The Distributional Impact of Local Taxation on Households in France

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Abstract – The distributive profile of local taxation on households results from three main determinants: the tax base (the rental value of occupied or owned properties), the schedule (of exemptions and reductions) and the differences between local rates. The overall contribution of local household taxes to the progressivity of compulsory levies in France is measured and broken down into the three determinants based on the Insee survey on income and living conditions (*Statistiques sur les ressources et conditions de vie*, or SRCV) at household level and comprehensive databases at the local authority level. The tax base has a regressive effect, partially offset by the schedule. Local taxes and average income increase with the size of inter-municipalities: territorial heterogeneity is thus characterised by levels of local tax per capita that tend to increase with per capita income. However, this increase is less than proportional to that of income, generating a ratio of local taxes to income that decreases with the level of average income in the inter-municipal area.

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During the 2017 French presidential campaign, the successful candidate made a commitment to exempting 80% of households from the housing tax, a local levy based on the rental value of occupied properties. The argument put forward by the campaign team was based on the regressive nature of the tax, which was seen as involving higher levies in poorer municipalities compared to affluent municipalities.[1]

The purpose of this paper is to measure the distributional impact of local taxes – specifically, housing tax and property tax – on households in France and to understand the determinants of their distributional impact. The distributional impact of a tax is measured by the distribution of the effort ratios for that tax – i.e. the amount paid relative to income – along the scale of living standards: the tax is progressive if the ratio increases with the standard of living and regressive if it decreases. Redistribution must be measured at the overall level of the tax and transfer system, the distributive profile of a tax being only its contribution to the general redistribution. It is not necessary for each individual tax to be redistributive, and indeed some may have other aims – such as the financial autonomy of local authorities and significant taxing powers at low economic cost – and their regressive aspect may be offset by other taxes or by the redistribution generated by the public spending they enable (Guillaud *et al.*, 2017).

The determinants of the distributional impact of a local tax can be of three kinds: the base, the schedule and the geographical variability of rates. In the case of France, the local taxation base governing levies on households is, in the case of housing tax, the rental value of the property occupied by households and, in the case of property tax, the rental value of the property they own. Local taxation on owned property is a common source of funding for local authorities internationally[2] and findings relating to the distributional impact of this type of base in France may apply more generally. While housing is typically considered to be a primary good, the consumption of which increases less quickly than income – which should lead to a regressive impact on the housing tax base – the impact of the property tax base is less clear cut since it is governed by two opposite effects: a home-ownership rate (the proportion of owner-occupiers) that increases with income, but owned property values that increase less quickly than income.

The second determinant is the schedule. Both taxes are essentially flat-rate taxes, but with exemptions and reductions based on income and household composition. Therefore, their schedules are constructed with the aim of achieving a progressive impact. The third determinant is the disparity in tax rates across the national territory and its correlation with the geographical distribution of household income. This question also extends beyond the borders of France and applies to all countries where local authorities enjoy fiscal autonomy: a correlation is typically found between local revenues and the funding needs of local authorities, meaning that the geography of local taxes has a distributional effect (Figure I). For example, Lewis (2001) and Zhao & Hou (2008) examined the case of consumption taxes in the United States, while Zhao (2009) complemented these studies by comparing the cases of China and the United States.

To measure the distributional impact of French local taxes and decompose their main determinants, this study draws on three databases. First, the survey on Households resources and living conditions (*Statistiques sur les ressources et conditions de vie,* SRCV*)* conducted by Insee at a household level is used to measure the overall distributive profile. For the sample of households, the impact of tax bases – the rental value of occupied properties and the proportion of owner-occupiers – can be determined, as can the impact of exemptions and reductions linked to family composition. However, because of the number of observations, the territorial division remains at a relatively aggregated level. The survey is used as a means of measuring the overall impact of the two taxes, these being slightly regressive, mainly on account of the low tax effort ratios of the top decile of the distribution of living standards. This is a consequence of the regressive impact of the tax bases, partially offset by the progressive impact of exemptions and reductions. For a given standard of living, the housing tax effort ratio increases with the size of the urban unit, while the property tax ratio

1. "Therefore, it is a regressive tax that generates further tax injustice. The housing tax also reinforces territorial inequalities. Taxpayers often pay far more if they live in a poor municipality than in an affluent municipality." *(En Marche, 2017). The exemption was enacted in stages by the Finance Act for 2018 No. 2017-1837 of 30 December 2017, with an initial reduction of 30% in 2018 followed by a 65% reduction in 2019 and, finally, a complete exemption from 2020 for households in the eight lowest deciles of the income distribution [https://www.impots.gouv.fr/portail/particulier/questions/suis-je-concerne-par-la-reforme-de-la-taxe-dhabitation].*

2. Similar taxes are levied in Germany, the United Kingdom, Sweden and Belgium.

is flat. For a given standard of living and size of urban unit, the effort ratios for both taxes are higher for households without children than for households with children.

To determine the impact of geographical disparities more specifically, two comprehensive databases at the local authority level are used. These two databases, produced by the General Directorate of Public Finance (in French, the *Direction Générale des Finances Publiques*, or DGFiP), aggregate data from household income tax returns on the one hand and data from local budgets on the other hand at the level of each local authority. The analysis is conducted at the level of "municipal blocks", i.e. the fiscal consolidation of municipalities and inter-municipalities. The evidence suggests that both public expenditure and local taxes per capita increase with the size of the municipal block. They also increase with average per capita income, but only because of the positive correlation between average income and the size of the municipal block. However, the growth in taxes per capita in line with income is relatively limited while the tax effort ratio follows a downward trend, underlining the slightly regressive contribution of local tax disparities.

The remainder of the paper is structured as follows. Section one presents the theoretical arguments explaining the distributive profile of property tax and housing tax. The databases used are then presented in a second section. The third section uses household-level survey data to measure the overall distributive profile and determine the contribution of the base and of exemptions and reductions. Section four uses data at the local authority level to document the impact of geographical disparities. The last section concludes and discusses the implications of the results.

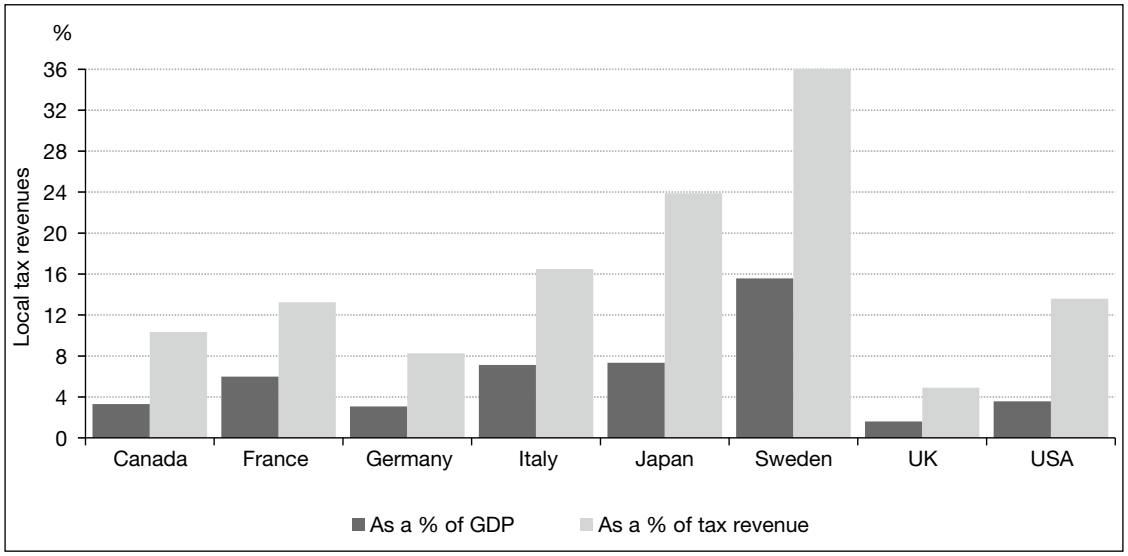
Theoretical Arguments on the Distributive Profiles of Local Taxes

The distributive profile of local taxes depends on three main determinants: 1) the tax base; 2) the schedule; 3) territorial disparities in the tax burden.

The Property and Housing Tax Base

When the base is not directly household income – as is the case in Switzerland – it can have a distributional impact depending on the correlation between the distribution of the base and the distribution of living standards. In France, as in many other countries, local household taxes are tied to property – in this case, to the rental value of properties, i.e. occupied properties in the case of housing tax and owned properties in the case of property tax.

Figure I
Local Levies in OECD countries, 2016



Coverage: Taxes levied to fund municipalities, inter-municipalities and counties (not *departments*, regions, provinces or states).
Sources: OECD, Revenue Statistics - Comparative tables.

The housing tax base increases with the taxpayers' standard of living, albeit at a lower rate than their income. Wealthier households live in more expensive properties, but the differences in rental values are smaller than the differences in income: the income elasticity of housing expenditure is positive but lower than the unit. Thus, the housing tax effort ratio – the housing expenditure-to-income ratio – decreases with the standard of living (Pirus, 2011 and Figure II-B), hence the regressive impact of the housing tax base.

