History, Geography, and the Markets for Mortgage Loans in 19th Century France

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Abstract

*Thi*s articles examines the impact of two themes in Kenneth Sokoloff's research on mid nineteenth-century French mortgage markets. In particular, the negative effects of inequality and the positive effects of large, competitive markets. We document negative externalities from inequality: when the distribution of wealth is too skewed, the middle class gets excluded from the market. The second externality is a positive one that is generated by the geographical density of markets. We further distinguish its effects in the credit market itself from possible spillovers from the comparable externality in product markets. We proceed in four steps. We begin by summarizing the sources of our data and our aggregate findings of our research on French credit markets. We then move to an analysis of local credit markets, which suggests that inequality had adverse effects on lending. The next step is to search for the positive externality by examining loans between inhabitants of different cities and towns. We show that there were indeed positive network externalities in credit markets, which are consistent with a queuing model. Although most loans were local, the credit network allowed for significant inter-market flows of resources

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Introduction: Inequality, Endowments, and Market Institutions.

From his early articles on Early American manufacturing to his work on comparative economic development in the Americas, much of Kenneth Sokoloff's research focused on how access to markets and initial levels of inequality changed individual behavior and in turn influenced subsequent market development. In particular, he emphasized the negative effects of inequality and the positive effects of large, competitive markets. We take up these themes in a different context—mid nineteenth-century French mortgage markets.

This paper seeks to document the existence of two sorts of externalities in the market for mortgages and related forms of medium and long term debt. The first involves the negative externalities from inequality; in other words, if the distribution of wealth is too skewed, the middle class gets excluded from the market. Engerman and Sokoloff, and others as well, have posited that this negative externality originates in the failure to develop institutions that allow the middle class to participate in markets. The mechanisms for the failure are by and large political, with the rich using their power to stall institutional change out of fear that they will face redistribution or a loss of rents. For credit markets, high levels of inequality are often associated with restrictions on bank formation and poor titling institutions. Since our analysis is restricted to France, a common set of institutions prevail in all our markets. Thus we highlight the economic rather than political mechanisms behind the connection between inequality and credit markets.

The second externality is a positive one that is generated by the geographical density of markets. In his work on manufacturing and on patenting, Sokoloff showed that distance to the market had an important impact on how private actors structured their activity. Grantham has made much the same argument for French agriculture. If an analogous externality worked for credit, regions in which medium and large credit markets were close would witness more lending than otherwise similar regions in which markets were far apart. The only complication is that the the reorganization studied by Sokoloff and Grantham often pass through capital markets, since individuals close to markets can operate at a larger scale or with a more capital intensive technology. If we look for the same externality in credit markets, we need to try to distinguish its effects in the credit market itself from possible spillovers from the comparable externality in product markets. Fortunately, we can do so, for our loan records give us geographic information for borrowers, lenders, and intermediaries, and we can measure both distance to the product

market and to the credit market. We can thus document precisely the effect of spatial transaction costs on the credit market and show how they affect different types of loans. It turns out that loans for the middle class are far more sensitive to such transaction costs than loans for the wealthy. In credit markets, inequality and market access are bound together.

While the context of our study is far removed from those Sokoloff investigated, it proves particularly illuminating. Wealth in mid-nineteenth-century wealth was very concentrated, particularly in large cities (Piketty, Postel-Vinay and Rosenthal). The distribution of formal political power was also quite restricted. Although it is conventional to assume France industrialized slowly (Landes, Bourguignon and Levy-Leboyer, Roehl), capital markets did nonetheless became more important over time. Most important of all, we have a wealth of data, since we can measure most of the relevant variables at very disaggregated levels.

We proceed in four steps. We begin by summarizing the sources of our data and our aggregate findings of our research on French credit markets. We then move to an analysis of local credit markets, which suggests that inequality had adverse effects on lending. The next step is to search for the positive externality by examining loans between inhabitants of different cities and towns. We show that there were indeed positive network externalities in credit markets, which are consistent with a queuing model. Although most loans were local, the credit network allowed for significant inter-market flows of resources.

A. Mortgage markets and notarial credit in France as a whole

As we have explained in a book on Paris and in articles on on rural lending, mortgages were fundamental component of the European financial system from the Middle Ages to the first World War; so were other sorts of medium and long term loans secured by other forms of collateral. Most of this lending involved loans arranged by notaries, who provided legal advice and served as financial intermediaries. Unlike the stock market or the banking system, the study of this financial system has most often been left to historians who have examined the evolution of credit in one market, region or for a particular social group. While time and again these scholars have emphasized the local importance of credit, little has been done to draw out aggregate conclusions.

Notaries were private individuals who after some training purchased the right to draft and authenticate private contracts in a given location. Other elements of their activity vary from country to country in continental Europe, and in France before the French Revolution, from region to region. For our purposes, it suffices to note that by the mid nineteenth century, their number in France had stabilized at 2 to 5 per rural canton, and an increasing number in cities as function of the urban population. (Here the canton is the second smallest of the administrative subdivisions of France, one just above that of the municipality. The country as a whole was divided into approximately one hundred roughly equal sized divisions called departments, each of which contained several smaller subdivisions called arrondissements. The arrondissements, which took roughly day of travel to cross on foot, were in turn divided up into several cantons, which typically contained a town and several villages.)

In contrast to other parts of the world, the French government encouraged competition by ensuring that notaries were not local monopolists and by allowing individuals to draw up contracts in front of whatever notary they wanted. Parties to all sorts of contracts—not just loans—had a strong incentive to consult a notary, for in civil litigation the burden of proof weighted heavily against anyone wanting to overturn a notarized contract. Notaries also had the advantage that their records gave them unparalleled information about individuals' asset position. The records included all previous contracts they and their predecessorts had drawn up, from loans and land sales to wills, estate settlements, and prenuptual agreements. Unlike banks, they could not take a position in the contracts they drafted, and so they served not as bankers, but as brokers of information. Yet as we have show for Paris, that role was extensive.

To study notarial market we selected a stratified set of cities, towns, and villages where the government had installed an office (a Bureau des Actes Civil Publics) that collected a tax on local notarial contracts. The registers of these offices contain a great deal of detail about the financial terms of notarial contracts; for credit, they reveal social characteristics of borrowers and lenders and tell which notary drew up the loan. Using these records, we constructed a balanced panel consisting of all loans recorded in 108 of these offices on six dates between 1740 and 1899. The data set now includes evidence on more than 225,000 loans, for the years 1740, 1780, 1807, 1840, 1865, and 1899. For this paper, we have added data on lending in 1840 and 1865 from another 50 officies that are neighbors to one of our original 108 offices in the eight departments

of the Aube, Eure, Gard, Haute Garonne, Morbihan, Sarthe, Seine Maritime, and Vaucluse. We will rely on two data sets. The first covers lending in 1840 and 1865 in 187 cantons, with the records coming from 158 offices. The second concerns lending in 81 cantons within the eight departments that we oversampled. The second data set has the advantage that all locations have been matched to GIS codes showing precise location, which is useful for studying spatial transaction costs. Both the old and new market are displayed in Figure 1.

To gauge the importance of notarial credit, we we divided the offices in our sample into three categories (Paris, large cities, cities, and rural markets), computed per capita levels of lending for each category, and then used French population data to estimate total notarial credit for France as a whole (Hoffman Postel-Vinay and Rosenthal 2008). Starting in 1840 we can compare our totals to those provided by the government for the total value of notarized loans in France and we come extremely close the government's estimates (see Table 1). We then employ the reported duration of the loan contracts and evidence about contract renewals to estimate the stock of loans. If we compare these numbers to GDP, notarial loans outstanding amounted to at least 22 percent of GDP in 1840 and 1865. Government data on the duration of loans, which are not available until the at the end of the century, point to an even higher figure—33 percent of GDP. In either case, there is no doubt notarial credit was large. Indeed, given the huge number of notarial loans that were made, we estimate that about one quarter of French households were involved in this market either as lenders or more likely as borrowers.

