Entry, Information, and Financial Development:
A Century of Competition between French Banks and Notaries

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Because poorly developed financial markets block economic growth, it is argued that modern intermediaries (banks) have to replace traditional intermediaries. The claim is that the traditional intermediaries are inefficient. We test that claim using an original panel data set from nineteenth-century France that is the first to provide quantitative evidence about traditional intermediaries (notaries), the scope of their business, and the entry of banks. We show that modern intermediaries were not more efficient. Despite free entry, they did not displace notaries, who arranged most mortgages and had originated a stock of mortgage loans equal to 27 percent of GDP in 1840. Overall, modern financial intermediaries were not substitutes for traditional ones. The results raise questions about empirical evidence linking financial development and economic growth.

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Introduction

It is now common in development economics to put part of the blame for low levels of income on poorly developed financial markets.[1] The same is true in economic history.[2] At bottom, the argument is that barriers to entry or to the flow of information leave borrowers beholden to a particular intermediary. Because this intermediary is a monopolist or inefficient, spreads are high and the volume of loans is low. Economists have advocated policies that encourage entry by new financial intermediaries—banks in particular—although such measures may be blocked by politics or by the banks' reluctance to enter underserved sectors of the economy. The assumption is that if they could enter, they would displace traditional intermediaries, boost the supply of loanable funds, and lower interest rates.

France is often held up as a poster child for this thesis. In the eighteenth century, so the argument goes, financial development stagnated there, while commercial banks were flowering in England. Although banks did diffuse in France in the nineteenth century, the process was supposedly slow and is claimed to have retarded economic development. However, even in the financial trough that followed the shock of the French Revolution, the French still signed nearly half a million mortgage loans a year, and the stock of mortgage debt approached 15 percent of GDP—about the same level relative to GDP as in US in 1950.[3] And by 1840, mortgage debt originated outside of the banking system came to 27 percent of GDP, roughly the same level as total mortgage debt in the US in the 1970s (Green and Wachter, 2005). If banks (and modern financial intermediaries in general) were essential, how could so much lending take place?

The data from France highlight a serious problem with the standard thesis. The problem, which is widespread, is that the official credit statistics scholars rely on usually underestimate the volume of traditional credit and therefore overestimate the role of banks. The root of the difficulty is that traditional credit intermediaries, unlike their modern counterparts, rarely face reporting requirements, and it is therefore difficult to estimate the volume of loans they make. The erroneous estimates in turn affect regressions that link lending to GDP growth. If the banks are substitutes for the traditional lenders, then some of the credit that banks provide is simply replacing lending from traditional sources. True growth in total lending is therefore smaller than the figures derived from bank data would suggest, and GDP growth may be more sensitive to total lending than the regressions would suggest. The consequences would be different, however, if banks are not substitutes for traditional lenders. If the traditional intermediaries actually prosper when banks diffuse, then the actual growth of total lending is larger than the figures based on bank data indicate, and GDP growth may be less sensitive to total lending than the regressions imply. Neglecting traditional intermediaries may therefore exaggerate the role that credit markets play in economic growth, if banks are not substitutes for the traditional intermediaries. If, however, they are substitutes, then credit markets may be even more important than we expect in explaining economic growth. Clearly one should measure the size of traditional lending; we do so in this article using an original panel data set we have assembled.

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[1] King and Levine, 1993; Demetriades and Luintel, 1996; Levine, 1997; Demirguc-Kunt and Levine, 2004; Rajan and Zingales, 2004, Burgess and Pande 2005.

[2] Postan, 1935; Gerschenkron 1962; Davis and Gallman 1978; Neal, 1994; Rousseau, 1999; Rousseau and Sylla, 2003, 2005, 2006; Sylla, 1999; Temin and Voth, 2006.

[3] Because the mean loan sizes in Table A.2 are not corrected for sample weights, the figure of half of million new mortgages per year (for 1807) differs from what one gets from Table A.2 by dividing the volume of new loans in 1807 by the mean loan size for that year.

Beyond that, we resolve the question of whether banks were substitutes for traditional lenders by using our data to determine whether bank entry leads to a decline in traditional lending.

We constructed our panel data set of mortgage loans to estimate the size of traditional lending in a major credit market—the market for mortgage loans. We can also show that the traditional financial intermediaries who arranged these loans were not less efficient than banks, the modern intermediaries. The data set, which comes from nineteenth-century France, demonstrates that as late as 1899 traditional intermediaries were providing 83 percent of mortgages even though banks were free to enter the mortgage market and even though the French government had created and guaranteed the securities of a modern mortgage bank.[4] Banks did enter local markets in large numbers, but they did not drive traditional intermediaries out of the mortgage business or significantly reduce the amount of lending the traditional intermediaries did. The reason was simple: the banks did not have the traditional intermediaries' informational advantages, and their costs were no lower. The banks, in short, were not superior substitutes for the traditional intermediaries. In fact, it seems that bank and traditional mortgage credit were large in the same places.

Our results are not likely to be peculiar to this one example. Estimates suggest that in 1900 traditional intermediaries were doing between 32 and 65 percent of mortgage lending in Britain, Germany, and the United States too, even though they all had highly developed financial systems and large mortgage markets.[5] That fits the evidence that these nineteenth-century economies had a wide variety of financial intermediaries that coexisted alongside banks, which would be unlikely if the banks were more efficient.[6] The old and new intermediaries may thus be complements, and if so, their coexistence can spur financial development.

Admittedly, these estimates and our own data all come from countries that were experiencing economic growth and had secure property rights and functioning legal systems. But the volume of traditional lending has still been underestimated, and so in all likelihood has the efficiency of traditional intermediaries. That raises questions about the empirical evidence linking financial development and economic growth and about inferences drawn from a low number of banks. In developing economies the growth of credit markets faces two hurdles, one political and another informational. First, politically motivated financial repression (monetary instability, insecure property rights, unequal distribution of wealth to loans, or barriers to entry) limits the ability of modern finance to bloom and also likely reduces the amount of lending done by traditional intermediaries. Removing the political constraints on credit markets is clearly necessary for lending to grow, but it is not sufficient, for there is a second hurdle as well, for whatever new intermediaries arise will have to overcome problems of asymmetric information. Our results suggest that it took a long time for modern intermediaries to overcome their informational handicaps, even in economies where property rights are secure. Nevertheless, both political and informational problems must be resolved, before developing countries can do what France, Britain, Germany, and the United States did in the nineteenth century.

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[4] For the level of mortgage lending relative to GDP, see table A.1 in the appendix.

[5] The estimates for Britain are derived from Sheppard 1971 and Offer 1981; for details, see Hoffman, Postel-Vinay, and Rosenthal, 2010. Those for the United States come from Goldsmith, 1969. For Germany, they are based on information in Koch 1910, Hoffmann 1965, and Preussische Statistik 1905-1906, p. 91; details about the German estimates are available from the authors. For the importance of mortgages in the United States later on, during the Great Depression, see Wigmore (2010).

[6] Neal, 1994; Quinn, 1997; Guinnane, 2001, 2002; Temin and Voth, 2006; Hoffman, Postel-Vinay, Rosenthal, 2011.

After providing the necessary background on financial intermediaries in nineteenth-century France, we describe the century's worth of data we have collected, which allow us to measure both traditional mortgage lending and bank entry. We then specify a simple model in which banks are superior substitutes for traditional intermediaries, because they offer loans at a lower cost. An alternative model assumes that banks provide a different set of services, where the demands for both types of financial intermediation are positively correlated. The two models have contrasting equilibrium predictions, both about the effect that banks had on traditional mortgage lending and about which mortgage markets they would choose to enter. These predictions can be tested using our data. We find no evidence that banks were superior substitutes for the traditional intermediaries in the long term loan market. On the contrary, demand for the bankers' skills and for the traditional intermediaries' were positively correlated, so that markets with more banks had more traditional lending as well. If anything banks and traditional intermediaries may have been complements, not substitutes.

