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Document de Travail n° 2024 – 12

Mars 2024

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RESIDENTIAL MOBILITY AND LIFE CYCLE: EXAMINATION OF THE INFLUENCE OF LOCAL TAXES[1]

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Abstract

This study examines the influence of local taxes on household migration behavior between French municipalities ("communes"). We consider five tenure status categories and four categories of household head age. Our findings partially support Tiebout "voting with feet" theory, especially among young flat renters in the private sector, flat owners and social housing renters. A surprising result is related to the introduction of the municipality size in the regression, which dramatically affects the coefficient measuring the effect of local tax rates on migration probability. This suggests that a large part of the "Tiebout effect" usually found in the literature is an artefact caused by the spurious correlation between municipality size and local tax rates.

Keywords: Residential mobility, local taxes, local public expenditures, heterogeneity, local amenities, life cycle.

JEL Classification: H71, H72, R23

[1] The authors would like to thank the financial support of the ANR AFFINITE (ANR-20-CE22-0014), as well as Joseph Kokouvi Djafon for research assistance.

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1 Introduction

Municipalities often engage in fiscal competition to retain households or attract new ones. When local tax rates increase in a municipality, households may choose to stay anyway, for several reasons. One key reason, highlighted by Tiebout (1956), is that households value the public services and local amenities that are financed by local taxes. Another factor influencing the decision to stay is the cost associated with moving to a different municipality. Relocation induces both moving costs and transaction costs (de Palma and Lefevre, 1985; Ben-Akiva and de Palma, 1986, de Palma, de Lapparent and Picard, 2015). On the other hand, households also consider potential gains from moving, either to a commune where local taxes are lower, or to a commune with better public services or local amenities.

Tiebout (1956) suggests that migration occurs either when household preferences or needs change, or when changes in municipal tax rates disrupt the equilibrium. In this paper, we analyze the combined effect of these two groups of factors influencing household migration, and try to disentangle the effect of local taxes from the one of public services or local amenities. On the one hand, local taxes are typically used to invest in, or maintain local public amenities, implying that some houses are willing to afford a higher local tax rate in order to enjoy better-quality local amenities. On the other hand, household preferences and moving cost strongly depend on the individual characteristics of household members (e.g. age or education of household head). In addition, preferences evolve over the life cycle.

Our study is original in several dimensions. First, we analyze migration at a very detailed geographical level, comparing 29,634 municipalities, whereas empirical literature usually considers either migration between large geographical units such as countries, regions or departments, or short distance migration, between municipalities in a single region. Second, it investigates in detail the impact of local tax rates on migration in France. Third, it is the first study to show that the “Tiebout effect” usually found in the literature is significantly biased by omitted variable bias.

To test the "voting with feet" theory of Tiebout (1956), we combine several data sources. Household information is built from census data, focusing on migration between 2012 and 2017. We selected 12.94 million households with a head over 15 in 2017, split into four age groups: 15-29, 30-44, 45-59, and at least 60. We consider price indices at the commune level, separately for flats and for houses, and separately for rents and for transactions. Finally, we gather information publicly available for tax and local expenditures for the 29,634 French municipalities ("communes").

We focus on inter-municipality migration. In our sample, 870,841 households relocated to a different municipality between 2012 and 2017. This represents a migration rate of 6.72 %. The 12.07 million remaining households (93.28%) either moved within the same commune, or did not move at all.

In a nutshell, our empirical findings stress the heterogeneity of migration behavior, which is concentrated at the early stages of the life cycle. Tenants in the private sector are more mobile than both owners and tenants in social housing sector. Migration is also correlated with gender, education, occupation and nationality of household head. Interestingly enough, household heterogeneity in migration patterns becomes negligible towards the end of the life cycle.

Our empirical findings support the Tiebout (1956) "voting with feet" theory in the sample of households living in a flat, irrespectively of their age or tenure status: these households are willing to pay a larger local tax rate because it is typically associated with better local public expenditures. Furthermore, the (positive) effect of local tax rate on migration probability is reduced when the amount of public investments is controlled for in the regression, as expected.

The subsequent results are more original. They highlight the fact that Tiebout effect is strongly biased by spurious correlation. Some non-public local amenities or characteristics enjoyed by households, with no clear causal relation to local tax rate, happen to be strongly correlated with local tax rates. As a consequence, controlling for such amenities significantly reduces the effect of local taxes on migration. Although such results make sense, they were not yet documented in the literature, to the best of our knowledge.

An even more surprising result is provided by the size of the commune (measured by the log of number of inhabitants). The introduction of this covariate in the regression has a dramatic effect on the coefficient measuring the effect of local tax rate on migration, which becomes non-significant in the social housing sector, and even negative for the older households renting a flat in the private sector. This suggests that **a large part of the "Tiebout effect" usually found in the literature is an artefact caused by spurious correlation between commune size and local tax rate**. Note that the effect of commune size is consistent with the fact that many private amenities such as restaurants, bars (appreciated by young households) or hospitals (appreciated by older households), are typically located in large communes (i.e. communes with a large number of inhabitants).

The results are totally different for households living in a house, for which the sign of the "Tiebout effect" is not consistent with what is usually found in the literature. For households renting a house, the effect of local taxes on migration is always negative, whatever the age of household head, and whatever the covariates considered. This can be explained by two factors. First, living in a house is typically more expensive than living in a flat, which makes households living in a house more sensitive to budget constraints than households living in a flat. Second, a house offers inside amenities such as a garden or more space or more comfort inside, so that households living in a house are less sensitive to local public (green, recreational) amenities than households living in a flat.

Finally, for households owning a house, whatever the age group and the other covariates considered, the "Tiebout effect" is negative when population size is not controlled, but positive when it is controlled for. This may reflect the fact that only very rich households can afford a house in a large commune, whereas intermediate-income households are more constrained financially, and have to trade-off between housing expenditures and enjoying local amenities.

Our paper is organized as follows: In Section 2, we provide a concise literature review that explores the impact of local taxes on household migration and establishes the relationship between household head characteristics, local amenities, and migration decisions. Section 3 is devoted to the presentation of the data used in our analysis, along with descriptive statistics. In Section 4, we analyze the heterogeneity of household migration behavior. In section 5, we estimate the influence of local tax rates on households' migration, separately for different age categories, tenure status and dwelling types, allowing for a comprehensive examination of the factors influencing migration patterns over the life cycle. Finally, Section 6 concludes our empirical findings.

2 Literature review

2.1 Influence of local taxes on migration decision

The idea that local tax rates influence household migration was developed in Tiebout's theory in 1956. It states that, in a competitive environment, local governments offer varying tax rates and local public expenditure programs. As a result, mobile households tend to migrate to municipalities that align with their needs and preferences in terms of local tax rates and local public expenditure programs. In an efficient resource allocation and equilibrium scenario, no household can improve their well-being by relocating to another municipality. An equilibrium can be reached if local taxes are used to finance local public expenditures, as suggested by Hansen and Kessler in 2001. The adjustment of local tax rates and local public expenditure programs serves as the driving force behind households' movement across municipalities, as originally outlined by Tiebout (1956).

Liebig et al. (2007) suggest that migration typically happens in two cases. First, when household preferences or needs change, and second, when the equilibrium is disrupted by changes in local tax rates. In this context, an increase in the tax rate of one municipality leads to households moving across municipalities, as noted by Hoyt (1993). According to Janez et al. (2016), if all municipalities increase their tax rates by the same percentage, households are less likely to relocate. However, when only one municipality alters its local tax rate, households start to move between municipalities, since mobile taxpayers seek to reduce their tax burden by changing their residence, as explained by Agrawal and Foremny (2019). Consequently, tax competition can be intensified (Wildasin, 2006; Aqzzouz and Dimou, 2022).

Empirical results are contrasted between countries. Frey (1981) studied the impact of local tax rates on household migration in the Swiss context, but found no significant effect of local tax rates on migration. Feld (2000) confirmed that local tax rates do not significantly influence the decision to migrate between Swiss cantons. However, Liebig et al. (2007) obtained contrasting results on the same case. They found that households tend to move to municipalities with high local tax rates if high local tax rates are associated with high local public expenditures. They argue that, if municipalities with low tax rates offer a lower quality of life compared to those with high tax rates, some households prefer to migrate to municipalities with a high quality of life. This suggests a positive correlation between mobility and difference in local tax rates.

Janez et al. (2016) argue that one of the key factors influencing household migration between municipalities is local property taxes. Their study focuses on analyzing the impact of property taxation on migration flows to the municipality of Ljubljana, the capital of Slovenia, in 2011. According to their results, if the property tax rate in Ljubljana were to increase by 0.15% and if this increase were used to boost local tax revenue, then the municipality would become more attractive for migration flows. The authors argue that municipalities can shape the development of their territories and future demographic dynamics by using local tax policies. Through the management of revenues, municipalities can provide local public goods and services and contribute to spatial development, as highlighted by Pichler, Milanovic et al. (2008).

In the analysis of migration, several studies consider the role of local public expenditures. Friedman (1981) is one of the pioneering authors who examined the impact of local public services on household migration. His research indicates that the influence of local public services on migration is limited. Quigley (1985) studies the Pittsburgh metropolitan area,

considering school expenditures per student and municipal expenditures per household. He finds that migration probability to a municipality with high levels of local public expenditures is large. Nechyba and Strauss (1998) demonstrate the relevance of school expenditures as an attractive factor in New Jersey. Municipalities with high levels of school expenditures are significantly more attractive than those with low school expenditures. Bayoh et al. (2006) further confirm these findings, focusing on the effect of per capita education expenditures on migration decisions within the state of Ohio, United States.