This rosy picture of a broad (though not democratic) credit market was clouded by one darker trend, for by our estimates the number of loans fell steadily over the nineteenth century. Even if we allow for longer loan durations, the number of loans did not keep pace with population growth. If there was a loan outstanding for every 14 persons or so in 1840 that number had fallen to 1 in 20 by 1865. One possible culprit was a rise in wealth inequality (Piketty, Postel-Vinay, and Rosenthal, 2006). That process, which has been documented with data from wealth at death, included both a jump in the value of large estates and an increase in the fraction of the population dying without any wealth. If the distribution of wealth among the living was not appreciably different, then a declining fraction of the population had assets, which were a prerequisite for accessing notarial credit. The lack of collateral plus growth in average wealth for those who did have some assets might well have led to fewer notarial debt contracts in

total and a larger average loan size for the smaller number of notarial credit contracts that were being drafted. That is precisely what we observe.

The history of notarial credit from its aggregate point of view thus raises two questions. First, is there a connection between wealth, inequality, and the size of credit market *within* an economy like that of France, where legal and political institutions can be taken as constant? Second, if wealth is unequally distributed both within and across localities, how are credit markets organized? The rest of this paper attempts to answer these two questions.

B. Evidence from Credit Markets in French Cantons

The data at the national level suggest that while the total amount of credit transiting through notarial offices was increasing because of economic growth, the number of loans was falling as wealth inequality rose. We can probe the relationship between wealth, inequality and mortgage loans by looking at the amount of lending that passed through the offices of the notaries in our sample. The 1840 cross section proves particularly valuable here because we have data on many measures of wealth and inequality for that year. Data of this sort are scarce earlier and later too.

Not all villages had notaries, but government regulation insured that there would be at least two notaries in every canton. The government ensured that notaries were broadly distributed over space because they were required for all sort of contracts and legal documents, and it was commonly believed that notaries in a canton would draw up the vast bulk of the contracts passed by its inhabitants. We begin by considering the relationship between the loans drawn up by the notaries in a canton and the canton's characteristics. To net out the obvious relationship between population and the level of lending, all our variables are per-capita.

The key relationships we seek to verify are that more wealth in a canton boosts lending, while more inequality reduces it. We would expect such a relationship if borrowing was limited by collateral and investment projects involved indivisibilities.[1] We have two yardsticks for of

[1]For a formal model along these lines and evidence that it applies to France, see Hoffman, Postel-Vinay, and Rosenthal (forthcoming). In this model, per-capita lending rises with average wealth, and with the demand for loans, which is correlated with variables such as city

wealth: the first is total tax payments per capita in the arrondissement (the next level up from the canton), and the second is the share of the population who paid 200 francs in taxes and were therefore eligible to vote. The first is correlated with wealth because taxes were primarily assessed on the value of land and the value of businesses, but it glosses over heterogeneity among cantons within a given arrondissement. The second yardstick, the share of males who paid 200 francs in taxes, is measured at the right level of aggregation (the canton), but it suffers from the fact it is very coarse way to gauge wealth. We also have variables that shed light on the bottom of the wealth distribution, including the fraction of individuals who were illiterate when they were drafted in the army between 1827 and 1830, and the percentage of draftees who were less than five feet tall when drafted. Other things equal, a larger fraction of individuals who were short or illiterate should reduce lending.

To test these relationships, we ran regressions in which the dependent variables were three different measures of lending: the numbers of notarial loan contracts, the value of the notarial loans, and the stock of the notarial loans (in other words, the value of the loans times contracted maturity). We ran the regressions for both the 1840 and 1865 cross sections; we did not run panel regressions because several important explanatory variables were measured only once. Our explanatory variables included the fraction of the population eligible to vote, the fraction of draftees who were illiterate, the population of the main town in the canton in 1806, and department level fixed effects, which should capture broad differences in wealth and in the demand for loans. (For descriptive statistics for both the dependent and explanatory variables, see Table 2.) In the regressions, the general pattern (Table 3) is that a larger fraction of individuals eligible to vote boosts lending while more illiteracy reduces it. The size of the coefficient on share eligible to vote is not affected by inclusion of the illiteracy variables, which suggests that the two effects are different. We interpret these two finding as supporting the hypotheses about wealth and inequality. Although the evidence is weaker when we measure lending by counting the number of loans, it is strong when our dependent variable is the value or stock of loans. In general, the patterns for 1865 are similar to those for 1840 but fainter, which is

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populations. Making investment projects indivisible then implies that lending will fall (ceteribus paribus) with inequality.

not surprising since illiteracy and the share of the population that votes were measured were measured back in 1840 or before. The results are robust to dropping subsets of the data (such as the largest towns) or specifying the regression in logarithms. And the regressions are not simply measuring the effects of urbanization because including the population of the main town in the canton has little effect on the other coefficients.

The economic importance of the coefficients can be evaluated by measuring the impact of moving one standard deviation in the distribution of the fraction of electors or of illiterates on the volume of loans in 1840. With a coefficient near 1000 and a standard deviation of 0.003, a one standard deviation increase in the fraction of men eligible to vote boosts the volume of loans by 3 francs, or 15 percent of the mean in 1840. For the fraction of illiterates, the coefficient is 0.35 and the standard deviation near 18. Hence an increase in illiteracy by one standard deviation reduces credit by roughly six francs or 30 percent.

Table 4 provides a set of alternative regressions with other variables that can proxy for wealth and inequality. None provide much additional insight. The insignificance of the coefficient of per capita taxes at the arrondissement level suggests that understanding credit requires measurement at a finer spatial scale because of local heterogeneity in wealth and inequality. The weak results for the population under five feet is more surprising, for shortness is often taken to be a sign of poverty, and is often correlated with low physical well being and limited human capital. It may be that an unequal distribution of physical human capital has less of an effect on credit markets than an unequal distribution of intellectual capital, but that remains to be verified. It could simply be that the stunted were an inframarginal fraction of the population that was excluded from notarial credit markets everywhere.

We also split the sample between northern and southern France. We do so for several reasons. As we have discussed elsewhere, notaries were more common (other things being equal) in the south than in the north, and the types of loan contracts they drew up were different. Their training was distinctive in the south too. When conjoined, these two effects might have led southern notaries to offer their services to a broader set of the population than their northern counterparts. Finally, the north of France was generally richer than the south. As for the regressions, the northern one reproduces the aggregate results, only more strongly. The southern results are weaker, with a negative and insignificant coefficient for the share of individuals

eligible to vote, and a coefficient for illiteracy that has the right sign but is smaller than in the north. The difference is not due to differences in the urban-rural relationship since the coefficient on market size is the same in both regressions. One possible explanation is that the sample in the south is simply too small. But it is also possible that rural southern notaries reached further down the wealth distribution in providing intermediation for agriculture.[2]

Overall, however, the French evidence is by and large consistent with the arguments that inequality can hamper the development of capital markets. The extent of inequality's effects, though, depends on how attached individuals are to the notaries of their cantons. To see how attached they were, we have to delve deeper into the spatial structure of the notarial credit system.

C. Municipalities and the credit network

Precisely how wealth and poverty affect the lending we measure turns out to be a complicated question. The reason is that the loans which crop up in a given canton in our sample are not necessarily ones made by individuals in the canton. Rather, they are loans contracted in front of notaries in the canton. Our regressions suggest that notaries were busiest in cantons where a larger fraction of men were able to vote and illiteracy was low, but that does not necessarily mean that the inhabitants of those cantons enjoyed more access to credit. It could just be that the local notaries were busier. To verify that it really was access to credit, we must analyze the flow of debt across cantons. To do so, we examine lending by the residence of the borrowers and lenders, and document the existence of significant externalities across markets

Because our original sample of 108 offices was stratified by city size and designed to broadly cover France, most markets were far from each other. As a result, if individuals did not borrow in their home market, they were likely lost to us, and we therefore could not analyze their choice of a home or distant market for their credit transactions. That is why we returned to the

[2] If we examine the distribution of loan sizes in small markets, a quarter of the loans were for less than 210 francs (with a maturity of one year) in the south; in the north the smallest quartile consists of loans less than 300 francs and with an average maturity of 2.5 years.