1. Financial intermediaries in nineteenth-century France

Although securities markets were important in nineteenth-century Europe, banks have long been considered the key modern financial intermediary for the continent's initial wave of economic growth, particularly large, diversified universal banks, which could make short term commercial loans and fund long term ventures such as the construction of a factory.[7] Banks secured short term funds from depositors and then used it to fund long term investments associated with the industrialization that drove nineteenth-century growth. In the U.S. in particular scholars have noted that industrialists used short term loans rolled over time and time again to fund not just working capital but machinery and other long term investments (Lamoreaux 1994, Davis 1972:349)

Doing so was risky since the time mismatch exposed everyone to liquidity crises–and remains so today, as the recent subprime mortgage debacle demonstrates. Nevertheless scholars have argued that bank's diversification and ability to mobilize short term funds made them a more effective source of capital than traditional intermediaries. Countries without such banks would simply not mobilize enough capital and would therefore suffer slower economic growth.

France in particular has been invoked as a cautionary example here. Banks in nineteenth-century France, it is claimed, were "too few" and banking resources "pitifully inadequate." The country therefore paid a price in slower economic growth, having fallen victim to the "intimate correlation between the tardy development of banking structure and the equally slow progress of industrialization" (Cameron, 1967 110-111, 127). This argument has been challenged by O'Brien and Kayder 1978, Roehl 1976, Lévy-Leboyer 1964, Lévy-Leboyer and Bourguignon 1985, and Lescure and Plessis 1999. But even the argument's critics neglect the fact that the new modern financial intermediaries—banks—were not the only source of loans in France. In fact, all over the country, notaries (semi private court officers who preserved records and also provided legal and financial advice; for details see Hoffman et all 2000) had acted as loan brokers for centuries. Similar traditional intermediaries (attorneys and scriveners in England, notaries in many other civil law countries) did much the same elsewhere in Europe (Anderson 1969, Miles 1981, Habakkuk 1994, Neal 1994). Any study of the impact of the spread of banking in the nineteenth

[7] For the origins of this argument, see Gerschenkron 1962, 12-14. For recent evidence in favor of it, see Calomiris, 1995; and for a recent criticism, Fohlin, 2007, 2.

century has to take into account these traditional intermediaries. For France, that means the notaries.

In the first half of the nineteenth century, French banks were overwhelmingly partnerships or sole proprietorships, and in the 1850s a number of corporate banks appeared, which had the ability to open branches. There were no regulations limiting the ability of banks to lend long term or make mortgages. In both periods, the privilege of monetary issue was reserved for the Bank of France, and the ability of banks to issue debt securities was closely supervised. To the extent there was an institutional constraint on the ability of banks to fund mortgages, it was that they could not refinance such activities at the bank of France, which only accepted high grade commercial paper for rediscount. Nevertheless, French banks were closely involved with the finance of industry and trade (Gille 1959, Cameron 1961, Lévy-Leboyer 1964).

Because our interest lies in the competition between banks and traditional intermediaries we will leave aside the details of the banking structure and banks' balance sheets and focus on bank offices. We wanted to test the argument about banks using French data and see whether banks were in fact essential for long-term lending. If the claims about France in particular are correct, banks ought to have been much more effective at funding long term loans than the archaic notaries. And thus when a bank opened an office, some of notaries' clients should have switched their business to the modern intermediary, either by having their mortgages financed by a bank or by using cheaper short-term credit for long term purposes. The notaries did labor under what were at least theoretically severe disadvantages. They could not pool risk or offer liquidity services, because they did not hold a portfolio of loans or take deposits. Instead, they simply used what information they had to match borrowers with individual lenders (Hoffman, Postel-Vinay, and Rosenthal, 2000, 2009, 2011). If the banks were superior intermediaries, then when they entered a market, they would presumably have undercut the notaries' lending and driven them out of business.[8] If not, then the arguments about France (and more generally about the critical role banks and other modern financial intermediaries play in mobilizing capital) are wrong. Although banks and other modern intermediaries may be very valuable for some purposes, they are not essential for long term credit.

2. The French Data

The data we have gathered concern over a hundred thousand loans drawn from 105 credit markets scattered through France (see Figure 1 for a map). These markets were chosen to yield a stratified sample of towns and cities that would reflect the French economy as a whole. The markets include Paris; other big cities such as Lyon; medium sized urban centers with 10 to 70 thousand habitants, such as Grenoble; and smaller towns with populations as low as 500 people.

The loans in each market were drawn up by notaries. The loans could have been arranged by anyone, and banks could have provided the capital. But in practice, the lenders were individuals, not banks. There were only two exceptions: mortgage backed credit lines, where the lenders were banks, and the mortgage loans made by the Crédit Foncier de France. The Crédit Foncier was a mortgage bank founded in 1852 that had a monopoly on the issue of mortgage backed securities, which were widely thought to benefit from a government guarantee. But notaries were involved in these bank loans too. They were responsible for drawing up the

[8] The cost of switching from one notary to another was low (Hoffman, Postel-Vinay, and Rosenthal 2000). There is no reason to believe that the cost of switching from a notary to a bank should have been any higher.

contracts and verifying borrowers' histories in the lien registers, and they must have provided some of the advice that led borrowers to seek a Crédit Foncier loan.

All such loans were subject to a tax, and the notaries had to register the loan contracts they drew up at the local tax office, where officials collected the tax and recorded information about the debts. We gathered data on the loans from the archives of the tax offices, which covered lending in the municipality where the office was located and in surrounding towns and villages.[9] The information we collected includes the number and size of new loans and loan durations; it allows us to estimate the volume of new loans and stock of outstanding debt in each market for 4 years: 1807, 1840, 1865, and 1899. Henceforth, traditional credit will refer to all of these loans except for Crédit Foncier loans and mortgage backed credit lines. (See the appendix for details about the data collection and the estimation process). The dates of these estimates were chosen to be roughly a generation apart, with the first date coming a decade after a devastating bout of inflation during the French Revolution, and 1899 being the latest date for which we could get access to the records needed for the data collection.

The notarized loans were quantitatively important. If we use population data (for lack of a better method) to extrapolate from our sample to the whole country, we find that there were likely to have been more than 1 million such loans outstanding at any point in time. The value of the outstanding debt originated by notaries ranged from 15 percent of GDP right after the Revolution (in 1807) to 27 percent in 1840.[10] In 1840, the average loan lasted 3 years. Only 14.3 percent of the loan durations were less than 12 months and 4.8 percent were less than 6 months.[11] Even 6 months was much longer than the short term loans (90 days or less) that banks used to finance trade.

The next question is whether banks began to enter this market for longer term loans and compete with the notaries. As noted above, because unincorporated banks in France were essentially unregulated they could open or close with little notice. Thus even though we know that many new banks did open up in the early nineteenth century (as one would expect if they were entering new markets), we had to await the publication of a systematic source to have a count of their numbers. Starting in 1829, commercial almanachs provide the addresses of bank offices. At this point, there were already 762 bank office in France (of which 153 were in Paris).[12] As the century wore on, banking spread to smaller cities. In 1829, only two out of every three cities with populations over 20,000 had a bank office; by 1851 all of them did. For cities between 5,000 and 10,000, the fraction with banks jumped from one third in 1829 to 87 percent in 1862. Did superior information or an ability to pool risk allow these bankers to encroach on the notaries' long term lending?