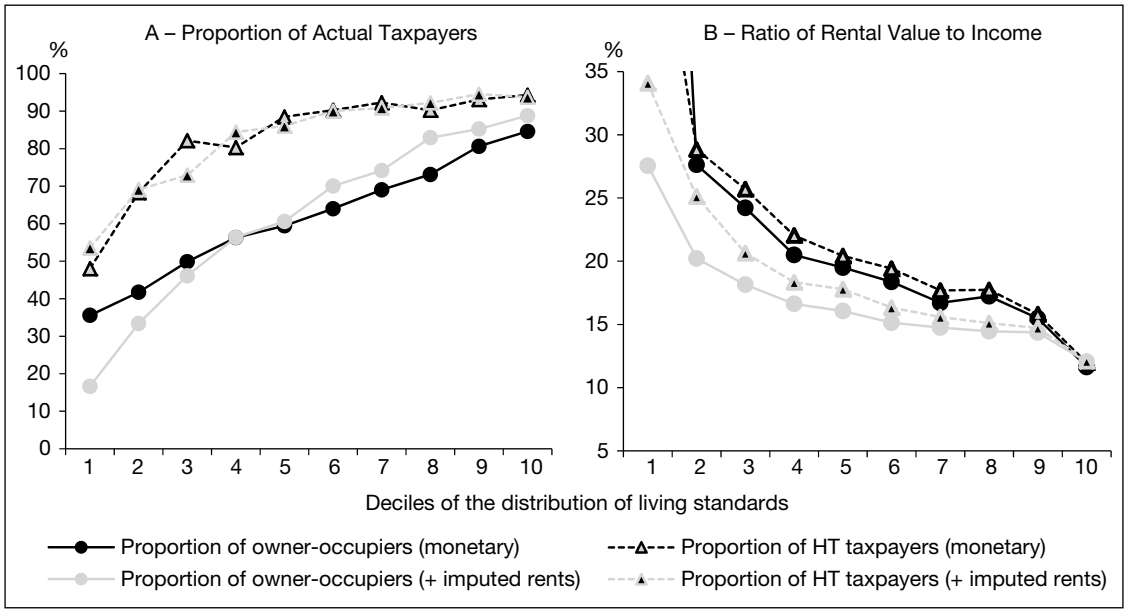
The case of property tax is markedly different since the base is the rental value of owned (rather than occupied) properties. In addition to the growth in property values in line with income, the growth in the proportion of households that own their property also needs to be considered (Figure II-A). However, the homeownership rate is not negligible even at the bottom of the distribution of living standards: one-third of households in the bottom decile and more than half from the fourth decile upwards own the property they occupy. In other words, there are two opposing effects: the decline in the value of owned property in proportion to income (among owner-occupiers, Figure II-B) and the increase in the proportion of owner-occupiers (homeownership rate).

In addition, property taxes apply not only to primary residences but also to secondary residences and rented properties. However, the effect remains limited since, for the nine lowest deciles of the distribution of living standards, 93% of the net value of owned properties was occupied by their owner in 2014 and made up more than two-thirds of the owner's assets (Garbinti *et al.*, 2016). The situation is different for the top decile, where ownership of rental property is more common but where property represents a far smaller proportion of total assets: one third for the top decile as a whole, one fifth for the top percentile and 12% for the top tenth of the top percentile. The wealthiest households mainly own movable property. Therefore, this paper does not examine the taxation of the estate as a whole (total assets), focusing instead on the primary residence.

Property and Housing Tax Schedules

The second determinant – the schedule – mainly consists of a single rate set at a local

Figure II
Parameters of Local Tax Bases According to Standard of Living



Note: In order to show all the graphs in the same scale and keep the curves visible, the values of the ratio (without imputed rents) for decile 1 are not represented in graph B for owner-occupiers and HT taxpayers; they are, respectively, 99% and 53%.
Coverage: Metropolitan France.
Sources: SRCV 2014.

level and exemptions and reductions set at the national level. In the case of housing tax, until the last reform exempting the least affluent households, a deduction was applied to the base based on the number of dependent children (10% of the average rental value in the municipality for each of the first two children and 15% for the following children). The elderly and the disabled were exempted from property tax and housing tax if the previous year's taxable income was below a given ceiling (€10,686 for a single person and €16,392 for a couple[3]). Other households could benefit from a housing tax ceiling equal to 3.44% of the previous year's taxable income if the latter was below a given ceiling (€25,130 for a single person and €36,872 for a couple plus €4,621 per dependent child). The effect of these schedules was to redistribute the income of middle- and high-income households towards low-income households and large families. In 2014, 82.7% of households were subject to housing tax and 56.9% to property tax. The latter figure is relatively close to the proportion of owner-occupiers since very few households are exempted: even in the lowest decile of the distribution of monetary living standards, the property tax exemption applies to just 5.8% of households (and just 2.0% of the lowest decile of the distribution of living standards including imputed rents), corresponding to 16.3% of owner-occupiers in this decile (12.2% including imputed rents).

Disparities in Local Tax Rates

The third determinant involves the possible territorial correlation between per capita income and the level of local taxes. The correlation may be due to a commitment to redistribution through grants to local authorities (mainly the General Operating Grant, known in French as the *dotation globale de fonctionnement*, or DGF) or to a correlation between local public expenditure and per capita income. Some inter-municipalities also operate on the basis of an equalisation between their municipalities through the Community Solidarity Grant (in French, the *dotation de solidarité communautaire*, or DSC), although local transfers remain limited relative to the equalising power of national grants (Frinault & Reigner, 2010; Reigner *et al.*, 2010).[4]

As for the possible correlation between local public spending and per capita income, the literature provides several explanations. The first goes back to Tiebout's (1956) seminal contribution on voting with the feet. Since then, research has shown that differences in preferences for local public goods can lead to economic segregation if marginal rates of substitution between public and private goods are ordered according to income (Westhoff, 1977; Gravel & Thoron, 2007). Segregation is exacerbated when endogenous variations in land prices are taken into account, without changing conditions (Rose-Ackerman, 1979; Calabrese *et al.*, 2006). Such segregation leads to a variation in local taxes directly dependent on per capita income and may be positive or negative depending on the sign of the correlation between income and the marginal rate of substitution between public and private goods: wealthier households may be more willing to pay for public goods than less wealthy households because they are able to acquire enough private goods and use local amenities; conversely, they may be less willing to pay because they prefer private substitutes to local public goods, viewed as being better suited to their individual preferences.

A direct link between local taxes and income may also arise from the need for large social budgets in municipalities with larger shares of poor households. Furthermore, the cause of segregation may be more related to socio-professional characteristics than to preferences in the territorial distribution of productive activities (Berry & Glaeser, 2005; Wheeler, 2005): if firms benefit from productivity gains related to sectoral agglomeration, geographical segregation may arise on the basis of the skill profiles of the labour force required by different industries. This can impact not only on average household income but also on local public spending since the latter represents both amenities for households and public factors for private production. This type of explanation is consistent with the main results of the geographical economy: two relationships exist in parallel, the first between agglomeration and productivity (and therefore per capita income), the second between agglomeration and local public investment needs, particularly to combat congestion (Ciccone, 2002; Martin *et al.*, 2011; Duranton & Puga, 2014).

3. These are the applicable ceilings for the 2014 housing tax; see https://www.impots.gouv.fr/portail/questions/theme/taxe-habitation/87

4. The empirical analysis focuses on municipal blocks (the fiscal consolidation of municipalities and inter-municipalities), thereby neutralising the DSCs: only government grants are considered.

The "zoo" effect (Oates, 1988) may also account for the correlation indirectly. The idea is that larger local authorities can offer their citizens the same public goods as smaller authorities and in greater quantities, but they can also offer new kinds of public goods (such as a zoo): the provision of public goods increases with size in the intensive and extensive margins. This was first observed by Schmandt & Stephens (1960) in the case of municipalities in Milwaukee County and, more recently, in France by Frère *et al.* (2011). In addition, the growth in local public expenditure per capita with population size – whether due to the zoo effect or congestion – can, in practice, be financed because of the decrease in the effects of local tax competition in line with the size of the regional authority (Carbonnier, 2013; Frère *et al*., 2014; Breuillé *et al*., 2018).

The different theoretical explanations presented in this section have different potential effects in terms of the distributive profile of local taxes. The empirical analyses in the remainder of the paper aim to document the correlation between local taxes and income with a view to testing the applicability of the different theoretical explanations to the case of France.

Data and Descriptive Statistics

To conduct the empirical analysis, two types of databases are used. The SRCV survey documents resources and transfers for a sample of households. Furthermore, databases at a local authority level ("Local authority accounting" and "Municipal income tax" – in French, *Impôt sur le revenu des communes*, or IrCom) are exhaustive and accurate from a geographical point of view, although the data are aggregated at a municipal level and conceal infra-municipal disparities. The focus of the analysis is the 2014 iteration, the most recent iteration common to all bases.

The SRCV survey provides information on local income and taxes paid by a sample of households, the characteristics of which are known in terms of family composition, homeownership and location (Box). The database also contains the rental value of the property, allowing for income and standard of living including imputed rents to be calculated.[5]

5. The equivalence scale used is the scale commonly used by Insee, the OECD-modified equivalence scale recommended by Eurostat: 1 for the first adult and 0.5 for any additional individuals if they are aged over 14 and 0.3 if they are aged under 14. http://www.insee.fr/en/methodes/default.asp?page=definitions/unit-consumption.htm

Box – **The SRCV Survey**

The SRCV survey is a face-to-face survey conducted every year by Insee among approximately 11,000 households. The survey collects information on material living conditions (income and transfers, dwelling size and associated expenditure) as well as the surveyed households' subjective perceptions of their standard of living. Most of the income and social transfer variables are matched with administrative sources.