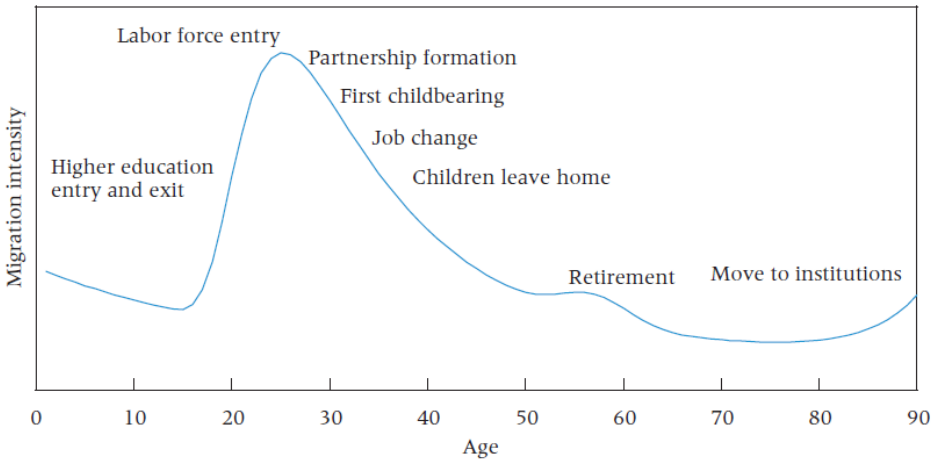
2.2 Individual characteristics, local amenities and migration decision

Household migration is influenced by various factors, as stressed in many studies. Positive factors such as market opportunities, local amenities, and employment opportunities have been identified as influential in migration decisions (Rossi, 1955; Leslie and Richardson, 1961; Strassmann, 1991; Hooimeijer and Oskamp, 1996; Strassmann, 2001; Winstanley, Thorns, and Perkins, 2002; de Palma et al., 2005). Negative factors such as negative social issues have also been found to contribute to residential mobility. For instance, separation or divorce may lead to household relocation (De Jong and Graefe, 2008); a decline in the housing price can influence migration decisions (Ferreira, Gyourko, and Tracy, 2010), and personal dissatisfaction has been identified as a factor in residential mobility (Nowok, Van Ham, Findlay, and Gayle, 2013).

Graves and Knapp (1988) argue that the analysis of household migration involves individual characteristics such as age, education level, family status, and the amenities available in both the departure and arrival locations. These amenities can include cultural amenities, quality of natural and social environment, provision of local public goods, and the level of local tax rates. According to Prashker et al. (2008), four groups of factors influence household migration. First, residential unit characteristics, such as the size and type of the dwelling, and the age of the building, play a role. Second, local characteristics, including the quality of living in a particular environment, or the level of security, traffic conditions, noise level, and air pollution, are also influential. The third group relates to accessibility characteristics, such as the proximity and accessibility to job offices or employment opportunities. Finally, individual characteristics, such as age, marital status, and presence of children, can influence migration decisions.

Castles and Miller (2009) explore the influence of individual characteristics on household migration. They highlight the significant role of age in residential mobility studies. Analyzing the connection between residential mobility and the life cycle of households, Abraham and Hunt (1997) as well as Clark and Huang (2003) find that young people in their twenties and thirties are the most mobile. Figure 1 depicts the age profile of migrants over the life course. It suggests that young people migrate to improve their education or to secure suitable employment opportunities. However, migration probability starts to decrease around the age of 27 or 28, especially when they find stable employment, and it further declines with the arrival of their first children (Bernard et al., 2014). This indicates that as households settle into their careers and start building their families, their propensity to migrate decreases.

Figure 1: Life-course transitions and the age profile of internal migration.



Source: Bernard, Bell and Charles-Edwards (2014)

Several studies examined the relationship between migration and various factors such as education level, demographic structure, and economic conditions. Warnes (1992) links migration to the level of education. Pandit (1997) explores the association between migration and the economic situation. De Jong, Graefe, and Pierre (2005) argue that family status plays a crucial role in migration decisions since the decision is made at the household level. They suggest that singles are more likely to move than married. Furthermore, the probability of moving tends to decrease as household size increases, as highlighted by Josnin and Robert (2009).

Boehm et al. (1991) study the correlation between tenure status and household migration. They argue that homeowners are less likely to move than renters in the private sector. Homeowners' migration is constrained by the costs associated with selling and purchasing a dwelling, whereas renters are influenced by variations in rental prices (Sinai and Souleles, 2005). de Palma and Lefevre (1985), as well as Ben-Akiva and de Palma (1986) argue that transaction costs and moving costs reduce migration probability for owners. By contrast, renters, who typically face lower transaction costs, have high probability to migrate as they have relatively lower barriers and expenses when it comes to changing their place of residence (de Palma et al., 2015).

Various studies, including Bartel (1979), Clark and Huang (2003) and Li and Wu (2004) examine the influence of education on household migration decision. These studies consistently find that education significantly increases migration probability. One explanation could be that households with low levels of education tend to have low expectations of the benefits of migration (Whisler et al., 2008; Grogger and Hanson, 2011).

Several studies have explored the impact of local amenities on household migration decisions. Feijten (2005), and Inoa et al. (2015) emphasize the influence of the local labor market. They highlight that households are more likely to migrate if the destination location offers more favorable employment opportunities, such as higher wages and better career prospects. Regarding local amenities beyond the labor market, de Palma et al. (2005) demonstrate that some factors, such as the number of metro stations in a municipality, increase migration probability. However, the presence of a large number of railway stations may decrease the likelihood of migration because of the negative externalities associated with rail transport in the close vicinity. Brueckner et al. (1999) suggest that the impact of local amenities on migration

and location choice depends on income: wealthier households are more likely to select municipalities with higher levels of local amenities.

In this study, our objective is to check Tiebout (1956) argument, that households are attracted to municipalities with high local tax rates because these rates are often associated with high levels of local public expenditures. We thus analyze in great detail the joint influence of local tax rates and public expenditures on migration decisions, controlling for all individual characteristics of households (such as age, education level, and family status) which may influence migration decisions, as stressed by literature.

More precisely, we investigate the role of differences in local amenities and local tax rates between origin and destination municipalities. We aim at checking to what extent the positive correlation between migration probability and local tax rate differences is driven by the role of high tax rates in financing local public expenditures, thus providing access to improved public local amenities. We explore the possibility that the observed positive association may be biased by spurious correlation with local factors such as private local amenities, which are not financed by local tax rates. Our aim is to disentangle the effects of local tax rates, local public expenditures (potentially financed by local taxes) and other local amenities which are not financed by local taxes.

3 Data and descriptive statistics

The main dataset used in this paper comes from the 2018 Population Census released by the French National Institute of Statistics and Economic Studies (INSEE). Specifically, using the MIGCOM file, we analyze the residential mobility of 12.94 million households and their respective locations in 2012 and 2017. All information regarding individual characteristics used here pertains to the household head.

We use information provided for 29,634 French municipalities (communes). Two distinct types of measurable flows can be identified: inter-municipality flows occur when a household migrates between two different municipalities, while intra-municipality flows refer to a move within the same municipality. Here, we focus on inter-municipality flows, and we explain household decision to move out of the original municipality without leaving the country.

The second dataset used includes information on local public amenities and local tax rates, which provide insights into the average well-being in each municipality. Table 1 presents descriptive statistics on local factors in our sample of municipalities. Population size (provided by INSEE) counts the number of inhabitants in each municipality in 2017, and serves as an indicator of its urbanization level. The level of local public investment per capita measures the financial resources allocated by municipalities to public infrastructures, services, and development projects. It reflects the extent of investment by the local government to enhance the quality of life and meet the needs of the municipality (Oates, 1969). To assess the level of local public expenditure in a municipality, we use the local public investment variable as a proxy. Local public expenditure can be divided into two categories: short-term and long-term. Short-term local public expenditure refers to the day-to-day spending required to ensure the smooth operation of local public services. This includes expenses related to maintaining and repairing infrastructure, providing essential services like street lighting, public transportation, parks, and gardens, as well as covering the salaries and wages of municipal employees. On the other hand, long-term local public expenditure includes investments made by local authorities

with a focus on improving infrastructure and developing public services over an extended period. These investments aim to enhance the quality of life and long-term sustainability of the municipality (Sonstelie and Portney, 1978). Local public investment measures the resources allocated to both short-term operational expenses and long-term development initiatives. Local public investment data were obtained from the French General Direction of Public Finance (DGFiP).

The unemployment rate is an important indicator of the health of the local labor market within a municipality. The median income of households is a marker of the wealth within the local population. Data on these two variables was provided by INSEE.

We computed two property price indices, namely the flat price index and the house price index, using the DV3F database maintained by CEREMA (built from Notaries' database). These indices measure the local price level. Each index corresponds to the log of the price per square meter of a representative dwelling (2 rooms, no garage, no cellar, no balcony or terrace). Property prices can also serve as a proxy for unmeasured municipality amenities (Liebig et al., 2007). In addition, we included two similar indices related to renting prices: the flat renting price index and the house renting price index. Renting price indices data comes from CESAER[3]. We also consider local fiscal variables, namely the property tax rate and the housing tax rate, obtained from the French General Direction of Local Authorities (DGCL).

The MIGCOM database contains information on 34,900 municipalities in France. Our sample was slightly reduced to 34,851 because of missing information on population size, unemployment rate, local public investment per capita, housing tax rate, or property tax rate. Missing information on median household income further reduced the number of municipalities to 31,390. Missing information on flat or house price index further decreased our sample to 29,634 municipalities. Data on flat and house price indices was not available for a significant number of municipalities, mainly located in Alsace Moselle and Mayotte. This missing information in the Notaries database is well documented[4]. We are left with a final sample of 29,634 municipalities with complete information on population size, unemployment rate, local public expenditures, housing tax rate, property tax rate, median household income, flat prices, house prices, flat renting price and house renting price was available.

In our dataset, 870,841 households (6.72% of the sample), relocated from their original municipality, whereas 12.07 million households (93.28% of the sample), chose to stay in the same municipality. Appendix Table 4 provides an overview of the migration patterns of households based on the age group of the household head. Since the probability of migration varies significantly throughout the lifecycle, we grouped households into four age groups: 15-29, 30-44, 45-59, and over 60. The largest migration rate (13.80%) is among households whose head is aged between 15 and 29. It decreases to 8.41% when household head is between 30 and 44, 3.95% for 45-59 years old heads, and 2.57% when household head is over 60.

[3] UMR1041 CESAER (Agrosup Dijon – INRAE).