archives and oversampled 9 departments for 1840 and 1865. In the Vaucluse we added every office; in the Haute Garonne, the Gard, the Eure and the Aube, we added another half dozen offices that allowed us to 'connect' the original bureaux. Finally, in the Sarthe, Morbihan and Seine Maritime[3], we added another five offices. Although we have gained considerable coverage (with 998 municipalities in these seven departments under observation), the sample is unbalanced in ways that might bias any estimates of borrowing and lending. In particular, the fact that we have all of the Vaucluse means that we are much more likely to detect borrowing by residents there than in the Seine maritime, where we have data from only six of the department's 30 plus offices. Although the number of nearby offices is likely to be random, we cannot tell ex-ante whether this number is correlated with any of the variables at interest. To counter this problem, all our statistical analysis includes fixed effects and wherever possible fixed effects at the canton level. It thus focuses on within canton differences between municipalities. One consequence is that we can no longer use any departmental, arrondissement, or canton level variables in the analysis because they are linear combinations of the cantonal fixed effects. For the Aube, Eure, Gard, and Vaucluse, we do at least have figures for municipal tax transfers to the central state, and for all municipalities in the sample we know populations in censuses between 1806 and 1846, the number of individual eligible to vote, and the results of the industrial census of the 1840s.[4]

To capture the effect of varying access to the market, we initially created three measures of access. The first, which is consistent with George Grantham's work on the important effects of concentrated sources of demand, begins by calculating, for each of the six largest cities in France, the ratio of its population divided by its distance to each of our municipalities. The sum of these measures over all six cities is the value of the index of concentrated urban demand for each of our municipalities. We then repeated the calculation, this time using the largest 20 cities. Few of these cities in either group are part of our sample. The two resulting measures represent the intensity of urban demand in a given municipality . The rationale behind the calculations is

[3] The data collection for the Haute Garonne, the Herault, and the Gard remains incomplete.

[4] The results of surveys of primary schools in the 1830s are available at a municipal level and could be used to replace the literacy information used in section B.

Grantham's argument that farmers reorganized their activities in ways that were capital intensive when faced with high urban demand. Presumably reorganization of this sort would have also boosted demand for credit.

The third measure of access to credit, which once again is calculated for each municipality, is simply the weighted sum of the 1806 populations of the cantons in our sample, with weights equal to the reciprocal of the distance from those municipalities to the municipality in question. The third measure is large when a municipality is surrounded by other sizeable municipalities in our sample, and it is computed with 1806 populations in order to avoid problems of endogeneity.

We inserted these three measures into regressions in which the dependent variable is the sum of the per-capita stock of loans in 1840 and 1865 that involved either borrower or a lender living in a given municipality. We chose the sum of both borrowing and lending over two years in order to dampen the noise from annual shocks to local markets. Using the per capita stocks for a single year nonetheless does produce similar results, albeit with higher standard errors. It turns out that none of the three measures has a statistically significant effect on lending (for brevity we do not report these results). Even more surprising, the population-distance ratio for the six big cities is more often than not negative. While the third measure of access to credit markets is almost always positive it is never statistically significant.

One problem common to all three measures is the assumption that each new lender in a city has the same effect on borrowing in a small municipality as in a larger one. In other words, they assume a tremendous amount of homogeneity in how the demand for transactions changes with greater access to markets. We might well expect that to be true for agriculture. Because the wheat produced in the small town is perfect substitute for that produced in a village, more potential customers should change a farmer's behavior in similar ways regardless of whether they happen to live in a large city or small municipality, provided of course that the distance to the city or municipality is the same. For credit, however, this assumption is likely wrong, because he transactions that occur in Paris are radically larger than those that take place small village. While an industrialist in a large town may consider going to Paris to get a loan, a farmer who wants to borrow three months income is not going to find the capital a welcoming place, because his affairs are simply too small to be of interest. For the farmer seeking a secured loan, what matters

is access to lenders or borrowers who want to participate in transactions of similar magnitudes as he does.

If we want to measure the externalities created by market density, we must therefore take a more disaggregated approach and allow for interaction effects for markets of different sizes. The easiest way to do so is to assume that there is there is some sort of hierarchy of markets that interacts with municipal populations. Although that is the path we take, we have no priors as to the structure of that hierarchy. We therefore adopt a simple procedure. We begin by breaking down our cantons into three categories by size: large (population greater than 20,000 in 1806), medium (population between 19999 and 10000), and small (population less than 10000). We next create population and distance ratios for each size category that resemble our third measure of market access and then use regressions to see whether these variables influence lending in our municipalities in a way that would be consistent with network effects. We run the regressions for separately for sets of municipalities group by the size of the municipal population.

The population and distance ratio for the large cantons, PD-big, is simply the sum of the ratios of the 1806 population in the large cantons to their distance to a given municipality in our sample. The population and distance ratio for medium sized cantons, PD-med, and for small cantons, PD-small, are defined in an analogous way. Once again, the 1806 populations are used to avoid problems of endogeneity. The dependent variable in the regressions is the sum of the per-capita stock of loans in 1840 and 1865 that involved either borrower or a lender living in the municipality in questiony, and the regressions also include a wealth measure—the fraction of the population in the municipality that is eligible to vote.

As table 5 and 6 show, even our rough and ready approach reveals the existence of network externalities (in the sense that population distance ratios have sizeable and significant coefficients in the regressions) for all but the smallest of municipalities, where the coefficients are rarely estimated with any precision. The magnitude of the coefficients of PDbig, PDmedium, and PDsmall varies between 0.01 and 0.005, while the standard deviation of those variables ranges from 2000 for PDsmall to 4500 for PDbig. The implication is that one standard deviation in the distribution of the population/distance variables would bring an increase in the stock of loans per capita between 10 francs and 45 francs, which would equate to a 10 to 30 percent jump in the stock of loans. In economic terms, the network externalities thus appear large.

A number of these coefficients are also statistically significant and positive—possible evidence of positive externalities. The coefficient on PDbig (the population/distance ratio for canton larger than 20000) is positive and significant for the largest markets which is exactly what we would expect if there were positive network effects. For some of the smaller municipalities, the coefficient on PDbig is negative for some smaller markets and positive for others. It is therefore hard to tell whether individuals who in villages near a big city have less access to credit because urban lenders concentrate on making large loans. The coefficient of PDmedium (the population/distance ratio for cantons larger than 10000) is always positive and often statistically significant, suggesting that the presence of large numbers of potential partners in neighboring medium sized towns fosters borrowing and lending. Finally the coefficient on PDsmall (population less than 10000) is almost always positive, though rarely statistically significant. As one might expect, these small canton do not offer the kind of concentrated pool of partners that are attractive to potential borrowers and lenders.

In sum, the regressions seem to indicate that what mattered most in France were middling markets that appealed to the large number of families with some wealth. Meanwhile, large cities limited their credit markets to large transactions and thus provided few financial benefits to their hinterland.

If we accept this evidence, where do the externalities lie? Because we are dealing with aggregate data, it could simply be that if a municipality is surrounded by a dense network of middling markets (PDmedium is large), then the municipality's inhabitants lend a lot to one another. Credit markets would be segmented, but simply because of high overall demand for (and supply of) loans within the municipality. Yet the residents of the municipality could borrow and lend more because they are engaged in loan contracts with inhabitants of other nearby localities. The only way to find out is to look at the loans themselves.

D. Individual loans

The aggregate evidence for network externalities could stem from greater demand and supply in local markets or from lenders' and borrowers' ability to meet partners beyond their home canton. Supply and demand might be greater if economies near larger cities and other

market towns were wealthier or more commercialized and thus generated more credit transactions. In that case, the network externalities in the credit market reflected something happening elsewhere—with endowments or in product markets. If borrowers and lenders were doing more business with partners in other markets, though, then something different was going on in the credit markets themselves. In regions with many nearby markets, for instance, notaries might be pooling information and then directing borrowers and lenders who could not quickly find a partner in their own canton to the offices of a notary in a nearby canton. The ease with which borrowers and lenders could find suitable partners would then induce individuals to rely more heavily on credit markets than would be the case in regions where markets were spread out.

This second hypothesis, which fits our data, is easiest to grasp if we consider the institutions affecting mortgage loans. First, there was little competition on price, since collateral requirements served to equalize the risk profile of borrowers. The dimensions of a loan that mattered where thus its duration, its size (someone who wanted to borrow a significant sum could do so in one or several loans, but transaction costs would be lower for a single loan), the amount of time that it would take to complete the transaction, the distance between borrowers and lenders (while the two need not have met, they still had to sign documents in presence of the notary). The notaries who arranged loans matched up borrowers and lenders. They did pool funds raised from investors and then use the money to fund mortgages and other notorial loans. That sort of mortgage banking was rare in France (and in other parts of Europe too) until the 1850s, in large part because it risky to fund medium and long term loans with the sort of demand deposits that banks relied on.