3. Bankers and Notaries

[9] More precisely, the 105 fiscal bureaus' geographic purview changes over time. To allow for proper comparison over time, we limit the notaries in a given market to those who reside in the canton where the fiscal bureau was located. A canton is the French administrative just above the municipality and usually consists of a town or city and several nearby villages.

[10] See the appendix table A.1 for further descriptive statistics for our samples of loans.

[11] Just like banker's short term loans, mortgages could be rolled over, in a procedure called a 'prorogation."

[12] The almanachs were the Almanach du commerce de Paris, des départements de la France et des principales villes du monde by Jean. de la Tynna continué et mis à jour par S. Bottin (1829-1845); the Annuaire général du commerce, de l'industrie, de la magistrature et de l'administration ou Almanach des 500000 adresses (1851 and 1855), and the Annuaire-Almanach du commerce et de l'industrie ou Almanach des 500000 adresses (1862-1898).

A simple model can help us analyze the effect of bank entry under the assumption that banks are superior substitutes for the lending done by notaries. Let us suppose that all notaries in France have an identical and constant marginal cost of lending, and that the total cost (interest and fees) of borrowing a franc through a notary is r_n and that they compete on price. Because all our markets (cantons) had at least three notaries, the value of loans made in a given market (say market *i*) before banks enter is given by the value of the local demand curve $D_i(r_n)$ at the competitive price r_n. Markets with greater demand have more loans, but prices are the same everywhere.

Let the value of loans made by notaries in market *i* before banks enter be V^0_{in}. ($D_i(r_n)= V^0_{in}$). For simplicity, assume that banks have some fixed costs, that their marginal cost is increasing, and that all banks are identical. Let V_b^* be the efficient scale for a bank. At V_b^* the cost of an additional franc loan is r_b , and a necessary condition for banks to be more efficient than notaries is that $r_b < r_n$.

Now let a bank enter a market not served by other banks. The bank attracts clients by offering them a tiny fixed rebate, and it maximizes its profits simply by lending to the point where its marginal cost equals that of notaries. Let V_b be the resulting value of loans made by the bank ($V_b \geq V_b^*$). As long as V_b is less than the lending V^0_{in} done before the bank entered, then the resulting equilibrium will have total lending $V^e_i=V^0_{in}$ with the bank making V_b in loans while the notaries lend $V^e_{in}= V^0_{in} -V_b$. The notaries' lending will obviously fall after the bank has entered. If the single bank finds it profitable to make more loans than V^0_{in} then notaries will exit the market and stop lending altogether.

If *m* banks enter the market, then the resulting equilibrium will have to satisfy the following two inequalities: $D_i(r_n) \geq m V_b$ and $D_i(r_b) < (m+1)V_b^*$. In this equilibrium, total lending will be $V^e_i= V^0_{in}= mV_b+V^e_{in}(m)$. Again, as banks enter notarial lending will drop, because banks are more efficient, but a small amount of notarial lending will remain provided even after full bank entry if $mV_b < V^0_{in}$. Because of bank indivisibilities, notaries will always survive in small markets (when $D_i(r_n) < V_b^*$), because the banks' fixed costs do not warrant entry even by a single bank. Bank entry will thus cut notarial lending, except in small markets.

One can build in more subtle assumptions about notaries that would allow for markets to differ in terms of the intermediaries' (notaries' or bankers') costs. Such heterogeneity will complicate the analysis, but as long as bankers are more efficient substitutes for notaries, bank entry should reduce notarial lending. We will test that prediction using our data and then examine what our model predicts about banks' decisions to enter markets of a given size as defined by population and by the volume of notarial lending.

4. Did bank entry reduce notarial lending?

To see whether bank entry cut notarial lending, consider what happens in market *i* if *m* banks enter and are more efficient substitutes for notaries. Under our assumption that all notaries have constant marginal cost r_n , then total long term lending $V^e_i = D_i(r_n) = mV_b+V^e_{in}(m)$. In other words, total lending will be the same as what it would have been had the banks not entered (namely the demand for loans $D_i(r_n)$ at price r_n since the banks will simply match the notaries' marginal cost r_n), and notarial lending will fall to $V^e_{in}(m) = D_i(r_n) - mV_b$. If no banks have entered the market, notarial lending will remain $D_i(r_n)$. We can therefore regress the volume of notarial lending in each market in our panel data set on the number of banks *m* in the market and on correlates for the demand for long term loans $D_i(r_n)$ in the market. If the coefficient of *m* is negative and sizeable, then banks are superior substitutes for notaries. The validity of the

regression obviously depends on a number of assumptions—in particular, the assumption that notaries have constant marginal cost—but we can allow the constant marginal cost to vary across time and from market to market by including fixed effects for each market and for each time period in the panel data set. Along with market population and our measure of wealth, these fixed effects will control for demand. The resulting regression will be

$$y_{it} = m_{it}\, a + X_{it}\, b + f_i + u_{it} \qquad (1)$$

where $y_{it} = V^e_{in}(m_{it})$ is notarial lending in market i at time t (t =1840, 1865, 1899); m_{it} is the number of banks in market i at time t; X_{it} is a matrix of the correlates of demand for long term loans $D_i(r_n)$ in the market at time t, which are wealth, market population, and time dummies for the fixed effects of time periods; f_i is a fixed effect for market i; u_{it} is the error term; and a and b are matrices of coefficients[13].

We start by setting aside any problems of endogeneity and run naive regressions of credit on banks in the same year. When we do so, the coefficient of the number of banks turns out to be positive, not negative (see Table 1 for the descriptive statistics and Table 2 for the regressions themselves). The results are similar if Paris (an obvious outlier) is excluded (Table 2, regressions 1 and 2). The coefficients for wealth and population are sensitive to the inclusion of Paris and are sometimes negative, which likely results from a non linear relationship between these two variables and the demand for loans. If we therefore add quadratic terms in wealth and population and compute the marginal effect that each of the two variables has on the demand for loans, then the marginal effect turns out to be positive—as we would expect—for average wealth levels, whether or not Paris is included.[14] The coefficient for the number of banks does not change greatly, both with and without Paris (Table 2, regressions 3 and 4). If the regressions are rerun without the wealth variable or without the population variable (see Appendix Table A.2, regressions 1 thru 4), the bank coefficients are similar except when Paris is included and the population variable is omitted. The coefficient is then negative and significant, but its magnitude (a bank cuts notarial lending in a market by 41,010 francs) is small relative to the volume of lending in the average market, 1.63 million francs. The important point is that none of the bank coefficients in these regressions are ever negative, significant, and large in absolute value.

The regressions above are naïve, because bank entry and exit and hence the variable m_{it} in equation (1) are endogenous. The fixed effects estimate of the coefficient of interest to us (a) may therefore be biased. If we assume that wealth and market population are exogenous, then sufficient conditions for the fixed effects estimate of a to be unbiased are that $E(m_{is}\, u_{it}) = 0$ for every s, t in {1840, 1865, 1899}. Those conditions would fail to hold if, for example, a demand shock in year t boosted mortgage lending, but banks took longer than a year to enter the markets and compete with the notaries for business. The notaries lending y_{it} would then increase, and although m_{it} might grow too, it would not yet have reached its equilibrium level. The result could be an erroneous positive estimate for a even if banks were superior subsitutes for notaries.

Estimating equation (1) by first differences (rather than by fixed effects) requires weaker conditions to get an unbiased estimate of a. The first differences equation is

[13] We have no count of banks before 1829 or wealth measure before 1840, so the 1807 cross section is omitted from the regression.

