The impact of local income inequality on local redistribution through public goods: Evidence from French municipalities

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Abstract

This paper brings new evidence on the impact of income inequality on public redistribution. I estimate for France the impact of income inequality at the municipal level on in-kind redistribution decided by municipalities. While previous papers suffer from a lack of data, I exploit a new panel dataset on indicators of individuals' pre-tax income distribution for 1,900 municipalities over the period 2002-2011. I measure redistribution using a database on the whole structure of municipal accounts over the same period. After controlling for municipal fixed-effects and the persistence of redistribution outcomes, I find that an increase by 1% of income inequality leads to an increase in the net value of municipal facilities between 0.06% and 0.17% (depending on the inequality measure). My results suggest that these additional facilities are funded through higher local tax rates. Under the assumption that municipal facilities are available to everyone in the same way, this corresponds to an increase in public redistribution decided by municipal elected officials. While the standard Political Economy literature predicts a decisive weight of the median voter or the middle class, I find that effects of income inequality are only driven by the bottom of income distribution.

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1 Introduction

One aim of public authorities is to redistribute resources among citizens, either through monetary redistribution or in-kind redistribution. Then, there have been many attempts among scholars to investigate the relationship between inequality and redistribution. The standard Political Economy literature highlights the decisive weight of the middle of the distribution in the political process. The median-voter theorem implies that income inequality, defined as the ratio between the mean and the median income, increases redistribution (Roberts, 1977; Meltzer & Richard, 1981). Other contributions, which consider voters as a set of coalitions, predict that the middle class benefits from the highest weight in the political process (Lindbeck & Weibull, 1987; Dixit & Londregan, 1998). However, empirical tests of these predictions give mix results and suffer from a lack of data (Persson & Tabellini, 1994; Alesina & Rodrik, 1994; Perotti, 1993; Milanovic, 2000; Scervini, 2012; Bucciol et al., 2013).

This paper aims at tackling this issue of data shortage and provides new evidence on the impact of income inequality on public redistribution. I study this relationship in the context of French municipalities. In France, municipalities constitute the second tier of government in terms of spending after the Central State. Their total expenditure represents 4.6% of GDP in 2011. Their main activity is to provide public goods of proximity (e.g. primary schools, public transports, sport infrastructures, retirement houses, etc.). This is illustrated by their important share in total public investment: municipalities represent 25.3% of it in 2014. From an empirical point of view, the main interest to focus on municipalities is to rely on a high number of jurisdictions in a given country. Previous empirical papers on the relationship between income inequality and redistribution exploit data at the national level, and rely on small samples, with a maximum of 104 observations across studies[1]. In this paper, I exploit a panel database which gives for each municipality over 2,000 inhabitants and each year between 2000 and 2011 all deciles of residents' pre-tax income distribution as well as the mean and the Gini coefficient. I rely on a balanced panel of 1,900 municipalities per year. Compared to previous papers, this database provides a much higher variability in income distribution, both across panel units and over time. Moreover, focusing on local governments in a *same* country ensures high comparability between observations. In addition, this database allows me to estimate precisely which kind of income inequality matters. Given the previously mentioned variability I have in income distribution, I can identify the impact on redistribution of a given decile of income ceteris paribus. Such estimations are very important to interpret results on the relationship between income inequality and public redistribution. Income inequality can be defined in many ways and it is crucial to know which parts of the income distribution are important in public decisions. Such estimations are all the more important since they provide a test of standard theoretical results in Political Economy that predict a decisive weight of the median voter or the middle class.

The existing literature focuses on the impact of income inequality on *monetary* redistribution

[1] See Persson & Tabellini (1994), Alesina & Rodrik (1994), Perotti (1993), Milanovic (2000), Scervini (2012), Bucciol et al. (2013).

provided by central states (Milanovic, 2000; Scervini, 2012). This must be a partial measure of overall redistribution as one important role of central states is to redistribute through the provision of public goods funded by taxes (in-kind redistribution). In this paper, I use data on the whole structure of French municipal accounts, which allows me to more flexible on the measurement of redistribution and to get a more complete picture of it. In France, municipalities make few monetary redistribution. As pointed out above, their main activity is to provide public goods of proximity. They invest in public facilities and pay for operating spending associated to these infrastructures. They fund this expenditure with intergovernmental grants and local taxes. Ideally, I would want to know for each individual its pre-tax income and his net gain from municipal redistribution. For in-kind redistribution, the net gain of a given individual would be the difference between the monetary value associated to his benefits from municipal public goods and the amount of contributions he pays for them. This is what Milanovic (2000) and Scervini (2012) compute for monetary redistribution. However, I do not have such individual data which would allow me to do this. Thus, I do not measure redistribution in a single variable defined as a net gain. Instead, I proceed in two steps. First, since the main mission of French municipalities is to provide public goods of proximity, I estimate the impact of income inequality on the value of municipal facilities. This value is a good proxy for public redistribution from poorer to richer people if the net gain of an individual from these facilities decreases with its income. In this paper, I make the implicit assumption that these municipal facilities benefit to every resident in the same way. This assumption is reasonable from my point of view. Public goods provided by municipalities are "basic" public goods of proximity, like public primary schools, sport infrastructures, public transports, roads, multi-purpose rooms, recreation centers for children, etc. In this step and under this assumption, I consider the value of facilities as a good proxy for redistribution *decided by municipalities*. However, this is the case only if revenues used to fund this equipment are over the control of municipalities and are designed in such a way that individuals' contributions for these facilities increase with their income. That is why in a second step, I look at the municipal revenue side associated to the funding of these facilities.

To estimate the impact of income inequality on municipal equipment, I consider the net value of the *stock* of municipal facilities per head (i.e. the value of this stock net from depreciation). I consider one observation per municipality per political term (i.e. per period between two municipal elections). It is natural to think that municipal councils take their decisions at the scale of their whole political term and not on a yearly basis. I have two political terms in my sample period. In order to deal with reverse causality[2], I explain the net value of the stock of municipal facilities at the end of a political term by the value of this stock and the value of income inequality observed at the beginning of the term. By including municipal fixed-effects, I find that an increase in income inequality by 1% leads to an increase in the net value of municipal facilities per head between 0.06% and 0.17% (depending on the income inequality measure I use).

Then, I look at the counterpart of this result in terms of revenues. Municipal accounts provide

[2] The net value of municipal public facilities may have an impact on individuals' choice of location.

a decomposition of all revenues which have funded observed municipal facilities. As mentioned above, knowing the categories of revenues which are responsible for the above effect makes part of the analysis of public redistribution. I find that the effect of income inequality on municipal facilities is driven only by local tax rates (which are decided by municipal councils). Municipalities with more income inequality decide to offer more municipal facilities, and they fund it only through higher tax rates. This evidence suggests that additional equipment due to more income inequality comes from an active decision of municipalities to raise more revenues for more municipal facilities, and not from more exogenous revenues from outside (e.g. through intergovernmental investment grants). Then, I find that this effect on local taxes is mainly driven by households taxation on private real estate. The strongest effect is on the housing tax. This is the only municipal household tax which concerns residents (instead of owners). Its design is made in a way to ensure increasing value of individuals' tax burden according to their income. This is confirmed empirically By Vignolles (2013)[3] Then, my results suggest a positive impact of income inequality on public redistribution decided by municipalities.

A positive impact of income inequality on public redistribution can have different meanings. That is why I identify the income deciles which drive my results. While the standard Political Economy literature predicts a decisive weight of the middle of the distribution, I find that the positive impact of income inequality on the value of facilities, as well as the impact on local taxation, are driven by the bottom deciles of income. Given the average income, when the poorest get poorer, municipal councils tend to increase their net value of facilities by an increase in taxation. However, other deciles do not seem to matter. This evidence that income inequality matters for public redistribution through the bottom of the pre-tax income distribution can be interpreted in two ways. First, if I consider income as the only characteristics of individuals, my results suggest that income of poorest individuals is decisive in the political process. Municipal councils and voters (irrespectively of their income) may attribute this weight to poorest people because of ideological considerations about in-kind redistribution. However, the interpretation can be different with voter turnout considerations. An important literature, both theoretical and empirical, highlights a positive relationship between voter turnout and income[4]. Then, if poorest people get poorer ceteris paribus, they may get further from political decisions. At the same time, residents other than the poorest ones may have a higher preference for public goods such that they demand more public equipment than poorest ones, even if their net monetary gain from it is lower (and even negative) through local taxes. In this context, a decrease in bottom deciles would lead to a higher weight of other parts of the pre-tax income distribution, and then to higher in-kind redistribution.

This paper proceeds as follows. Section 2 presents a brief review of the theoretical and empirical literature on the relationship between income inequality and public redistribution. Section 3 describes the French institutional context I study. Section 4 presents the data and the empirical

[3] Even if the tax burden in euros increases with income, Vignolles (2013) shows that the pattern of the effective housing tax rate is not monotonically increasing. According to his results, it is increasing until the sixth income decile, to become flat and then decrease from the eighth decile).

[4] See Feddersen & Pesendorfer (1996, 1999), Ghirardato & Katz (2002), Filer et al. (1993), Smith (1984).

strategy. Results and discussion follow in Section 5. Section 6 concludes.

2 Review of the literature

An important theoretical literature on the impact of income distribution on public redistribution has emerged over the last four decades. Roberts (1977) and Meltzer & Richard (1981) rely on median voter considerations. According to these contributions, the voter with median income is decisive in the political process. In a context of a unique tax proportional to income which funds lump-sum transfers, the higher the ratio of the mean over the median is, the higher will be the preferred amount of redistribution of the median voter and then, the decided amount of redistribution. In this framework, the position of the median relatively to the mean is the only parameter which matters. Other contributions see voters as a set of coalitions instead of a set of individuals, and point out the power of the middle class. Lindbeck & Weibull (1987) provide a model where two political parties compete for office, and where each voter has an ideological component in his choice (which is independent from redistribution). Candidates can target specifically each group of voters through their redistributive policy. The authors find different results according to different assumptions. However, they find that if poor people are more left-wing and rich people are more right-wing on average, then the middle class benefits from the highest weight in the political process, because this is the group which is the most sensitive to a marginal change in policy. In other words, redistribution will favor the middle class at the expense of poorer and richer voters.

Public decisions on redistribution may depend as well on ideological considerations. Dixit & Londregan (1998) provide a model in which the political process is similar as in Lindbeck & Weibull (1987). Their main contribution is that they introduce ideological considerations about redistribution, while ideology in previous models was independent from redistribution. In this theoretical framework, each candidate chooses a unique tax rate which is a weighted average between what the candidate would do if he ignores his ideology and what he would do if he cares only about it. The relative importance of these two components depends on the power hunger of the candidate. Then, each candidate decides on group-specific transfers used as tactical components. Their importance depends as well on the power hunger of the candidate.

If one considers public redistribution as the result of a political process, voter turnout and its heterogeneity according to income may have an impact on the relationship between income distribution and public redistribution. Above models assume that all individuals have the same political participation. However, there is much evidence that low-income people tend to abstain more (Filer et al., 1993; Smith, 1984). In this context, income of the decisive voter, or of the decisive group of voters, may be underestimated in above models. This relationship between income and voter turnout has been explained theoretically by a matter of information. It relies on the fact that low-income voters are on average less-educated and have less information, or information of lower quality. Feddersen & Pesendorfer (1996, 1999) show how asymmetric information across voters impacts voter turnout. Ghirardato & Katz (2002) show that voters with information of lower

quality will consider abstention as optimal if they are averse to ambiguity.