Because notaries matched every borrower with a given lender (or set of lenders), a problem of queuing arises: when someone decides to borrow or to lend, there may not be anyone with the reverse requirement who is searching at the same time. This will be particularly true in smaller (and unequal markets) because the arrival rate of demands for new loans will be slow, and the same will hold for offers to supply new loans. In larger markets the interval of time between new loan demands or between offers to supply new loans will be less.

Now consider a lender who lives in a settlement of given size. In equilibrium, she faces transaction costs incurred in determining the characteristics of a potential partner and a given wait time for completing a desired transaction in her home market. If that wait time is long

enough, she may want to see if there is another market nearby where she can arrange the transaction quickly. However, doing so raises three costs, first since there are many alternative markets, she needs to find out where there are borrowers who are likely to suit her needs, then she needs to face the travel costs to complete the deal (both at initiation and termination). Finally she must worry about the possibility of adverse selection and moral hazard. In the absence of intermediaries, the first and third problem are likely to prevent nearly anyone from arbitraging the wait times, for no one knows where to go, and people will worry about facing a lemons' problem in the foreign market.

If local and distant intermediaries cooperate in the regional redistribution of credit, then the lender knows what which nearby town will offer her opportunities for investing her funds, she can be assured her concerns about adverse selection are moot, and the intermediary can monitor the borrower and remit his payments of interest and principal. In this case, beyond paying the intermediary for his services, our lender faces only the cost of travel to the distant market and in return faces a much shorter wait time.

Notice that with inter-regional intermediation most of these costs are fixed: the cost of a notary communicating to another about his net demands for transactions does not depend on the size of loans, nor do the travel costs. Although the cost of investigating collateral increases with loan size, it will be the same in the home market and a distant one. Thus if notaries are organized in a network that trades information, the lender faces a fixed transaction cost for distant deals.

Now let us return to the wait time, which depends on the population of the home canton and the distribution of wealth. Suppose the home canton is small and wealth very evenly distributed. Wait times are then going to be higher for smaller and larger loans than for 'middling' ones. Clearly, a lender who wants to invest a large sum will likely want to see what deals are available in nearby towns, provided the local wait times are long enough. Since small loans are rare, so will a lender who wants to lend out a small sum, but for him the inter-regional fixed interregional costs of intermediation are comparatively large, so he is less mobile. If travel costs are small, middling lenders are therefore the most likely to do their business in their home market, but if travel costs are large, only individuals who seek larger transactions will leave the home market in large numbers. The integration of markets should thus vary systematically with settlement size and loan size. All other things being equal, individuals who live in large

municipalities should be likely to engage in credit transactions in their home community (because they have more potential partners), while individuals who have less representative loan demands should be less loyal to their home markets, provided their transactions are not too small.

To explore the effects of these costs and wait times, we computed the fraction of loans in which the lender, the borrower, and the notary resided in the same municipality. We performed the calculation for various sized loans and municipalities (Figures 2 and 3). Figure 2 reports the fraction of loans in which the borrower, the lender, and the notary all reside in the same municipality. Figure 3 modifies the calculation by including cases in which the borrower and lender resided in the same municipality but ended up traveling to a notary in another community. The cases added would include loans in the borrower and lender lived in a small village with no notary, for they alwys had to go elsewhere to see a notary, even if they arranged a loan among themselves. Figure 3 would also include instances in which a borrower and lender from a municipality with a notary decided to do their business before a notary elsewhere.

We expect both fractions to rise with the size of the municipality and to decrease with loan size. The data for the calculations come frm 39,000 transactions covering 81 of 187 of our cantons. The municipal populations are those of the community where borrower resided; computations using the lender's residence lead to similar conclusion, with the caveat that lenders are more urban and thus more likely to live in the same settlement as their notary.

The data confirm that individuals who live in large municipalities do more business at home and that the fraction of loans arranged within a municipality diminishes for large loans. In the very largest settlements the fraction of the population that co-resides with their notary and partners approaches 80 percent and is not sensitive to loan size except for the largest loans. This last result may be the result of a limitation of our data set, which does not yet contain the largest cities in the sample (Paris and Lyon), where people from regional cities might have gone to complete large transactions (most likely to borrow). The only time we observe this credit 'elite' is when Parisians or Lyonnais show up lending in other markets. Nevertheless, even for the largest municipalities in our sample some 20 percent of loans had either a borrower or lender who did not reside in the same municipality as the notary. If we consider borrowers who lived in municipalities with between 1000 and 2000 inhabitants, the fraction of loans arranged with a co-

resident falls from 45% to nearly nothing as loan size passes from 100 to 50000 francs (Figure 3). Clearly transactions costs seem to matter to what types of loan involve distant partners.

The other dimension of the spatial distribution of loans involves distance. Figure 4 traces the average distance between borrower and lender (for those loans where it is positive) given loan and city size. Here the reverse pattern holds, in small and medium municipalities where people travel often they do not go very far: usually less than 50 kilometers. How far one travels, however, increases with city size, so that individuals from smaller municipalities rarely go beyond 30 kilometers whatever the loan size, while in larger cities people may travel 100 kilometers or more (several days prior to the age of railroads). The distance traveled also rises steadily with loans size. That is precisely what one would expect if, as loan size increases, individuals are willing to bear higher fixed costs to find a shorter queue.

Averages can be misleading, in particular for small municipalities. One can have an inordinate number of loans made to local borrowers by men in the military, who happen to be posted in distant garrisons. Or one can run into an unusual number of migrants who return home to invest. To filter out unusual cases of this sort, we examine the 75th percentile of the distribution of the distance borrower and lender travelled conditional on their voyaging at all. We interpret this value as the outer range of how far people are willing to go to join a short queue for a match in the credit market. The results are displayed in figure 5. Once again, distance is increasing in loan size and municipal population, so long as the city is not too large. The striking finding, however, is that for all loans under 2000 francs (a category that account for 85 percent of all transactions) and for all municipalities except the very largest, this 75th percentile lies between 17 and 25 kilometers. The explanation for this upper bound on how far most people would travel is simple: it is the outer limit of an overnight's journey by foot. Only for the largest loans and the largest municipalities do individuals want to travel further. That large loans involved more distant travel is easy to understand, because a large loan dilutes the fixed cost of travel. That individuals in large cities are willing to voyage longer distances (for a given loan size) may reflect improved transportation between larger cities, as they connected to the national transport grid. In other words, the pattern of market integration seems to reflect the fixed costs of travel, which weigh more heavily on small loans than larger ones;

That the same outer limits to travel applied to most loans and all but the largest municipalities is likely evidence that the notaries formed a network, in which a notary whose shingle hung in a village of 1000 people had more or less the same information as a colleague in a town of 3000. Notaries knew not only what deals were available in their own municipality or canton but in nearby cantons as well. Although in larger municipalities more deals could be completed with co-residents, when that failed, lenders and borrowers faced the same conditions as their rural brethrens. Travel costs, however, made it undesirable to go far beyond a location that could be reached in a day, because they would then rise sharply. One can surely imagine that individuals would sometimes have secured the information themselves, but in that were common it would be hard to understand why borrowers commonly traveled more than lenders. After all, any distant lender who was arranging a loan on his own would presumably want to go verify the value of the borrower's collateral and ensure as well that other potential lenders were aware of his claim on the borrower's assets. But with a network of notaries, it is likely that borrowers would be given an introduction from their notary and all the requisite paper work and that they would then be sent off to meet their lenders. The borrowers would then be the ones to travel.

Thus even for small loans, notaries worked to match lenders and borrowers in a series of overlapping markets that covered all of France. Market integration resulted from how ready borrowers and lenders in large loans were to travel. They could rarely arranged loans with someone in their home town, and the large loan sizes made it economical for them to travel long distances in search of a suitable partner. Because the sums were big, thecapital flows between regions (or actually between urban regional centers) were huge. Half of the loans above 5,000 francs (about 7 times per capita income) involved borrowers and lenders who did not live in the same municipality and travel of 50 kilometers. These loans over 5000 francs amounted to only 7 percent of the loans in the sample, but they constituted 57 percent of the value of loans, and almost two thirds of the stock. When new opportunities arose in a given location the rich, at very least, could rely on the notarial system to secure distant resources backed by their real assets.