[14] If we use regression 3 (regression 4) to compute the marginal effects at average levels of wealth and population, then a one franc increase in our wealth measure (per capita property taxes paid) boosts notarial lending by 25131 (15718) francs, and adding 1000 people to a market increases it by 2920 francs (9110 francs).

$$y_{it} - y_{it'} = (m_{it} - m_{it'}) a + (X_{it} - X_{it'}) b + (u_{it} - u_{it'}) \qquad (2)$$

Here *t'* is the year of the previous sample cross section, so that *t' = 1865* if *t* is 1899, etc. Under our assumption that wealth and population are exogenous, sufficient conditions for the first difference estimator of *a* to be unbiased are that $E (m_{it} - m_{it'} , u_{it} - u_{it'}) = 0$ for every *t* in {1840, 1865, 1899}, which is less demanding than the sufficient conditions for the fixed effects estimator. Given the structure of our panel, what will likely make this condition fail to hold is that either $E (m_{it} , u_{it}) \neq 0$ or $E (m_{it'} , u_{it'}) \neq 0$. The other possibilities—either that $E (m_{it} , u_{it'}) \neq 0$ or that $E (m_{it'} , u_{it}) \neq 0$—can be ruled out as implausible. The first would require that the number of banks m_{it} would still be affected by $u_{it'}$ for 25 years or more that separate the cross sections. That seems unlikely since there were no barriers to bank entry, and banks could be formed or dissolved in a year or two or less. The other unlikely inequality—that $E (m_{it'} , u_{it}) \neq 0$—would mean that 25 or more years of bank entry could not eliminate the effect that $m_{it'}$ has on u_{it} and hence on traditional mortgage lending y_{it}.

If these assumptions about covariances and bank entry are correct, then the number of banks 10 years before each cross section, m_{it-10} , furnishes an instrument for $m_{it} - m_{it'}$ that makes it possible to estimate (2) by two stage least squares.[15] The instrument is $m_{it-10} - m_{it'-10}$. First stage regressions (Appendix table A.2, regression 5) show that it is a strong instrument for $m_{it} - m_{it'}$. And the covariances that have to be checked, $E (m_{it-10} , u_{it})$ and $E (m_{it-10} , u_{it'})$, to see if the estimate is unbiased are both likely to be zero, for banks could enter or exit quickly enough to eliminate any effect that $u_{it'}$ would have on the number of banks 15 or more years later in year *t-10*, or any effect that m_{it-10} has on u_{it} . The same argument would apply to the number of banks 5 years before each cross section, m_{it-5}.[16] First stage regressions (available from the authors) show that $m_{it-5} - m_{it'-5}$ is also a strong instrument for $m_{it} - m_{it'}$ and the key covariances $E (m_{it-5} , u_{it})$ and $E (m_{it-5} , u_{it'})$ are likely to be zero because banks could enter or exit in under 5 years.

When we estimate equation 2 using two stage least squares and $m_{it-10} - m_{it'-10}$ as an instrument for $m_{it} - m_{it'}$ (along with linear and quadratic terms for wealth and population), the coefficient of the number of banks is still positive and even larger than before, whether or not Paris is included (Table 2, regressions 5 and 6). The marginal effects of wealth and population continue to be positive at average levels of wealth and population. As a robustness check, we ran the regressions with $m_{it-5} - m_{it'-5}$ as instrument for $m_{it} - m_{it'}$. Those regressions also imply that banks and notarial credit are positively correlated (Table 2, regressions 7 and 8).

Another potential problem is that our regressions do not take into account lending by the Crédit Foncier. The government backed mortgage bank, which opened its doors in 1852, was headquartered in Paris, and although many of its clients were Parisians, it did engage in some lending throughout the country. Although notaries were involved because they drew up the mortgage documents, the Crédit Foncier's loans should be considered those of a modern financial intermediary, because it was a bank that issued mortgage backed securities to fund the lending it did. But the Crédit Foncier would not appear in the count of banks outside Paris. We do know the volume (V_{icf}) of its lending that was drawn up by the notaries in each market, and if we assume that it too simply matched the notaries' marginal cost, then $V^{e}_{in}(m) = D_i(r_n) - mV_b - V_{icf}$

[15] The variable m_{it-10} is the number of banks in the market in 1829 for the 1840 cross section, in 1854 for the 1865 cross section, and in 1889 for the 1899 cross section. Under our assumptions, the lagged difference in the number of banks, $m_{it'} - m_{it''}$, could not serve as an instrument, because it would be correlated with the error term in (2)

[16] The number of banks in the market in 1894 for the 1899 cross section, the number in 1859 for the 1865 cross section, and the number in 1834 for the 1840 cross section.

and we can take its lending into account by simply adding the first difference of the volume of its loans as an additional explanatory variable in regression (2). If the Crédit Foncier was a superior substitute for notaries, then this first difference should enter the regressions with a negative coefficient; the coefficient would then represent the amount that each franc of notarial lending fell when the Crédit Foncier extended a loan of 1 franc.

There is a similar problem with mortgage backed credit lines opened by banks. The credit lines could count as long term lending if the borrowers drew upon them, and although the notaries were involved in the transactions, it would be reasonable to classify them as the banks'. Unfortunately, the bank that opened the mortgage line of credit might not appear among the ones counted in a given market. The solution, as with the Crédit Foncier, is to add the first difference of the lending they did as yet another explanatory variable in regression (2). We know how big the mortgage line of credit was and the market in which the loan was extended, because it was there that the mortgage was registered. We do not know, however, whether the borrower actually tapped the line of credit, nor how big a loan he actually took out if the line was used. So the volume of mortgage lines of credit is measured with error. If bank lending through the mortgage lines of credit is a superior substitute for notarial lending, then the variable should have a negative coefficient, but its value will be biased toward zero if it is the only variable measured with error.

We add the first difference of the volume of mortgage credit lines and of Crédit Foncier lending to our regression (2), ignoring for the moment the fact that they too may be endogenous. With these two added variables and $m_{it-10} - m_{it'-10}$ as an instrument for $m_{it} - m_{it'}$, the coefficient for the number of banks is still positive, as is that for mortgage credit lines (Table 3, regression 1). Both coefficients remain positive if Paris is omitted (Table 3, regression 2), and both regressions imply a positive marginal effect of population and per capita wealth when these effects are computed at average population and wealth levels (results available from the authors). The Crédit Foncier, however, has a negative and statistically significant coefficient, although only when Paris is included in the regression. The coefficient in this case implies that 100 francs of Crédit Foncier loans cut notarial lending by 32 francs. Overall, it appears that banks were not more efficient competitors in long term lending. The only exception was Crédit Foncier, but it enjoyed monopoly on the issue of mortgage backed securities and had government backing for its bonds.

These two regressions ignore, though, the possible endogeneity of the Crédit Foncier and mortgage credit line lending. The solution is to find instruments for each. It turns out that a measure of urbanization and our second instrument for the number of banks (the first difference in the number of banks 5 years before the cross section, $m_{it-5} - m_{it'-5}$) work as instruments for regression 2.[17] The measure of urbanization is the growth in the population, c_{it}, of the market's largest city between 19 and 4 years before each cross section, or in other words, $c_{it-4} - c_{it-19}$.[18] Both make sense: Crédit Foncier and mortgage credit line lending tended to appear in markets that were more heavily urbanized and where banks had opened. Furthermore, $c_{it-4} - c_{it-19}$, like $m_{it-5} - m_{it'-5}$, is unlikely to be correlated with the error term in equation (2), since the Crédit Foncier and banks offering mortgage credit lines could adjust rapidly to market conditions.