Given this theoretical background, an empirical literature on this relationship has emerged over the three last decades, and provides mixed results. In contrast with my paper, the main part of empirical contributions exploits data at the country level. Persson & Tabellini (1994) provide an empirical test of the median voter-theorem. They investigate indirectly the impact of inequality (defined as the pre-tax household income of the third quintile) on redistribution by estimating the link between inequality and economic growth. Under the assumption that redistribution reduces economic growth (through lower incentives for investment), the median-voter theorem implies a negative relationship between income inequality and growth. Authors find such a relationship for democracies but not for other countries. They present this evidence as a support of the median-voter theorem. Alesina & Rodrik (1994) test the same model, by taking the Gini coefficient of ex-post income as a measure of inequality. Their result contrasts with Persson & Tabellini (1994). They find a negative relationship between inequality and growth, but their results provide no evidence of a different relationship between democracies and non-democracies. An important caveat of these two contributions is the absence of a redistribution measure. Perotti (1993) provides a significant progress in this literature. He estimates separately the impact of inequality[5] on redistribution (measured by the maximum marginal tax rate) and the link between inequality and growth. Unexpectedly, he finds no correlation between inequality and redistribution, and a positive relationship between redistribution and growth.

An important limit of these papers is the lack of data. The larger database used in above literature is made of 70 countries, without any panel dimension. Moreover, data at the country level suffer from a lack of comparability. In this sense, Milanovic (2000) provides an important further step, by using the Luxembourg Income Survey (LIS). This database of 79 observations (for 24 countries) has a panel dimension, and provides indicators of national income distributions which are comparable across countries and over time. It gives for each decile of pre-tax income the average pre-tax income and the average disposable income, so that it is possible to know the extent to which each decile benefits from redistribution. By exploiting the panel dimension of the data, the author finds that inequality has a positive effect on redistribution, in the sense that the bottom half and the bottom quintile of pre-tax income see their benefit from redistribution decrease with the share of pre-tax income they represent. However, there is no evidence of such a relationship when he focuses on the middle class. Thus, his conclusion is that the positive relationship between inequality and redistribution cannot be explained by the median-voter theorem or the literature on the power of the middle-class. Then, Scervini (2012) uses the same LIS database, with a larger sample (104 observations) and adds control variables on political institutions and democracy. As Milanovic (2000), he finds a positive relationship between inequality and redistribution. He finds as well a negative relationship between the share of pre-tax income of the middle class and the amount of redistribution this group benefits from. However, these results are not driven by democracies specifically. Thus, as in Milanovic (2000), these results cannot be a support of the median voter

[5] Perotti (1993) takes the share of income belonging to the third and the fourth quintiles as his measure of inequality.

theorem or the power of the middle-class. At the same time, the author finds that the distance between the middle class and the top affects negatively the gain from redistribution of the middle class. Scervini (2012) presents this result as an evidence of a political power biased towards the richest. However, gains of the poorest if not affected by the distance between lowest and top incomes.

These above two papers suffer from two caveats. First, they look only at monetary redistribution (in-kind redistribution is ignored). Secondly, they rely on few observations (with a maximum of 104), with countries as their sampling unit. Georgiadis & Manning (2012) has pointed out the problem of investigating the link between inequality and redistribution by comparing different countries. They focus, as in my paper, on a unique country (United-Kingdom). However, they still look at inequality and redistribution at the national level. Looking at aggregated data, they find a negative relationship between income inequality and redistribution. Their main contribution is to analyse in detail determinants of the demand for redistribution using individual data in order to explain this result. As a complement to this contribution, it may be important to investigate the link between inequality and redistribution by taking different jurisdictions in a given country. My paper goes in this direction. To my knowledge, the only other paper which investigates the impact of inequality on redistribution by looking at local governments in a same country is Bucciol et al. (2013). They investigate for Italy the impact of income inequality at the municipal level on redistribution municipalities decide for their childcare policy. They find no significant effect of inequality on redistribution. But again, this paper suffers from a lack of data. The sample is made up of one hundred municipalities with no panel dimension, and information on income distribution is limited to the median and the mean.

3 Institutional background

In this paper, I focus on municipalities. This is the lowest tier of local government in France. The national territory is made up of 36,677 municipalities. I focus on the 1,900 municipalities which are over 3,500 inhabitants for the whole panel period (2002-2011). Then, the French territory is made up of 2,599 inter-municipal communities (*intercommunalités*)[6], 100 districts (*départements*) and 26 provinces (*régions*). Apart from having a high number of observations, an additional reason to focus on municipalities is that this is the most important tier of local government in terms of expenditure. As shown in Table 1, total municipal spending represents 4.6% of GDP in 2011, while this share goes from 1.3% to 3.4% for the other tiers of local government.

The main role of municipalities is to provide local facilities. This is illustrated by their important share in public investment: they represent 25.3% of it in 2014. They are in charge of primary schools, public transport, extracurricular facilities, local sport and cultural equipment, retirement houses, etc. Then, the previously mentioned assumption that municipal facilities benefit to everyone in the

[6] Inter-municipal communities are groups of municipalities which decide to cooperate and merge for the provision of public goods for which there are potential economies of scale. Since 2013, being in such a community is mandatory for every municipality. During my sample period (2002-2011), it was not the case. However, 95.5% of municipalities were in a community in 2011.

way seems reasonable. Given these competencies, municipalities make few monetary redistribution. Their main activity is to invest in local equipment and to pay for operating costs associated to these infrastructures. This is why I focus on the impact of inequality on the net value of municipal facilities and revenues which fund it.

Then, it is important to have a picture of the structure of municipal accounts. Table 2 shows macro data on municipal revenues from the budgets of all French municipalities in 2011. In France, the budget of each municipality has to be decomposed into an operating section and an investment section. Municipalities are not allowed to have an operating section in deficit, that is why there is no debt in this section. However, debt can be used to fund municipal investments. If the operating section of a municipality is in surplus, this extra-money can be used to fund investment expenditure.

As I focus on the net value of the stock of municipal facilities and revenues which have funded it, the most important section is at first stage the investment section. In Table 2, I distinguish between investment revenues over the control of municipalities (in bold) and those municipalities do not control. Controlled revenues are the most important category. They represent 63.3% of municipal investment resources. They are composed by operating surplus transferred to the investment section and loans. Transferred operating surplus represent the most important source of investment revenues, with a share of 42.4%. As for loans, they fund 20.9% of the investment section. Then, municipalities benefit from other revenues they do not control. They receive formula-based grants from the State, which represent 13.5% of investment revenues, and discretionary investment grants (i.e. grants allocated by other upper tiers of government in a discretionary way), which count for 11.9% of investment revenues. Finally, they can benefit from assets transfers due to transfers of competencies.

As transferred operating surplus represent the main source of investment revenues, it is important to look at the structure of operating revenues. Local taxes represent the most important category, by funding 60.1% of the operating section in 2011. They represent the main tool for redistribution municipalities can play on in their decisions on revenues. There are four local taxes in France. For each of them, municipalities decide on tax rates. The first is the housing tax (*la taxe d'habitation*). It is a household tax paid by all residents on the cadastral value of their accommodation, whatever their status regarding it (owner or tenant). In order to prevent from a regressive design at the bottom of the income distribution, tax exemptions and reductions exist for low-income households. Rules of these exemptions and reductions are decided by national law. The resulting loss of fiscal product for municipalities is compensated by the Central State. Second, the property tax on built estate (*la taxe foncière sur les propriétés bâties*) is paid by owners of all private real estate (households as well as firms). The tax base is still the cadastral value. As for the housing tax, there are tax exemptions and reductions which depend on households' income. The third tax is the property tax on unbuilt estate (*la taxe foncière sur les propriétés non bâties*). The principle is the same as the previous property tax. The only difference is the kind of taxed property (unbuilt lands). Fourth, the local business tax (*la taxe professionnelle*) is paid by companies on their real

estate and their production facilities[7].

The second main source of operating revenues are formula-based operating grants, which fund 25.3% of the operating section. These grants mainly come from the Central State. The operating section can also be funded by other resources (e.g. fees, sales, etc.) which represent 14.6% of operating revenues. Although I classify transferred operating surplus as an investment revenue over the control of municipalities, one can consider this control as partial, as some operating revenues are not controlled by municipal councils (e.g. formula-based operating grants). That is why in case of a significant effect of income inequality on transferred operating surplus, it is important to look at each component of the operating section (each category of operating revenues as well as operating spending).

4 Data and empirical specification

4.1 Data

I use the RFL (*Revenus Fiscaux Localisés*) database on residents' *pre-tax* income distribution at the municipal level. This database is provided by the French National Institute of Statistics and Economic Studies (INSEE). It is constructed from French tax returns on the income tax and the local housing tax, which ensures high reliability. It provides for each municipality with more than 2,000 inhabitants over the period 2000-2011 indicators of the distribution of residents' income per unit of consumption (UC). The number of units of consumption is a measure of household size. It allows to take into account economies of scale in consumption needs according to this size[8]. This database gives for each municipality and year the amount of each decile, the mean, and the Gini coefficient of the distribution of pre-tax residents' income. For deciles, the sorting unit is the individual, whatever his age. The amount given for each decile is the cut-off of income above which one moves to the other decile of population[9].

Inequality can be defined in many ways, with very different meanings. Then, it is important to consider different kinds of income inequality. In addition to provide high variability in income distribution given the number of observations, this database allows to do it. I use five different measures of inequality. The first is the ratio between the interquartile gap and the median ($IQ/D5$). It measures inequality for the half of population which is in the middle of the distribution. Then, I take three different decile ratios: the ratio between the ninth and the first (D9/D1), the ratio between the median and the first decile (D5/D1) and the ratio between the ninth decile and the median (D9/D5). They measure respectively the position of the top of the distribution relatively to the bottom, the position of the middle relatively to the bottom and the position of the top relatively

[7] A reform in 2010 has removed production facilities from the local business tax base, through the creation of a new tax called the Contribution of Companies on Property (*la contribution foncière des entreprises*). Municipalities are compensated for this change, through a yearly transfer from the State which is fixed over time.

[8] The rule is the following: one unit for the first adult, 0.5 unit per other individual who is 14 or more and 0.3 unit per child below 14.

[9] For instance, a first decile of X euros means that 10% (respectively 90%) of the population has an income per UC lower (respectively higher) than X euros.

to the middle. My last measure is the Gini coefficient. Moreover, information on each decile of income allows to identify which part of the distribution matters for municipal decisions.

As the main activity of French municipalities is to provide local public goods (see Section 3), I focus on in-kind redistribution decided by municipalities. Ideally, I would need for each individual of each municipality his net gain from this redistribution. This net gain would be the difference between the monetary value of the individual's benefit from municipal equipment and his contribution for it (e.g. through taxes, fees, etc.). However, I do not have such information at the individual level. Instead, I use data on municipal accounts and municipal decisions on local taxation. I proceed in two steps. First, I estimate the impact of income inequality on the value of municipal facilities per head. In this paper, I make the assumption that these facilities benefit to every resident in the same way. Given the nature of public goods provided by municipalities (see Section 3), this assumption seems reasonable. However, under this assumption, the value of municipal facilities is a good proxy for in-kind redistribution decided by municipalities only if revenues used to fund them are over the control of municipal councils and have a design such that individuals' contribution is increasing with their income. That is why in a second step, I estimate the impact of income inequality on each kind of revenue used to fund these facilities. Regarding the French legislation, I know for each kind of revenue the control municipalities have on it, and characteristics on the design of individuals' burden according to their income.

This information on budgetary and fiscal decisions come from two different administrative sources, both provided by the General Broad of Public Finance (*DGFiP*, French Ministry of Economy and Finance). They cover all French municipalities over the period 2002-2011. The first source gives on a yearly basis municipal balance sheets and yearly profit and loss statements. Balance sheets provide data on municipal assets. They give a picture of the whole history of the investment section of municipal accounts: variables of this section are *stock* variables. This database gives for each municipality and year the monetary value of the stock of municipal facilities, as well as the value of the stock of investment revenues associated to these infrastructures. Stocks of investment revenues are decomposed in the categories mentioned in Section 3. As I have information on depreciation, I can compute stock values net of it. As for profit and loss statements, they give for each year exhaustive information on the operating section of municipal accounts. As the main part of investment revenues come from operating surplus (see Section 3), looking at this budgetary section is of key importance. I have information on all operating revenues and expenditure, as well as the operating surplus of the current year. In contrast with balanced sheets, these variables are in *annual flow*. The second administrative source (the "REI" database) is on local taxes. It gives for each local tax information on the tax base, the tax product and the tax rate.