[4] See https://datafoncier.cerema.fr/actualites/version-2-dv3f-disponible.

Table 1: Descriptive statistics: local characteristics of municipalities in 2017

	Mean	Std Dev	Min	Max
Population size	2,016.19	8,744.85	80	479,55
Unemployment rate	10.82	4.43	0	41.67
Local public investment per capita	419.83	664.17	0	61,785.71
Property tax rate	15.09	6.67	0	56.38
Housing tax rates	12.55	4.89	0	43.17
Median household income	20,352.72	2,838.57	9958.3	45,902.40
Flat price index	7.21	0.36	5.39	9.29
House price index	6.66	0.35	5.91	9.24
Flat renting price index	5.78	1.40	2.97	30.23
House renting price index	7.13	1.76	3.64	25.67

Source: INSEE, DGCL, DGFiP, DV3F, CESAER, Authors' computations

4 Determinants of migration over the life cycle

In this section, we analyze the effect of household head characteristics on inter-municipality migration. Following Moretti and Wilson (2017) and Agrawal and Foremny (2019), let D denote the Departure municipality and A the Arrival municipality. Household *i* chooses the location that maximizes her utility U_i among a finite set of mutually exclusive destinations. Household *i* moves from departure municipality *D* to arrival municipality *A* if she can obtains a larger utility level in *A* than in any other alternative municipality *A'*, including departure municipality D (Herger & McCorriston, 2013). If household *i* stays in departure municipality *D*, then her utility in *D* is larger than her utility in any other destination *A* (taking into account the costs to be paid in case of moving). Let U_{iDA} denote the utility of *i* moving from *D* to *A* and U_{iDD} her utility is she stays in *D*:

$$M_{iDA} = \begin{cases} 1 \; if \; U_{iDA} > U_{iDA'} \quad \forall \, A' \neq A \\ 0 \; if \; U_{iDD} \geq U_{iDA} \; \forall \, A \neq D \end{cases} \qquad (1)$$

Movers are household for which M_{iDA} = 1 and stayers are household for which M_{iDA} = 0. Then, the probability that I migrates is:

$$P\,(M_{iDA} = 1) = \Phi\,(\alpha_0 + \alpha_1 X_i + \alpha_2 (Z_A - Z_D) + \alpha_3 (TAX_A - TAX_D)) \qquad (2),$$

where Φ is the CDF of the standard normal, $\alpha_0 + \alpha_1 X_i + \alpha_2 (Z_A - Z_D) + \alpha_3 (TAX_A - TAX_D)$ is the deterministic part of $(U_{iDA} - U_{iDD})$; X_i is a vector of household head characteristics; Z_D and Z_A are vectors of local amenities at Departure and Arrival, respectively and TAX_A and TAX_D are vectors of local tax rates at Departure and Arrival.

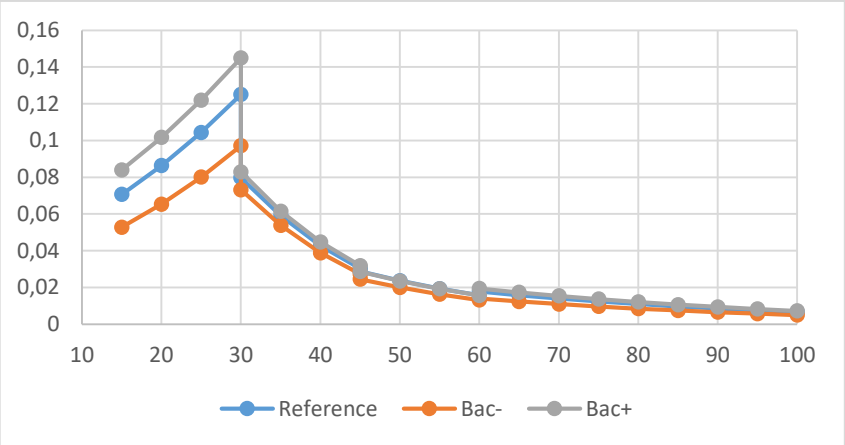
We split our sample of households into four distinct age categories for household head: 15-29, 30-44, 45-59, and over 60. In each sample, we fit a binary probit model corresponding to Equation (2) to estimate the effect of individual characteristics on household migration, and compute migration probability as a function of age and other individual characteristics. Results are displayed in Appendix Table 11 and sum up in Figures 2 to 7. Each figure represents the combined effect of age and a specific characteristic on migration probability, for a representative household (head), defined by: tenure status = owner; family status = married or living together; Education = Baccalaureate; gender = male; nationality = French; profession = Employee. Each curve illustrates the evolution of migration probability by age for one category of the individual characteristic of the household (head) considered in the figure considered.

Our main conclusions are as follows. The effect of household head age aligns with the life cycle perspective of residential mobility discussed in Figure 1 of the literature review. Controlling for household head characteristics, migration probability increases fast from 15 to 29, then decreases slower and slower from 30 to over 60, with a few (not significant) small jumps for some categories. The positive relationship between age and migration within the younger cohort is consistent with Becker (1964) prediction. Overall, this result supports the notion that age plays a significant role in residential mobility, with the highest migration probabilities observed among younger household heads. Our empirical findings thus confirm existing theories regarding the influence of age on migration behavior, and they fine-tune the understanding of the dynamics of migration patterns over life cycle.

Since Equation (2) was estimated independently in the four age groups, the shape of age effect displayed on Figure 2 to Figure 7 was not imposed to be continuous: the (quasi) continuity of the effect of age on migration probability at 30, 45 or 60 is an empirical result obtained in our sample.

Figure 2 and Appendix Table 5 illustrate the effect of household head education and age on migration probability. In Figure 2, all other characteristics are fixed to their reference category. Migration probability significantly increases with education between 15 and 29. This suggests that education plays a significant role in motivating households to seek opportunities and better prospects in other locations. Higher levels of education often correspond to increased economic opportunities, access to better job markets, and a willingness to explore new environments. By contrast, lower levels of education may limit the prospects for individuals to pursue migration as a means of improving their circumstances.

Figure 2: Migration probability by age and education

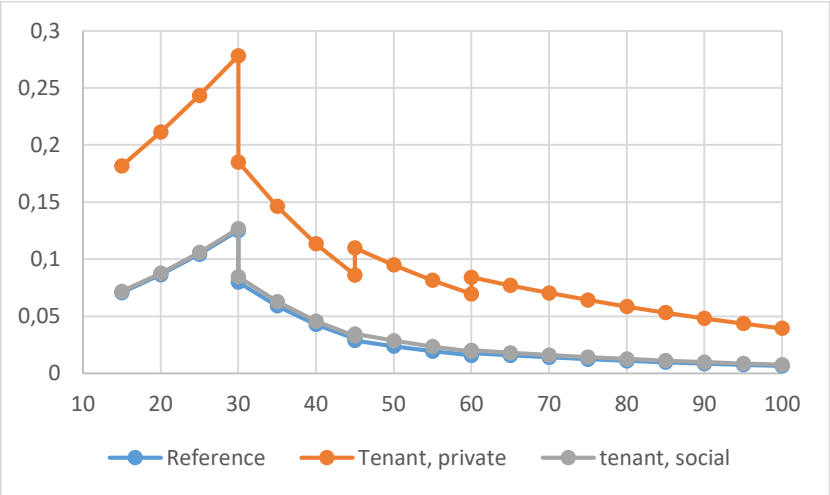


Source: INSEE, MIGCOM data, Authors' estimations

Figure 3 and Appendix Table 6 illustrate the effect of tenure status and household head age on migration probability. The difference between migration probabilities of tenants in the social sector and owners (reference category) is very small, and hardly significant. Migration probability is by far larger for tenants in the private sector, throughout the entire life cycle. This suggests that households renting in the private sector are more inclined to seek opportunities outside their original municipality, all over the life cycle. By contrast, tenants in the social housing sector face a major challenge when considering relocation. Given severe short supply in social housing sector in most municipalities, it is very difficult to find a dwelling in the social

housing sector in the destination municipality. Owners face bear higher moving costs, mainly related to transaction costs.

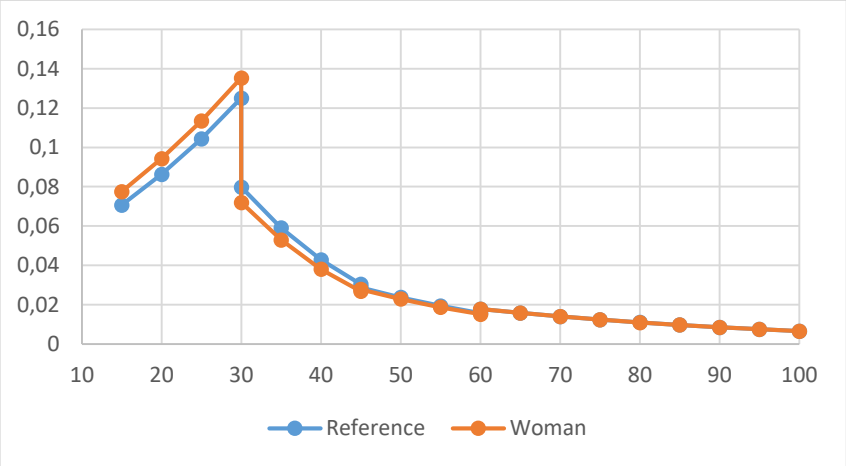
Figure 3: Migration probability by age and tenure status



Source: INSEE, MIGCOM data, Authors' estimations

Figure 4 and Appendix Table 7 illustrate the effect of gender and household head age on migration probability. The difference in migration probabilities between households headed by women and those headed by men (reference category) is very small and significant only between 15 and 59. Before 30, households headed by women (and thus single)[5] are slightly more likely to migrate than those headed by men, whereas the opposite holds after 30.

