

Once in the elite, always in the elite?

Changing wealth in a changing city (Paris, France, 1845-1859)

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VERY PRELIMINARY. PLEASE DO NOT QUOTE

Remarks:

- Here, the reader will find the introduction and the presentation of data sources
- The results will be presented and discussed during seminar (along with the introduction and data)
- Slides will be in English, oral presentation in French

Keywords: elites, franchised voters, top wealth, individual economic mobility, matching quantitative sources, electoral lists, estate tax data, 19th century

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1. Introduction

What is an elite? According to the common definition it consists of a small group of individuals who have a great amount of wealth and exert a strong influence over political decisions in a given country. However clear, this definition of the elite is too static to be entirely convincing. The wealth criterion raises some interesting questions about the consistency of the elite and its stability over time.

The recent economic literature on intragenerational income and wealth mobility shows that there is considerable movement and that being rich is a transient state. Using Swedish tax data and tracking wealth at the household level over the period 1968-2005, Hochguertel and Ohlsson (2012) observe the mobility of the top three percent of wealth distribution. It appears that the duration in this quantile is about six years, which is quite short. Moreover, the wealth-age profile is consistent with the life-cycle hypothesis, people in their sixties being more frequently rich. Auten and Gee (2009) examine income mobility in the US economy over the periods 1987-1996 and 1996-2005. They use panel data, follow taxpayers, adjust for household size and show that mobility is high, both upwards and downwards. For instance, 55 percent of taxpayers changed quintile between 1996 and 2005. The median income of those in the lowest quintile grew more than the median income of those in the highest one. Belonging to the top one percent is transient: about 40 percent of those in that percentile in 1996 were still present in 2005. In a set of two complementary papers, Auten, Gee and Turner (2013 AER and 2013 NTJ) look at, among other things, the question of yearly persistence at the top of the income distribution in the short run (*i.e.* five consecutive years). The authors ask the question of whether individuals in the top one percent are "old neighbors or new friends". The detailed analysis of persistence rates show that both types of individuals exist. The authors also underline the effect of macroeconomic conditions on the variations of persistence rates between the different five-year periods they observe (for example, one-year persistence rates tend to be lower during recessions).

As yet, very little has been done concerning intragenerational wealth or income mobility over earlier time periods. The dramatic long-term trend in rising wealth inequality has been well documented for the 19th century, especially for Paris and France from 1807

onwards. Piketty, Postel-Vinay and Rosenthal (2006 AER and 2006 working paper) have made extensive use of estate tax returns. However, the use of cross-sectional data can hardly give an idea of the patterns of individual mobility at this time and cannot address the question of individual heterogeneity. Piketty, Postel-Vinay and Rosenthal underline the importance of these issues for assessing the possibility of opportunities in an ever more highly unequal society experiencing economic development (industrialization, financial capitalism). According to the authors, the decline in the share of aristocratic wealth from the 1850s onwards suggests that mobility "might have been quite high" during the 19th century, aristocrats being replaced by industrialists and bankers in top fortunes. It is clear that these broad intuitions require closer scrutiny. A better knowledge of individual mobility during the 19th century is necessary to assess both economic efficiency and social fairness at that time of profound changes. Was high inequality bad for growth? Was upward mobility possible for the talented, enterprising individuals despite all sorts of constraints and barriers (credit, human capital)?

In this article my objective is not to answer the complex questions of efficiency and fairness but to contribute to the knowledge of what was individual mobility in the 19th century. To do so, I have built an original dataset that allows the study of wealth mobility of a specific group: the franchised Parisian voters of the year 1845. The threshold for enrolment on electoral lists is very high. The franchise is limited to male citizens paying a *cens* of at least 200 francs in direct taxes, *i.e.* a threshold corresponding approximately to the top three percent of the male Parisian population in 1845. Although considerably limited in terms of demographic size (16.048 voters out of a Parisian population of one million inhabitants according to the 1846 census¹), the group of franchised Parisian voters is of high significance, both politically and economically. This group— and more particularly its richest fraction — provides the interesting example of a mid-19th century urban elite. Different sources have been matched in order to follow the individual trajectories of the members of this group in terms of economic wealth. The comparison between the franchise Parisian lists of the years 1845 and 1846 gives the possibility of studying short-term wealth mobility (the resulting database is henceforth called the "short-term database") in so far as franchise lists indicate the detail of the direct taxes paid by each of the franchised voters. Here, direct taxes will be used

¹ At national level, there are 248.000 franchised voters out of a French population of 36 million, *i.e.* a proportion of 1.4 percent if the male population is considered.

as a proxy for wealth. Of course, the relevance of this proxy will be discussed throughout this article. Long-term wealth mobility will be studied too by matching the 1845 electoral list and the Parisian Tables of successions and absences (TSA) of the years 1845 to 1859 (henceforth "long-term database"). These tables contain information about the wealth at death of individuals.