In my regressions, I use control variables from different sources. The French national census (provided by INSEE) gives me information on total municipal population and its age structure. I include as well political variables from the French Home Office. Subsection 4.2 provides a detailed description of control variables I include. All monetary variables I use are per capita and deflated using the consumption price index with base 2010 provided by INSEE.

Although my data are in a yearly basis, the time unit I choose is the political term. A municipal council may take its budgetary and fiscal decisions at the scale of its whole term rather than on a yearly basis. Then, it is important to take as the time unit political terms instead of years in order to prevent from autocorrelation. Thus, my final panel database is made up of one observation per municipality per political term. Each observation indicates values of variables at the end of the term. For monetary variables in annual flow (operating revenues and expenditure), I consider their cumulated amount over the term[10]. The last three municipal elections in France took respectively place in 2001, 2008 and 2014. Then, my sample period is related to two political terms: 2001-2007 and 2008-2013[11]. Figure 1 gives a picture which compares political terms and periods covered by my different data sources. As illustrated in this figure, my data cover only partially the two political terms, and especially the second one (which ends in 2013, while my data end in 2011). Implications of it for my identification strategy are explained in Subsection 4.2.

I focus on municipalities which reach some critical size. I keep in my sample jurisdictions over 3,500 inhabitants. Another reason to make this restriction is that political variables are not available for smaller municipalities, while these variables may be important controls for regressions. My sample is a balanced panel of 1,900 municipalities. As my panel is made up of two time periods (two political terms), I have 3,800 observations. Table 3 provides descriptive statistics on this sample. The average total municipal population is 11,776 inhabitants. This illustrates the fact that the main part of municipalities are on the bottom of the interval between the minimal population of 3,018[12] inhabitants and the maximum of 93,211[13]. My sample is almost balanced between left-wing and right-wing municipalities. 50% are right-wing, 46% are left-wing and the remaining jurisdictions have an independent mayor. As for my different measures of inequality, Table 3 illustrates the high heterogeneity in these measures across municipalities. This heterogeneity is especially large for ratios where the first decile is the denominator. For instance, D9/D1 goes from 2.80 to 12.29, with a mean of 4.78 and a standard deviation of 1.33. As for the net value of the stock of municipal facilities per head, its average is 6,274 euros. This accumulated value of equipment corresponds to 20.1% of the French GDP per capita of 2011. This illustrates the crucial importance of municipal infrastructures in France.

Figures 2 and 3 provide a macro picture of effects I investigate in this paper. They are constructed from the above described sample (one observation per municipality and per political term). Figure 2 sorts municipalities in quintiles according to their value of D9/D1. The horizontal axis

[10] Subsection 4.2 describes the way to include in regressions stock variables and cumulated flows in a coherent way.

[11] Municipal elections take place in March. Then, a new municipal council can play on the budget during the year of its election. Thus, I assume that political terms start during the year of the ballot.

[12] The criteria used to do the restriction on municipalities over 3,500 inhabitants is the existence of political variables. In France, municipal electoral rules are different for municipalities over 3,500 inhabitants and those under this population threshold. I have reliable political data only for the first group of municipalities. Then, the used criteria for my restriction is the value of population used by the French administration for municipal elections. Because this value is lagged, some municipalities of my sample do not fill the condition of a population higher than 3,500 inhabitants for some years. In addition, a municipality with more than 3,500 inhabitants before an election can experience a decrease in population between two municipal elections.

[13] I drop municipalities with more than 100,000 inhabitants. They represent only 27 jurisdictions. These big municipalities are very specific in terms of municipal policy, that is why it is preferable not to include them.

represents these quintiles and indicates for each of them the corresponding range in terms of D9/D1. The vertical axis gives for each quintile the average net value of the stock of municipal facilities per head (i.e. the value of this stock per head corrected from depreciation). Although this is only a macro picture without any control, it provides evidence of a strong macro effect of income inequality on the net stock of municipal equipment. Moving from the first to the last quintile makes the average stock of municipal facilities per head going from 5,710 euros to 6,809 euros. However, the stock of facilities cannot be directly taken as a measure of redistribution. It is necessary to look at the way of funding this equipment. Figure 3 provides a first picture on it, focusing on one category of municipal revenues: local taxes. This category of revenues represents the main tool for redistribution on the revenue side for municipalities (see Section 3). Figure 3 shows for the same quintiles as above the average amount of total municipal tax products during last years of political terms. The pattern is similar to the previous figure, with a continuous increase, and a decrease in the slope between the two last quintiles. Again, effects are important: when one moves from the first to the last quintile, the total fiscal product per head moves from 413 euros to 531 euros. These two figures are an additional motivation to look more deeply at the impact of income inequality on budgetary and fiscal decisions of municipalities.

4.2 Empirical specification

My first aim is to estimate the impact of income inequality on the net value of the stock of municipal facilities. Under the assumption that these infrastructures benefit to everyone in the same way, this variable is a good proxy for public redistribution decided by municipalities only if these facilities are funded by revenues over the control of municipal councils and for which individuals burden increases with their income. From this perspective, this estimation is only a first step, as I will look next at the impact of income inequality on municipal revenues which fund these facilities.

I assume that in political term t, a municipal elected official has an optimal stock of facilities which depends on the characteristics of his municipality he observes when he arrives at office (i.e. characteristics at the end of term $t-1$). This stock is given by:

$$SF_{it}^{*} = I_{it-1}\beta + X_{it-1}\gamma + \lambda_t + \mu_i + \epsilon_{it}$$

SF_{it}^{*} is this optimal stock of facilities per head of municipality i in term t. I_{it-1} and X_{it-1} are respectively the inequality variable and a vector of control variables of municipality i at the end of term $t-1$. λ_t and μ_i are respectively a political term and a municipal fixed-effects. Such a specification makes the strong assumption that a municipal council is able to reach its target SF_{it}^{*} during its term. Instead of it, I assume that a municipal council acts in a way to get as close as possible from it at the end of the term, given the existing stock of facilities at the beginning of the term. If I denote SF_{it} the stock of facilities per head of municipality i at the end of term t, the municipal council of municipality i in term t has a targeted stock variation of $SF_{it}^{*} - SF_{it-1}$. I assume that the municipal council reaches a fraction d of this variation at the end of the term. This fraction is assumed to be constant across all municipalities and terms. This gives the following

expression:

$$\Delta SF_{it} = d\left(SF_{it}^{*} - SF_{it-1}\right)$$

Where $\Delta SF_{it} = SF_{it} - SF_{it-1}$. The above equation gives:

$$SF_{it} = (1-d)SF_{it-1} + d\left(I_{it-1}\beta + X_{it-1}\gamma + \lambda_t + \mu_i + \epsilon_{it}\right) \tag{1}$$

One challenge in estimating the impact of inequality in any variable on municipal decisions is to deal with the sorting of residents, which implies a reverse-causality problem. Households may choose their municipality of residence according to municipal facilities or taxation. Equation (1) deals with this issue through the lagged dependent variable SF_{it-1}. As a result of SF_{it-1}, I am explaining variations in the stock of facilities during a term by income inequality observed at the end of the previous term. Then, the coefficient on I_{it-1} captures a relationship which goes only in one way: the impact of income inequality on municipal facilities and not the reverse.

Estimating this equation by omitting the municipal fixed effect μ_i through pooled MCO suffers from endogeneity issues. In addition to be likely correlated with income inequality and other covariates in X_{it-1}, it must be strongly correlated with the lagged dependent variable SF_{it-1} as well. Moreover, as shown in Figure 1, I am constrained to take the value of the stock of 2002 as my lagged dependent variable for the first term. As 2002 is already in this political term, SF_{it-1} may be correlated with ϵ_{it} for $t = 1$.

Regarding above comments, I want to get rid of the municipal fixed effect. Given that I have two time periods (two political terms), the within equation is equivalent to the first-difference one. I estimate for the second political term the following first-difference equation:

$$\Delta SF_{it} = (1-d)\Delta SF_{it-1} + d\left(\Delta I_{it-1}\beta + \Delta X_{it-1}\gamma + \Delta\lambda_t + \Delta\epsilon_{it}\right) \tag{2}$$

In Equation (2), I estimate the impact of variations in income inequality during the first political term on variations in the stock of municipal facilities during the second political term (given the lagged variation of this stock and other covariates).

As illustrated in Figure 1, my data on municipal accounts and local taxation cover only partially the two political terms I look at. Then, I am constrained to assume for my specifications that my data contain all budgetary and fiscal decisions of these terms. The dropping out of the municipal fixed effect relies on this assumption. For the first term, the only missing year is 2001 (one year over seven), while for second one, two years are missing over six (2012 and 2013). In both cases, my data do not contain the whole political term period, but the majority of it.

Equation (2) allows to get rid of the municipal fixed-effects and associated endogeneity issues under the above assumption. Although it is my preferred specification for this reason, I still have an endogeneity issue due to the fact that I take 2002 to define the lagged dependent variable for the first term. Formally, ΔSF_{it-1} is correlated with $\Delta\epsilon_{it}$, because of the correlation between SF_{it-2} and ϵ_{it-1}. In addition, I have now a correlation between ΔSF_{it-1} and $\Delta\epsilon_{it}$ because SF_{it-1} is correlated

with ϵ_{it-1} (see Nickell (1981) for a characterisation of this bias). One solution to deal with this issue is to run a GMM estimation (Arellano & Bond, 1991; Arellano & Bover, 1995; Blundell & Bond, 1998). However, this strategy leads in my case to misleading results. This can be explained by two reasons. First, having three periods (two periods plus the lag used for the first period) makes the number of instruments too low. Second, the stock of facilities may not be stationary and I do not have enough time periods to test for it. For these reasons, I do not report results on GMM specifications.

To sum up, estimating the effect of income inequality on the stock of facilities per head by pooled MCO or by first-differencing present endogeneity issues which are of different nature. That is why I present results for both specifications in order to show the robustness of my findings to these different biases.

Given Equation (1), I could estimate a short-run and a long-run effect of income inequality on my dependent variable. These two effects are respectively given by $d\beta$ and β. While results on the short-run effect show evidence of robustness across specifications (see Section 5), it is not the case for the coefficient on the lagged dependent variable, as expected. This is problematic for the long-run coefficient as I need the coefficient on the lagged dependent variable to estimate it[14]. Thus, I focus on the short-run effect because of the lack of confidence in the long-run one. Finally, the MCO equation and the first-difference equation I estimate are the following:

$$\textit{Pooled MCO:} \quad SF_{it} = \alpha_1 SF_{it-1} + I_{it-1}\alpha_2 + X_{it-1}\alpha_3 + \lambda_t + \epsilon_{it} \qquad \text{for } t = 1;2 \tag{3a}$$

$$\textit{First-difference:} \quad \Delta SF_{it} = \alpha_1 \Delta SF_{it-1} + \Delta I_{it-1}\alpha_2 + \Delta X_{it-1}\alpha_3 + \Delta\lambda_t + \Delta\epsilon_{it} \quad \text{for } t = 2 \tag{3b}$$

The first-difference estimation may seem very demanding, as it relies on within-variations in income inequality over a period of seven years (between 2000 and 2007). At first stage, one could think that there may not be enough variations over time in income distribution at the local level for identification. Figure 4 provides some evidence on this point. For each measure of inequality I use, I show an histogram of the distribution of relative variations of these measures between 2000 and 2007. These variations are not negligible, and present a high degree of heterogeneity across municipalities, whatever the inequality measure. This makes my first-difference specification reliable. These relative variations move from about -20% to 20%, except for D9/D5 and the Gini coefficient where the range is narrower. For D9/D1 and D5/D1, there are some municipalities with very high variations, which can reach a maximum of about 40% in absolute value. This higher range is due to the higher variability over time of the first decile with respect to others.