A disposable income variable consisting of all declared income is thus constructed, including capital gains and allowances, from which direct taxes (including social contributions but excluding consumption taxes) are deducted. Based on this variable (referred to hereinafter as disposable monetary income), we calculate disposable income including imputed rent, which measures the benefit derived from a property below fair market value. Imputed rents are calculated on the basis of the rental value of occupied properties, estimated by Insee using hedonic regressions on an external source: the Housing survey[(a)]. For homeowners or households housed below fair market value (mainly social housing), the difference between housing costs and property rental value is added as income in kind. The costs taken into account for owner-occupiers include the interest on loans taken out to purchase the property but not the repayment of the principal. This is because such repayment increases the net wealth of the household, meaning that it is not a cost but a saving.

The principle of taking imputed rent into account has long been advocated in the literature, for both national accounts (Eisner, 1988) – which is now the case in most developed countries – and measuring income distributions (Yates, 1994). Homeownership is very strongly related to inequalities in living standards (Bonnet *et al.*, 2018; Carbonnier, 2015, 2017, 2018). The key idea is that a household's disposable income is the sum of its consumption and the increase in its net wealth. Thus, the consumption of services in one's own property is income in kind, from which financial costs must be subtracted. Similarly, the rental value of properties for households housed free of charge (or the difference with the rent for households benefiting from low-rent housing) must be added to income to properly measure the standard of living.

(a) http://www.insee.fr/en/methodes/default.asp?page=definitions/enquete-logement.htm

Income including imputed rent can be calculated using the SRCV survey but not with databases at the local authority level. As such, analyses based on data from local authorities only consider monetary income and analyses based on household data compare results for monetary income or including imputed rents. The two income measures (monetary or including imputed rent, respectively) are used to calculate the effort ratios for local taxes, which correspond to the payment of tax relative to income (monetary or including imputed rent, respectively).

Two important clarifications need to be made about the local tax measures used in the analysis at the household level. First, the amounts are derived from administrative data for housing tax but are reported by the households surveyed for property tax. Second, the amounts relate only to taxes paid in respect of the primary residence. Since primary residences account for the vast bulk of the housing stock, the weighted sums of taxes measured in the survey correspond to 89.4% of the amounts collected in housing tax and 88.6% of the amounts collected in property tax as measured in the national accounts.

Finally, the size of the urban unit[6] of residence is taken into account based on five categories: rural municipality (less than 2,000 inhabitants), small unit (2,000 - 19,999 inhabitants), medium unit (20,000 - 99,999 inhabitants), large unit (more than 100,000 inhabitants excluding Paris – the largest being Lyon with 1,620,331 inhabitants in 2014) and Paris (10,659,489 inhabitants in 2014).

Local Authority Data

Two administrative databases are used. The "Local Authority Accounting" database (in French, *Comptabilité des collectivités locales*) collates the local budgets filed by the DGFiP on a dedicated website.[7] For each level of local government, the aggregate values of the different categories of expenditure (personnel, investment, purchases, financial costs, etc.) and revenue (grants and different local taxes) as well as debt levels and flows are reported. The "Municipal Income Tax" (or IrCom) database is built by the DGFiP by aggregating tax return data at the municipal level. The database contains the number of tax households and households, as well as the breakdown of local populations by declared income segments. It also includes the sum of income declared by households in the municipality and their breakdown into wages, pensions, capital income and social transfers.

Since the revenue and expenditure of the two most decentralized levels are closely linked, the budgets of municipalities and inter-municipalities are consolidated; the territorial level examined here is precisely the resulting consolidation, termed "municipal block". The fifty municipalities (including Paris) that did not belong to any inter-municipality in 2014 are considered to be standalone municipal blocks. The two administrative databases are matched at the municipal block level. Local taxes are calculated in terms of per capita revenue but also in proportion to the total income of households across the municipal block. The ratio of local taxes to income is interpreted as a proxy for the local average tax effort ratio, although it differs from the effort ratios actually calculated in the analysis at the household level. For housing tax, variables at the municipal block level include taxes on second homes (potentially paid by households in other municipalities) and the proportion of tax reductions offset by the national budget (not paid by municipal block households). For these reasons, the housing tax data from these databases exceed the national accounts by 15.0%. For property tax, the difference with the national accounts is significantly smaller: the sum of the property taxes recorded in the base represents 97.9% of the total revenue.

Despite these weaknesses, the analysis at the municipal block level complements and explains the results at the household level. Although a portion of the measured taxes is paid by households residing outside the municipal block, the proportion relative to the total is very low. In addition, examining local tax levels in relation to the socio-demographic characteristics of municipal blocks – in terms of size, per capita income, local business tax base and grants – allows for the territorial effects that appear in the household analysis to be documented. They also provide empirical

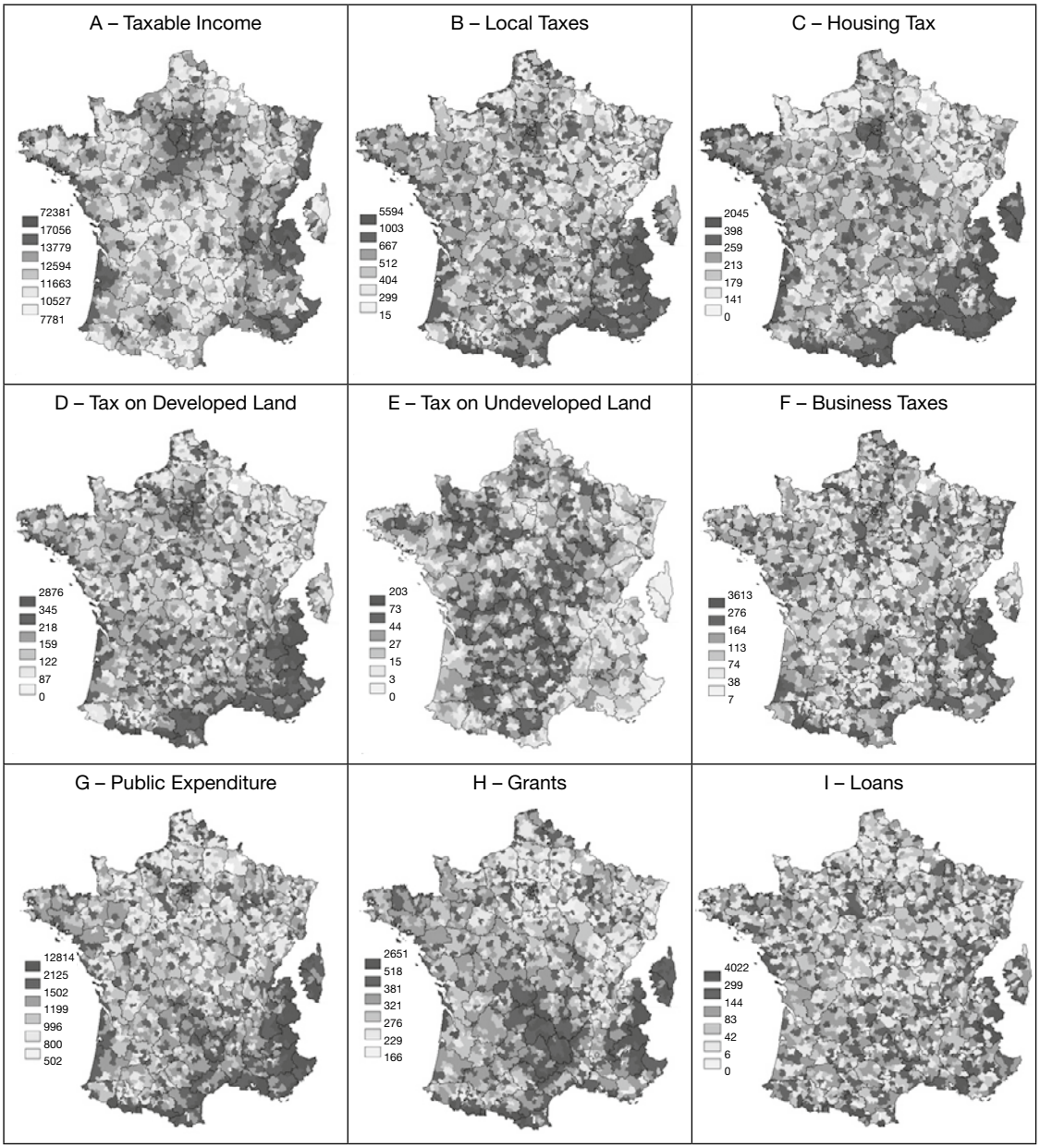
6. Urban units are determined by Insee according to the continuity of built-up land: properties situated less than 200 metres apart are considered to be part of the same urban unit. http://www.insee.fr/en/methodes/default.asp?page=definitions/unite-urbaine.htm

7. For the year 2014, four inter-municipalities are not included in the database because of changes in their composition: the CC (Community of Communes) of the Pays Rethelois, the CA (Conurbation Community) of Charleville-Mézières-Sedan, the CA of Colmar and the CC of Vinça-Canigou. These make up 0.4% of the population of France.

insight into the respective contributions of the theoretical determinants presented in the previous section.