Figure 4: Migration probability by age and gender



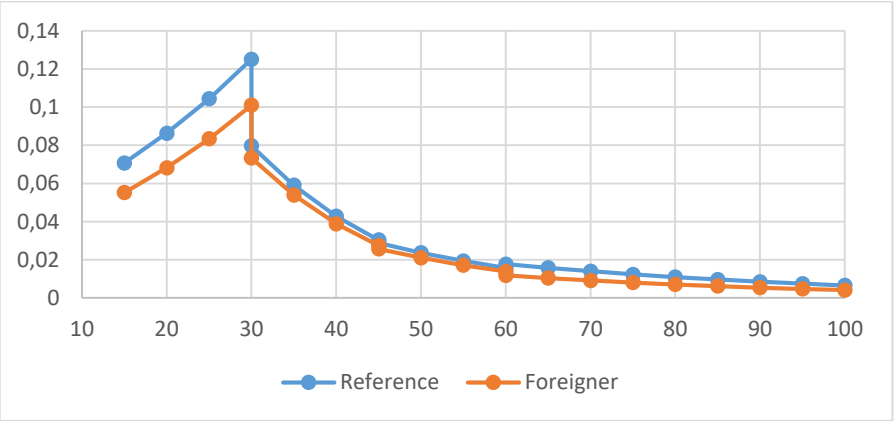
Source: INSEE, MIGCOM data, Authors' estimations

Figure 5 and Appendix Table 8 illustrate the effect of nationality and household head age on migration probability. Between 15 and 29, migration probability is significantly larger when household head is French (reference category). One possible reason for this difference could be linked to the socio-economic conditions of foreigners, who may experience greater social and economic vulnerability (Schaffar et al., 2019). After 30, migration probability is still

[5] The convention chosen by INSEE is that, when a household is headed by a heterogamous couple, the household head is by definition the man.

significantly lower for Foreigners than for French (controlling for other characteristics)[6], but the effect of nationality on migration is smaller.

Figure 5: Migration probability by age and nationality



Source: INSEE, MIGCOM data, Authors' estimations

Figure 6 and Appendix Table 9 illustrate the effect of family status and household head age on migration probability. All over life cycle, migration probability is larger for singles without children ("Alone") than for the reference (couples, with or without children), although the difference becomes non-significant after 60. Singles have more flexibility and autonomy than couples in making migration decisions, and they might face less constraints related to family considerations, making it easier for them to seek opportunities in different locations.

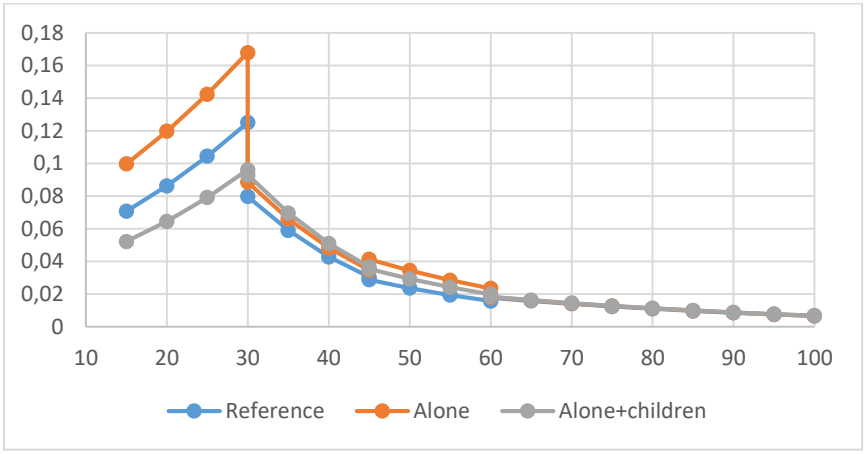
For single parents ("Alone+children"), migration decision is influenced by a complex combination of personal and familial considerations affecting both needs and means, acting in opposite directions. Parents' separation usually implies the move of at least one parent, and possibly child(ren). This first effect increases migration of single parents shortly after separation, provided they can afford it, which is more likely after 30 than before 30. Shortly after a separation, single parents typically either stay in the initial dwelling with the children, or make an emergency and heavily constrained decision, to move to a new dwelling close by, i.e. often in the same commune. After a few years (and thus often after 30), their financial constraints may become less severe, they may take more time to seek better opportunities farther away, and they may need a larger living space as their children grow, thus increasing both the need and the means for inter-municipality migration.

As a result of these factors acting in opposite directions, before 30, migration probability is the lowest for single parents, which could be explained by the financial challenges that limit resources for undertaking migration. By contrast, between 30 and 44, migration probability is the highest for single parents, which could be explained by a catch-up effect: single parents may feel more able to manage the costs associated with migration, because at this age, individuals are often more established in their careers and may have achieved a higher level of financial stability compared to their younger single parents. Between 45 and 59, once again, singles without children have a more chances to migrate than single parents or couples. The lowest migration probability for single parents between 45 and 59 could be explained by the

[6] The effect of nationality on migration rate is less clear in Table 8, in which characteristics other than age are not controlled for.

fact that, at the stage of adulthood, children move to new dwellings while parents remain in their established homes.

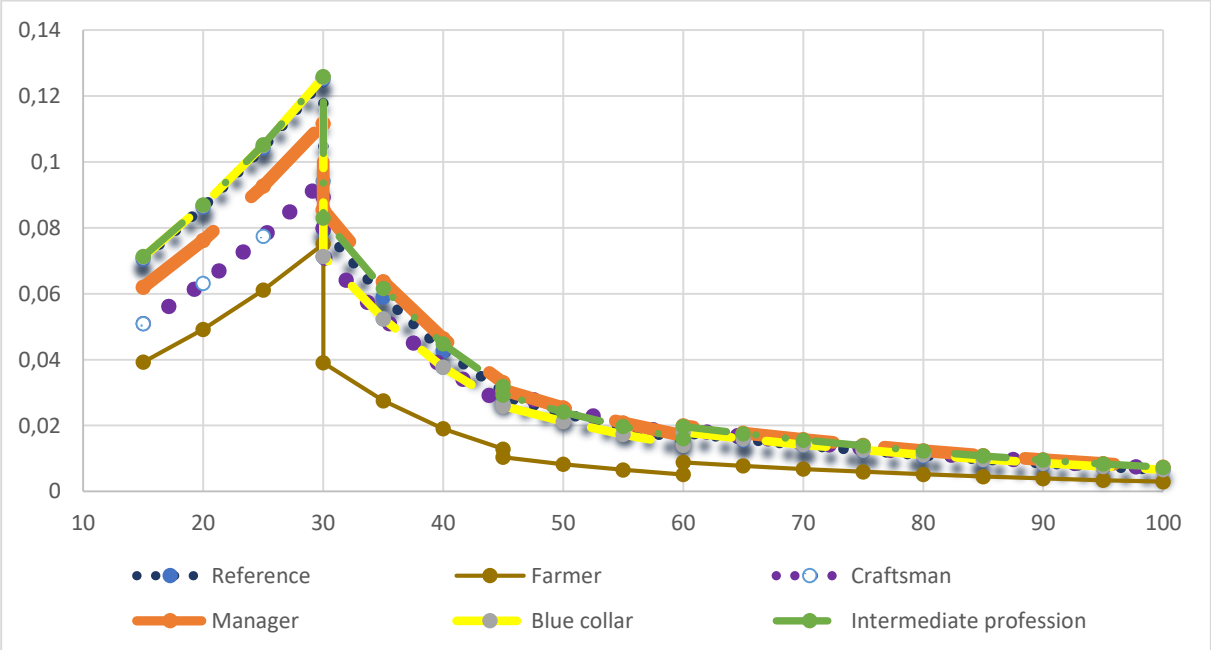
Figure 6: Migration probability by age and family structure



Source: INSEE, MIGCOM data, Authors' estimations

Figure 7 and Appendix Table 10 illustrate the effect of profession and household head age on migration probability. All over the life cycle, migration probability is the lowest for farmers which is mainly related to the nature of their work (farms cannot move). Between 15 and 29 and over 60, the difference between migration probabilities of blue-collars and employees (reference category) is not significant. Between 15 and 29, migration probability is by far larger for household heads having an intermediate profession[7].

Figure 7: Migration probability by age and profession



Source: INSEE, MIGCOM data, Authors' estimations

[7] Intermediate professions, as defined by INSEE, includes elementary and primary school teachers, healthcare and social professions, public services, administrative and commercial professions, technicians, and supervisory staff.

The majority of household heads with an intermediate profession typically start their professional careers with short-term contracts, allowing them to relocate from one municipality to another until having an opportunity for a long-term contract, often as a public servant, arises. Between 30 and 60, migration probability is significantly larger when household head is a manager. Their desire for greater responsibility and expertise may lead them to pursue enhanced professional opportunities in various municipalities. Moving to a new location could have the potential to unlock doors to high managerial position and salary.

5 Disentangling the role of local tax rates from other determinants

Our analysis of the influence of local tax rates on household migration shows significant and original findings, detailed throughout the section below. Our main finding is that the estimated effect of local tax rate strongly depends on the list of covariates used to explain migration. This is illustrated by the point estimate and confidence interval for the coefficient measuring the effect of local tax rate (difference) on migration probability "all other things being equal", in different models. Each model is estimated separately by tenure status and age group, controlling for a model-specific list of covariates. These results are consistent with the correlation structure displayed in Appendix Table 12.

Ten models (see Table 2) are considered for flat tenants in the private sector (Figure 8 below), for flat owners (Figure 9 below), for house tenants in the private sector (Appendix Figure 10), and for house owners (Appendix Figure 11). For tenants in the social housing sector (Appendix Figure 12), only six models were estimated because of missing information on renting prices in the social housing sector. Overall, considering 5 tenure statuses, 4 age groups and 10 or 6 different models, we estimated a total of (10*4+6)*4 = 184 probit models. This comprehensive approach allows us to analyze in great detail the influence of local tax rates on migration over the life cycle. Each model includes the same household head characteristics as in the previous section, difference in local tax rates between departure and arrival municipalities, and a model-specific list of local amenities and dwelling prices, measured in difference between Departure and Arrival municipalities. Only the results concerning the effect of local tax rates are discussed here. Other estimation results are available upon request.