If we estimate equation 2 via two stage least squares, using these two new instruments and $m_{it-10} - m_{it'-10}$ as an instrument for the first difference in the number of banks $m_{it} - m_{it'}$ then the

[17] Note that using lagged values or first differences of Crédit Foncier lending itself would violate our assumptions about the covariances with the error terms in the regressions, as would lagged values and first differences of the mortgage backed letters of credit.

[18] The city's population growth from 1821 to 1836 is used for the 1840 cross section; from 1846 to 1861 for the 1865 cross section; and from 1881 to 1896 for the 1899 cross section.

first stage regressions show that all three pass tests for strong instruments (Appendix Table A.3, regressions 1 through 3). The regression again yields positive coefficients for banks and mortgage credit lines, although only the bank coefficient is significant, and the marginal effect of population and wealth (available from the authors) remain positive too (Table 3, regression 3). As for coefficient of the Crédit Foncier lending, it is negative and close to that obtained in Table 3 regression 1 (0.28 as opposed to 0.32), but it is no longer statistically significant. The signs of the coefficients are the same if we use two alternative measures of urbanization as instruments in place of $c_{it-4} - c_{it-19}$.[19] In particular, the Crédit Foncier continues to have a negative coefficient with these alternative instruments, and it is still not significant (Table 3, regressions 4 and 5). And if we drop Paris from regression 3, the coefficient of Crédit Foncier remains insignificant but becomes positive (Table 3, regression 6). Results (available from the authors) with the alternative instruments are similar when Paris is dropped. The coefficients for the Crédit Foncier and mortgage credit lines never turn out to be negative and significant.

Again, banks do not appear to be lower cost substitutes for notaries, either directly or via mortgage backed credit lines. The only possible exception is the Crédit Foncier, which had government backing and a monopoly on the right to issue mortgage backed securities, but even then the evidence is weak (it disappears when we take into account the endogeneity of Crédit Foncier lending) and only comes from Paris. That any effect the Crédit Foncier had was limited to Paris is not surprising. To begin with, it only operated in a fraction of our 105 markets (17 in 1865, 60 in 1899), essentially Paris and the other large ones.[20] In addition, it relied on a government lien registration system to evaluate the collateral. Using that system involved sizeable fixed costs, which would made it prohibitive for smaller loans. Notaries consulted the lien registration system too, but they could draw on other sources of information as well, which they derived from their own business doing lending and also arranging a wide variety of other property transactions, from sales and leases to inheritances. They could turn to these other sources of information when making smaller loans, but the Crédit Foncier did not have that advantage. It therefore focused on big loans, which were rare outside Paris and other large markets. One might doubt the value of such information, but for lack of it earlier mortgage banks had gone bankrupt, because they had ended up making loans lending to risky clients with dubious collateral. And even the Crédit Foncier took a long time to do much lending, particularly outside of Paris. In 1899, Crédit Foncier lending amounted to only 98 thousand francs on average in markets outside of Paris, versus 953 thousand francs for notarial lending in the same markets.

Apart perhaps from the government backed Crédit Foncier, the regressions suggest that banks did not have lower costs than notaries. The results are much the same if we weight the regressions according to the stratification of the sample or look only at markets with banks. They are similar too if instead of the volume of loans we look at their number or at the stock of outstanding debt, which we estimate by multiplying loan amounts by loan durations. And the

[19] The two alternative measures of urbanization are the fraction of population in the largest city in the market nine years before each cross section, and the change in the urban population over the 9 years preceding each cross section. When either one is substituted for $c_{it-4} - c_{it-19}$ and used along with $m_{it-5} - m_{it'-5}$ and $m_{it-10} - m_{it'-10}$ as instruments, the first stage regressions (available from the authors) pass tests for strong instruments. In the resulting two stage estimates of equation 2, the marginal effect of wealth and population remain positive. The change in the urban population over the 9 years preceding each cross section does have the problem that it might be correlated with u_{it}.

[20] If regression 3 in Table 3 is reestimated without the largest 10 percent of the markets, the Crédit Foncier has a negative coefficient, but the results likely stem from having weak instruments when we do without the large markets where the Crédit Foncier made its loans. In any case, the coefficient is not significant.

conclusion remains unchanged if we rerun the regressions in log form, even though the actual levels make more sense given the simple economics of supply and demand.[21]

5. Bank entry decisions

The simple substitute model also makes predictions about which markets banks enter. Indeed, if banks were in fact moving into long term lending, then they would have preferred markets with a large volume of notarial loans, because there would be enough business to defray their entry costs. After all, if a banker could undercut notaries, he would be better off doing so when they had a great deal of business to surrender. We would therefore expect banks to enter markets where long term notarial lending was already high in the early nineteenth century, before banks had spread. We can take the volume of notarial loans in each of our markets in 1807 as our yardstick of notarial business in the early nineteenth century and compare it with the number of banks in each market in 1829, the earliest year for which we have bank data. If we graph the logarithms of both variables against market population, we see that banks did enter markets where notaries had been doing a lot of lending.[22] The same relationship holds if we graph the number of loans notaries had arranged in 1807 (Figure 2). Figure 3 repeats the same procedure for 1840 and shows that notaries continued to arrange large numbers of loans even in cities where many banks had opened their doors (Figure 3).

That banks entered where there is lot of notarial credit is consistent with the initial hypothesis that modern intermediaries were substitutes for traditional ones. But it is also consistent with a variety of alternatives. Consider the case where banks provide a new set of services that are strict complements to the business of notaries. Then bankers considering whether to enter a market will definitely predict the demand for their services based on the volume of notarial loans and they will be most likely to enter where notarial credit is largest.

This case is clearly unreasonable, because an individual who wants a mortgage does not necessarily want a letter of exchange or a short term loan. But it does suggest an important alternative. Banks could simply have been providing financial services whose demand was correlated with that for notarial lending. In other words, places where the demand for short term lending by banks was important were also markets where notaries usually arranged many mortgage loans. How could banks provide different services from notaries? Let us suppose that there are two types of loans—say commercial and mortgage loans. Assume too that the technologies for certifying different types of loan requests are distinct and that the information needed for certifying mortgage loans is not useful to certifying commercial loans. Borrowers want to raise an amount V, which they can do either by pledging real collateral (with notaries) or moveable goods and their reputation (with a banker). The two types of loans could be substitutes (which they presumably are at the margin), but if so, then we are simply back in the previous case. So let us suppose that the two types of loan rely on different information and serve different purposes. The notaries, for example, could provide services to agriculture and real estate while bankers served primarily industry and trade. If the distribution of farms was independent of the distribution of industrial firms, then demand for notarial loans would be independent of demand for bank loans, once we controlled for wealth and population. It would be more reasonable to presume, however, that although banks provide few loans to agriculture, the demand for the bankers' short term commercial loans will rise with the value of agricultural output, as

[21] All these regressions results are available from the authors.
[22] Since the number of banks is often zero, we graph log(1 + the number of banks in 1829).

manufacturing firms dependent on farming expand. The value of agricultural output would then be positively correlated with the demand for mortgage loans and so would the demand for notaries' and bankers' services.

In fact, one would expect notarial lending to be positively associated with bank entry as long as some common variables enter the demand for both intermediaries' service with the same sign. Clearly, one would expect larger and richer towns to have a higher demand both for banks' services and for notarial lending. As towns get larger, they should have higher demand for banking services because they serve as regional trade centers and thus have growing demand for the payments and short term loan services that are provided by bankers. At the same time these larger towns would have higher real estate values, which would drive up the value of mortgages.