E. Change and structure

The preceding sections have taken the data as if it were a single cross section to reveal the spatial structure of notarial lending. The evidence that individuals could and frequently travel to meet partners in loans has important implications for research on the growth of mortgage markets. To begin with, most of the research implicitly studies these markets as island economies where changes in fundamental variables like wealth or economic structure interact with scale of the local market. The evidence above suggests that we must reconsider these implicit assumptions not just for the American Mid-West or Latin America but also for the long settled economies of continental Europe.

Consider for a moment an economy where credit increases with wealth as we have shown in our cross sectional analysis in section B. In terms of the mortgage market this could be because individuals who are buying more valuable housing or land have larger mortgages, because there are more individuals in the economy taking out mortgages (to purchase or build housing either to rent or occupy), or even because entrepreneurs turn to long term markets to build manufactures. In a closed economy, such an increase in the demand for financial intermediation must be met locally and thus we expect the local credit market to grow. To some extent this is the story revealed by the astounding developments in the canton of Montcenis. The major iron works of the Schneider firm, le Creusot, were located there. Between 1840 and 1865, as the works grew into the largest firm in France, the population doubled in the canton, the credit market pretty much matched this growth since the stock of loans per capita remained constant. Yet that was a fraction of the total change in the capital structure of the locality. Schneider itself was practically absent from in the local market. The family and its firm financed themselves in Paris, and through retained earnings. Other individuals who wanted to borrow could turn to the nearby town of Macon or Chalon-sur-Saone. Thus the resources available for borrowing and lending in Le Creusot or in the canton of Montcenis are only a limited part of the story of financial change there. Instead what mattered most was the interactions of Le Creusot with other areas of France and in particular Paris three hundred and fifty kilometers away.

The tale of Le Creusot is not as extreme as it might seem. If we take our 187 cantons as isolates, then neither the existence of industrial firms in 1840 nor any other level variables are correlated with the growth of lending between 1840 and 1865. Neither is the growth of

population either in the canton or in its chief city. The lack of correlation holds whether we measure lending by the number or the stock of loans.

In part, the lack of correlation reflects shocks to small markets: the twentyfold growth in the value of loans in Aigues Mortes is solely due to a loan taken out by a corporation that intended to turn nearby marshes into vineyards and salt flats. The collapse of lending in Nuits St Georges (lending there collapsed by 91 percent) was not due to a sudden decline in demand for high quality Burgundy wines but to an exceptionally large loan taken by a Dijon banking family in 1840 for more than a million francs. Such loan not only does not recur in Nuits, but it does not recur anywhere in our data outside Paris.

The seeming random walk of our credit markets is not solely due to the chance arrival of large loans (if this were the case, larger markets would be more predictable than small ones). Rather, it is a direct consequence of the intense spatial integration of what are commonly taken to be closed and traditional markets. While a very large fraction of all loans matched local borrowers and lenders, even small loans could be transacted at some distance. Thus when credit boomed in Mauguio (another canton with endowments favorable to salt marshes and wine) between 1840 1865, the inhabitants of the canton also appear in the two nearby markets of Montpelier and Lunel for another (25 loans and 40,000). Beyond the smaller markets, if we take into account in the growth of inequality between 1807 and 1899 and the redistribution of population from villages to cities, it is likely that this spatial integration was growing. As wealth inequality increased, the number of loans outstanding per capita fell while their size and duration increased. The increase in loan size and maturity implies that the willingness to travel to find partners increased. But the loans where partners met after some travel most likely depended both notaries' information and on the formal registration of liens, which could be exploited by a new mortgage bank founded in the 1850s, the Crédit Foncier. On the other hand, in many large settlements notaries may well have decided to eschew intermediating smaller loans because there was more money to be made in dealing with rich clients, a move that would have increased inequality over time.

Evaluating the welfare consequences of the spatial scale of credit markets is thus complex. On the one hand the progressive disappearance of smaller, shorter term loans was costly in particular in areas where alternative institutions (savings banks, pawnshops) were

scarce. On the other, these larger loans served to integrate the economy and to redistribute capital across different rural areas and toward the more rapidly growing urban centers. In the countryside, participation in these markets remained widespread through the 1860s, in part because demand was too small for alternative intermediaries to enter, and in part because the scale of farms and firms guaranteed that a very large number of entrepreneurs need access to long term credit. In cities a completely different economy emerged, one where most of the population rented its lodgings throughout its life and worked for a firm where the entrepreneur provided the capital. This was true even in Paris where much of manufacturing occurred on a contract, basis with workers toiling away in very small shops where they often owned their tools. Most often it was the wholesale merchant (fabricant) who organized production and provided the working capital. Hence cities could grow and grow quickly without a 'democratic' credit market. The structure that our spatial analysis revealed, suggests a final element to the process of change: competition. While notaries were locally in positions where they seemed to control the market, the increasing capacity of borrowers and lenders to choose to direct their business to notaries in other municipalitiesl provided incentives for notaries to exchange information in order to serve their clients.

Conclusion

From the aggregate evolution of loans sizes that we discussed in Section A to the spatial distribution of loans, inequality clearly marked French credit markets. Yet it is not easy to detect any sizeable negative consequences for the growth of financial markets—and perhaps economic growth too—in contrast to what has been argued for many developing countries. One important reason is that French credit markets remained highly competitive, even though wealth was very concentrated and access to human capital restricted. While the state limited entry into particular form of financial intermediation (most famously corporate banks and the Bourse), it did not cartelize the whole of the system. In fact, entry into private banking was always free and more than 10,000 notaries competed for the business of intermediating private mortgages and other asset market. These 'traditional' intermediaries provided all the necessary impetus to change.

On a second level, the findings presented here reinforce our conviction that prices are only one element of market integration. If we consider mortgage markets where rationing is almost always a key facet of the allocation mechanism, price convergence is less relevant than understanding whether these markets move capital across space and towards areas that are growing more rapidly. If we look at quantities of capital moving from one place to another it is clear that by the mid nineteenth century notaries helped integrate French credit markets. In future work we hope to show that this was also the case before the French Revolution.

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Figure 1 Localities in our sample