The resulting dataset represents a unique opportunity to study economic mobility during the 19th century within a highly unequal urban society. Between the last years of the July Monarchy and the first years of the Second Empire, Paris was indeed a capital city which experienced large-scale changes: political revolutions, industrial and financial development, demographic growth, urban renewal, real estate speculation. Thus, Paris appears to be an interesting observatory in order to measure economic and social mobility. Recent research (Delbos, 2014), based on the dataset I built, has revealed – among other striking results – the elites' considerable mobility in terms of movements in and out of the group of franchised Parisian voters. Among individuals who appeared at least one time on the franchise Parisian lists of the years 1845, 1846 and 1847, only three quarters were present every year. This means an overall mobility rate of 25 percent, which is considerable inasmuch as it is observed over a very short period of time (two full years). Thus, franchised Parisian voters appear to be an "instant class", they do not form a close elite group. However, this overall mobility rate mixes the economic and geographic dimensions of mobility. Although it is difficult to disentangle these two dimensions with the database at my disposal, there is consistent evidence that economic mobility is dominant (Delbos, 2014). Besides short-run mobility in and out the group, franchised Parisian voters are also characterized by high mobility in the long run as measured by quintile change, wealth at death of individuals being compared to the amount of direct taxes paid in 1845. By and large, despite some persistence, long-run wealth mobility seems to be random, both upwards and downwards.

These different elements raise important issues about wealth at death conditional on wealth as proxied by direct taxes paid at some other point in the lifecycle of individuals. These questions are discussed thoroughly in section two of this article, along with the presentation of the data sources I use. Section three is dedicated to the detailed description of economic mobility, both in the short- and long-run. In section four I propose a very simple

simulation which aims at making the link between short term and long term results for mobility. Section five concludes.

2. Data

The franchise lists

In order to study economic mobility in the mid-19th century, I have two types of data sources at my disposal: franchise Parisian lists on one hand and Parisian Tables of successions and absences (TSA) on the other hand. The electoral franchise lists of the July Monarchy are very precious documents insofar as they allow social historians (such as French scholars Daumard, 1963, and Tudesq, 1964) and economists (Delbos, 2014) to have a precise knowledge of the upper parts of the bourgeoisie, nobility, notability and landownership of the time. The printed, official franchise lists of the 1840s are well preserved and easily readable. For a given geographical level (department, electoral arrondissement, canton, town), they provide detailed information on male French citizens who are qualified to elect members of the Chamber of Deputies. To be qualified, male French citizens must pay a *cens* of at least 200 francs in direct taxes^{2 3} and be age 25 or older according to the Electoral Law of April 19, 1831.

For a given canton (or arrondissement, as regards Parisian lists), franchised voters are sorted according to alphabetical order. For each voter, the lists contain the following elements⁴: full name, title of nobility (if any), occupation or function, honorary position, address, date of birth, the total amount of direct taxes paid and their breakdown by tax district and tax type. Voting qualification derives from the summation of four different types of direct taxes that were created during the French Revolution: (i) a real property tax (*contribution foncière*), (ii) a two-component tax (*contribution personnelle et mobilière*) consisting of a poll

² Members and correspondents of the Institut de France and retired military officers, under specific conditions, are qualified as franchised voters if they pay at least 100 francs in direct taxes. Since these voters constitute a negligible part of the electorate, they are excluded from analysis.

³ In an electoral arrondissement, if there are less than 150 franchised voters, the largest direct tax payers under the 200-franc *cens* complete the electoral list. This provision concerns primarily poor, rural arrondissements.

