206)	0.00628 (0.0185)	-0.00307 (0.0170)
<i>hotelguests</i>	0.000655*** (0.000215)	0.000408** (0.000168)	0.000372** (0.000144)	
<i>pPIT</i>	-0.0111 (0.0255)	0.00623 (0.0171)		
<i>logTotExp</i>	-0.128 (0.154)			
<i>logDebtMun</i>	0.0477 (0.0894)			
Constant	0.364 (0.346)	0.323 (0.203)	0.335** (0.148)	0.282** (0.136)
Observations	810	1,377	1,681	1,946
R-squared	0.781	0.786	0.755	0.736
No. of municipal- ities	278	278	278	278
Adj. R ²	0.778	0.785	0.753	0.735

Notes: All regressions include municipal and period-fixed effects, and cover 278 mainland Portugal municipalities. Robust standard errors clustered by municipality in parentheses.
Significance level: *** p<0.01, ** p<0.05, * p<0.1.