In the strict substitutes or complements cases (where there is no better statistic for the demand for bank services than notarial credit), when we regress the number of banks on notarial lending and on other covariates, the coefficient of notarial lending should be large and positive, and the coefficients of the other demand variables could be zero. In all other cases, though, we would expect the coefficient of notarial lending to diminish in absolute value as we add other demand variables. If these other covariates are the only ones that affect both the demand for bankers' services and notarial lending, then a positive coefficient for notarial lending would imply that the banks were lower cost substitutes for notaries and that they were entering markets where they could take more business away from incumbent notaries.

For this regression, we use the number of banks in 1829 (again, the earliest year for which we have the number of banks in each market) as our dependent variable and notarial lending in 1807 as our independent variable. Because the number of banks is a nonnegative integer, we estimate negative binomial regressions, where m_i , the number of banks in market i in 1829, is assumed to be distributed as

$$Poisson\ (u\ exp\ (y_i\ a + X_i\ b + u_i\ ))\quad (3)$$

Here the time subscript t is dropped since this is a cross sectional regression; $y_i = V^e_{in}(m)$ is notarial lending in market i in 1807; X_i is a matrix of the correlates of demand for long term loans $D_i(r_n)$ in the market in 1829, which for this regression is the market population in 1831 only, since a wealth measure is not available for 1829; u_i , the error term, is a random variable that is assumed to follow a gamma distribution of mean 1 and variance g; and a and b are matrices of coefficients. The expected value of m, conditional on y and X is

$$E\ (m_i \mid y_i\ ,\ X_i\ ) = exp\ (y_i\ a + X_i\ b\ )$$

The expected marginal effect of notarial lending in 1807 on the number of banks in 1829 is

$$a\ exp\ (y_i\ a + X_i\ b\ )$$

A positive coefficient a would then imply that banks were moving into markets where notaries had been busy in 1807. That would be consistent with the banks being low cost substitutes for notaries.

In the basic regression the coefficient is negative and significant (Table 4, regression 1), but that result is driven by Paris which is a clear outlier because it had many banks but little notarial lending in 1807 due to the shock of the French Revolution (Hoffman, Postel-Vinay, Rosenthal 2000). When we take out Paris, the coefficient remains negative, but it is not

statistically significant, as our correlated demand hypothesis would suggest (Table 4, regression 2). In fact in all other estimates, the coefficient for notarial credit is never statistically significant, and the marginal effects of notarial lending (available from the authors) are small. It seems that the demand for banks and notarial services were driven by the same underlying variables, but that the banks were not lower cost substitutes for notaries.

We can do the analogous negative binomial regression with the number of banks in 1840 and regress it on notarial lending in 1807. For 1840, we have a per-capita wealth measure, so we can include linear and quadratic terms in the wealth measure and the 1841 market population as controls for the demand for loans (Table 4, regression 3). Again, there is no sign that banks were entering the markets where notaries were lending heavily, relative to population and wealth.[23] One might find the negative coefficient of notarial credit a bit puzzling now that we've added wealth, but it has a very straightforward explanation. Although we adjusted for population and wealth, we have not adjusted for the composition of economic activity, which we cannot observe at such fine levels of aggregation. Those areas where there is more real estate based activity are likely to demand more mortgages while those with more commercial and manufacturing activity will demand more commercial loans. That in turn could introduce a negative correlation between notarial credit and the demand for banks once we control for the population and wealth. To be sure, this effect is small and not statistically significant, so the overall conclusion remains that banks, like notaries, preferred markets that were populous and rich, but the banks were not substitutes for the notaries.

One can go one step further and take into account the number of notaries already in a market. As long as the notaries have constant marginal cost—an assumption we have maintained up to now—their number does not matter. But suppose that assumption fails to hold and that notaries have increasing marginal costs. Since there are always at least three notaries in each market, we will continue to assume that they compete and that (for the sake of simplicity) their marginal cost functions are identical. Let each notary's supply curve be the increasing function $S(r)$. If there are k notaries in market i, and no banks, then together they will supply $k\,S(r_n)$ in loans, at a competitive price r_n that satisfies $k\,S(r_n) = D_i(r_n)$, so long as r_n is greater than the notaries' minimum average cost r_{min}. For a given market demand $D_i(r)$, a smaller number of notaries k will mean a higher competitive price r_n because the supply $k\,S(r_n)$ will be lower. We would therefore expect banks to be more likely to enter markets with a given demand $D_i(r)$ if the number of notaries is small. The banks would simply have more rents to earn if their marginal costs are less than r_n.

We can test that prediction by regressing the number of banks on correlates of demand and a dummy variable for markets with a small number of notaries. What constituted a small number of notaries? Again, there were always 3, but in rural markets regulations limited the number to a maximum of 5. In cities, the number was essentially fixed at levels reflecting demand back in 1800, although notaries were always free to exit the business. A dummy variable for 5 or fewer notaries would thus be a reasonable yardstick in a market with a small number of notaries. Such markets were smaller on average, but it was not simply a matter of size, for their populations (in 1896) ranged from just over 4 thousand to nearly 60 thousand, while the markets with more than 5 notaries had populations from 9 thousand to 2.5 million. As for the correlates of demand in these markets, we use the volume of lending that the notaries themselves were doing, plus linear and quadratic terms in wealth and population, which will capture residual demand met not by the notaries, but by banks.

[23] Tobit regressions (available from the authors) lead to the same conclusions.

Because the dummy variable for 5 or fewer notaries is virtually constant across time, we cannot run panel regression with fixed effects or first differences. We therefore run negative binomial regressions separately for 1840, 1865, and 1899; our 1807 cross section is omitted because bank numbers are unavailable. In the three cross sectional regressions, the expected value of the number of banks (conditional on the covariates) will then be:

$$E\,(m_i \mid y_i\,,\, X_i\,,\, d_i\,) = exp\,(y_i\,a + X_i\,b + d_i\,c\,) \qquad (4)$$

where m_i is the number of banks in market i in the year of the cross section; $y_i = V^e_{in}(m)$ is notarial lending in market i in the cross section; X_i is a matrix of the correlates of demand for long term loans $D_i(r_n)$ in the cross section, which are the market population and per-capita wealth; d_i is a dummy variable for a market with 5 or fewer notaries; and a, b and c are matrices of coefficients. If banks are a lower cost subsitute for notaries in the long term lending, then they will be more likely to enter markets where the number of notaries was small, provided demand is held constant and X_i includes all the covariates affecting demand. The dummy variable for 5 or fewer notaries should then have a positive coefficient c.

In the regressions, however, the coefficient is always negative and significant (Table 5, regressions 1 through 3), and simple scatter plots point in the same direction if the number of banks is plotted against the market population (see Figure 4 for the example of the 1840 cross section). The results (available from the authors) are the same if we drop notarial lending y_i from the regressions or leave out Paris. One might worry about the endogeneity of notarial lending and of the dummy variable for 5 or fewer notaries, even though it is virtually constant. One solution is to rerun the regressions with the value of the both variables from the previous cross section. The coefficient of the dummy variable for a small number of notaries is still negative and significant in all the regressions (Table 5, regressions 4 through 6), and the results (available from the authors) do not change greatly if we drop Paris. Another concern is the effect of bank lines of credit or lending by the Crédit Foncier, but we can add the volume of lending they did from the previous cross section since their lending too is endogenous. (Because the Crédit Foncier did not exist 1840, its value from the previous cross section can only be used as an explanatory variable in 1899.) Again (Table 5, regression 7) the dummy variable has a negative coefficient, as in all the other regressions in Table 5. That is not what would be predicted if banks were lower cost substitutes for notaries.