⁴ For a more precise account of the organisation and content of franchise lists, see Tudesq (1958) and Kent (1971).

tax and a tax proportional to the rental value of dwelling, (iii) a tax on doors and windows (*contribution sur les portes et fenêtres*) and (iv) a tax on industrial and commercial activities (*contribution sur les patentes*) consisting of a fixed charge which depends on the type of activity and the size of town population and a charge proportional to the rental value of occupied premises. Note that this complex tax on industrial and commercial activities was revised by the *patente* law of April 25, 1844, that is to say just before the period I study (see Koepke, 1980, for a presentation of the 1844 *patente* reform). It is also very important to point out that the *contribution personnelle et mobilière* is not a tax on moveable assets, contrary to what the French term *mobilière* might mistakenly suggest. This means that some rich individuals whose wealth consists essentially of moveable assets are not qualified as franchised voters. It is particularly the case of *rentiers*, that is to say individuals living off capital income. Real property remains the basis of wealth in the mid-19th century, but *rentiers* make up a non-negligible part of the Parisian bourgeoisie of the time (Tudesq, 1958, and Daumard, 1963).

The real property tax accounts for most of the direct taxes paid by franchised voters. For instance, in the industrializing but still largely rural department of Seine-Inferieure, the total direct taxes paid by franchised voters in 1845 break down as follows: 68 percent for the real property tax, 10 percent for the personal tax, 4 percent for the tax on doors and windows and 18 percent for the *patente*. In Paris, the average breakdown is the following: 65 percent for the real property tax, 7 percent for the personal tax, 1 percent for the tax on doors and windows and 27 percent for the *patente*, thus reflecting the significant weight of merchants, traders, small businessmen, craftsmen, industrialists and bankers in the Parisian electorate. Outside Paris (and most probably outside other big cities too), real property can be regarded by and large as a sine qua non to be qualified as voter. In rural areas, amounts paid for the *patente* are generally small. In Paris, the picture is quite different and it is possible to be qualified without paying any real property tax. Thus, the *patente* plays an important role in shaping the sociology of the franchised Parisian electorate.

There is a little-known aspect of the voting franchise: it is the family dimension of the calculation rules that enable male individuals to add, under the conditions prescribed by the Electoral Law, the direct taxes paid by women and children, so as to meet voting qualifications (Verjus, 1998). The direct taxes paid by the wife, even in case of separation of

property (but not in case of judicial separation), are added to those of the husband. The father adds to his own direct taxes those of his minor children, on condition that he is entitled to use their property. Besides these cases, the widow or the separated or divorced woman has the right to delegate the direct taxes she pays to the son, grandson, son-in-law or grandson-in-law she designates. Unfortunately, franchise lists are silent on these calculations and delegations, so that it is practically impossible to identify the voters who benefited from this system and were thus able to meet voting qualifications⁵.

Is it possible to assert that franchise lists are exhaustive in terms of headcount of male citizens paying at least 200 francs in direct taxes? By and large, I think it is the case. There are, however, three main reasons as regards non-enrolment (Tudesq, 1958, and Kent, 1971). Firstly, enrolment procedures can be quite complex because of the multiplicity of required supporting documents that have to be produced in a short period of time (for instance, for individuals who pay taxes in many different departments). If one document is missing, enrolment will not be possible. Secondly, political opinions may, in part, explain non-enrolment on franchise lists. Simply by invalidating one document, a prefect can try to block enrolment of individuals who are politically hostile to the regime. Of course, an appeal against the prefect's decision can be made but it is a long and complex procedure. Conversely, some individuals exclude themselves from the lists by political indifference, negligence or (mainly legitimist) reluctance to swear allegiance to King Louis-Philippe (an act which was required before voting for the first time). Legitimist abstention was particularly high at the beginning of the July Monarchy but then, in the 1840s, Legitimists tend to get more and more involved in the electoral field. Thirdly, it is important to underline that members of the jury are randomly drawn from franchise lists. Insofar as jury duty is an expensive, time-consuming activity, some citizens are tempted to avoid this legal obligation and the best way to do this is to stay out of the lists. This behavior was a matter of concern for prefects. To conclude, it is very difficult to estimate the number of individuals who exclude themselves or are excluded from franchise lists. Nevertheless, a few clues suggest that the magnitude of non-enrolment remains limited. This ensures that franchise lists are a reliable source concerning top taxpayers.

⁵ Information on the date of marriage of voters would be helpful to count the number of voters who met qualification just after marriage. Their access to the voting franchise is probably due to marriage.