Table 2: List of covariates in the different models, from top to bottom on Figures 8 to 12

	HH characteristics	Tax rate	Public investment	Price per m²	Unemployment & income	Population size
Model 1	X	X				
Model 2	X	X	X			
Model 3	X	X	X	X		
Model 4	X	X	X		X	
Model 5	X	X	X	X	X	
Model 6	X	X				X
Model 7	X	X	X			X
Model 8	X	X	X	X		X
Model 9	X	X	X		X	X
Model 10	X	X	X	X	X	X

The Tiebout effect usually considered in the literature is illustrated by the comparison between two models: model 1 (Figure 8 to Figure 12), contains only household head characteristics and difference in local housing tax rate between Departure and Arrival municipalities; model 2 (on the different figures), contains the same variables, plus the difference in local public investment per capita between Departure and Arrival municipalities. We argue that the true Tiebout effect is better illustrated by the comparison between model 6 (on the different figures) and model 7. In comparison to model 1 (respectively model 2), model 6 (resp. model 7) consider as an additional covariate: the difference in log-population size between Departure and Arrival municipalities.

The reasoning underlying the measurement of Tiebout effect in the literature is as follows: 1) local tax rates is (at least partly) used to finance local public expenditures/investments; 2) this induces a strong correlation between local tax rates and local public expenditures/investments; 3) households do not like paying taxes, but they enjoy local public amenities funded by local public expenditures/investments; 4) the expected implication of 1) to 3) is that the coefficient of local tax rates should be positive in Model 1 because it is biased by correlation, but negative in Model 2. However, Appendix Table 12 shows that population size is heavily correlated with per capita public investment (59% to 68% depending on tenure and dwelling type), and more marginally with property tax rate (13% and 35% for owners depending on dwelling type) or housing tax rate (23% to 33% depending on dwelling type). This induces additional spurious correlation and additional bias in the measurement of the effect of both local taxes and investments on migration decisions in models 1 to 5, and more generally in the literature on Tiebout effect. This is the reason why we argue that it is necessary to control for population size (as we do in models 6 to 10) in order to measure the Tiebout effect.

The fact that population size is more correlated with per capita investment than with tax rates suggests that larger communes are able to increase only marginally tax rates and in order to significantly increase per capita expenses because they can benefit from economies of scale. In addition, large communes like Paris, Lyon, Marseille, Toulouse or Nice are characterized by very large real estate prices and rents, especially for houses[8], so they can get a larger amount of tax for a given tax rate[9].

Other local factors such as unemployment rate, average household income or price/rent per m² also induce spurious correlation and bias in the measurement of Tiebout effect, but we will see in the following subsections, that the magnitude of these spurious correlations and resulting bias are less severe than for population size. We now analyze these effects more precisely for the different tenure and dwelling types.

5.1 Flat tenants in the private sector

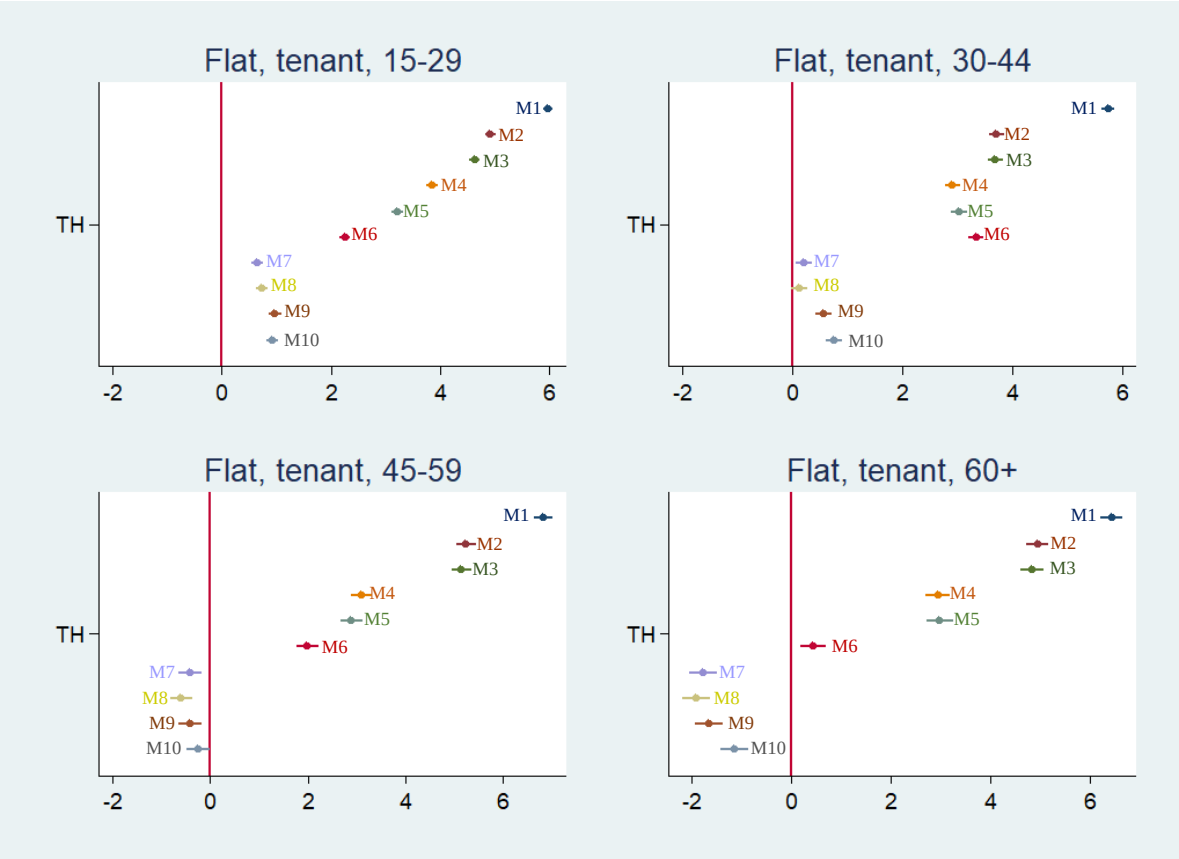
Figure 8 illustrates the influence of housing tax rate on flat tenant (private sector) migration, for the 10 models of Table 2. Our most striking result is that controlling for population size is essential for measuring Tiebout effect. Consistently with Tiebout theory, the coefficient of

[8] Table 12 shows a 24% correlation between log-population and log-house rent/m², and a 35% correlation between log-population and log-house price/m².

[9] The amount of housing tax is proportional the renting value, which supposed to represent the rent, and the amount of property tax is proportional the property value, which supposed to represent the value of the dwelling on the real estate market.

Housing tax rate is positive in Model 6 because Housing tax rate is positively correlated with local public investment per capita, but it becomes not significant (between 30 and 44) or significantly negative (after 45) in Model 7, when local public investment per capita is controlled for. By contrast, in model 2, the coefficient of housing tax rate (although reduced compared to Model 1) remains significantly positive in all age groups. In strong contradiction with Tiebout theory, or Cebula (2009), Model 2 would imply that households prefer paying more tax even when these taxes do not increase local public investment! These results are confirmed by Models 3 to 5 and 8 to 10 (adding local income level, unemployment rate and flat rents to the model), showing that population size is the only key variable (along with housing tax and public expenditures) for revealing the genuine Tiebout "voting with feet" effect.

Figure 8: Coefficient measuring the effect of housing tax rate on migration, flat tenants in the private sector



Source: Authors estimates using MIGCOM data

In Model 3, we further control for the difference in flat rent index difference between origin and destination municipalities. This variable is often argued in the literature to serve as a proxy for unmeasured local public and private amenities, as well as local housing quality. However, our results show that, for flat tenants in the private sector, the effect of the inclusion of rent on the measured coefficient of housing tax rate is significant (although very small) only before 30. Similar results hold for Model 8 compared to Model 7.

In Models 4 and 9 we substitute flat rent index with unemployment rate and median households' income, in order to control for the local economic situation in the municipality. Unemployment rate is an indicator of local employment opportunities, whereas median households' income is an indicator of local financial well-being of residents. Consistently with the literature, the

comparison of Models 2 and 4 seem to confirm that these two variables play a significant role in migration, and significantly reduce the measured effect of housing tax rate on migration, which still remains positive and significant in all age groups. However, the comparison of Models 7 and 9 contradict this result, suggesting that the role of local economic situation on migration was already captured by population size.

In Model 5, we include again flat rent index in the list of covariates. The comparison of Models 4 and 5 confirms the results obtained when comparing Models 2 and 3: controlling for renting price significantly affects the measured effect of local tax rate on migration decision of flat tenants in the private sector only before 30. However, this effect becomes very small and not significant when population size is controlled for (Model 10 versus model 9).