The vector X_{it-1} is a set of control variables, which are suspected to be simultaneously correlated with income distribution and my dependent variables. The most important control to keep in mind is the average income per unit of consumption. In other words, estimated impacts of income

[14] The short-run effect of income inequality is simply the coefficient I obtain on I_{it-1}, while the long-run effect has to be obtained through a non-linear combination of the coefficients on I_{it-1} and SF_{it-1}: coefficient on $I_{it-1}/(1 -$ coefficient on $SF_{it-1})$

inequality are *given the average income*. I control for total municipal population, as well as its age structure: I include in the regressions the share of population aged 14 or less and the share of population aged 60 or more. Total population is an indicator of the degree of urbanisation and may be an important determinant of equipment needs[15]. The share of young and elderly people are also of high interest, as an important part of municipal facilities are intended to young people (e.g. primary schools) and elderly people (e.g. retirement houses). I control as well for political affiliation of the mayor. I take two dummies: a left-wing dummy and a dummy for independent mayors (the reference being right-wing municipalities). I control also for the margin of victory of the mayor and for the interaction between this margin and dummies on political affiliation. This margin is defined as the difference in percentage point between the share of votes of the mayor and the one of his first challenger. These political variables are used as proxies for the municipal political landscape. Dummies on affiliation are used as proxies for the ideology of the mayor, which can play a role on the impact of inequality on municipal decisions. Interaction terms between these dummies and the margin of victory measure the extent to which voters are in majority for the winning affiliation. They can be seen as proxies for the ideology of voters in the jurisdiction, which may be an important determinant in decisions the municipal council takes on redistribution. Finally, the margin of victory independently from the affiliation of the mayor can be seen as a proxy for experience and skills of the municipal council. I control as well for the share of households who are owners of their accommodation (distinguished from tenants). This variable measures the share of stable residents. These residents may not have the same influence on the political process. I also include in my regressions the share of secondary residences, as municipalities where this share is high may have a different structure of facilities. Finally, I control for a dummy equal to one if the municipality is in an inter-municipal community. These communities constitute an additional tier of local governments. They are groups of municipalities which have decided to cooperate and have merged for the provision of public goods for which there are potential economies of scale. Municipalities which are not in such a community (which represent 8.3% of my sample) have a higher charge in terms of public goods to provide.

I could have taken other controls from the French national census. I could have included the structure of municipal population in terms of socio-professional categories, or the unemployment rate at the municipal level. These controls would have been relevant for a cross-sectional analysis. However, the first-difference specification relies on variations in income distribution over time. Variations in income distribution may be highly linked to variations in the distribution of residents' economic activity. This is why it is natural not to consider variations in income distribution given variations in the socio-professional structure of population or the unemployment rate. This choice highlights an important aspect of my specification. I do not focus on a specific factor of variations in income distribution, but I consider an average effect of all these factors.

[15] I could have used population density as another indicator of urbanisation. However, as municipal areas do not vary over time, it is not possible to add population density in the first-difference estimation in addition to total population, as my variables are in logarithm. I could have added it at least for pooled MCO, but I decide to keep the same set of control variables across specifications.

After estimating the impact of income inequality on the stock of municipal facilities per head, I look at *stocks* of investment revenues associated to these infrastructures. For these estimations, my identification strategy is the same, and I just replace the stock of facilities by stocks of revenues.

Because transferred operating surplus represent the main source of investment revenues (see Section 3), the operating section has to be investigated as well. This is all the more important since local taxes (which are registered in the operating section) are the main tool for redistribution on the revenue side. My data on profit and loss statements give me each component of the operating section. However, these variables are in annual flow, and not in stock. I take for each observation the cumulated amounts of these components over the political term. If STI_{it} denotes the stock of transferred operating surplus of municipality i at the end of political term t, the first-difference specification is:

$$\Delta STI_{it} = \alpha_1 \Delta STI_{it-1} + \Delta I_{it-1}\alpha_2 + \Delta X_{it-1}\alpha_3 + \Delta\lambda_t + \Delta\epsilon_{it}$$

Where:

$$STI_{it} = SS_{it} - STO_{it}$$

SS_{it} corresponds to the stock of cumulated operating surplus and SR_{it} denotes the part of this stock which has been kept in the operating section. My data contain both amounts (in addition of STI_{it}). This allows me to know whether an effect on STI_{it} is driven by SS_{it} or SR_{it} (i.e. if it is driven by higher accumulated operating surplus or by a different allocation of surplus between the operating section and the investment one). C_{kit} denotes the cumulated amount of the k^{th} component of the operating surplus of municipality i over political term t (with $k = 1, ..., K$). If revenue components are positive and spending components are negative, then:

$$\Delta SS_{it} = \sum_{k=1}^{K} C_{kit} \tag{4}$$

The first-difference equation for SS_{it} gives:

$$\Delta SS_{it} = \alpha_1 \Delta SS_{it-1} + \Delta I_{it-1}\alpha_2 + \Delta X_{it-1}\alpha_3 + \Delta\lambda_t + \Delta\epsilon_{it}$$

Which is equivalent to:

$$\Delta\left(\Delta SS_{it}\right) = (\alpha_1 - 1)\Delta SS_{it-1} + \Delta I_{it-1}\alpha_2 + \Delta X_{it-1}\alpha_3 + \Delta\lambda_t + \Delta\epsilon_{it}$$

Given Equation (4), I run for each component (for each $k = 1; ...; K$):

$$\Delta C_{kit} = (\alpha_1 - 1)\Delta SS_{it-1} + \Delta I_{it-1}\alpha_2 + \Delta X_{it-1}\alpha_3 + \Delta\lambda_t + \Delta\epsilon_{it} \tag{5}$$

Through this equation, I explain within variations in each component of the operating section by within variations in income inequality.

5 Results

I first estimate the impact of local income inequality on the net value of the stock of municipal facilities. Table 4 presents these results. Although the first-difference specification is my preferred estimation because of the dropping out of the municipal fixed-effect, I present results for pooled MCO as well. Both specifications present endogeneity issues. However, the correlation between regressors and residuals are of different nature across these two specifications (see Subsection 4.2). This is why it is important to ensure that my effects are robust to these different kinds of endogeneity. This is what Table 4 shows. The impact of income inequality on the stock of municipal facilities per head is always positive and significant, whatever the specification and the measure of income inequality. This coefficient on income inequality, which measures a short-run effect (see Subsection 4.2), is always higher for the first-difference than for the pooled MCO. Because of the correlation between ΔSF_{it-1} and $\Delta \epsilon it$, the first-difference coefficient can be upward biased if ΔI_{it-1} and ΔSF_{it-1} are positively correlated (Nickell, 1981). This gap may be also explained by a negative correlation between income inequality and the municipal fixed-effect which is omitted in pooled MCO. As all my variables are in logarithm, my coefficients have to be interpreted as elasticities. Then, by taking results from the first-difference specification, an increase in income inequality by 1% leads to an increase in the stock of municipal facilities per head between 0.06% and 0.17% (depending on the inequality measure and given the previous net value of facilities).

The coefficient on the lagged dependent variable in Table 4 is positive and significant for both specifications and all measures of inequality. For pooled MCO, this coefficient may be overestimated, because of the correlation with the omitted municipal fixed-effect. For the first-difference specification, this bias may be negative if the true value of the coefficient is positive (Nickell, 1981). My results are in line with these expectations. This coefficient is much higher for pooled MCO than for the estimation in first-difference, with a respective value of 0.94 and 0.10. This difference is substantial. This is why I do not present long-run effects of inequality, which would rely on this coefficient. As for the coefficient on the average income, it is positive and significant only for two cases over five in pooled MCO, and never significant for the first-difference specification. This constitutes a weak evidence of a positive correlation between average income and the municipal fixed-effect.

Table 4 shows that the coefficient on the short-run effect of income inequality varies from 0.06 to 0.17 across income inequality measures for the first-difference specification. Decile ratios with the first decile as the denominator are the inequality measures with the lowest coefficients. At first stage, one may think of it as an evidence that bottom deciles are not the most decisive ones. However, given the value of the average fiscal income, all deciles are interdependent. Then, it is not possible to draw at this stage any conclusion on the part of the income distribution which matters. My data provide the value of all deciles for every municipality and political term of my sample. Then, given the high number of observations I have, it is possible to estimate precisely the impact of one decile given others. Table 5 shows results in first-difference when I include in regressions three different deciles instead of an inequality measure. I include no more than three deciles in addition

to the mean in order to have enough variations for identification. Each column represents a different regression with a different set of deciles. Deciles used as regressors in a same estimation have to be far enough in order to ensure identification. In each estimation, I include one bottom decile (among the first three), one decile of the middle (the fifth or the sixth) and one top decile (between the three last ones). Table 5 shows that previous results on inequality are driven by the bottom of income distribution. Only coefficients on the bottom deciles are significant. These coefficients are all negative, which is in line with previous findings of Table 4: the poorer poorest individuals are (given the average income and other deciles), the higher will be the stock of municipal facilities per head. A decrease in bottom deciles by 1% leads to an increase in the stock of facilities between 0.05% and 0.19%, depending on the set of deciles included in the regression. While the standard Political Economy literature predicts that middle deciles are decisive, my results suggest that municipal councils seem to react only to income of poorest individuals, given the average municipal income.

Under the assumption that municipal infrastructures benefit to everyone in the same way, the stock of municipal facilities is a good proxy for public redistribution decided by municipal councils only if this stock is funded through revenues over the control of municipalities and whose residents' contribution increases with individual income. Then, it is important to look at the way additional facilities associated to more income inequality are funded before drawing any interpretation. Table 6 shows results from first-difference estimations on the impact of income inequality on the stock of uncontrolled and controlled investment resources (see Section 3 and Table 2 for a definition of these two categories). Interestingly, these results suggest that the insignificant effect of the average income in Table 4 is the result of a positive effect on the stock of controlled revenues and a (weaker) negative effect on the stock of uncontrolled ones. This first positive effect may be due more capacity to raise revenues in richer municipalities. The negative effect on uncontrolled revenues suggests a role of compensation of these differences played by formula-based investment grants or discretionary upper grants. Results in Table 6 suggest that additional facilities associated to more inequality are funded by investment revenues over the control of municipalities. The elasticity of controlled investment revenues with respect to income inequality is higher than the one of municipal facilities, going from 0.10 to 0.20. This was expected, as controlled investment revenues do not represent overall investment resources. Table 7 aims at identifying the components of controlled investment revenues which drive results of Table 6. These controlled revenues are made up of loans and operating surplus transferred to the investment section (see Section 3). Table 7 shows that results in Table 6 are driven by transferred operating surplus, with similar coefficients (which go from 0.10 to 0.19). In order to ensure that this effect is the counterpart of the impact of income inequality on municipal facilities, I run for the stock of transferred operating surplus per head the same regressions as in Table 5 which include three deciles instead of an income inequality measure. Results of these estimations are shown in Table 8. They suggest that the effect of income inequality on the stock of transferred operating surplus is indeed driven by bottom deciles, as in Table 4.

When a municipality realizes an operating surplus in a given year, it decides either to keep it in the operating section, or to transfer it in the investment one. Then, a higher stock of operating

surplus transferred to the investment section can be the result either of a higher total accumulated operating surplus, or of a different allocation of this surplus between the operating section and the investment one (or both). This is why I estimate separately the effect of income inequality on the stock of total accumulated surplus and on the stock of operating surplus kept in the operating section. Table 9 shows results of these regressions. It suggests that additional facilities associated to more income inequality are funded through a higher the stock of accumulated operating surplus. As for the stock of operating surplus allocated to the operating section, results are not robust. Coefficients on income inequality are negative and significant for only two inequality measures over five.