The Tables of successions and absences

The Parisian Tables of successions and absences (TSA) are the other source of data I use (and that were previously used by Piketty, Postel-Vinay and Rosenthal, 2006). The Tables of successions and absences – termed thus since 1825 – are maintained by a specific tax administration (*Administration de l'Enregistrement*) which was created in 1790 (and existed until 1969) in order to collect inheritance taxes. The TSA are intended to control estate tax registration (the estate tax was created in 1791 too and was a flat tax until 1902). For a given *bureau* of the *Enregistrement* administration, a TSA consists of a 200-sheet register in which each hand-written entry corresponds to a decedent who died and/or had some wealth in the area covered by the *bureau*. In principle, there is one *bureau* for each chief town of canton but there may have been changes over time. In Paris (the capital city is not subdivided into cantons) there were seven *bureaux* until 1859, each *bureau* covering generally two arrondissements. After the annexation of surrounding municipalities by Paris in 1860, there are nine *bureaux* (then 14 in 1921 and finally 20 in 1955). The TSA are sorted both alphabetically and chronologically (which will be of great help in matching them with franchise lists). More precisely, a register contains individuals with names beginning with the same initial letter. Once a register is full, the administration opens a new one, which explains why TSA are arranged chronologically according to time periods of varying length (generally between two and six years for the Parisian TSA of the mid-19th century).

The TSA contain the following information: the decedent's name, first name, title of nobility (if any), occupation (or former occupation), address, age at death, date of death, marital status (sometimes left blank), date of the declaration of succession, information about heirs (generally limited to the indication of their kinship ties), amount of non-real estate, real estate income (the value of which is assessed by the tax administration on the day of death), address of real estate. Note here that from the 1870s onwards (that is to say after my period of interest), the TSA no longer contain numeric information about wealth. If some possession is left at death, it then becomes necessary to refer to the declarations of succession (with the help of the dates indicated in the TSA) contained in the registers of transfers following death (*registres de mutation par décès*). This operation makes post-1870 data collection much more tedious.

The estate tax becomes progressive in 1902, which means that estate tax returns have henceforth to be aggregated at individual level in order to compute the amount of estate tax to be paid. Before this date, a decedent may appear in the TSA registers of different *bureaux*, according to the location of estate⁶. Given the flat-rate taxation system, estate taxes were paid at the *bureau* level. There was no need to centralize estate tax returns. Such dispersion must be kept in mind for the data collection process.

Last but not least, I briefly consider the question of the reliability of estate tax data. According to Piketty, Postel-Vinay and Rosenthal (2006, AER), tax evasion was, in all likelihood, very limited during the 19th century insofar as estate was taxed at a very low rate (one percent for transfers to heirs in the direct line). The tax administration had the capacity to control changes in asset composition or in account ownership and, if necessary, crack down on tax evaders.

Definition of the sample, matching process and issues

Because of the size of both the franchised Parisian electorate and the Parisian population, it has proved necessary to restrict data collection and matching to a well-defined sample. First of all, given the way in which individuals are sorted in the franchise lists and the TSA, it is easy to limit the sample to individuals with names beginning with the same initial letter. In 1845 there are about 1.700 franchised Parisian voters whose names begin with letter B (12 percent of Parisian voters). This substantial sample is the second largest group in terms of initial letter after letter D group (about 1,900 individuals), but its representativeness is greater than that of letter D group. Many nobles are classified in letter D group because they have the French particle *de* (or one of its variants) in their names. Of course, the particle *de* is not synonymous with belonging to the nobility but it is clear that nobles are overrepresented in letter D group, hence an overrepresentation of large landowners in that group. Moreover, names including the particle are not necessarily classified under letter D, which may cause

⁶ Note that non-real estate was, in principle, included in the estate tax returns of the *bureau* covering the area where the decedent had his place of residence. However, some decedents whose residence (as indicated in the Parisian TSA) was outside Paris can be found with non-real estate located in Paris. This is particularly the case for very rich foreigners.

specific difficulties when matching TSA and franchise lists. For all these reasons, it is preferable to choose letter B group.