Figure III shows the distribution of household income and the different characteristics of local governments at the municipal block level. The west of the Paris region, the Côte-d'Azur and the south Atlantic coast, as well as the German and Swiss borders, appear to be the most affluent regions. The major urban agglomerations also stand out (the rest of the Paris agglomeration, Caen, Rennes, Nantes, Bordeaux, Pau, Toulouse, Montpellier, Aix-en-Provence, Grenoble, Lyon, Clermont-Ferrand and Dijon). The two notable exceptions are Marseille and Douai-Lens. By contrast, rural areas are found to be less affluent than the rest of France.

Figure III
Maps of Local Authority Public Accounts in 2014



Notes: Values in euros per capita. Business taxes include corporate property tax (in French, *contribution foncière des entreprises*, or CFE), business value-added tax (*cotisation sur la valeur ajoutée des entreprises*, or CVAE) and the flat-rate tax on network companies (*imposition forfaitaire sur les entreprises de réseaux*, or IFER). These three taxes, along with property tax and housing tax, account for 98.3% of local taxes, the remainder being made up of a large number of very small taxes.
Coverage: Municipal blocks in metropolitan France.
Sources: DGFiP 2014.

The map of local taxes differs from the income map: the area of the Paris region with a high level of local taxes per capita is more concentrated towards the centre than the high-income area; the Alpine and Pyrenean regions levy high local taxes, as does the entire Mediterranean region – and not only the Côte-d'Azur. The distributions of property and housing tax are very similar to those of all local taxes, but differ significantly from the distribution of the tax on undeveloped land, which is highly concentrated in rural areas.

Despite very different profiles for grants, the tax and spending maps are largely similar. Grants are high in mountainous regions but do not offset the very high level of local public spending, and these regions levy large amounts of local taxes per capita.[8] However, the impact of grants is visible in large urban areas with poor households, such as Lille and Marseille. Both metropolitan areas have some of the highest levels of local public expenditure but relatively low local taxes.

There also appears to be a link between income distribution and urban density. Figure IV directly illustrates the existence of this link. The municipal blocks are arranged into 21 groups: Paris is isolated while the others are ordered according to the number of inhabitants and grouped to ensure each group has the same number of inhabitants.

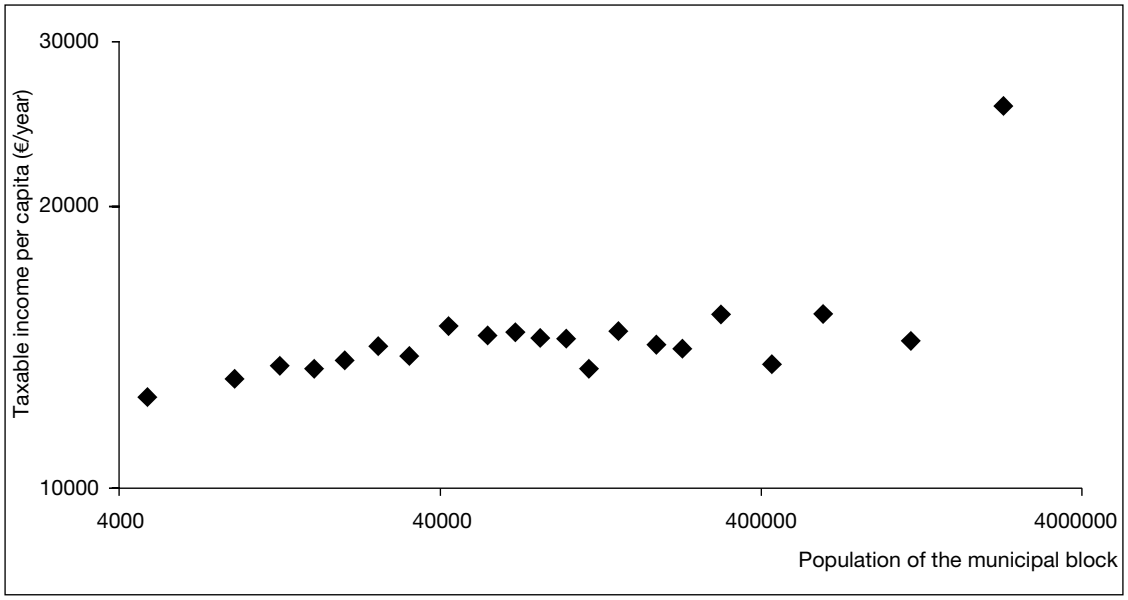
This figure only partially confirms the correlation. The relationship between municipal block size and per capita income is clearly stronger in the case of the smallest municipal blocks – i.e. up to 50,000 inhabitants – representing 40% of the population: the annual taxable income per capita increases from €12,500 to €15,000. The larger municipal blocks – representing 60% of the French population – show a per capita income of €15,000 (excluding Paris, which is both far more populous and much more affluent). However, although the largest agglomerations have the highest income levels, they are also where the greatest inequalities are found (Garnier & Kaldi, 2017).

Measuring the Distributive Profile of Local Taxes at the Household Level

In this section, the SRCV data are used to understand the distributive profile of local

8. *However, the perimeter of high local tax levels in the Massif Central is more concentrated around the Cantal* department *than the perimeter of high local public spending and grants.*

Figure IV
Correlation Between Municipal Block Population Size and Per Capita Income



Notes: The values are the averages for 21 groups of municipal blocks: Paris on the far right and 20 groups of the remaining municipal blocks ordered by size, ensuring that the total population is the same in each group.
Coverage: Municipal blocks in metropolitan France.
Sources: DGFiP 2014.

taxes and to break it down into its main determinants. The next section focuses more specifically on documenting the geographical determinant using the databases at the inter-municipal level.

Decomposition of the Distributive Profile of Local Taxes

The first step involves assessing the average effort ratio for property tax and housing tax for each standard-of-living decile (Figure V). In practice, the effort ratio is regressed on a set of decile indicator variables, with the top decile as a reference. This "gross" profile is represented by the "All households" curve in Figure V. For each tax, two specifications are implemented according to the measure (monetary or including imputed rent) of the standard of living.

Housing tax is found to be generally regressive: the parameters of each decile are positive and significant, meaning that the upper decile has a lower average effort ratio than the rest of the distribution of living standards. On the other hand, the effort ratio is relatively stable between the other nine deciles, very flat between the fifth and ninth deciles and higher for the three lowest deciles. The regressive profile is reduced but remains when imputed rents are taken into account.

To test the distributional effect of housing tax exemption, a similar regression is estimated solely on actual taxpayers (grey curve with black round dots). The regressive profile is clearly amplified, especially at the bottom of the distribution: the effort ratio for non-exempt households is very high and follows a downward trend from deciles one to four and stable from deciles four to nine before falling in the top decile. Here too the profile is robust to the measure of living standards. The increase in regressivity when taking into account actual taxpayers only reflects the progressive impact of housing tax exemptions. In what follows, further estimates are carried out by successively adding controls for household composition (cf. Figure V) and the size of the urban unit of residence. None of these additions substantially alter the profile of the curves, underlining the limited impact of these characteristics on the distributive profile of housing tax. Lastly, a final set of estimates is provided by adding a control for the rental value of the property relative to household income.[9] The effect is that the distributive profile is radically transformed for monetary living standards but not for living standards with imputed rents. In the case of monetary income, the profile becomes flat: the regressive nature of housing tax between actual taxpayers is entirely due to differences in effort ratios for housing.

To summarize the results, the distributive profile of housing tax relative to monetary living standards is slightly regressive due to the very regressive impact of the base – the rental value of the property – partially offset by the progressive impact of exemptions. However, the inclusion of imputed rents yields a different picture. The generally slightly regressive profile is maintained, as is the progressive impact of exemptions, but the latter appears to offset not the effect of the base but the residual distributive profile – possibly because of a link with local rate differences. One possible explanation is that most households – and even more so actual taxpayers – are homeowners: for them, the effort ratio for housing includes the rental value in both the numerator (housing value) and the denominator (imputed rent), which reduces the correlation with the housing tax effort ratio. On the other hand, the significant differences in rental values and homeownership rates between local areas – and, consequently, the significant disparities in living standards including imputed rents – can help to explain the residual regressive profile of housing tax linked to geography.