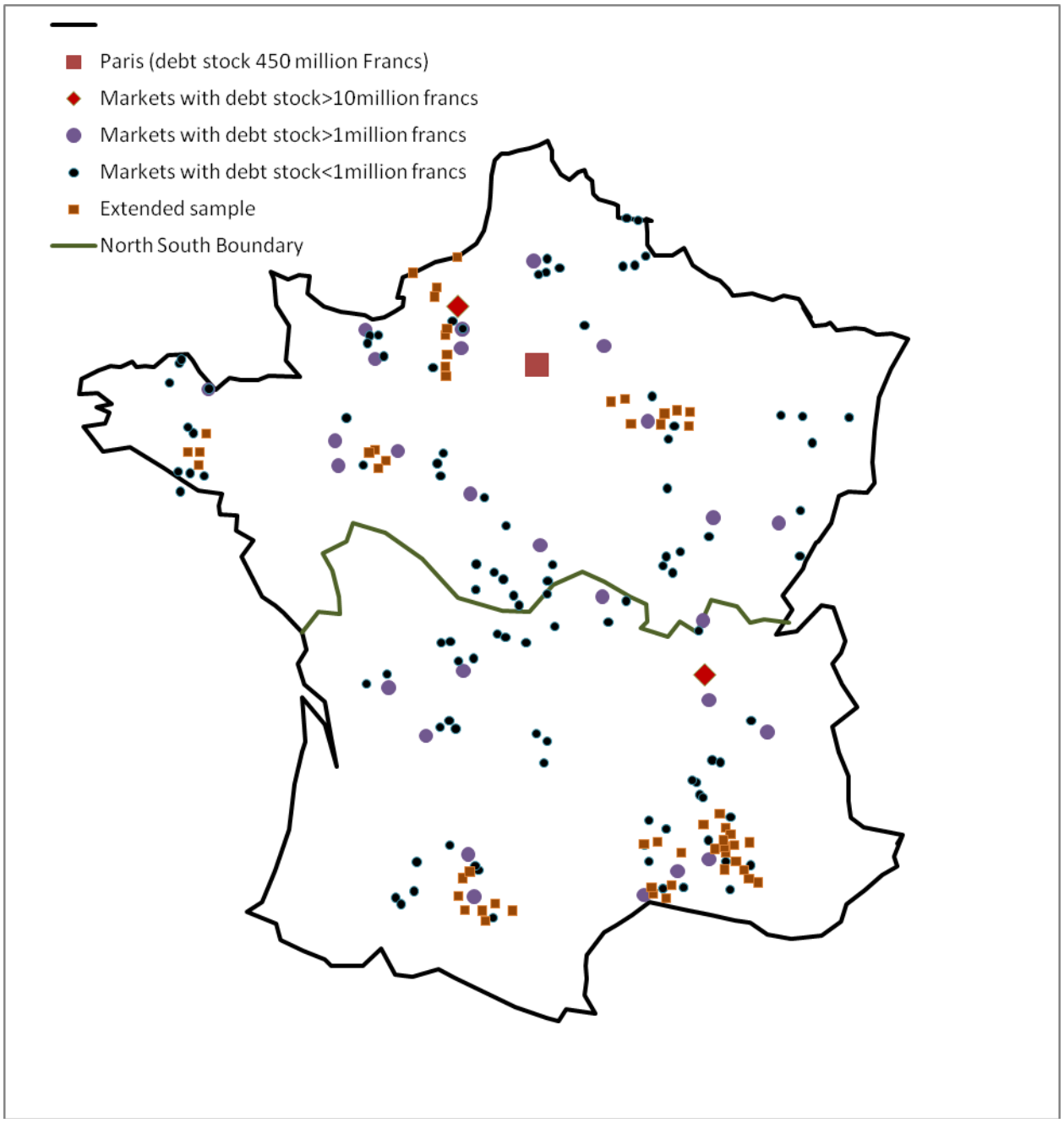


Table 1: The aggregate market for notarial loans1740-1899

	1740	1780	1807	1840	1865	1899
	Loans made that year					
Total	457848	382376	444569	652831	452361	248922
	Value of Loans (million livres/francs)					
Total	230	362	453	817	919	975
	Stock of Loans (Contracts * Duration)					
Total	3399797	2360452	1419796	2313890	1957808	2271190
Loans/Person	0.14	0.09	0.05	0.07	0.05	0.06
	Stock of Debt in million livres/francs (Value* Duration)					
Total	2403	2446	1750	3675	4097	5995
Stock/GDP	0.21	0.19	0.13	0.23	0.19	0.21
	Duration (years)					
Average	10	7	4	4	4	6
	Average Loan size					
	503	948	1018	1251	2031	3918
Average/GDP/POP	1.1	2.06	2.2	2.7	3.5	5.2

Source: Hoffman et all 2008.

Note: the estimates for 1865 and 1899 exclude Crédit Foncier Loans

Table 2 Variable definitions for Table 3

Variable	year	Mean	Mean
Number of Loans per Capita	1840	0.016	0.0109
	1865	0.012	0.0082
Value of Loans per Capita	1840	18.63	19.38
	1865	20.91	17.07
Stock of Loans per Capita	1840	80.63	121.15
	1865	101.44	117.44
Share of Pop who votes	1840	0.0054	0.00303
Share of recruits illiterate	1827-30	57.25	18.46
Share of recruits<5feet	1827-30	14.07	6.83
Population of main town	1806	10079	48607
	1841	12935	65413
Arrondissement taxes/per capita	1840	0.0047	0.0013
	1865	0.0046	0.0014
Percapita value added in Manufacturing	1840	65.95	249

Table 3 Regressions of Per capita Credit Activity by Canton

	Number of Loans		Value of loans		Stock of Loans	
	1840	1865	1840	1865	1840	1865
Share of Pop who votes	0.73 (0.42)	-.118 (.29)	*847* (460)	913 (525)	3842 (3440)	*5098* (3073)
Share of Pop Illiterate	-0.00006 (0.0009)	-2.1e-6 (0.0006)	**-0.31** (0.1)	-0.106 (0.115)	**-1.60** (0.75)	-0.48 (0.67)
Population of main town	-5.7e-8 (1.1e-11)	-1.89e-8 (7.7e-8)	**0.0007** (0.0001)	**0.0007** (0.0013)	**0.0035** (0.001)	**0.004** (0.001)
Constant	0.17 (0.006)	**0.135** (0.0044)	**24.36** (6.92)	14 (7.95)	**116** (52)	56 (46)
Fixed effects	Dept	Dept	Dept	Dept	Dept	Dept
N	170	161	170	161	170	161
R^2	0.37	0.44	0.74	0.57	64	69

Note: Standard errors in parentheses, bold coefficients are significant at 5% or better.

Table 4 Regressions of the per capitavalue of Loans in 1840 with alternative variables for wealth and poverty**.**

				North only	*South Only*
Share of Pop who votes	**1218** (459)		*987* (548)	**1301** (644)	-92 (619)
Share of Pop Illiterate		**-0.35** (0.1)	**-0.33** (0.12)	**-0.35** (0.137)	-0.23 (0.14)
Population of main town	**.001** (.0001)	**.001** (.0001)	**0.0007** (0.0001)	**0.0007** (0.0001)	**0.008** (0.002)
Arrondissement taxes/per capita		92.9 (1407)			
Share of recruits<5feet	(0.055) .214				
Per capita value added in Manufacturing			-0.005 (0.014)		
Constant	2.33 3.81	**29** (9.46)	**24.4** (6.82)	**23.7** (9.18)	**25** **(**10)
Fixed effects	Dept	Dept	Dept	Dept	Dept
N-obs	186	170	132	103	67
R^2	0.73	0.74	0.74	0.76	0.68

Note: Standard errors in parentheses, bold coefficients are significant at 5% or better

Variable definitions for the regressions in Table5

The dependent variable is the sum of the stock of loans where borrowers reside in a given municipality for 1840 and 1865 divided by the population of 1840. Regression of the variable summed over only one year give similar results but with the coefficients have larger standard errors.

The independent variables

Pelec is the ratio of individuals eligible to vote in national elections, since one was eligible only if one paid 200 francs in taxes only 2% of adult males voted.

PD big is thus the sum of population in 1806/distance to the municipality of interest for all cantons with more than 20000 inhabitants. PD medium is the sum of the ratios of the population in 1806/to the distance to municipalities for all cantons with between 19999 and 10000 inhabitants. PD small is the same measure for cantons with population less than 10000 in 1806. Thus PD big is larger when there are many potential partners from large canton nearby and smaller when the large cantons are far away. While using the population of 1806 means that we measure the size of the potential partner pool with error, it has the advantage that it is exogenous to credit in the 1840s and 60s

	Mean	Stdeviation
Stkborrowed	125.4765	216.14
Stklent	89.20	422.77
P Elec	0.0038	0.0047
PD big	3862.82	4655.18
PD Med	5075.41	3385.01
PD Small	2314.75	1828.63

Table 5: Regressions of the Stock of Money Borrowed per capita in a municipality in 1840 and 1865