Insofar as franchised voters belong a priori to the richest part of the population (they are, at least, the top direct tax payers)⁷, it is quite natural to focus on the wealthiest decedents and to look whether these individuals appear on the franchise list of the year 1845. In other words, I assume some wealth persistence over time. For each of the seven Parisian *bureaux*, I have therefore decided to restrict to male decedents with real estate or at least 20,000 francs in non-real estate at death. Considering all decedents with real estate maximizes the chances of finding, in the TSA, franchised Parisian voters who paid taxes on Parisian real property in 1845. The threshold of 20,000 francs concerning non-real estate is not too restrictive, in my opinion, because it is far lower than the average (real plus non-real) estate of male decedents between the 90th and 98th percentiles, as calculated by Piketty, Postel-Vinay and Rosenthal (2006 working paper, table 1) for the July Monarchy (29,000 francs) and the Second Empire (52,000 francs). Thus, the 20,000-franc threshold allows for the observation of a relatively wide range of downward mobility trajectories.

A decedent's estate being disaggregated by *bureau* (a disadvantage of having a decentralized flat-rate taxation system for inheritance), collecting estate data from outside Paris would be an enormous task. In this article, observed wealth at death is limited to its Parisian part. In the case where the decedent has a non-Parisian residence, non-real estate cannot be observed (see footnote 6). That is why I restrict my sample to individuals with a Parisian residence at death. Moreover, since non-Parisian real estate is not observed, one can think that a potentially sizeable part of wealth is left aside, especially for large landowners. Franchise Parisian lists may then be helpful to have a rough idea of the proportion of non-Parisian estate because direct taxes are aggregated at national level for each franchised voter and electoral lists indicate the breakdown by tax district⁸. On average, individuals in my long-

⁷ I say *a priori* because moveable assets are not taken into account when calculating direct taxes.

⁸ Here, it must be emphasized that the annual revision of electoral lists was a gigantic task for the administration. In each department, the prefect had the legal obligation to update the lists on the basis of the diverse rolls concerning the direct taxes paid nationwide by voters. There were 100,000 such rolls for the franchised voters of the Seine department according to the prefect's annual report (Rambuteau, 1837). The prefect also had to detect potentially new voters and add them to the franchise lists.

term database⁹ paid, in 1845, 17 percent of their direct taxes in non-Parisian tax districts (concerning the tax on real property, the proportion rises to 21 percent). This non-negligible proportion will have to be taken into consideration when measuring economic mobility between 1845 and the year of death of individuals.

There is another possible bias as regards collecting data on wealth at death. Given that the matching process between TSA and franchise lists is carried out on the basis of each Parisian *bureau* taken separately¹⁰, wealth at death is biased downwards for decedents who have less than 20,000 francs in non-real estate in the Parisian *bureau* of their residence and no real estate in that *bureau*. However, the average decedent in my long-term database has 135,000 francs in non-real estate (out of a wealth at death of 275,000 francs). The potential bias is therefore limited to only 7 percent of the average decedent's observed wealth.

Data collection is limited to a well-defined time period too. Concerning my short-term database (see footnote 9), I wanted to choose two consecutive years so as to measure economic mobility on an annual basis. In the Archives of Paris, I had at my disposal, for the July Monarchy, the franchise lists of the years 1842 and 1844 to 1847. I excluded the 1844 electoral list insofar as the reform of the *patente* did have an immediate, strong impact on the composition of the franchised Parisian electorate, so that measuring economic mobility on the basis of the direct taxes paid by voters in 1844 and 1845 would not be a good idea (necessity of an unchanged tax framework for analysis). I excluded the 1847 electoral list too, inasmuch as the last years of the July Monarchy were marked by a severe economic (and political) crisis that led to the collapse of the regime in February 1848. The suffrage was then granted to all male citizens aged 21 or over. As a result of these considerations, 1845-1846 is the only pair of consecutive years that proves to be satisfactory.

Concerning the long-term database, I use TSA registers of the years 1845-1859. The period ends in 1859 because of the extension of the limits of the City of Paris on January 1, 1860. Each of the nine new TSA *bureaux* covers two or three new Parisian arrondissements

⁹ As a reminder, the long-term database matches the 1845 franchise Parisian list to the TSA Parisian registers. The short-term database matches the franchise Parisian lists of the years 1845 and 1846.