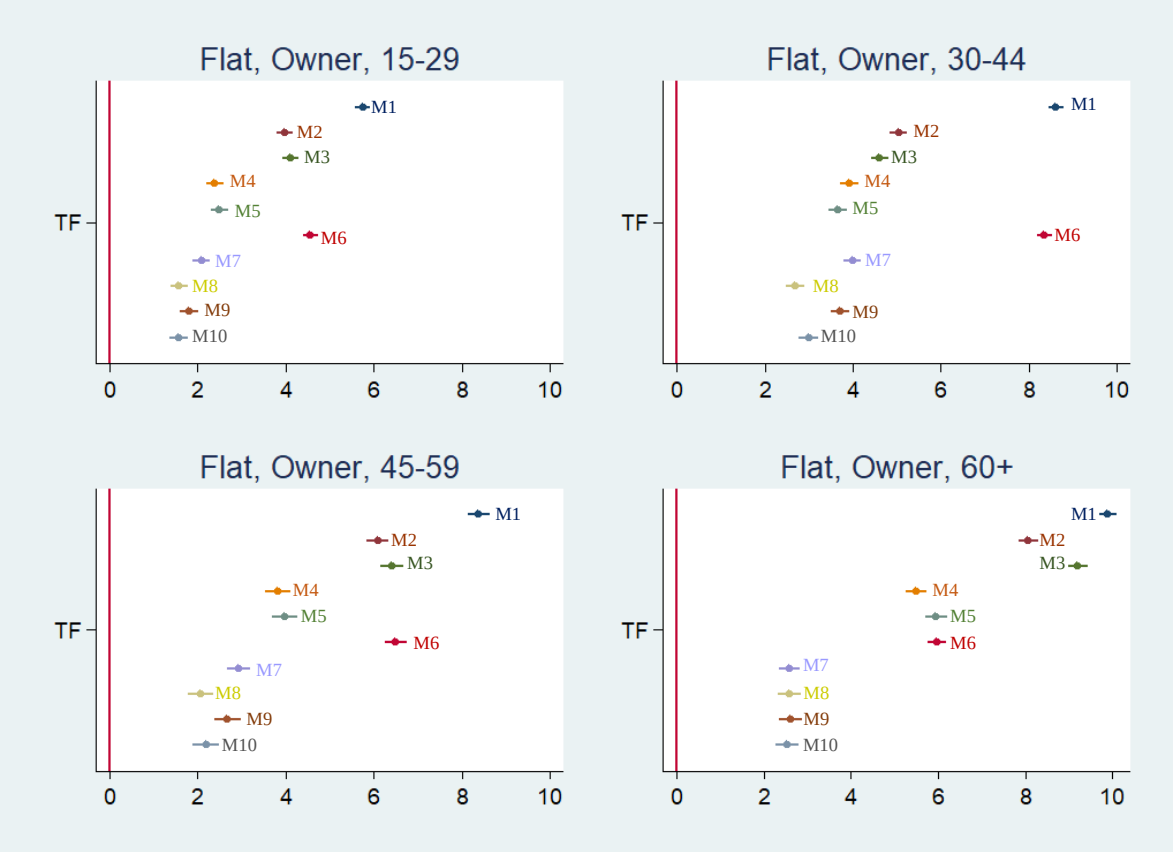
Interestingly enough, the "true" Tiebout effect (after correcting for omitted variable bias) regularly decreases with age. The youngest households (before 30 or 45 depending on covariates considered) renting a flat in the private sector seem to prefer municipalities with larger housing tax rate even when public and private local amenities are controlled for. This could be explained by the fact that such households would often be exempted from this tax (especially before 30), or by the fact that they enjoy unobserved local amenities, which happen to be correlated with housing tax rate, but not captured in our models. This counterintuitive (although small and hardly significant) totally disappears after 45. The absence of counterintuitive results after 45 could be explained by the fact that older households enjoy less than younger ones the unobserved local amenities responsible for spurious correlation bias.

The effect of local housing tax rate becomes significantly negative, and large in absolute terms after 60. This can be explained by the fact that older households can afford renting larger and more expensive dwellings, which implies that the amount of housing tax is larger after 60 than before, for a given tax rate (the rate applies to the rent amount). This may explain that households become more reluctant to a large housing tax rate after 60 than before.

5.2 Flat owners

Figure 9 illustrates the effect of property tax rate on flat owners' migration, for the 10 models listed in Table 2. The main result is that this effect is always positive, whatever the list of covariates, for all age categories. The inclusion of population size has a more limited effect on reducing the coefficient of property tax rate than what was found in Section 5.1 for flat renters in the private sector. In all age categories, the comparison of Models 1 and 2, and of Models 6 and 7, shows that including local public investment per capita has a large and highly significant effect of reducing the coefficient measuring the effect of property tax rate on migration for flat owners. This is consistent with the fact that property taxes are used to finance local public expenditure enjoyed by flat owners all over the life cycle. The comparison of Models 2 and 3, and of Models 7 and 8, shows that including flat price has a small and hardly significant influence on the coefficient measuring the effect of property tax rate on migration for flat owners.

Figure 9: Coefficient measuring the effect of property tax rate on migration for flat owners



Source: Authors using MIGCOM data

The inclusion of unemployment rate and median households' income (Models 4 and 5) significantly reduces the measured effect of property tax rate on migration, which still remains positive and significant in all age groups. Like for flat renters, these two variables play a significant role in migration, suggesting that, all over the life cycle, the apparent Tiebout effect is strongly biased by the omission of local economic situation. When buying a flat, households are willing to move to a place with higher property tax partly because higher taxes happen to be correlated with less unemployment or richer neighbors. The comparison of Models 4 and 5 confirms the results obtained when comparing Models 2 and 3: controlling for flat owner price does not really affect the measured effect of property tax rate on migration decision of flat owners, whatever their age. However, when population size is controlled for (Models 9 and 10), the inclusion of unemployment rate and median households' income has no effect on the estimated coefficient of tax rate on migration probability, suggesting that the spurious correlation bias is more related to population size than to economic situation.

Overall, when population size is not controlled for, all over life cycle, migration probability of flat owners is positively influenced by property tax rate difference, which could be explained by the fact that property tax rate is associated with better local public amenities (measured by local investment per capita), but also because higher property taxes are associated with better other local amenities (such as unemployment or neighbors' income), which are not financed by local taxes. In parallel, flat prices negatively influence flat owner migration and Table 12 shows that a negative correlation between property tax rate and flat prices, aligning with the literature

on negative capitalization of property tax on property prices (Oates, 1969). Both factors could explain that flat owners are willing to pay high property taxes to reside in municipalities with low flat prices (Goodman, 2006).

The inclusion of population size (Models 7 to 10) reduces the measured effect of property tax rate on flat owner migration, especially over 60. This result could be explained by the fact that flat owners over 60 are particularly attracted by large communes, where they can find a better supply of medical or public transport amenities, for example. Since property tax rate is highly correlated with population size, the omitted variable bias on the measured coefficient of property tax is particularly large for household heads over 60. This omitted variable bias is corrected when population size is controlled for.

5.3 House tenants and owners

Figure 10 illustrates the effect of housing tax rate on migration for house (single dwelling unit) tenants in the private sector, for the 10 models of Table 2. Confidence intervals are larger because sample size is smaller (see appendix Table 3).

Our results are in strong opposition with Tiebout "voting with feet" theory for house tenants, and contrast with the results obtained for flat tenants or owners. The coefficient of housing tax rate is negative in Model 1, i.e. when the only determinants of migration considered are household characteristics and difference in housing tax rate between origin and destination commune. This result holds throughout the life cycle, although it is hardly significant after 60. Households renting a house prefer to move to communes with lower housing tax rate. In Model 2, taking into account local public investment per capita only marginally reduces the influence of housing tax rate difference on house tenants' migration.

When population size is controlled for (Models 6 to 10), all other things being equal, an increase in property tax rate reduces migration probability, whatever the list of covariates, provided it includes population size. This negative effect is highly significant after 60 and becomes smaller and smaller, and less and less significant for younger households. The explanation could be related to cadastral rental value. The amount of housing tax paid by house renters is proportional to the product of housing tax rate by cadastral rental value.[10] Consider two municipalities with the same population size and housing tax rate, but different fractions of houses and flats. Since the cadastral rental value is typically larger for houses than for flats, the municipality with a large proportion of houses has a larger tax base than the municipality with a large proportion of flats. As a result, the former municipality can choose a tax rate lower than the latter, for the same total fiscal resources, and same local public investment per capita. This may explain the negative correlation between housing tax rate difference and house tenants' migration, all other things being equal.

Appendix Figure 11 illustrates the effect of property tax rate on house owner migration, for the 10 models of Table 2. Once again, our results for Models 1 to 5 are in contradiction with Tiebout "voting with feet" theory for house owners, and contrast with the results obtained for flat tenants or owners (sections 5.1 and 5.2) and similar to that obtained for house tenants. The coefficient

[10] Cadastral rental value is determined by the commune and supposed to correspond to the annual rental price of the property if it were rented (Leprince et al., 2005).

of housing tax rate is negative (and highly significant before 60) in Model 1, i.e. when the only determinants of migration considered are household characteristics and difference in housing tax rate between origin and destination commune. When no controls for commune characteristics are included in the model, house owners prefer to move to communes with lower property tax rate. Before 60, property tax rate coefficient is only marginally reduced (more negative) when public expenditures are added in the regression (Model 2), and it becomes significant after 60. These results correspond more to common sense (increasing the cost decreases the demand) than to Tiebout effect. Tiebout effect could be advocated in Model 6, showing a positive effect of property tax rate on migration when population size is controlled for, but the results of Model 7 contradict this explanation, since the coefficient of property tax rate is only marginally affected and remains positive, large and highly significant all over life cycle. These results, in contradiction with the literature, might be explained by the fact that house owners are particularly responsive to local private amenities, especially before the age of 60. The influence of commune size aligns with the observation that many private amenities, such as restaurants and bars (enjoyed by young households) or hospitals (enjoyed by older households), are typically found in larger communes. Since house owners are typically in a better financial position than renters of households living in a flat, they can afford larger taxes and enjoy public and private local amenities. Fiscal competition leads to some specialization: in large municipalities benefitting from good private amenities and characterized by a large proportion of house owners (typically the large cities in the south east coast of France like Nice), the municipality can choose a high tax rate to finance public investments and attract rich house owners; by contrast, large municipalities characterized by a large proportion of flats and less amenities or even negative amenities (like crime in Marseille) specialize in the opposite direction: lower property tax rate, less public expenditures. The resulting spurious correlation between property tax rate and unobserved private local amenities may explain the positive coefficient of property tax rate in Models 6 to 10.

5.4 Social housing tenants (both flats and houses)

Appendix Figure 12 illustrates the influence of housing tax rate on social housing tenants' migration. Models 3, 5, 8 and 10 in Table 2 are not considered here since real estate prices or rents are not relevant for social housing tenants. This leaves only 6 models. This provides a perfect illustration of the fact that it is necessary to control for population size in order to observe Tiebout effect, like for flat tenants or owners (sections 5.1 and 5.2). All over the life cycle, the coefficient of housing tax rate is positive and highly significant in Model 6 and it becomes significantly negative or not significant in model 7. By contrast, in Model 2, when population size is not controlled for, the coefficient of housing tax rate remains positive and highly significant, although it is reduced in comparison to Model 1. Public expenditures financed by housing tax are not enough to explain the fact that tenants in the housing sector seem to be attracted by large housing taxes. Local average household income or unemployment rate considered in Models 4 and 9 do not play a significant role, all other things being equal.