To sum up, my results suggest that higher income inequality leads to a higher stock of municipal facilities which is funded by higher operating surplus. Thus, the next step is to identify the components of the operating section which drive this evidence. As I have only annual flows for these components in my data, I run estimations of Equation (5), as explained in Subsection 4.2. Point estimates are presented in Tables 10 and 11. According to Table 10, higher operating surplus due to higher income inequality are driven by higher operating revenues. As for operating expenditure, the impact of income inequality is positive but not significant (except for one measure of inequality over five). Since more municipal equipment may induce more operating expenditure, one could have expected a positive and significant effect of income inequality on this spending, but lower than the effect on operating revenues to be in line with higher operating surplus. However, operating costs of new equipment may start to be supported with some lag in time, once the new infrastructure is achieved and effectively used by residents. My identification strategy consists in estimating the impact of variations in income inequality on variations in facilities during a unique period of four years. This period may be too short to observe an effect on operating spending due to new equipment. Table 11 shows point estimates for Equation (5) for the different categories of operating revenues described in Table 2. These results suggest that higher operating revenues due to higher income inequality are driven only by local taxes. There is no evidence of an impact of income inequality on the other kinds of operating revenues. An increase in income inequality by 1% leads to an increase in total municipal tax products per head between 0.14% and 0.29% (depending on the measure of income inequality). There are four local municipal taxes in France: the housing tax, the property tax on built estate, the property tax on unbuilt estate and the local business tax (see Section 3 for a description of these taxes). Table 12 aims at identifying local taxes which drive the positive effect of income inequality on total fiscal products per head. Municipalities decide on tax rates while tax bases are exogenous. Then, results of Table 11 about local taxes are due to municipal choices if they are driven by tax rates. Table 12 shows for each local tax results from estimation of Equation (5) in which I take as the dependent variable the tax rate. According to these results, there is evidence of a positive impact on the housing tax rate and a weak evidence of a positive effect on the property tax rate on built estate. The common feature between these two taxes is the taxation of households' private real estate. The weaker effect on the property tax on built estate may be interpreted as a preference for municipalities to tax residents rather than

owners, and also to make households contribute rather than firms. This last point is strengthened by the insignificant impact on the local business tax. For regressions on this tax, I have only 413 observations. Municipalities which are in an inter-municipal community (91.7% of municipalities of my sample) can decide, either to transfer the competencies regarding this tax to the community, or to keep a share of it. The first case is the most frequent: 75.1% of municipalities of my sample do not have any fiscal product from the local business tax because of this transfer of taxation[16]. This explains this lower number of observations. The strongest effect is on the property tax rate on unbuilt estate. This strong and positive impact can be associated to a willingness not too keep unbuilt lands in municipalities which want to increase their stock of facilities. Such municipalities may want to make owners of these estates internalize the collective costs of having unbuilt lands in the municipal territory. However, this tax must explain only a low share of the total effect on local fiscal products given in Table 11, as revenues from this tax represents on average only 2.1% of total municipal tax product in my sample, while the estimated elasticity of the property tax on unbuilt estate with respect to income inequality reaches a maximum of only 0.12 across inequality measures. In contrast, the housing tax and the property tax on built estate represent on average respectively 39% and 48.6% of total municipal tax product in my sample.

Then, I replace income inequality measures by the same different sets of three deciles used in Table 5. These estimations aim at checking that effects of Table 12 are associated to an impact of income distribution of the same nature as for municipal facilities. If this check passes, it is an additional evidence that effects on local taxation is linked to the funding of additional facilities due to more income inequality. Tables 13, 14, 15 and 16 present results of these checks for the four local taxes. As for municipal facilities, the effect of income inequality on the housing tax rate and the two property tax rates is driven by the bottom of the distribution. Lower bottom deciles lead to higher tax rates for these three taxes. As in Table 12, results on the property tax on built estate are less robust than for the two other taxes. In line with Table 12, I do not find any significant impact of any decile on the local business tax rate.

These results on municipal revenues confirm an evidence of a positive impact of income inequality on public redistribution decided by municipalities. Overall, my results suggest that higher income inequality leads simultaneously to a higher net value of municipal facilities and higher local tax rates, while other parts of municipal accounts seem to be unchanged. This suggests that higher income inequality in a municipality makes municipal councils increase taxation in order to fund more public goods. Since tax rates are over the control of municipalities, additional facilities due to more income inequality seem to be the result of an active decision of municipal councils to raise more revenues for more facilities rather than from more exogenous revenues from outside (e.g. through intergovernmental grants). Under the assumption that municipal public goods benefit to everyone in the same way and that these taxes are designed in a way that residents pay increasing contributions according to their income, this means that more income inequality leads to more redistribution

[16] The complement of this share is 24.9% while the reduced sample of 413 observations used for regressions on the local business tax rate represents 21.7% of my whole sample. Indeed, in order to run the first-difference equation, I need to keep municipalities which take decisions on the local business tax rate for both political terms.

decided by municipalities. The first assumption seems reasonable regarding the nature of municipal public goods in France (see Section 3). As for the second one, my results suggest that the impact of income inequality on local tax rates is mainly driven by households taxation on private real estate, as the property tax on unbuilt estate represents on average only 2.1% of total municipal fiscal product in my sample. The strongest effect is on the housing tax. Among the four municipal taxes, this tax is the closest from a tax which makes all individuals paying a burden which increases with their income (see Section 3 for a description of these taxes): it is paid by residents (and not owners), in contrast to other taxes. It is based on the value of accommodations, with tax exemptions and reductions for low-income households. This makes the housing tax burden likely to increase according to income. By using data on income and the housing tax at the individual level in France, Vignolles (2013) finds such a design[17], which strengthens the second assumption.

I find that this positive impact of income inequality on municipal redistribution is driven by bottom deciles. This evidence can be interpreted in two ways. First, if income is considered as the only characteristics of individuals, my results suggest that poorest residents in a municipality benefit from the highest weight in the political process. Municipal councils and voters (irrespectively of their income) may attribute this weight to poorest people because of ideological considerations about in-kind redistribution. However, if one considers that political participation is not constant according to income, the interpretation can be strongly different. An important literature, both theoretical and empirical[18], highlights a positive relationship between voter turnout and income. Then, if poorest individuals get poorer, they may get further from political decisions. At the same time, it is possible that other residents than the poorest ones want more public goods, either for in-kind redistribution, or for public goods themselves. The preference for public goods of these residents can be such that they have a higher demand for them than poorest residents, even if their net gain is lower (and even negative) through local taxes. In this context, a decrease in bottom deciles would lead to a higher weight of other parts of the income distribution in the political process, and then to higher in-kind redistribution.

6 Conclusion

While the standard Political Economy literature predicts a decisive role of voters of the middle of the income distribution in the political process, existing empirical contributions on the impact of income inequality and income distribution on public redistribution have found mix results, suffer from a lack of data and use partial measures of redistribution. By using new French databases on income distribution at the municipal level and French municipal accounts, I bring in this paper new evidence on the impact of income inequality on public redistribution.

I use for 1,900 municipalities over the period 2000-2011 indicators of residents' pre-tax income distribution. Comparing to previous empirical papers, I benefit from high variability in income

[17] As for the *effective* housing tax *rate* according to income, he finds a progressiveness of the housing tax scheme until the sixth decile. Then, the shape becomes flat until the eighth decile, when it becomes slightly decreasing.

[18] See Feddersen & Pesendorfer (1996, 1999), Ghirardato & Katz (2002), Filer et al. (1993), Smith (1984).

distribution across my observations, both in cross-section and over time. In addition, focusing on different local governments in a same country ensures high comparability. Available indicators on local income distribution allow me to be flexible in the measures of inequality I use and to determine precisely which part of the distribution matters for municipal redistribution.

I have information on the whole structure of municipal accounts. Then, I am able to have precise evidence on the impact of income inequality on municipal budgetary and fiscal decisions. This allows me to have a more complete picture of public redistribution decided by municipalities, compared to previous papers. The main activity of municipalities is to provide local public goods of proximity. Then, they mainly take decisions on in-kind redistribution. I implicitly assume that these public goods benefit to everyone in the same way. Under this assumption, the net value of municipal facilities is a good proxy for redistribution decided by municipalities only if these facilities are funded by contributions over the control of municipal elected officials and whose individuals' burden is increasing according to their income. That is why I proceed in two steps. First, I estimate the impact of income inequality on the net value of municipal facilities. Then, I investigate the role income inequality plays in revenues which fund these facilities, by looking at each category of municipal investment resources.

I consider that municipal councils take their decisions at the scale of their political term rather than on a yearly basic. Then, I consider only one observation per municipality per political term, by considering accumulated budgetary and fiscal decisions during periods between two elections. I have two political terms in my sample period. For identification, I include municipal fixed effects in addition of a set of control variables on municipal characteristics. I include as well a lagged dependent variable in each of my regressions in order to take into account the persistence of accounting and fiscal variables.

I find that income inequality has a positive impact on the net value of municipal facilities. An increase by 1% of income inequality leads to an increase in this value between 0.06% and 0.17% depending on the income inequality measure. On the revenue side, I find that income inequality has an impact only on local taxation through local tax rates, which are decided by municipalities. The elasticity of total fiscal products per head with respect to income inequality varies from 0.14 to 0.29 across my measures of inequality. All other categories of municipal revenues are not impacted by income inequality according to my results. These findings on municipal revenues suggest that additional facilities due to more income inequality come from an active decision of municipalities to increase revenues for more equipment and not from an exogenous increase in municipal resources (e.g. through intergovernmental grants). Moreover, I find no impact on operating spending. The fact of having simultaneously a positive impact of income inequality on municipal equipment and local tax rates, without any impact on all other municipal budget components suggests that higher inequality in a municipality leads to more facilities funded by higher taxation decided by municipal councils. Then, I show that effects of income inequality on local tax rates is mainly driven by households taxation on private real estate. The strongest effect is on the housing tax. This is the only municipal household tax paid by residents (instead of owners). Its design is made in a way to

ensure increasing contributions according to households' income. Then, according to these results, income inequality has a positive impact on the amount of public redistribution municipal councils decide.

In order to provide an interpretation of my results, I identify the part of income distribution which drives my results on the positive impact of income inequality on public redistribution. While the standard Political Economy literature predicts a decisive role of the middle of the income distribution, I find that my results are driven only by bottom deciles. I find this evidence for the net value of municipal facilities as well as for local tax rates. This is an additional evidence of the link between my results on facilities and taxation. Thus, according to my results, what matters is only income of poorest people, for a given average income. A decrease by 1% of bottom deciles leads to an increase in the value of municipal facilities per head between 0.05% and 0.19%. I provide two alternative interpretations for this result. First, given all characteristics of individuals other than income, this evidence suggests that poorest residents are decisive in decisions on public redistribution. Thus, if poorest people get poorer given the average income, their net gain from redistribution increases, which leads to higher implemented redistribution. Municipal councils and voters (irrespectively of their income) may attribute this weight to poorest people because of ideological considerations about in-kind redistribution. Second, if one considers that political participation is not constant according to income, the interpretation of my results can be strongly different. An important literature, both theoretical and empirical, highlights a positive relationship between income and voter turnout. Then, if poorest residents get poorer, this may lead to a decrease in turnout for these individuals, which makes them get further from political decisions. In this case, the political weight of voters other than poorest ones increases. In this context, one should observe an increase in public redistribution only if voters of the middle or the top of the distribution want on average more public redistribution than poorest ones. It is possible that voters with middle or top incomes have a higher preference for public goods such that they claim for more municipal facilities than poorest individuals even if their net gain from these infrastructures is lower (and even negative) through local taxation. They may want more in-kind redistribution, not for redistribution itself, but for public goods it implies.