¹⁰ TSA registers are not previously matched together before being matched to franchise lists. It would take a long time.

and thus generally mixes parts of the former Parisian *arrondissements* with parts of the incorporated suburbs. Given that for each decedent wealth at death is aggregated at *bureau* level (the only distinction is between real and non-real estate), TSA registers do not specify the value of real estate that is precisely located in the former limits of Paris. This is problematic when it appears that for a given *bureau* a decedent has buildings or lands that are located on both sides of the former limits of Paris. A quite tedious solution would be to open the declarations of succession of such post-1859 decedents.

Lastly, I would like to add here that matching individuals is far from being a trivial operation (Delbos, 2014), especially when it comes to matching franchise lists and TSA. The process is complex and cannot be easily automated since there are many elements of uncertainty, in particular as concerns the TSA registers. A decedent may have several first names but the TSA are generally not exhaustive, contrary to franchise lists. Father and son may have exactly the same first name. Brothers may have one of their first names in common. Besides, the spelling of surnames is not entirely fixed during the 19th century. In addition to these issues, TSA registers may contain some illegibilities (information is hand-written), but numbers are generally easy to read. However, age at death, when indicated, may sometimes be inaccurate. Finally, geographic (and, at the margin, occupational) mobility can also make the matching process trickier.

Measuring economic mobility

My measures of both short- and long-term mobility do not fall within a standard framework. The measure of short-term mobility is based on a multidimensional proxy for wealth that adds four different types of tax. Moreover, direct taxes do not take into account either moveable assets or income. As Tudesq (1958) put it, franchise lists provide indications on "acquired wealth" (*i.e.* lands, buildings, premises) rather than on "easy-to-mobilize wealth". Thus, annual variations in the amount of direct taxes paid by an individual reveal downward and upward changes in structural terms: sale or purchase of real property, transfer or inheritance, entrance into activity or retirement, *patente*-sharing between partners, expansion (or reduction) of premises, change in the type of activity, changes concerning the residence that impact on the *contribution mobilière* or the levy on doors and windows,

changes in marital status or family situation, etc¹¹. There is clearly a tension between the very short time period of observation (one year) and the nature of the underlying causes of observed changes. Here, moveable assets can be viewed as an unobserved buffer. For all these reasons, it is preferable to rely on a relative rather than an absolute measure of economic mobility. Because of the size of the short-term database (1,519 individuals), measuring movements in terms of quintile changes seems convenient.

As regards the measure of long-term mobility, I would like to highlight the different dimensions of the discrepancy between the *cens* and observed wealth at death. Firstly, the direct taxes indicated in the franchise lists are aggregated at national level for each voter, whereas I observe wealth at death as only indicated by the Parisian TSA. Nonetheless, Parisian wealth at death may, in part, derive from non-Parisian land revenues or business income or be due to changes in the geographical composition of property (for instance, the sale of a voter's country house one decade after 1845, so as to purchase a luxurious Haussmannian building in Paris). Secondly, a similar reasoning may apply to the fact that moveable assets are not taken into account for tax-based voting qualifications. Non-real wealth at death may indeed derive from property revenues or business income, *i.e.* from a property or an activity that was subject to direct taxation in the 1845 franchise lists. Thirdly, the 20,000-franc threshold in non-real estate introduces a downward bias in the measure of wealth at death. On average, this bias is very limited but it might account for a non-negligible part of the fortune of the less wealthy individuals whom I collected in the TSA. Fourthly, because of the family dimension of the tax-based franchise, there is a dissociation between the amount of direct taxes that are taken into account in order to meet voting qualifications and an individual's own wealth. The direct taxes that are indicated in the franchise lists do not necessarily derive from a voter's own property, but possibly from the delegated direct taxes of other well-defined members of his family. Thus, for some voters, the 1845 proxy for wealth – direct taxes as indicated in the franchise lists – tends to be biased upwards. This may impact on my measure of individual mobility. Unfortunately, franchise lists can be seen as a black box with respect to this issue. Despite these difficulties, it is necessary to explore the data so as to decide whether the franchise lists provide a good proxy for individual wealth or not.

¹¹ Changes in the amount of direct taxes from one year to another may also be due to the correction of some erroneously printed or computed numbers or an exceptional delay in updating a voter's tax situation. In order to limit these problems, I use the tables of rectification that amended the electoral lists initially drawn up by the administration. There were four semimonthly tables of rectification. For 1845, the last two are missing.

3. Results

(to be continued)

4. Discussion

5. Conclusion

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