6 Conclusion

Our study explores the Tiebout (1956) "voting with feet" theory from an empirical perspective, and stresses the heterogeneity of this effect across tenure status and age groups of household heads. To the best of our knowledge, it is the first study to show that the "Tiebout effect" usually found in the literature is significantly biased by omitted variable bias. Our analysis is conducted

in a sample of 12.94 million households with heads over 15, spread across the 29,634 French municipalities ("communes"). We categorize our household sample into four distinct age groups for the household head in 2017: 15-29, 30-44, 45-59, and over 60.

We first analyze the determinants of migration over the life cycle. A binary probit model estimated independently in each age group illustrates the impact of individual characteristics on household migration and allows to compute migration probability as a function of age and other individual characteristics. The main findings concerning the evolution of migration over the life cycle are as follows: (i) migration probability increases fast from 15 to 29, then gradually decreases from 30 to over 60, with a few (not significant) small jumps for some categories; (ii) higher education significantly increases migration probability between 15 and 29, indicating a correlation with enhanced economic opportunities and job market access; (iii) The migration probability difference between social sector tenants and owners is small and generally non-significant. Private sector tenants consistently exhibit higher migration probabilities throughout the life cycle; (iv) the disparity in migration probabilities between households headed by women and men is small and only significant between 15 and 59; (v) between 15 and 29, migration probability is significantly higher for French household heads. After 30, though still significantly lower, the impact of nationality on migration diminishes; (vi) Throughout the life cycle, migration probability is higher for singles without children compared to couples, though the difference becomes insignificant after 60. For single parents, migration decision is influenced by a complex interplay of personal and familial considerations; (vii) All over life cycle, farmers exhibit the lowest migration probability. Before 30, migration probability is significantly larger when household head has an intermediate profession, whereas between 30 and 60, the largest migration probability is for managerial positions.

We then delve into the influence of local tax rates differences on household migration, separately for flat tenants in the private sector, flat owners, house tenants in the private sector, house owners, and social housing tenants. Our detailed analysis shows the complexity of the effect of local tax rates on migration over the life cycle and across tenure and housing types. We show that the estimated effect of local tax rates on migration probability is highly contingent on covariates included in the analysis, shaping our main conclusion.

The theoretical Tiebout "voting with feet" effect usually considered in the literature is illustrated by comparing a model considering only local tax rate (corresponding to our Model 1), to a model considering both local tax rate and local public investment per capita (corresponding to our Model 2). As suggested by the literature on Tiebout effect, this inclusion significantly reduces the influence of local tax rates on migration for flat tenants in the private sector and for tenants in the social housing sector. However, the influence of local tax rates on migration remains positive and highly significant. At this stage, a puzzle remains concerning Tiebout effect.

Our main finding is that the solution to this puzzle is related to population size. Indeed, for both tenure status, when log-population is controlled for (our Models 6 and 7), the influence of housing tax rate on migration dramatically decreases, and becomes negative or non-significant. We thus demonstrate that controlling for population size is necessary to measure the true Tiebout effect.

Turning to flat owners, the effect of property tax rate difference on migration consistently remains positive across all age categories, regardless of the list of covariates. The mechanism

argued by Tiebout, that the positive effect of local tax rate on migration probability is explained by the fact that local taxes are used to finance public expenditures is only partially confirmed. The genuine Tiebout "voting with feet" effect is larger when considering commune size in conjunction with local public investment per capita, since the effect of property tax rate on migration is far more reduced by the introduction of local public investment per capita when population size is controlled for than when it is not. However, this confirmation is only partial for flat owners, since the effect of local property tax rate on migration remains positive when both local public investment per capita and population size (as well as other factors such as local unemployment rate, average income or flat prices per m²) are controlled for. This suggests some spurious correlation remains between property tax rate and some unobserved local amenities enjoyed by flat owners.

Our empirical findings strongly contradict the Tiebout "voting with feet" theory for house tenants. The effect of housing tax rate on migration is negative even when neither local public investment per capita nor any other local amenity is controlled for, and it is not significantly affected when controlling for local public investment per capita. These result holds all over the life cycle and whatever the other covariates.

Our empirical findings also strongly contradict Tiebout's "voting with feet" theory for house owners. On the one hand, when population size is not controlled, the effect of housing tax rate on migration is negative and hardly affected by local public investment per capita before 60. On the other hand, controlling for population size, the effect of housing tax rate on migration is positive and, once again, hardly affected when controlling for local public investment per capita before 60. The effect of property tax rate on migration remains significantly positive all over the life cycle when other covariates such as unemployment rate, average income or house price per m² are added.

Overall, our study illustrates the complex relationships between local tax rates, local public and private amenities, household head characteristics, tenure status, dwelling type, and migration behavior, offering original and valuable insights for policymakers and researchers in the field.

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8 Appendix

All tables in Appendix were computed by authors, using MIGCOM data provided by INSEE.

Table 3: Sample size

	15 - 29	30 - 44	45 - 59	+ 60	All Age
Flat tenants	628,414	507,349	300,995	287,365	1,724,123
Flat owners	209,971	374,128	308,552	533,829	1,426,480
House tenants	221,043	254,755	190,028	141,935	807,761
House owners	866,130	1,202,263	1,613,852	2,239,901	5,922,146
Social housing tenants	600,474	615,683	552,871	506,498	2,275,526
All tenure statuses	2,526,032	2,954,178	2,966,298	3,709,528	12,156,036

Table 4: Inter-commune migration rate, by age group

Migration	15 - 29	30 - 44	45 - 59	+ 60	Total
Migrant	384,255	262,462	122,392	101,732	870,841
Migration rate (%)	*13.80*	*8.41*	*3.95*	*2.57*	*6.72*
Non- migrant	2,399,175	2,857,669	2,974,717	3,845,452	12,077,013
Total	2,783,430	3,120,131	3,097,109	3,947,184	12,947,854

Table 5: Inter-commune migration rate, by diploma and age group

Diploma	15 - 29	30 - 44	45 - 59	+ 60	Total
Bac -	1,266,288	1,079,797	1,685,344	2,814,011	6,845,440
Migration rate (%)	*9.36*	*7.48*	*3.70*	*2.41*	*4.84*
Baccalaureate	740,625	632,888	488,569	464,199	2,326,281
Migration rate (%)	*14.36*	*8.26*	*4.24*	*2.88*	*9.94*
Bac +	776,517	1,407,446	923,196	668,974	3,776,133
Migration rate (%)	*20.50*	*9.19*	*4.24*	*3.05*	*9.58*

Table 6: Inter-commune migration rate, by tenure status and age group

Tenure Status	15 - 29	30 - 44	45 - 59	+ 60	Total
Owner	1,078,387	1,579,196	1,925,728	2,777,967	7,361,278
Migration rate (%)	*7.67*	*5.80*	*2.38*	*1.44*	*3.55*
Renter, private sector	853,236	765,325	494,321	445,577	2,558,459
Migration rate (%)	*23.43*	*15.07*	*10.13*	*6.99*	*16.13*
Renter, social sector	600,474	615,683	552,871	506,498	2,275,526
Migration rate (%)	*7.56*	*5.84*	*2.92*	*1.53*	*4.69*
Other[11]	251,333	159,927	124,189	217,142	752,591
Migration rate (%)	*22.31*	*12.14*	*8.16*	*10.41*	*17.12*

[11] It includes households housed for free, those living in a non-ordinary housing, those renting in an Ephad or in a "foyer" and tenants of dwellings with furnished accommodation.

Table 7: Inter-commune migration rate, by gender and age group

Gender	15 - 29	30 - 44	45 - 59	+60	Total
Man	1,401,807	1,535,698	1,509,040	1,710,354	6,156,899
Migration rate (%)	*13.14*	*8.82*	*4.04*	*2.49*	*7.32*
Woman	1,381,623	1,584,433	1,588,069	2,236,830	6,790,955
Migration rate (%)	*14.47*	*8.01*	*3.86*	*2.64*	*7.05*

Table 8: Inter-commune migration rate, by nationality and age group

Nationality	15 - 29	30 - 44	45 - 59	+60	Total
Foreigner	193,155	338,816	234,833	219,645	986,449
Migration rate (%)	*13.46*	*8.47*	*4.16*	*2.07*	*7.23*
French	2,590,275	2,781,315	2,862,276	3,727,539	11,961,405
Migration rate (%)	*13.83*	*8.40*	*3.93*	*2.60*	*7.18*

Table 9: Inter-commune migration rate, by family structure and age group

Family structure	15 - 29	30 - 44	45 - 59	+ 60	Total
Alone	363,395	448,785	573,794	1,248,591	2,635,086
Migration rate (%)	*26.11*	*10.94*	*6.00*	*2.60*	*9.69*
Mono parental	492,806	328,055	341,521	150,142	1,312,524
Migration rate (%)	*7.86*	*8.81*	*4.78*	*2.21*	*6.63*
Couple	1,742,693	2,248,938	2,096,061	2,334,484	8,422,176
Migration rate (%)	*12.09*	*7.74*	*3.13*	*1.92*	*5.91*
Other[12]	184,536	94,353	85,733	213,967	578,589
Migration rate (%)	*21.76*	*10.78*	*6.79*	*9.78*	*14.31*

Table 10: Inter-commune migration rate, by Socio-professional category and age group

Profession	15 - 29	30 - 44	45 - 59	+60	Total
Farmer	24,200	28,427	49,061	21,183	122,871
Migration rate (%)	*6.16*	*3.59*	*1.11*	*0.90*	*2.64*
Craftsmen, shopkeeper	151,371	201,546	234,115	73,278	660,310
Migration rate (%)	*8.76*	*7.34*	*4.00*	*2.54*	*5.95*
Manager - higher intellectual job	380,191	552,920	505,801	136,833	1,575,745
Migration rate (%)	*14.82*	*9.70*	*4.09*	*2.88*	*8.54*
Intermediate profession	612,235	753,706	656,574	148,603	2,171,118
Migration rate (%)	*15.97*	*9.02*	*3.96*	*2.76*	*9.02*
Employee	715,536	676,308	703,072	229,632	2,324,548
Migration rate (%)	*14.17*	*8.68*	*4.08*	*2.40*	*8.36*
Blue collar	654,321	716,986	661,709	137,267	2,170,283
Migration rate (%)	*12.95*	*7.39*	*3.58*	*2.39*	*7.59*
Retired	53,100	50,296	112,716	2,936,448	3,152,560
Migration rate (%)	*4.72*	*3.87*	*3.73*	*2.09*	*2.22*
Other[13]	192,476	139,942	174,061	263,940	770,419
Migration rate (%)	*13.83*	*8.03*	*5.22*	*8.11*	*14.40*