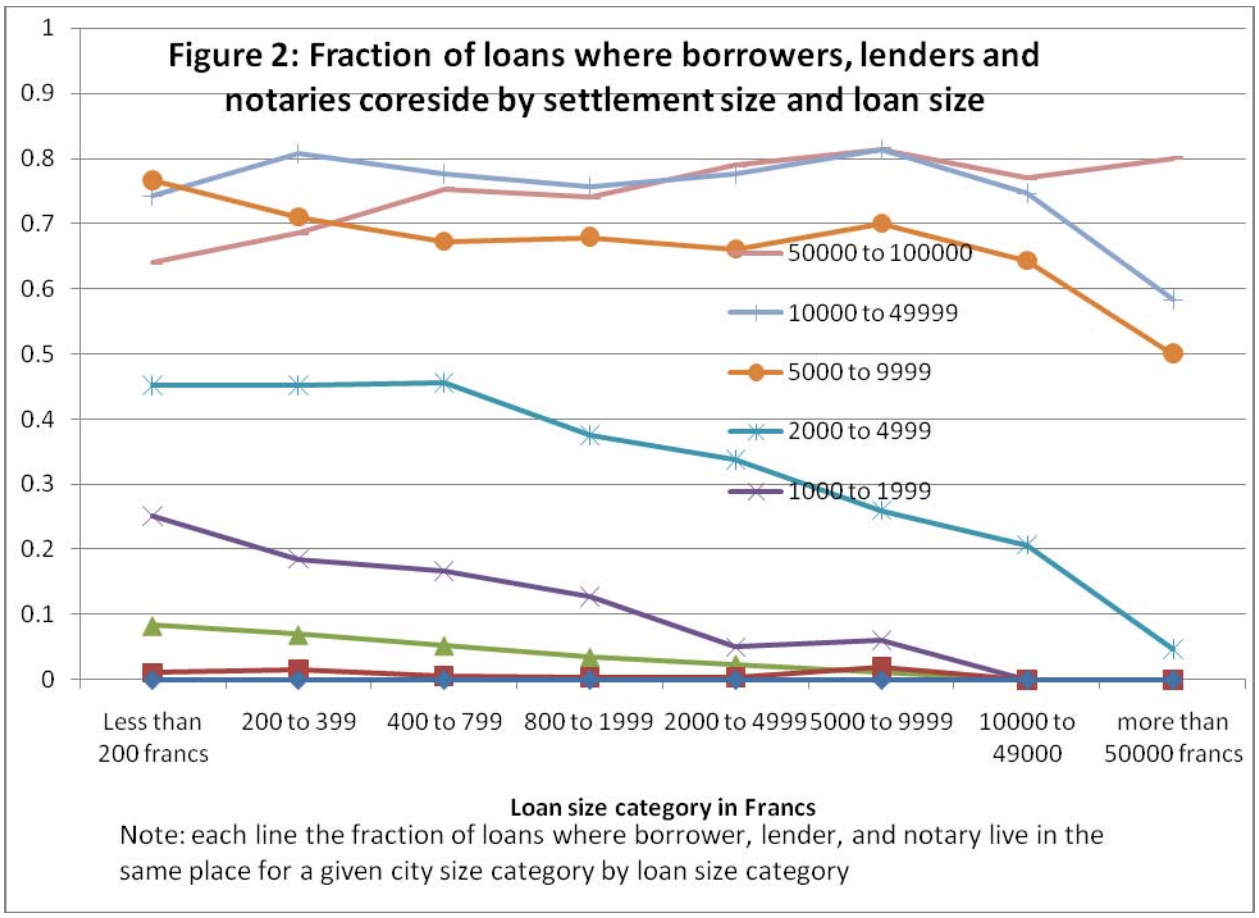
	Pop>4999	5000> Pop>1999	2000> Pop>999	1000> Pop>499	Pop<500
Number of electors per capita	4898 (9315)	1062 (7708)	1086 (3017)	1643 (3237)	-2679 (8862)
PD-big	**0.0032** (0.0013)	-0.0034 (0.015)	**-0.014** (0.0076)	**0.0107** (0.0056)	**-0.070** (0.388)
PD-Medium	0.0034 (0.04)	**0.0108** (0.0028)	**0.0105** (0.003)	0.007 (0.006)	**0.056** (0.301)
PD-Small	0.0027 (0.021)	0.001 0.005	0.006 (0.004)	-0.012 (0.014)	0.0244 (0.052)
Constant	126 (136)	52 (52)	59 (29)	42 (47)	80 (208)
F.E.	Dept	Canton	Canton	Canton	Canton
N-Obs	27	90	147	273	208
Rˆ2	0.70	0.85	0.71	0.26	0.44

Note: Standard errors in parentheses, bold coefficients are significant at 5% or better

Regressions of the Stock of Money lent per capita in a municipality in 1840 and 1865

	Pop>4999	5000> Pop>1999	2000> Pop>999	1000> Pop>499	Pop<500
Number of electors per capita	**19352** (10204)	322 (8244)	1170 (2708)	1267 (2259)	-1165 (8106)
PD-big	0.0044 (0.015)	-0.007 (0.016)	**-0.0138** (0.007)	**0.010** (0.004)	**-0.062** (0.035)
PD-Medium	**0.008** (0.005)	**0.0127** (0.003)	**0.0116** (0.0026)	0.006 (0.004)	**0.0696** (0.027)
PD-Small	0.022 (0.023)	0.002 (0.005)	**0.006** (0.003)	-0072 (0.0102)	0.010 (0.047)
Constant	-48 (149)	46 (56)	37 (26)	10 (33)	25 (190)
F.E.	Dept	Canton	Canton	Canton	Canton
N-Obs	27	90	147	273	208
Rˆ2	0.80				

Note: Standard errors in parentheses, bold coefficients are significant at 5% or better



Note: each line the fraction of loans where borrower, lender, and notary live in the same place for a given city size category by loan size category