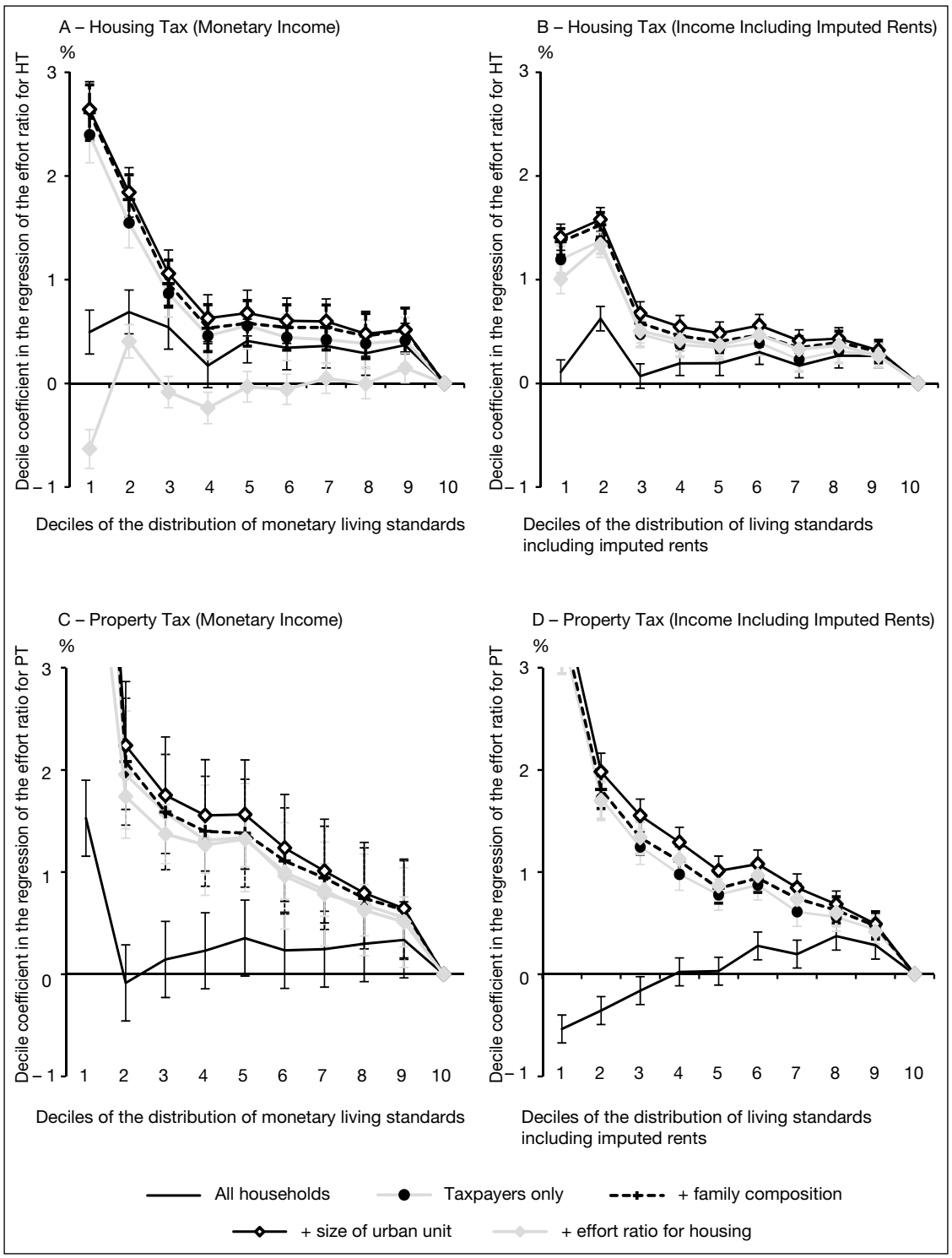
The case of property tax is different. The overall distributive profile is not independent of the measurement of living standards. The effort ratios of deciles two to nine of the distribution of monetary living standards are not significantly different from the effort ratio of the top decile because of large standard deviations, while the effort ratio is significantly higher for the bottom decile. By contrast, the effort ratio increases significantly along the distribution of living standards including imputed rents of deciles one to eight before decreasing significantly for the two highest deciles.

The results of the estimations on actual taxpayers[10] are indifferent to the inclusion of control and the measurement of living

9. Rental value is the value of rent for tenants at fair market value, imputed rent for owner-occupiers and the sum of the actual and imputed rents for tenants below fair market value.

10. This study only considers property tax on the primary residence, meaning that actual taxpayers are non-exempt owner-occupiers.

Figure V
Distributive Profile of Property Tax and Housing Tax



Notes: Coefficients of the regression of the effort ratio for local taxes on the indicator variables of the deciles of the distribution of living standards (decile 10 as a reference), the error bars indicate the 95% confidence intervals: black diamonds, all households without control; dark diamonds bordered with light shade, only taxpayers without controls; crosses and dotted lines, only taxpayers with controls for family composition; light diamonds bordered with dark shade, only taxpayers with controls for family composition and urban unit size; light grey diamonds, only taxpayers with controls for family composition, urban unit size and effort ratio for housing. To present all the results with the same scale, the coefficient values for decile 1 in graphs C and D are only represented for all households and without controls.
Coverage: Households in metropolitan France.
Sources: SRCV 2014.

standards, giving a strongly regressive profile.[11] Of course, this does not mean that property tax amounts decrease with the standard of living of homeowners, but that property tax increases at a slower rate than taxpayer income, leading to a decrease in the effort ratio in line with the standard of living of taxpayers.

The Impact of the Occupancy Status of the Property

The distributive profile of property tax is the result of the regressive profile between actual taxpayers and the proportion of actual taxpayers per decile. The proportion of actual taxpayers – which is very close to the proportion of owner-occupiers[12] – is linked to the difference between monetary living standards and including imputed rents. This explains the difference between the two distributive profiles of property tax and the fact that it is observed mainly at the bottom of the distributions: since monetary income is low at the bottom, potential imputed rents can represent a significant proportion of total income.

As shown in Figure II, the homeownership rate is low in the bottom decile of the distribution of living standards including imputed rents (one sixth) but is not negligible in the bottom decile of the distribution of monetary living standards (one third). This explains why the average cost rate for property tax is so high for the bottom decile of the distribution of monetary living standards and why it is low for the bottom decile of the distribution of living standards including imputed rents. The occupancy status of the property may also be important for the distributive profile of housing tax – even if the profiles with and without imputed rents are similar. To test this factor, Figure VI shows a direct comparison of housing tax effort ratios for tenants and owner-occupiers.

The differences between tenants and owners are limited and non-significant. The curve profiles in Figure VI are similar to those in Figure V regardless of the occupancy status of the property. In fact, a difference is found in the lower decile of the distribution of monetary living standards. Since it applies equally to all households and to actual taxpayers only, the difference is not due to a different exemption rate between tenants and owners, but probably to differences in the rental value of properties rented or owned by households in the lower decile. However, the general results presented above remain valid regardless of the occupancy status of the property.

Other Determinants of the Local Tax Effort Ratio

Adding control variables to the regressions presented above does not alter the distributive profiles of local taxes. For local taxes, this does not mean that these household characteristics have no impact on their effort ratios, but only that the impact is the same for households in different deciles. Figure VII presents the coefficients estimated for family composition and the size of the urban units in the regressions of the local tax effort ratio with all control variables. Therefore, the coefficients measure the impact of these determinants *ceteris paribus*, in particular at a given standard of living.

The results do not depend on whether exempt households or imputed rents are included, indicating that neither the proportion of households exempt from housing tax nor the proportion of owner-occupiers significantly influences the effort ratio differences according to family composition and the size of the urban unit. By contrast, the results for property and housing tax differ significantly. The effort ratio for housing tax increases significantly and continuously with the size of the urban unit, unlike property tax.

The profiles according to family composition are similar: for both singles and couples, effort ratios are higher for families without children than for those with children. This can be partly explained by an age composition effect: older households living in larger properties no longer have dependent children. However, the cases of singles and couples are not identical. First, with the same number of children, singles have a higher effort ratio for housing tax but a lower ratio for property tax compared to couples. Moreover, while no differences are found between couples with one or two children and those with more than three children with regard to property tax, large families appear to benefit from a lower effort ratio for housing tax. This is because base reductions

11. To compare the distributive profiles and provide a clear view of the variations between deciles two to ten, the y-axis is the same for all the graphs, ranging from -1% to 3%: the coefficients of the effort ratio for property tax for actual taxpayers are not represented for the bottom decile since they exceed 3%; they stand at 3.5% when including imputed rents and at 7% otherwise.

12. Exemptions exist, but only for very poor households and the disabled.

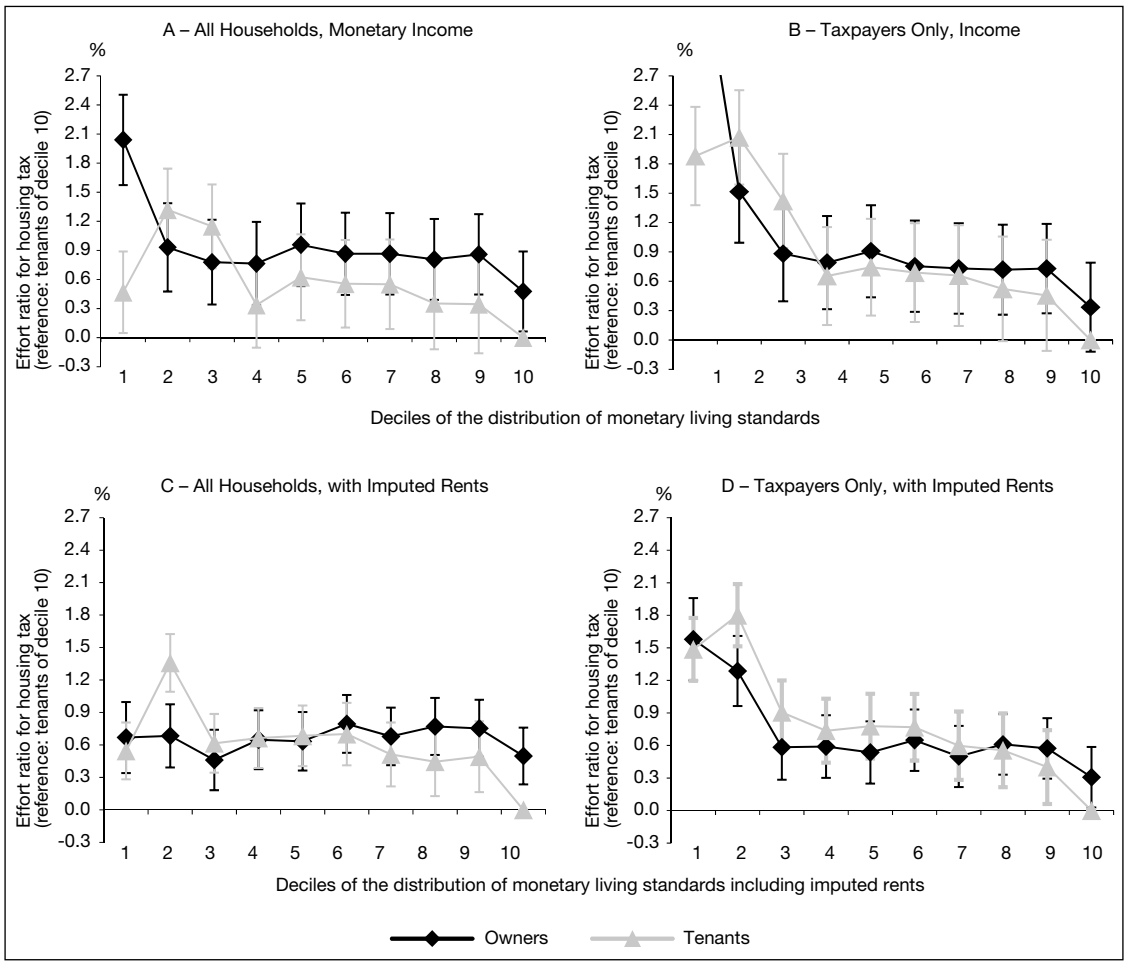
per dependent child exist for housing tax but not for property tax.