Deciding between these two interpretations remains open and requires further investigation. It would be interesting to have a decomposition of municipal facilities by function (schooling, urban policy, elderly policies, sport, etc.). Identifying the categories of municipal equipment which drive my results may be a way to give a more precise interpretation of my findings. Unfortunately, there is no reliable data on such a functional decomposition. Second, while this paper represents from my point of view a substantial improvement in the empirical identification of the impact of income inequality on redistribution, it presents only average effects for the whole investigated sample. Another interesting extension for further research would be to investigate the heterogeneity of these effects.

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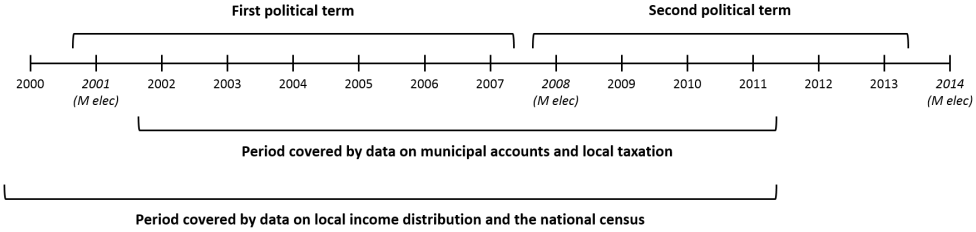
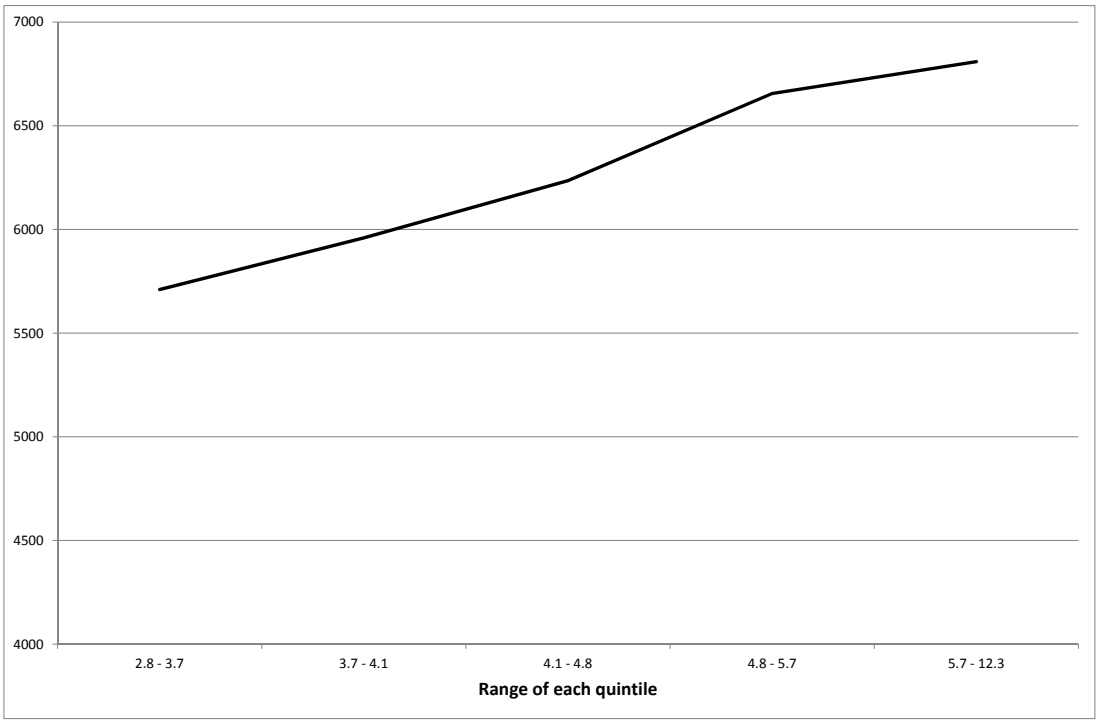
Figures and Tables

Figure 1: Periods covered by the different data sources



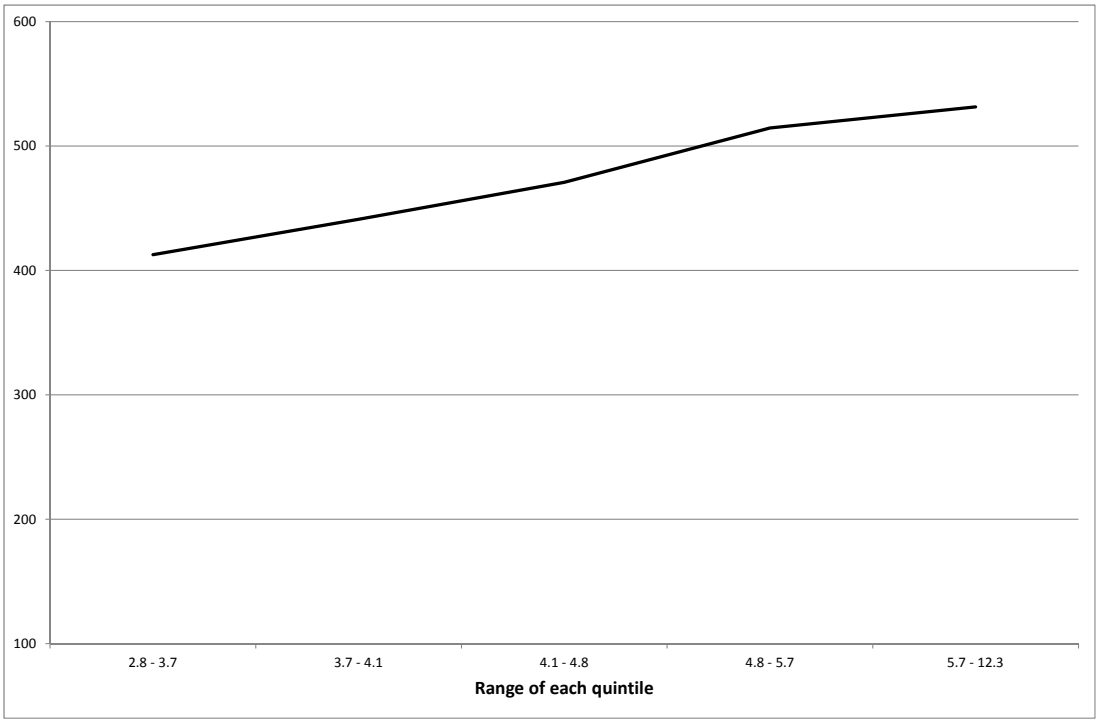
This figure confronts the two analyzed political terms with periods covered by the different data sources. "M elec" denotes municipal elections. These covered periods impose some constraints in the years I consider for my two political terms in my regressions (see Subsection 4.2 for a description of my specifications). My dependent variables come from data on municipal accounts and local taxation. For these variables, and given the covered period in this dataset, I take in my regressions values of 2007 and 2011 (instead of 2013) respectively for the two political terms. For variables on income distribution and other covariates from the national census, I take values of 2000 and 2007, as I use one-year lags. As for lagged dependent variables, I am constrained to use values of 2002 (instead of 2000) and 2007 respectively for the two terms.

Figure 2: Net value of the stock of municipal facilities per capita (in 2010 euros) by quintile of D9/D1



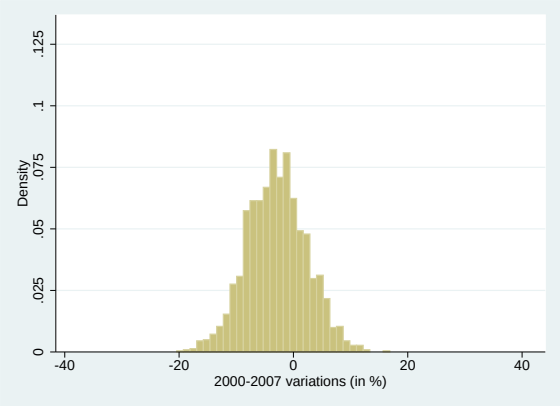
This graph shows for my sample (one observation per municipality per political term) a macro picture of the impact of income inequality on municipal facilities. Its shows for each quintile of D9/D1 the average net value of municipal facilities per head. The horizontal axis indicates the range of D9/D1 of each quintile.

Figure 3: Total municipal tax revenues (in 2010 euros) by quintile of D9/D1

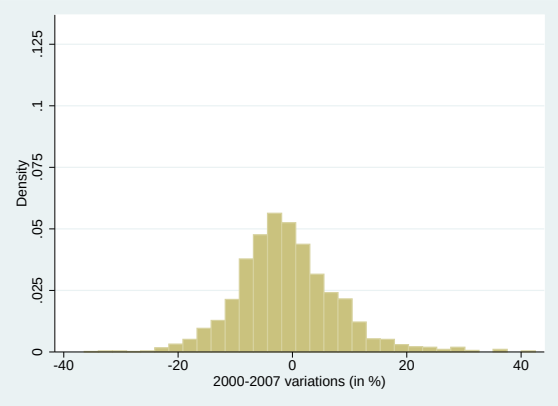


This graph shows for my sample (one observation per municipality per political term) a macro picture of the impact of income inequality on total municipal tax revenues. Its shows for each quintile of D9/D1 the average total fiscal product during last years of political terms. The horizontal axis indicates the range of D9/D1 of each quintile.

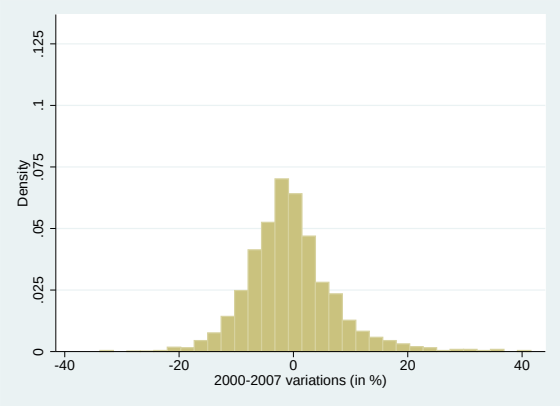
Figure 4: Distribution of variations in income inequality over the first political term (2000-2007) - in %.



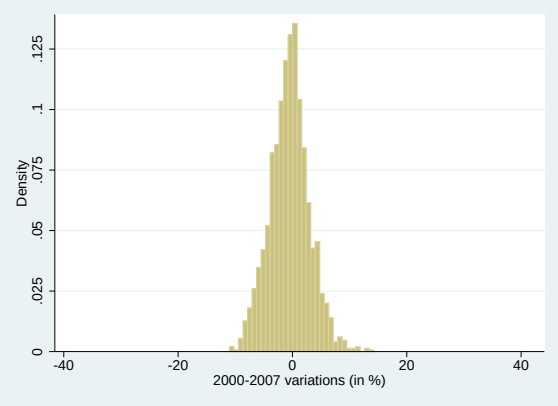
(a) *IQ/D5*



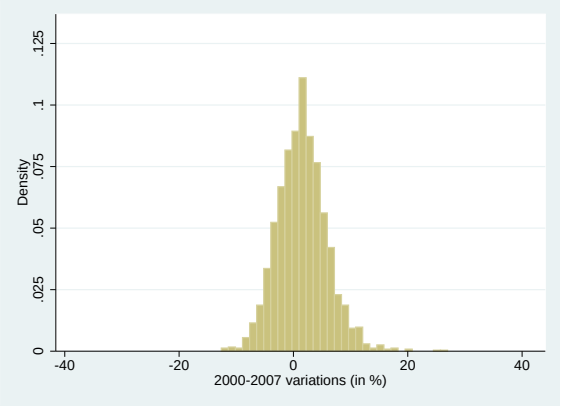
(b) *D9/D1*



(c) *D5/D1*



(d) *D9/D5*



(e) *Gini coefficient*

Table 1: Total spending of the different tiers of French government in 2011 (non-consolidated[1])

	Amounts	Percentage of GDP
Central State	445.3 B €	21.6%
Provinces (*régions*)	27.2 B €	01.3%
Districts (*départements*)	69.6 B €	03.4%
Inter-municipal communities (*intercommunalités*)	37.7 B €	01.8%
Municipalities (*communes*)	94.1 B €	04.6%

Source: DGFiP (French Ministry of Economy and Finance)
[1] These amounts are not consolidated. For instance, transfers from the State to municipalities are counted twice in these data.