The regression results provide remarkable support for a simple model of credit demand that is a reasonable description of what was happening in nineteenth-century France, which, like developing countries today, had a large agricultural sector. Its implications fit our data. Bankers would enter markets were notaries were busy, but they would not undercut the notaries' business or be drawn to markets where the number of notaries was small. The only exception would be the Crédit Foncier, the government backed mortgage bank, which did compete with notaries, but only in the largest markets.

7. Conclusion

Our original data set is the first that makes it possible to measure the value of loans arranged by traditional financial intermediaries and to test whether they were less efficient than modern financial intermediaries, as much of the literature in development economics and economic history has assumed. Our analysis of nineteenth-century French credit shows that banks, the modern intermediaries, were not more efficient substitutes than their traditional

counterparts, the notaries. Banks were free to enter markets, and when they did they had at most a minimal impact on the notaries' lending and certainly did not drive any of them out of business. The reason was that banks were providing different financial services than the notaries—short term commercial loans instead of the long term mortgages that the notaries arranged. Demand for both sorts of loans was correlated, so the banks did enter markets where the notaries were busy, but not because they expected to take business away from notaries, but rather, because those were the places where the demand for the short term credit they offered was high.

It is true that one bank did undercut the notaries' business, but it had the benefit of government backing for its securities. Even then it could not compete outside the largest markets or in serving the biggest scale borrowers. For most of the population, notaries remained the principal source of long term loans until World War I. They were able to maintain such a position because they had the best information about the value of collateral and the creditworthiness of borrowers. Notaries therefore ended up arranging loans for a broad fraction of the population, including women and individuals far down the social–economic ladder. Perhaps a quarter of households with property had notarial loans outstanding, and the sums that notaries mobilized were large—the stock of loans they had arranged in 1840 came to 27 percent of GDP. In doing so, they helped integrate financial markets, and they were therefore not archaic intermediaries, which banks, with better information and an ability to pool risk, could simply sweep aside. The banks were indeed the modern intermediaries, but they could not mobilize capital for long term loans, and they did not have the information needed to sift through mortgage applicants. In the end, they were not more efficient substitutes for notaries.

Our analysis offers two different lessons. The first concerns the economies that developed in the nineteenth century (Western Europe, North America, or Japan). In these economies, there was often a vibrant credit market before banks appeared, and financial development accompanied industrialization. But any regressions of economic outcomes on financial development as measured by bank assets would lead to erroneous results, because the measures of financial development would be biased downwards. The reason is simply that the traditional intermediaries do not have reporting requirements and so their business goes uncounted. And the problem will obviously be worse in those countries, poor or rich, that rely heavily on traditional intermediaries—countries that would include not just France but the United States and the United Kingdom.[24] Beyond this problem of measurement, one must take into account that the slow diffusion of modern intermediaries in economies with effective traditional systems, may not be the result of either political barriers to entry or capital market inefficiency. More likely the slow diffusion should be explained by demand and informational factors. Indeed, traditional intermediaries are likely to have information or provide specialized services that make them the low cost competitors in many markets, and they may retain this cost advantage for a long time, even when there is free entry. The lack of banks or other modern intermediaries may thus not reflect institutional failure, but simply the presence of efficient traditional intermediaries who are already in the market.

A second lesson applies to economies that are still trying to develop modern financial markets. Indeed scholars tend to emphasize the dearth of modern financial intermediaries in places like India or Sub-Saharan Africa. The small volume of credit available forces individuals to rely on alternative forms of inter-temporal trade or forego it altogether (Paulson and Townsend 2004). Nonetheless, the demand for credit in such places is likely to be high, and one might

[24] In 1900, financial institutions held only 35 percent of outstanding mortages in the United States and at most 50 percent of mortgages in the United Kingdom.

expect that modern financial intermediaries would offer major benefits. Yet in many places their entry has been slow, whether measured by the opening of new bank branches or by the volume of credit extended. Some of the reasons for such slow diffusion lies entirely outside our analysis (such as political constraints on entry in late nineteenth-century Mexico, or threats of expropriation), but the same reasons that led to a slow diffusion of banks in France are likely to apply there as well. First of all, there is often insufficient demand for bank services once one takes into account the cost of doing business with very small depositors or borrowers; second, it is likely to take a good deal of time for an exterior organization like a bank to accumulate the relevant information to do business in what had heretofore been an unbanked location. Indeed these external entrants will face even larger learning costs than did local merchants who converted their business from wholesale trade to banking. In France, the transition to banks took well over a century, despite free entry for bankers, secure property rights, stable political institutions, and widespread property ownership. While change may have accelerated, it is likely that the diffusion of modern credit intermediaries will remain slow subject to the constraints of demand and information.

Appendix Sources and credit data construction

Thanks to generous support from the Sage Foundation, we have managed to gather data on some over one hundred thousand loans spread out over 105 separate markets in 4 cross sections that cover the nineteenth century: 1807, 1840, 1865, 1899. The markets were chosen to form a stratified sample of French towns and cities according to their population; the sample includes Paris; three other large urban centers (Lyon, Rouen, Toulouse); 14 medium sized cities such as Amiens with populations between 20,000 and 50,000 in 1840; and 39 smaller cities with populations between 5,000 and 20,000; and 48 towns with populations under 5000. Our evidence, it should be stressed, comes not simply from the cities and towns themselves but from the surrounding countryside as well.

In addition to the credit data, we have also collected data on financial intermediaries, populations, economic development, bankruptcies, wealth, inequality, human capital, and social capital in each of the 105 markets. Here we will describe our sources and how we estimated the per-capita stock of outstanding debt in each market.

To estimate this stock, we used records of loan registration that survive as far back as the early eighteenth century. Lenders had to have their loans registered with a local registration office and pay a tax on the transaction. If they did not do so, they would have difficulty enforcing their loans in court in case of default, and they therefore had a powerful incentive to register the loans and report truthfully the terms of the loan contract. The registration offices were located in towns and cities but they registered transactions for the nearby countryside. The nature of the tax and the size of the areas covered by each office hardly changed over time. Typically each office covered an area that was nearly the same as a nineteenth-century French *canton*, a small administrative unit averaging some 150 square kilometers in size.

For each market and cross section, the registration records gave us the number of new loans made, the types of loans, their size, and, in most cases, their duration (the number of years before the loan had to be repaid). To calculate the outstanding stock of debt, we took the new loans registered in each market in the years of our four cross sections and multiplied the value of each loan by its duration. The sum of these products is our estimate for the loan stock. The calculation assumes that the market is in a steady state, but a detailed investigation of the credit market in Paris shows this method is a good approximation.

Our population data come from the French census in the years closest to the dates of our cross sections (1806, 1841, 1866, 1896); the market population is that of the French *canton*. Our per-capita wealth measure was the per-capita property tax paid in 1840, 1864, and 1899. It was not available for 1807, and assessed values changed in 1899 due to a reassessment of structures on real property. The GDP figures come from Toutain 1987; for 1807, GDP is assumed to grow at 0.4 percent per year between 1807 and Toutain's earliest GDP estimate (1815). With one exception, the estimates for France as a whole use market population and the sampling rate of our stratified sample to extrapolate the volume of new loans and the stock of outstanding debt. The one exception is for the Crédit Foncier, for which published totals for France as a whole were available from the Annuaire Statistique de la ville de Paris, 1880-1900.