Rate Disparities and the Distributive Profile of Local Taxes

The analysis conducted so far at the household level does not point to a distributional impact of rate disparities between different areas according to the degree of urbanisation. However, the increase in the effort ratio in line with the size of the urban unit of residence is significant in the case of housing tax (but not in the case of property tax). Figure IV shows a positive correlation between municipal block size and per capita income. Several theoretical explanations have been proposed pointing to a territorial correlation between local taxes and per capita income, including preferences for public goods that vary with income and a double correlation between, on the one hand, municipal block size and per capita income and, on the other, between municipal block size and local public spending (due to the zoo effect or to fight congestion). The commitment to equalisation through grants to local authorities can also have an influence.

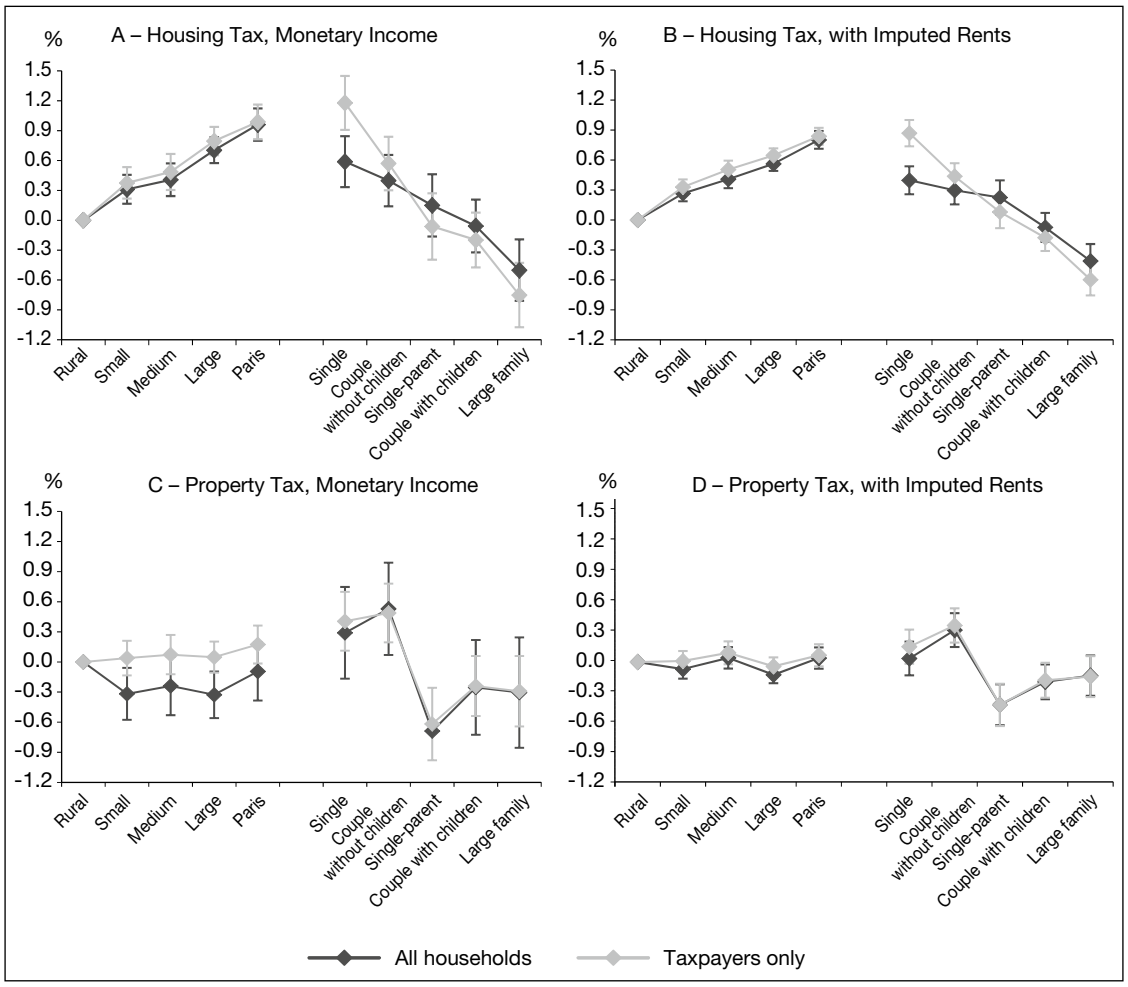
To test these theoretical hypotheses, databases will now be used at the municipal block level to compare average income with local authority budgets. The data on local taxes differ slightly from those used previously in that they relate to all actual revenue and not only to revenue levied on primary residences. However, it was

Figure VI
Distributive Profile of Housing Tax According to the Occupancy Status of the Property



Notes: Coefficients of the regression of the effort ratio for housing tax on the cross-tabulation of the indicator variables of the deciles of the distribution of living standards with the indicator variables of property occupancy status (decile 10 of tenants as reference), the error bars indicate the 95% confidence intervals. In order to show all the graphs in the same scale and to keep the curves of graph B visible, the effort ratio is not represented for decile 1 (4.3%).
Coverage: Households in metropolitan France.
Sources: SRCV 2014.

Figure VII
Determinants of the Effort Ratio for Property Tax and Housing Tax



Notes: Coefficients of the regression of the effort ratio for local taxes on the cross-tabulation of the urban unit size and family composition indicator variables, with control, for the income decile, of the deciles of the distribution of living standards, the error bars indicate the 95% confidence intervals.
Coverage: Households in metropolitan France.
Sources: SRCV 2014.

shown above that local taxes related to the primary residence account for the vast bulk of actual revenue, meaning that the vast bulk of local authority revenue levied on households is actually paid by local residents.

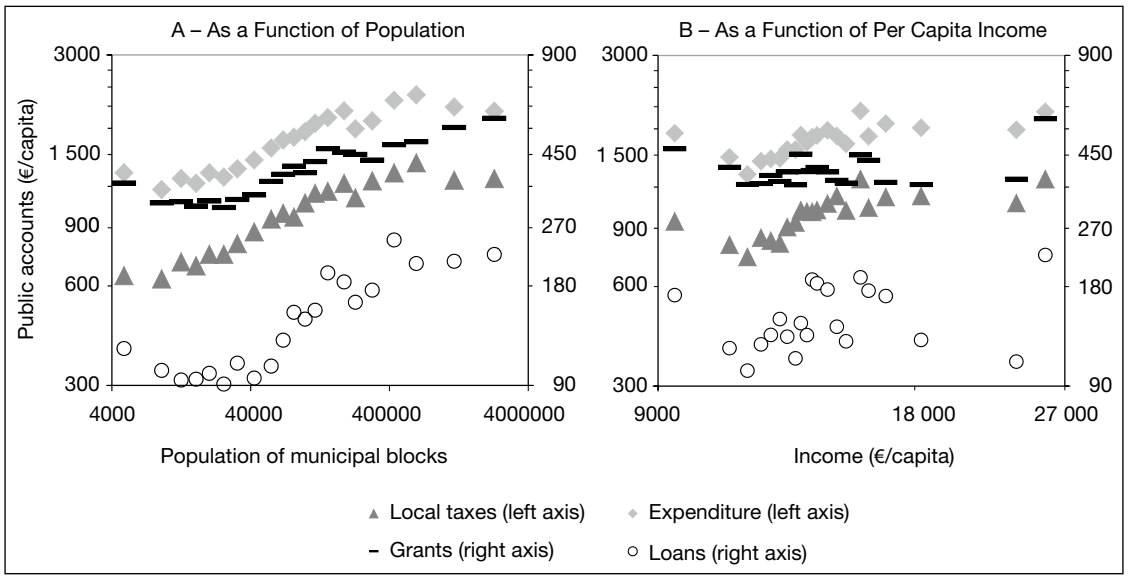
Composition of Municipal Block Budgets

First, four components of the budgets of municipal blocks are examined, including expenditure on the one hand and three types of resources on the other: local taxes, grants and loans. Figure VIII shows average values according to population quantiles (Figure VIII-A) and per capita income (Figure VIII-B).