Table 2: Revenues of French municipalities in 2011

Type of revenue	Amounts	Share in operating revenues	Share in investment revenues	Share in total revenues
Operating section				
Local taxes	46.3 B €	60.1%	.	48.8%
Formula-based operating grants	19.5 B €	25.3%	.	20.5%
Other operating revenues[1]	11.2 B €	14.6%	.	11.8%
TOTAL operating revenues (1)	77.0 B €	100.0%	.	81.1%
Investment section				
Surplus of the operating section (2)	**13.2 B €**	**.**	**42.4%**	**13.9%**
Loans	**06.5 B €**	**.**	**20.9%**	**06.9%**
Formula-based investment grants	04.2 B €	.	13.5%	04.4%
Discretionary investment grants	03.7 B €	.	11.9%	03.9%
Assets transfers[2]	03.5 B €	.	11.3%	03.7%
TOTAL investment revenues (3)	31.1 B €	.	100.0%	32.8%
TOTAL municipal revenues : (1)+(3)-(2)	94.9 B €	.	.	100.0%
Used for operating spending : (1)-(2)	*63.8 B €*	.	.	*67.2%*
Used for investment spending : (3)	*31.1 B €*	.	.	*32.8%*

Source: DGFiP (French Ministry of Economy and Finance).
These macro data come from the budgets of all French municipalities.
Investment revenues in bold are investment revenues over the control of municipalities.
[1] "Other operating revenues" mainly contain fees and sales.
[2] This item represents transfers of capital assets due to transfers of competencies.

Table 3: Descriptive statistics

	Mean	Std. dev.	Min	Max
Density of population (in inhab/km^2)	1253	2254	33	25207
Municipal population (in inhabitants)	11776	12325	3018	93211
Share of municipal population aged 14 or less	0.19	0.03	0.09	0.29
Share of municipal population aged 60 and over	0.22	0.06	0.04	0.50
Left-wing mayor	0.46	0.50	0.00	1.00
Right-wing mayor	0.50	0.50	0.00	1.00
Independent mayor	0.04	0.20	0.00	1.00
Average pre-tax income per UC[1] (in 2010 Euros)	20746	5010	11276	72298
D1 - pre-tax income per UC[1] (in 2010 Euros)	7753	2566	2334	18430
D5 - pre-tax income per UC[1] (in 2010 Euros)	18296	3977	10174	44204
D9 - pre-tax income per UC[1] (in 2010 Euros)	34618	8499	19194	131879
IQ/D5 - pre-tax income per UC[1]	0.72	0.11	0.48	1.16
D9/D1 - pre-tax income per UC[1]	4.78	1.33	2.80	12.29
D5/D1 - pre-tax income per UC[1]	2.50	0.54	1.70	5.35
D9/D5 - pre-tax income per UC[1]	1.89	0.15	1.55	2.98
Gini - pre-tax income per UC[1]	0.33	0.04	0.23	0.54
Net stock of municipal facilities per capita (in 2010 Euros)	6274	2844	970	50731
Nb. observations	3800			

[1] UC : unit of consumption. It is a measure of household size: one unit for the first adult, 0.5 unit per other individual who is 14 or more and 0.3 unit per child below 14.

Table 4: The effect of income inequality on municipal facilities

	Dependent variable: net value of the stock of municipal facilities per head				
	IQR/D5	D9/D1	D5/D1	D9/D5	Gini
			Pooled MCO		
Lagged dependent variable	0.94***	0.94***	0.94***	0.94***	0.94***
	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)
Average pre-tax income per UC	0.01	0.02**	0.02**	0.00	0.01
	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)
Inequality	0.05***	0.03***	0.02**	0.11***	0.07***
	(0.02)	(0.01)	(0.01)	(0.03)	(0.02)
Municipal fixed effects	No	No	No	No	No
Adjusted R-squared	0.94	0.94	0.94	0.94	0.94
Nb. Obs	3800	3800	3800	3800	3800
			First-difference specification		
Lagged dependent variable	0.10***	0.10***	0.10***	0.10***	0.10***
	(0.02)	(0.02)	(0.02)	(0.02)	(0.02)
Average pre-tax income per UC	0.04	0.06	0.05	0.01	0.01
	(0.05)	(0.05)	(0.05)	(0.05)	(0.05)
Inequality	0.10***	0.07***	0.06**	0.15***	0.17***
	(0.04)	(0.02)	(0.03)	(0.05)	(0.04)
Municipal fixed effects	Yes	Yes	Yes	Yes	Yes
Adjusted R-squared	0.04	0.04	0.04	0.04	0.04
Nb. Obs	1900	1900	1900	1900	1900

* $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$. In parentheses : clustered standard errors (at the municipal level) for pooled MCO, and robust standard errors for the first-difference specification.

This table shows results from pooled MCO (Equation (3a)) and the first-difference specification (Equation (3b)). For each of these two specifications, each column represents a different regression with a different measure of income inequality. Coefficients represent elasticities, as my variables are in logarithm. Coefficients on income inequality represent short-run effects and correspond to the coefficient $d\beta$ in Equations (1) and (2) and the coefficient α_2 in Equations (3a) and (3b).

Table 5: The effect of the different deciles on municipal facilities

	Dependent variable: net value of the stock of municipal facilities per head					
D1	-0.05*	-0.06**				
	(0.03)	(0.03)				
D2			-0.14**	-0.15**		
			(0.06)	(0.06)		
D3					-0.16**	-0.19**
					(0.07)	(0.09)
D5		-0.04		-0.03		0.00
		(0.11)		(0.12)		(0.13)
D6	-0.12		-0.04		-0.02	
	(0.09)		(0.10)		(0.11)	
D7		-0.14				
		(0.14)				
D8				0.12		0.13
				(0.13)		(0.12)
D9	0.14		0.09		0.11	
	(0.09)		(0.09)		(0.09)	
Municipal fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
Adjusted R-squared	0.04	0.04	0.04	0.04	0.04	0.04
Nb. Obs	1900	1900	1900	1900	1900	1900

* $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$. Robust standard errors in parentheses.
This table shows results from the first-difference specification (Equation (3b)). Each column represents a different regression with a different set of three deciles. Coefficients represent elasticities, as my variables are in logarithm. Coefficients on deciles of income are short-run effects and correspond to the coefficient $d\beta$ in Equation (2) and the coefficient α_2 in Equation (3b).

Table 6: The effect of income inequality on the different categories of investment revenues

	Dependent variable: net value of stocks of municipal investment revenues per head				
	IQR/D5	D9/D1	D5/D1	D9/D5	Gini
	Uncontrolled investment revenues				
Lagged dependent variable	0.16***	0.16***	0.16***	0.16***	0.16***
	(0.02)	(0.02)	(0.02)	(0.02)	(0.02)
Average pre-tax income per UC	-0.09	-0.12*	-0.13*	-0.11*	-0.11*
	(0.07)	(0.07)	(0.07)	(0.06)	(0.06)
Inequality	0.04	-0.01	-0.03	0.06	0.09*
	(0.05)	(0.03)	(0.03)	(0.07)	(0.06)
Municipal fixed effects	Yes	Yes	Yes	Yes	Yes
Adjusted R-squared	0.07	0.07	0.07	0.07	0.07
Nb. Obs	1900	1900	1900	1900	1900
	Controlled investment revenues				
Lagged dependent variable	0.04	0.04	0.04	0.04	0.04
	(0.02)	(0.02)	(0.02)	(0.02)	(0.02)
Average pre-tax income per UC	0.14**	0.18***	0.17***	0.11*	0.10*
	(0.06)	(0.06)	(0.06)	(0.06)	(0.06)
Inequality	0.10**	0.10***	0.09***	0.19***	0.20***
	(0.04)	(0.03)	(0.03)	(0.07)	(0.05)
Municipal fixed effects	Yes	Yes	Yes	Yes	Yes
Adjusted R-squared	0.02	0.02	0.02	0.02	0.02
Nb. Obs	1900	1900	1900	1900	1900

* $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$. Robust standard errors in parentheses.
This table represents results on the impact of income inequality on uncontrolled and controlled investment revenues using the first-difference specification (Equation (3b)). For each of these two dependent variables, each column represents a different regression with a different measure of income inequality. Coefficients represent elasticities, as my variables are in logarithm. Coefficients on income inequality represent short-run effects and correspond to the coefficient $d\beta$ in Equation (2) and the coefficient α_2 in Equation (3b).

Table 7: The effect of income inequality on investment revenues over the control of municipalities

	Dependent variable: net value of stocks of municipal investment revenues per head				
	IQR/D5	D9/D1	D5/D1	D9/D5	Gini
	Operating surplus transferred to the investment section				
Inequality	0.10**	0.10***	0.11***	0.15***	0.19***
	(0.04)	(0.03)	(0.03)	(0.06)	(0.05)
Municipal fixed effects	Yes	Yes	Yes	Yes	Yes
Adjusted R-squared	0.24	0.24	0.24	0.24	0.24
Nb. Obs	1900	1900	1900	1900	1900
			Loans		
Inequality	0.13	0.17	0.24	-0.02	0.24
	(0.21)	(0.13)	(0.16)	(0.31)	(0.24)
Municipal fixed effects	Yes	Yes	Yes	Yes	Yes
Adjusted R-squared	0.01	0.01	0.01	0.01	0.01
Nb. Obs	1900	1900	1900	1900	1900

* $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$. Robust standard errors in parentheses.
This table represents results on the impact of income inequality on the two components of controlled investment revenues (transferred operating surplus and loans) using the first-difference specification (Equation (3b)). For each of these two dependent variables, each column represents a different regression with a different measure of income inequality. Coefficients represent elasticities, as my variables are in logarithm. Coefficients on income inequality represent short-run effects and correspond to the coefficient $d\beta$ in Equation (2) and the coefficient α_2 in Equation (3b).

Table 8: The effect of the different deciles on operating surplus transferred to the investment section

	Dependent variable: net value per head of the stock of operating surplus transferred to the investment section					
D1	-0.10***	-0.11***				
	(0.03)	(0.03)				
D2			-0.18***	-0.20***		
			(0.06)	(0.06)		
D3					-0.15*	-0.15
					(0.08)	(0.09)
D5		-0.01		0.02		-0.04
		(0.13)		(0.13)		(0.14)
D6	-0.06		0.02		-0.01	
	(0.12)		(0.13)		(0.14)	
D7		-0.14				
		(0.15)				
D8				0.00		0.05
				(0.14)		(0.13)
D9	0.08		0.05		0.10	
	(0.10)		(0.10)		(0.09)	
Municipal fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
Adjusted R-squared	0.24	0.24	0.24	0.24	0.24	0.24
Nb. Obs	1900	1900	1900	1900	1900	1900

* $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$. Robust standard errors in parentheses.
This table shows results from the first-difference specification (Equation (3b)). Each column represents a different regression with a different set of three deciles. Coefficients represent elasticities, as my variables are in logarithm. Coefficients on deciles of income are short-run effects and correspond to the coefficient $d\beta$ in Equation (2) and the coefficient α_2 in Equation (3b).