12 Outside ordinary housing.

13 Households without professional activity.

Table 11: coefficients measuring the effect of household heads characteristics on migration

	15 - 29	30 - 44	45 - 59	+ 60
Age	0.021***	-0.031***	-0.016***	-0.009***
Bac-	-0.147***	-0.045***	-0.069***	-0.095***
Bac+	0.091***	0.021***	-0.002	0.036***
Bac (Ref)	-	-	-	-
Renter, private sector	0.561***	0.510***	0.671***	0.724***
Renter, social sector	0.008**	0.032***	0.080***	0.053***
Other	0.517***	0.406***	0.542***	0.722***
Owner (Ref)	-	-	-	-
Woman	0.048***	-0.054***	-0.015***	-0.00004
Man (Ref)	-	-	-	-
Foreigner	-0.125***	-0.044***	-0.049***	-0.160***
French (Ref)	-	-	-	-
Alone	0.187***	0.056***	0.163***	0.006**
Mono-parental	-0.153***	0.083***	0.091***	0.012
Other	0.178***	0.058***	0.184***	0.326***
Couple (Ref)	-	-	-	-
Farmer	-0.288***	-0.355***	-0.412***	-0.269***
Craftsmen, shopkeeper	-0.165***	-0.058***	0.026***	0.023**
Manager - higher intellectual job	-0.067***	0.038***	0.029***	0.046***
Intermediate profession	0.004***	0.021***	0.007*	0.042***
Blue collar	0.003	-0.058***	-0.045***	0.005
Retired	-0.397***	-0.279***	0.091***	0.032***
Other	-0.156***	-0.158***	-0.068***	0.156***
Employee (Ref)	-	-	-	-
Intercept	-1.791***	-0.469***	-1.143***	-1.532***

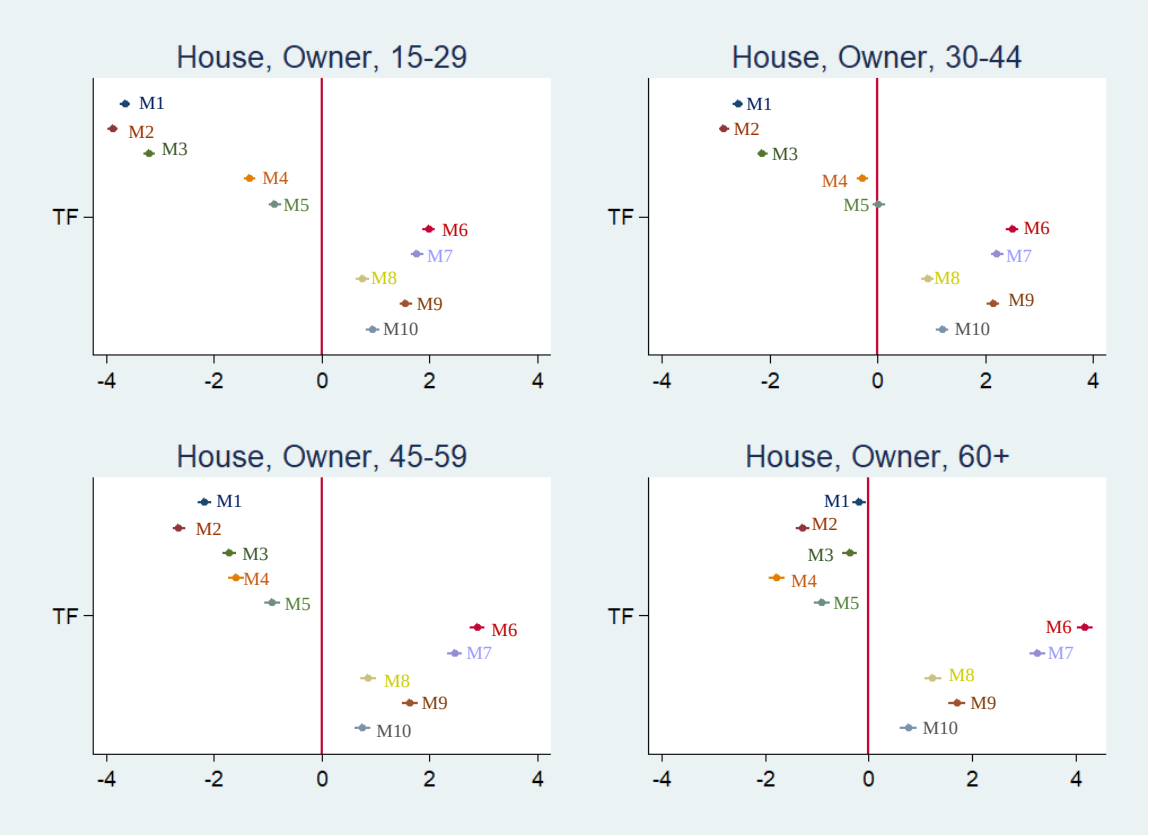
Table 12: Correlation between selected covariates at destination, by tenure and dwelling type

		HT	PT	Investment	Pop	Rent/Price
HT (Housing tax rate)		1.0000				
PT (Property tax rate)	Flat tenants	0.3730				
	Flat owners	0.3149				
	House tenants	0.5197	1.0000			
	House owners	0.5153				
	Tenants, social housing	0.3121				
Investment (Local public investment per capita)	Flat tenants	0.4532	0.2224			
	Flat owners	0.3870	0.1101			
	House tenants	0.5135	0.5177	1.0000		
	House owners	0.5155	0.4908			
	Tenants, social housing	0.3978	0.1484			
Pop (log(Population size))	Flat tenants	0.2517	0.1163	0.6773		
	Flat owners	0.2187	0.1389	0.6854		
	House tenants	0.3357	0.2232	0.5928	1.0000	
	House owners	0.3452	0.2412	0.5953		
	Tenants, social housing	0.2305	0.0738	0.6709		
Flat Rent/m²	Flat tenants	0.1676	-0.3266	0.2545	0.0015	
Flat price:m²	Flat owners	0.0790	-0.4395	0.2215	0.0338	1.0000
House Rent/m²	House tenants	0.2067	0.1014	0.4135	0.2407	
House price/m²	House owners	0.3035	0.1547	0.5685	0.3538	

Figure 10: Coefficient measuring the effect of housing tax rate on migration, house tenants

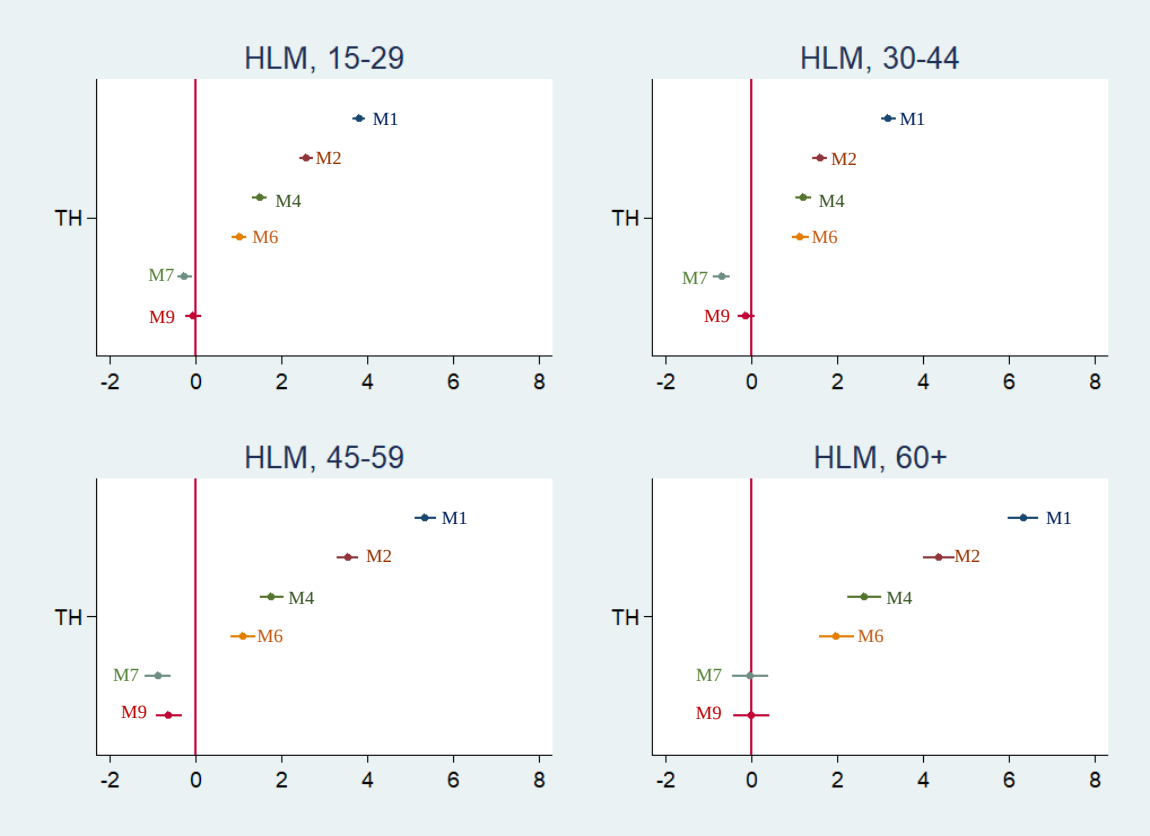
Source: Authors computations using MIGCOM data

Figure 11: Coefficient measuring the effect of property tax rate on migration, house owners



Source: Authors computations using MIGCOM data

Figure 12: Coefficient measuring the effect of housing tax rate on migration, tenants in the social housing sector



Source: Authors computations using MIGCOM data