The four components increase with municipal block population size, excluding the two extremities, i.e. the quantile of the smallest municipal blocks on the one hand and Paris on the other. The relationship with per capita income is less clear-cut. There is no trend for either loans or grants. However, the middle of the income distribution (excluding the first three and last five quantiles) shows an increasing trend. The top of the distribution is constant. The bottom shows an opposite trend: the poorest municipal blocks have higher levels of expenditure, local taxes and grants than the wealthiest municipal blocks.

Regressions are used to test the significance of the trends and measure the interaction of

Figure VIII
Accounts of Municipal Blocks in 2014



Notes: Per capita value of the components of municipal block accounts by quantile (20 quantiles plus Paris) of population and per capita income.
Coverage: Municipal blocks (consolidation of municipalities and inter-municipalities) in metropolitan France.
Sources: DGFiP 2014.

the two explanatory variables (Table 1). The separate regressions for per capita income and population confirm the results of Figure VII: all the explained variables increase with municipal block population size and per capita income. The average range is a 10% increase in local expenditure when the population doubles and a 3% increase when average income increases by 10%. For local taxes, we find an increase of 11% when the population doubles and a 6% increase when the average per capita income increases by 10%.

However, the link with income is influenced by the correlation with population: the income coefficient is cancelled out (expenditure) or even becomes negative (grants and loans) when population is controlled for. The income coefficient is halved, but remains significantly positive in the case of local taxes. By contrast, the population coefficients are virtually unchanged when controlling for per capita income. Moreover, the proportions of variance (R^2) explained by the regressions are significantly higher when regressing on population than on income, and almost identical when regressing on population only or on both variables.

These broad trends conceal significant disparities. The French Court of Auditors (Cour des comptes, 2016) specifically analysed these disparities in terms of expenditure and grants, showing that they are the result of history and the compensation of past resources. Table 2 shows the results of similar regressions for the breakdown of public expenditure into financial charges, investments, purchases and personnel costs (civil servants and contractors). The same relationships are found as for all expenditure items: the coefficients are significantly positive for the separate regressions, but when regressing on income and population at the same time only the population coefficient remains positive (and of constant value). The income coefficient for the decline in investments remains positive when controlling for population, but is divided by five and significant only at the 10% threshold; it is cancelled for purchases and personnel costs, and becomes negative for financial charges.

The evidence suggests that the components of the budget of municipal blocks are directly linked to the size of municipal blocks and that the link with per capita income is only an indirect effect of the correlation between the population of the municipal blocks and per capita income.

Composition of the Local Taxes Financing the Municipal Blocks

Local taxes can be broken down into taxes on developed and undeveloped land, housing tax and local business taxes (Figure IX and Table 3).

Table 1
Budget of Municipal Blocks According to Population and Income in 2014

	Public spending			Grants		
	On income	On population	On income and population	On income	On population	On income and population
Income	0.321*** (0.028)		0.018 (0.023)	0.072*** (0.025)		-0.210*** (0.020)
Population		0.134*** (0.003)	0.134*** (0.003)		0.114*** (0.003)	0.125*** (0.003)
R^2	0.055	0.444	0.444	0.004	0.429	0.457
Observations	2191	2191	2191	2191	2191	2191
	Loans			Local taxes		
	On income	On population	On income and population	On income	On population	On income and population
Income	0.409*** (0.088)		-0.252*** (0.085)	0.608*** (0.032)		0.310*** (0.028)
Population		0.261*** (0.012)	0.274*** (0.012)		0.147*** (0.004)	0.131*** (0.004)
R^2	0.010	0.196	0.200	0.142	0.378	0.411
Observations	2073	2073	2073	2073	2073	2073

***: significant coefficient at the 1% threshold.
Notes: OLS regressions at the municipal block level; all variables are in logarithmic form as the logarithm of per capita value except population, expressed as the logarithm of municipal block population.
Coverage: Municipal blocks (consolidation of municipalities and inter-municipalities) in metropolitan France.
Sources: DGFiP 2014.

Table 2
Public Spending of Municipal Blocks According to Population and Income in 2014

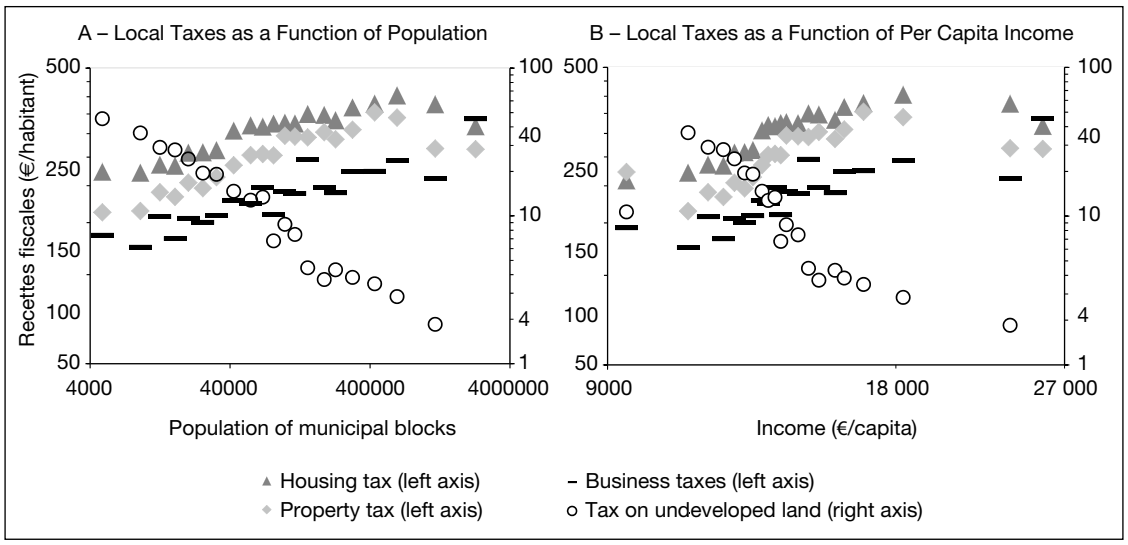
	Financial charges			Investment		
	On income	On population	On income and population	On income	On population	On income and population
Income	0.178*** (0.051)		-0.162*** (0.050)	0.334*** (0.035)		0.065* (0.033)
Population		0.142*** (0.007)	0.150*** (0.007)		0.122*** (0.005)	0.119*** (0.005)
R^2	0.006	0.163	0.167	0.039	0.240	0.242
Observations	2191	2191	2191	2191	2191	2191
	Purchases			Personnel costs		
	On income	On population	On income and population	On income	On population	On income and population
Income	0.175*** (0.029)		-0.024 (0.028)	0.387*** (0.038)		- 0.038 (0.030)
Population		0.087*** (0.004)	0.088*** (0.004)		0.186*** (0.004)	0.188*** (0.004)
R^2	0.017	0.187	0.187	0.045	0.475	0.476
Observations	2191	2191	2191	2191	2191	2191

***: significant coefficient at the 1% threshold, *: at the 10% threshold.
Notes: OLS regressions at the municipal block level; all variables are in logarithmic form as the logarithm of per capita value except population, expressed as the logarithm of municipal block population.
Coverage: Municipal blocks (consolidation of municipalities and inter-municipalities) in metropolitan France.
Sources: DGFiP 2014.

Three of the four local taxes increase with both population and income. The last tax – the tax on undeveloped land – has a strongly decreasing profile: the proportion of undeveloped land decreases sharply with municipal block size since undeveloped land is largely agricultural land. From this point of view, Figure IX-B shows that the poorest municipalities are not

rural: indeed, the lower quantile of income distribution is characterised by a particularly low level of tax on undeveloped land, meaning that these are municipalities with little under-developed land. The lower quantile appears to be out of step with the alignment of the other quantiles for the other taxes too. The quantile is made up of municipal blocks with much lower income levels compared to the other blocks and has particularly high levels of property and business taxes but particularly low levels of housing tax.

Figure IX
Taxes Financing Municipal Blocks According to Population and Income in 2014



Notes: Per capita tax revenue of municipal blocks by quantile (20 quantiles plus Paris) of population and per capita income.
Coverage: Municipal blocks (consolidation of municipalities and inter-municipalities) in metropolitan France.
Sources: DGFiP 2014.

Table 3
Taxes Financing Municipal Blocks According to Population and Income in 2014

	Housing tax			Tax on developed land		
	On income	On population	On income and population	On income	On population	On income and population
Income	0.804*** (0.028)		0.607*** (0.027)	0.518*** (0.036)		0.208*** (0.033)
Population		0.117*** (0.004)	0.087*** (0.004)		0.147*** (0.005)	0.137*** (0.005)
R^2	0.274	0.265	0.403	0.086	0.319	0.332
Observations	2191	2191	2191	2190	2190	2190
	Local business taxes			Tax on undeveloped land		
	On income	On population	On income and population	On income	On population	On income and population
Income	0.914*** (0.050)		0.547*** (0.047)	-2.241*** (0.106)		-0.950*** (0.077)
Population		0.189*** (0.007)	0.162*** (0.007)		-0.617*** (0.011)	-0.570*** (0.011)
R^2	0.135	0.264	0.307	0.170	0.589	0.616
Observations	2191	2191	2191	2186	2186	2186

***: significant coefficient at the 1% threshold.
Notes: OLS regressions at the municipal block level; all variables are in logarithmic form as the logarithm of per capita value except population, expressed as the logarithm of municipal block population.
Coverage: Municipal blocks (consolidation of municipalities and inter-municipalities) in metropolitan France.
Sources: DGFiP 2014.