Table 9: The effect of income inequality on transferred operating surplus: which component?

	Dependent variable: net stock value per head				
	IQR/D5	D9/D1	D5/D1	D9/D5	Gini
	Total cumulated operating surplus				
Inequality	0.08*	0.08***	0.07**	0.15***	0.15***
	(0.04)	(0.02)	(0.03)	(0.06)	(0.05)
Municipal fixed effects	Yes	Yes	Yes	Yes	Yes
Adjusted R-squared	0.27	0.27	0.27	0.27	0.27
Nb. Obs	1900	1900	1900	1900	1900
	Stock of operating surplus kept in the operating section				
Inequality	0.73	-0.91**	-1.39***	0.42	-0.94
	(0.74)	(0.43)	(0.51)	(1.07)	(0.79)
Municipal fixed effects	Yes	Yes	Yes	Yes	Yes
Adjusted R-squared	0.13	0.13	0.13	0.13	0.13
Nb. Obs	1900	1900	1900	1900	1900

* $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$. Robust standard errors in parentheses.
This table represents results on the impact of income inequality on the cumulated operating surplus and the operating surplus kept in the operating section using the first-difference specification (Equation (3b)). For each of these two dependent variables, each column represents a different regression with a different measure of income inequality. Coefficients represent elasticities, as my variables are in logarithm. Coefficients on income inequality represent short-run effects and correspond to the coefficient $d\beta$ in Equation (2) and the coefficient α_2 in Equation (3b).

Table 10: The effect of income inequality on the different components of the operating section

	Dependent variable: cumulated amount per head over the political term of the operating component				
	IQR/D5	D9/D1	D5/D1	D9/D5	Gini
			Operating revenues		
Inequality	0.13***	0.07***	0.08**	0.10*	0.11**
	(0.04)	(0.03)	(0.03)	(0.06)	(0.05)
Municipal fixed effects	Yes	Yes	Yes	Yes	Yes
Adjusted R-squared	0.05	0.05	0.05	0.05	0.05
Nb. Obs	1900	1900	1900	1900	1900
			Operating expenditure		
Inequality	0.10**	0.05	0.05	0.05	0.04
	(0.05)	(0.03)	(0.03)	(0.07)	(0.06)
Municipal fixed effects	Yes	Yes	Yes	Yes	Yes
Adjusted R-squared	0.04	0.04	0.04	0.04	0.04
Nb. Obs	1900	1900	1900	1900	1900

* $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$. Robust standard errors in parentheses.

This table represents results on the impact of income inequality on operating revenues and operating expenditure using the first-difference specification. As these two dependent variables are in annual flow in my data, I estimate Equation (5). For each of these two dependent variables, each column represents a different regression with a different measure of income inequality. Coefficients represent elasticities, as my variables are in logarithm. Coefficients on income inequality represent short-run effects.

Table 11: The effect of income inequality on the different categories of operating revenues

	Dependant variable: cumulated amount per head over the political term of operating revenues (by category)				
	IQR/D5	D9/D1	D5/D1	D9/D5	Gini
			Formula-based operating grants		
Inequality	0.04	0.04	0.07*	-0.07	0.03
	(0.06)	(0.04)	(0.04)	(0.09)	(0.07)
Municipal fixed effects	Yes	Yes	Yes	Yes	Yes
Adjusted R-squared	0.16	0.16	0.17	0.16	0.16
Nb. Obs	1900	1900	1900	1900	1900
			Local taxes		
Inequality	0.22***	0.15***	0.14***	0.29***	0.25***
	(0.07)	(0.04)	(0.05)	(0.09)	(0.08)
Municipal fixed effects	Yes	Yes	Yes	Yes	Yes
Adjusted R-squared	0.17	0.17	0.17	0.17	0.17
Nb. Obs	1900	1900	1900	1900	1900
			Other operating revenues		
Inequality	0.10	-0.01	-0.06	0.16	-0.04
	(0.18)	(0.10)	(0.13)	(0.25)	(0.21)
Municipal fixed effects	Yes	Yes	Yes	Yes	Yes
Adjusted R-squared	0.02	0.02	0.02	0.02	0.02
Nb. Obs	1900	1900	1900	1900	1900

* $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$. Robust standard errors in parentheses.
This table represents results on the impact of income inequality on the different components of operating revenues using the first-difference specification. As these dependent variables are in annual flow in my data, I estimate Equation (5). For each of these two dependent variables, each column represents a different regression with a different measure of income inequality. Coefficients represent elasticities, as my variables are in logarithm. Coefficients on income inequality represent short-run effects.

Table 12: The effect of income inequality on local tax rates

	Dependant variable: local tax rates				
	IQR/D5	D9/D1	D5/D1	D9/D5	Gini
			Housing tax		
Inequality	0.06**	0.05**	0.04**	0.08*	0.06*
	(0.03)	(0.02)	(0.02)	(0.04)	(0.03)
Municipal fixed effects	Yes	Yes	Yes	Yes	Yes
Adjusted R-squared	0.15	0.16	0.16	0.15	0.15
Nb. Obs	1900	1900	1900	1900	1900
			Property tax on built estate		
Inequality	0.08**	0.04*	0.03	0.09*	0.07*
	(0.03)	(0.02)	(0.02)	(0.05)	(0.04)
Municipal fixed effects	Yes	Yes	Yes	Yes	Yes
Adjusted R-squared	0.15	0.15	0.15	0.15	0.15
Nb. Obs	1900	1900	1900	1900	1900
			Property tax on unbuilt estate		
Inequality	0.07**	0.06***	0.05***	0.12***	0.10***
	(0.03)	(0.02)	(0.02)	(0.04)	(0.03)
Municipal fixed effects	Yes	Yes	Yes	Yes	Yes
Adjusted R-squared	0.14	0.14	0.14	0.14	0.14
Nb. Obs	1900	1900	1900	1900	1900
			Business tax		
Inequality	0.05	0.04	0.02	0.15	0.04
	(0.08)	(0.04)	(0.05)	(0.10)	(0.09)
Municipal fixed effects	Yes	Yes	Yes	Yes	Yes
Adjusted R-squared	0.07	0.07	0.07	0.07	0.07
Nb. Obs	413	413	413	413	413

* $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$. Robust standard errors in parentheses.

This table represents results on the impact of income inequality on the different municipal tax rates using the first-difference specification. As these dependent variables are components of operating revenues I have in annual flow (tax products), I estimate Equation (5). For each of these dependent variables, each column represents a different regression with a different measure of income inequality. Coefficients represent elasticities, as my variables are in logarithm. Coefficients on income inequality represent short-run effects.

The main part of municipalities of my sample have transferred the competency of the local business tax to their inter-municipal community (see Section 5). These municipalities do not decide on the local business tax rate and have no product from this tax. This explains the lower number of observations I have for the local business tax.

Table 13: The effect of the different deciles on the housing tax rate

	Dependent variable: housing tax rate					
D1	-0.04*	-0.04**				
	(0.02)	(0.02)				
D2			-0.07**	-0.08**		
			(0.04)	(0.04)		
D3					-0.11*	-0.14**
					(0.06)	(0.07)
D5		-0.01		0.01		0.06
		(0.09)		(0.08)		(0.09)
D6	0.00		0.04		0.07	
	(0.07)		(0.08)		(0.08)	
D7		-0.02				
		(0.10)				
D8				0.12		0.11
				(0.09)		(0.09)
D9	0.10		0.09		0.09	
	(0.06)		(0.07)		(0.07)	
Municipal fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
Adjusted R-squared	0.16	0.15	0.16	0.16	0.16	0.16
Nb. Obs	1900	1900	1900	1900	1900	1900

* $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$. Robust standard errors in parentheses.
This table shows results from the first-difference specification. As the housing tax rate is a component of an operating revenue I have in annual flow (the housing tax product), I estimate Equation (5). Each column represents a different regression with a different set of three deciles. Coefficients represent elasticities, as my variables are in logarithm. Coefficients on deciles of income are short-run effects.

Table 14: The effect of the different deciles on the property tax rate on built estate

	Dependent variable: property tax rate on built estate					
D1	-0.03	-0.03				
	(0.02)	(0.02)				
D2			-0.08*	-0.08*		
			(0.04)	(0.04)		
D3					-0.14**	-0.15**
					(0.07)	(0.08)
D5		-0.10		-0.05		0.03
		(0.09)		(0.09)		(0.11)
D6	-0.05		-0.00		0.05	
	(0.08)		(0.09)		(0.10)	
D7		0.04				
		(0.11)				
D8				0.14		0.13
				(0.11)		(0.10)
D9	0.09		0.06		0.05	
	(0.08)		(0.08)		(0.08)	
Municipal fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
Adjusted R-squared	0.15	0.15	0.15	0.15	0.15	0.15
Nb. Obs	1900	1900	1900	1900	1900	1900

* $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$. Robust standard errors in parentheses.
This table shows results from the first-difference specification. As the property tax rate on built estate is a component of an operating revenue I have in annual flow (the property tax product on built estate), I estimate Equation (5). Each column represents a different regression with a different set of three deciles. Coefficients represent elasticities, as my variables are in logarithm. Coefficients on deciles of income are short-run effects.

Table 15: The effect of the different deciles on the property tax rate on unbuilt estate

	Dependent variable: property tax rate on unbuilt estate					
D1	-0.05**	-0.05***				
	(0.02)	(0.02)				
D2			-0.09**	-0.09**		
			(0.04)	(0.04)		
D3					-0.10*	-0.12*
					(0.05)	(0.06)
D5		-0.04		-0.07		-0.05
		(0.08)		(0.08)		(0.09)
D6	-0.11		-0.07		-0.06	
	(0.07)		(0.07)		(0.08)	
D7		-0.12				
		(0.09)				
D8				0.10		0.10
				(0.08)		(0.09)
D9	0.09		0.08		0.09	
	(0.06)		(0.06)		(0.06)	
Municipal fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
Adjusted R-squared	0.14	0.14	0.14	0.14	0.14	0.14
Nb. Obs	1900	1900	1900	1900	1900	1900

* p < 0.1, ** p < 0.05, *** p < 0.01. Robust standard errors in parentheses.

This table shows results from the first-difference specification. As the property tax rate on unbuilt estate is a component of an operating revenue I have in annual flow (the property tax product on unbuilt estate), I estimate Equation (5). Each column represents a different regression with a different set of three deciles. Coefficients represent elasticities, as my variables are in logarithm. Coefficients on deciles of income are short-run effects.

Table 16: The effect of the different deciles on the local business tax rate

	Dependent variable: local business tax rate					
D1	-0.02	-0.03				
	(0.05)	(0.05)				
D2			-0.04	-0.03		
			(0.11)	(0.11)		
D3					-0.08	-0.04
					(0.16)	(0.16)
D5		0.01		-0.21		-0.20
		(0.25)		(0.23)		(0.25)
D6	-0.12		-0.10		-0.07	
	(0.19)		(0.19)		(0.22)	
D7		-0.29				
		(0.26)				
D8				0.19		0.19
				(0.24)		(0.23)
D9	0.14		0.13		0.12	
	(0.15)		(0.15)		(0.15)	
Municipal fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
Adjusted R-squared	0.06	0.07	0.06	0.07	0.07	0.07
Nb. Obs	413	413	413	413	413	413

* $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$. Robust standard errors in parentheses.
This table shows results from the first-difference specification. As the local business tax rate is a component of an operating revenue I have in annual flow (the local business tax product), I estimate Equation (5). Each column represents a different regression with a different set of three deciles. Coefficients represent elasticities, as my variables are in logarithm. Coefficients on deciles of income are short-run effects. The main part of municipalities of my sample have transferred the competency of the local business tax to their inter-municipal community (see Section 5). These municipalities do not decide on the local business tax rate and have no product from this tax. This explains the lower number of observations I have for the local business tax.