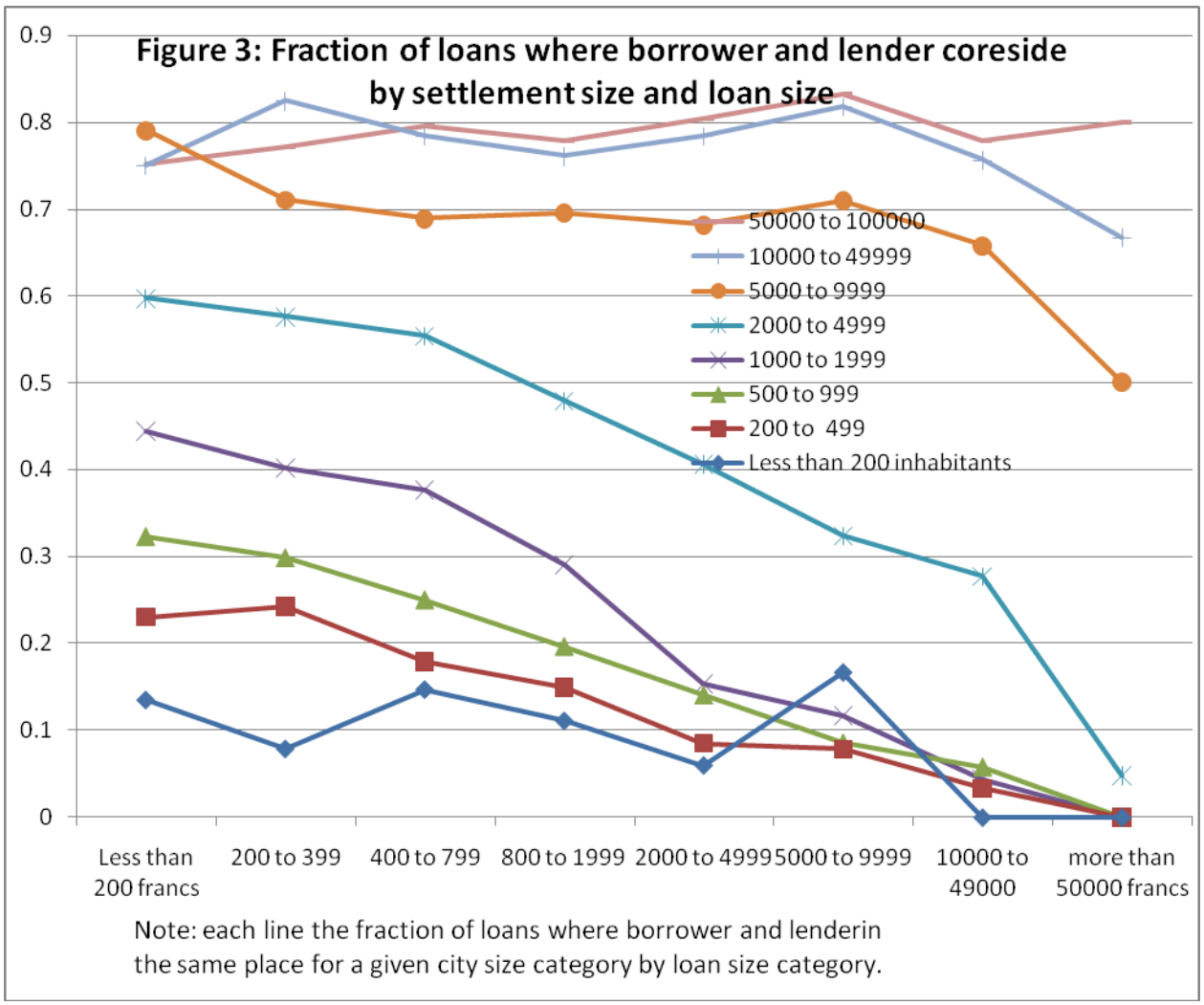
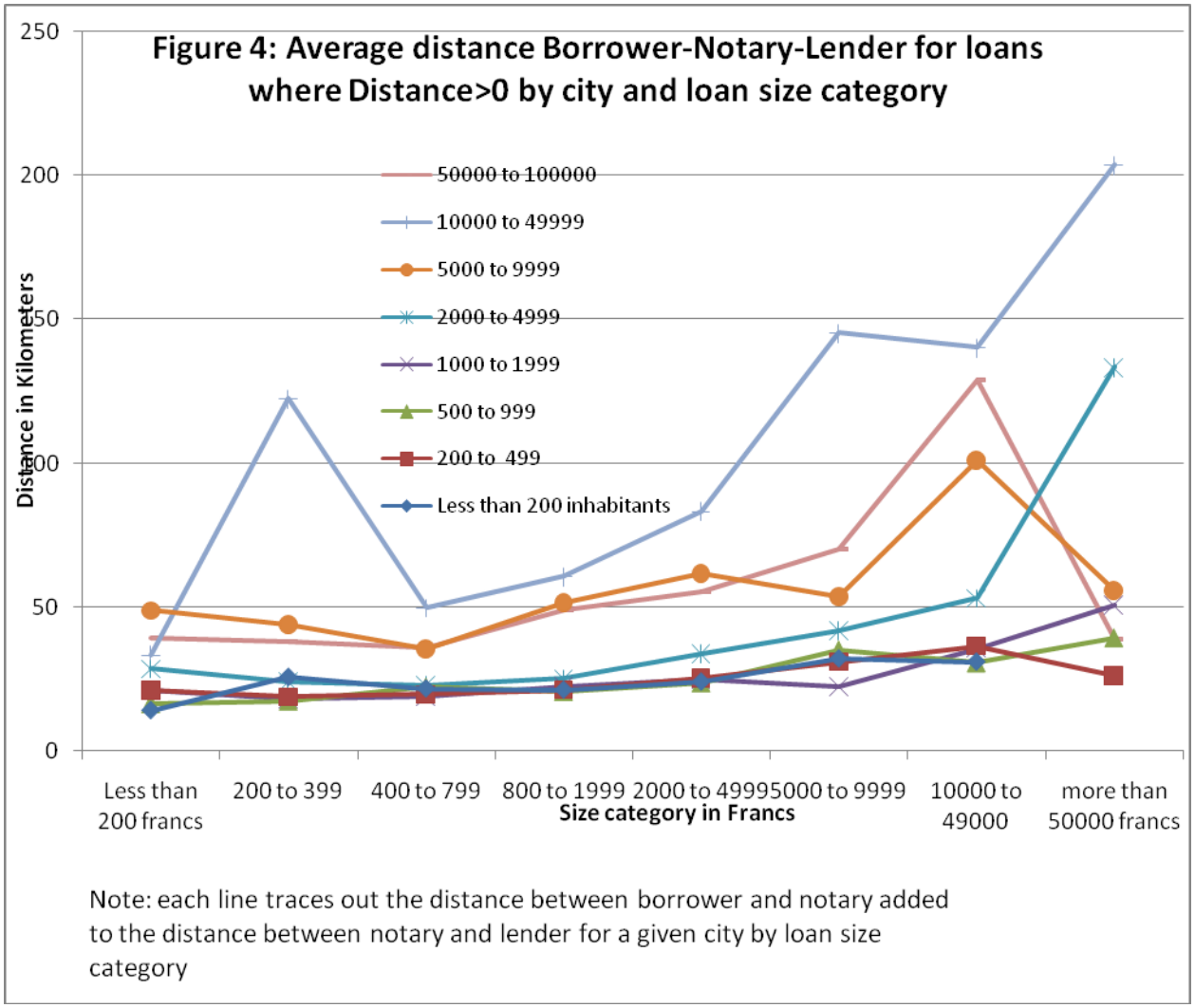
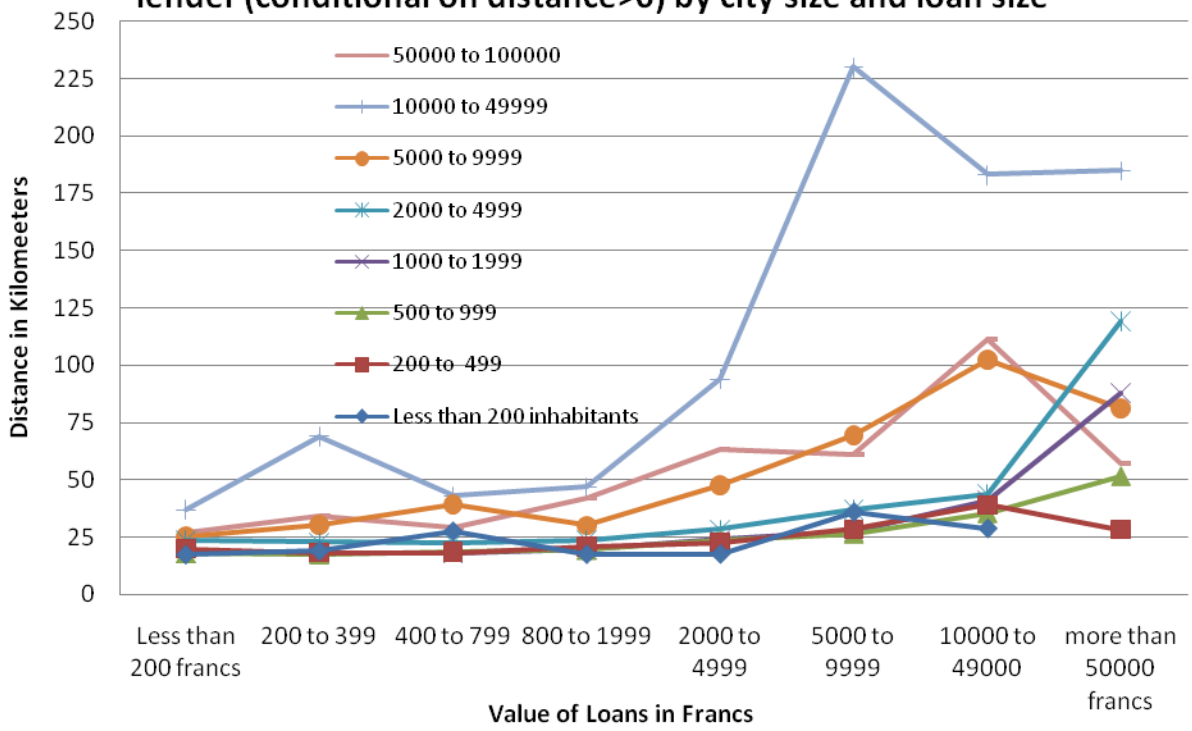


Figure 3: Fraction of loans where borrower and lender coreside by settlement size and loan size
0.9
0.8
0.7
0.6
0.5
0.4
0.3
0.2
0.1
0
50000 to 100000
10000 to 49999
5000 to 9999
2000 to 4999
1000 to 1999
500 to 999
200 to 499
Less than 200 inhabitants
Less than 200 francs
200 to 399
400 to 799
800 to 1999
2000 to 4999
5000 to 9999
10000 to 49000
more than 50000 francs
Note: each line the fraction of loans where borrower and lenderin the same place for a given city size category by loan size category.



Note: each line traces out the distance between borrower and notary added to the distance between notary and lender for a given city by loan size category

Figure 5: 75 percentile value of distance between borrower and lender (conditional on distance>0) by city size and loan size



Note each line traces out the critical value in distance travelled for loans where borrowers reside in a settlement in a given size category across the loan size distribution