As for the rest of the income distribution, business taxes do not deviate from the upward trend, while the curves are non-monotonic for property and housing tax: the two upper quantiles decline. On average, the log-linear regressions indicate that housing tax per capita increases by 8% when the population doubles or per capita income increases by 10% (when regressed separately); the same coefficients fall to 6% when both variables are regressed together. The corresponding values for property tax are an increase of 11% when the population doubles and of 5% when income increases by 10% (when regressed separately), with the same values falling to 10% and 2% respectively when both variables are regressed together.

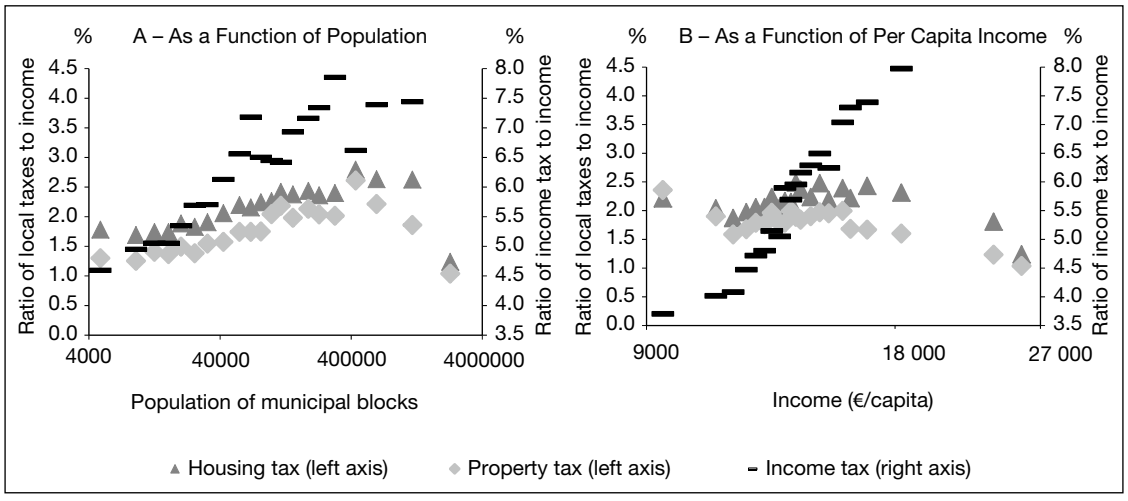
Impact of Territorial Disparities on the Distributive Profile of Local Taxes

The distributive profile of local taxes concerns the effort ratio and not the per capita amount. To test it, we measure the variations in the ratio of local taxes to per capita income according to the population and per capita income of municipal blocks (Figure X and Table 4).

Except for the upper quantile – Paris – the effort ratio for housing tax increases with the population size of municipal blocks. A similar profile is found for property tax, with the difference that the decrease at the top of the population distribution begins earlier. On the other hand, the effort ratio for both taxes is non-monotonic relative to the per capita income of municipal blocks. The lower part initially follows a downward trend, followed by an upward trend in the median part, before a further decrease at the top of the distribution of per capita income. This gives a generally regressive average relationship confirmed in Table 4. The coefficients of per capita income are negative for both effort ratios, whether or not the population of the municipal blocks is controlled for. The correlation with the population is significantly positive in the case of the effort ratio for housing tax (with and without controlling for income) but zero in the case of the effort ratio for property tax (with and without controlling for income).

However, regressivity remains low, with a 0.03 percentage point decrease in the effort ratio for housing tax when per capita income increases by 10% (0.21 points when income doubles) and 0.08 points for property tax (0.56 points). By adjusting for the differences in the population of the municipal blocks, the result is identical for property tax, unlike the result for housing tax: the decrease in the effort ratio with a 10% increase in per capita income rises to 0.07 percentage points (0.48 points when income doubles).

Figure X
Effort Ratios of Municipal Blocks According to Population and Income in 2014



Notes: Ratio of local taxes to income of municipal blocks by quantile (20 quantiles plus Paris) of population and per capita income.
Coverage: Municipal blocks (consolidation of municipalities and inter-municipalities) in metropolitan France.
Sources: DGFiP 2014.

Table 4
Effort Ratios of Municipal Blocks According to Population and Income in 2014

	Housing tax on income			Property tax on income		
	On income	On population	On income and population	On income	On population	On income and population
Income	-0.305*** (0.063)		-0.691*** (0.062)	-0.807*** (0.069)		-0.967*** (0.077)
Population		0.136*** (0.009)	0.170*** (0.009)		-0.000 (0.000)	0.000*** (0.000)
R^2	0.011	0.098	0.147	0.060	0.001	0.068
Observations	2191	2191	2191	2191	2191	2191

***: significant coefficient at the 1% threshold.
Notes: OLS regressions at the municipal block level; per capita income and population are in logarithmic form; property tax and housing tax are expressed as municipal block revenue relative to per capita income.
Coverage: Municipal blocks (consolidation of municipalities and inter-municipalities) in metropolitan France.
Sources: DGFiP 2014.

* *
*

This study showed that, prior to the recent reform introducing housing tax exemptions for the bottom eight deciles of the distribution of monetary living standards, housing tax was slightly regressive. This is the result of the highly regressive impact of the base, the generally regressive impact of the disparity in rates across the national territory and the progressive impact of reductions and exemptions. In this sense, the post-reform breakdown should be similar, unlike the very significant increase in exemptions. It should result – before potential adjustment for local rates – in a generally progressive profile: zero for the bottom eight deciles and positive for the top two deciles. However, the profile remains regressive within the two upper deciles. Taking imputed rents into account in the measurement of household income makes little difference to the overall profile and breakdown: the base remains regressive while the reductions and exemptions remain progressive, but the resulting regressivity is only maintained at the top of the distribution of living standards. The breakdown of the property tax profile is similar, with a highly regressive base among owner-occupiers offset by the growth in the rate of actual taxpayers along the distribution of living standards (since wealthier households are more likely to be owners). The result is a flat profile up to the eighth decile of the distribution of monetary living standards (the profile is progressive according to the distribution of income with imputed rents) and regressive at the top of the distribution (for both distributions).

To refine the analysis of the impact of local differences in tax rates between households, a larger sample than the SRCV survey sample would be needed: while the survey allows households to be located at the municipal level, the number of observations at this level is not always sufficient to allow analysis at the local level. On the other hand, the use of data aggregated at the municipal block level (budget consolidation of municipalities and inter-municipalities) provides an understanding of the impact of rate disparities – i.e. progressive on average but non-monotonic. The ratio of amounts collected to income decreases with per capita income at both ends of the distribution but increases in the middle of the distribution. When controlling for municipal block population size, the regressive impact increases, especially in the case of housing tax. Although beyond the scope of this paper, an important question involves determining which approach (with or without controlling for the size of municipal blocks) provides the best indicator of the distributional impact of local taxes. To answer this question, a detailed analysis is required to understand the reason for the increase in the local tax burden with the size of local authorities, which initially suggests that households derive specific benefits in return for paying such taxes.

The explanation based on spatial segregation due to a correlation between household income and household preferences for local public goods – in other words, voting with one's feet – is contradicted by the fact that the growth in per capita taxes as a function of income disappears completely when controlling for municipal block population. However, several competing explanations remain plausible. For

example, it is conceivable that households in the more populous municipal blocks – which are on average wealthier – pay higher local taxes because their local governments provide them with a wide range of public goods (the zoo effect). In this case, the true regressive impact must be measured by controlling for the size of the municipal blocks, in which case it is twice as high as without controlling. The correlation with population may have another cause: the governments of the most populous local authorities are subject to less pressure from local tax competition, the link between size and tax competition having been highlighted by studies on the impact of the creation of inter-municipalities on local rates (see Carbonnier, 2013; Frère *et al.*, 2014; Breuillé *et al.*, 2018). The correct measurement of the distributional impact then depends on the use of these additional public resources, useful public goods – according to the literature initiated by Zodrow & Mieszkowski (1986) showing the sub-optimal provision of public goods due to tax competition – or, on the contrary, on the waste of public funds from the perspective of the government as a fiscal Leviathan (Brennan & Buchanan, 1977).

A third possible explanation is that households in the more populous municipal blocks – which are on average wealthier – pay higher taxes because of additional public spending to fight congestion. However, the distribution of the consequences of agglomeration – in terms of the productivity of economic activities and congestion costs – can be ambiguous. Combes *et al.* (2012) show that most of the productivity gains enabled by agglomeration are passed on to property prices. This indicates that the additional public expenditure allowing agglomeration and the associated productivity gains ultimately benefit owners in large metropolitan areas. This raises the question of the interaction of income and wealth inequalities and refers us back to the recent debate around the idea that the increase in asset values in proportion to income, noted by Piketty & Zucman (2014) and Piketty (2014), is largely driven by the significant increase in property values. □

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