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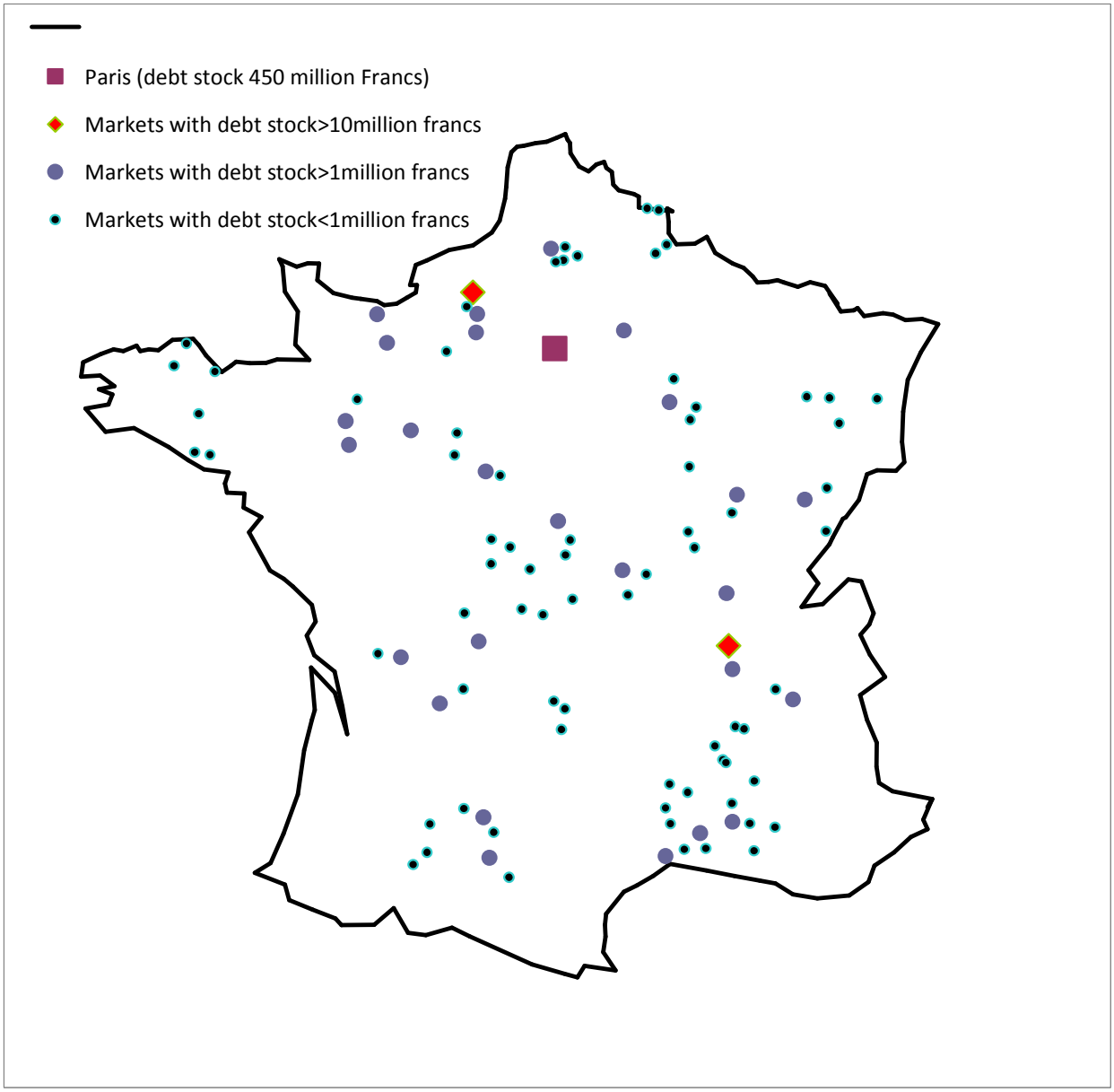

Figure 1. Markets in our sample with their stock of outstanding debt in 1807. The stock of outstanding debt is estimated by multiplying the volume of new loans in each market in 1807 times average durations for each type of loan.

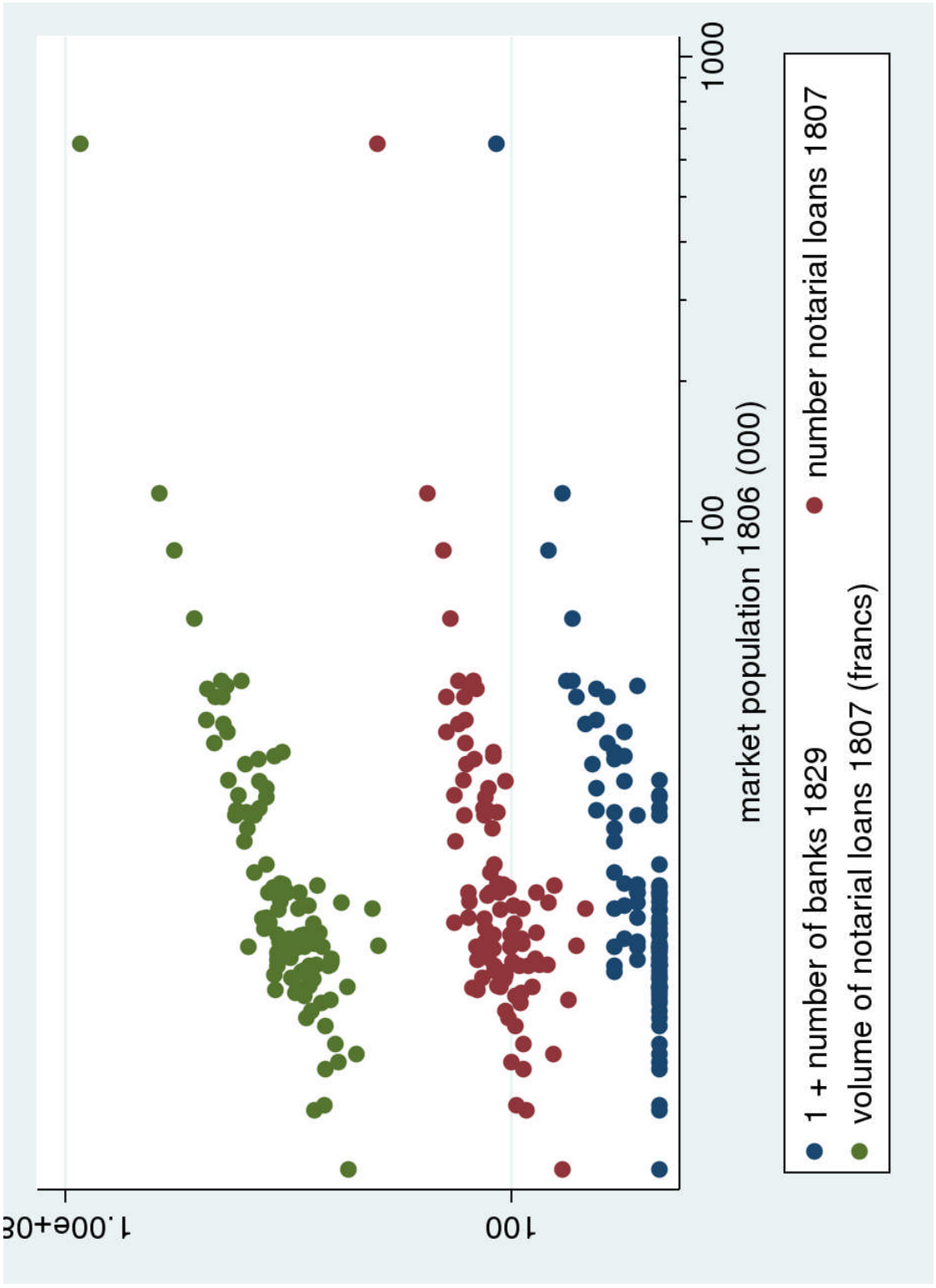

Figure 2. Banks, notarial lending and market population 1807-1829

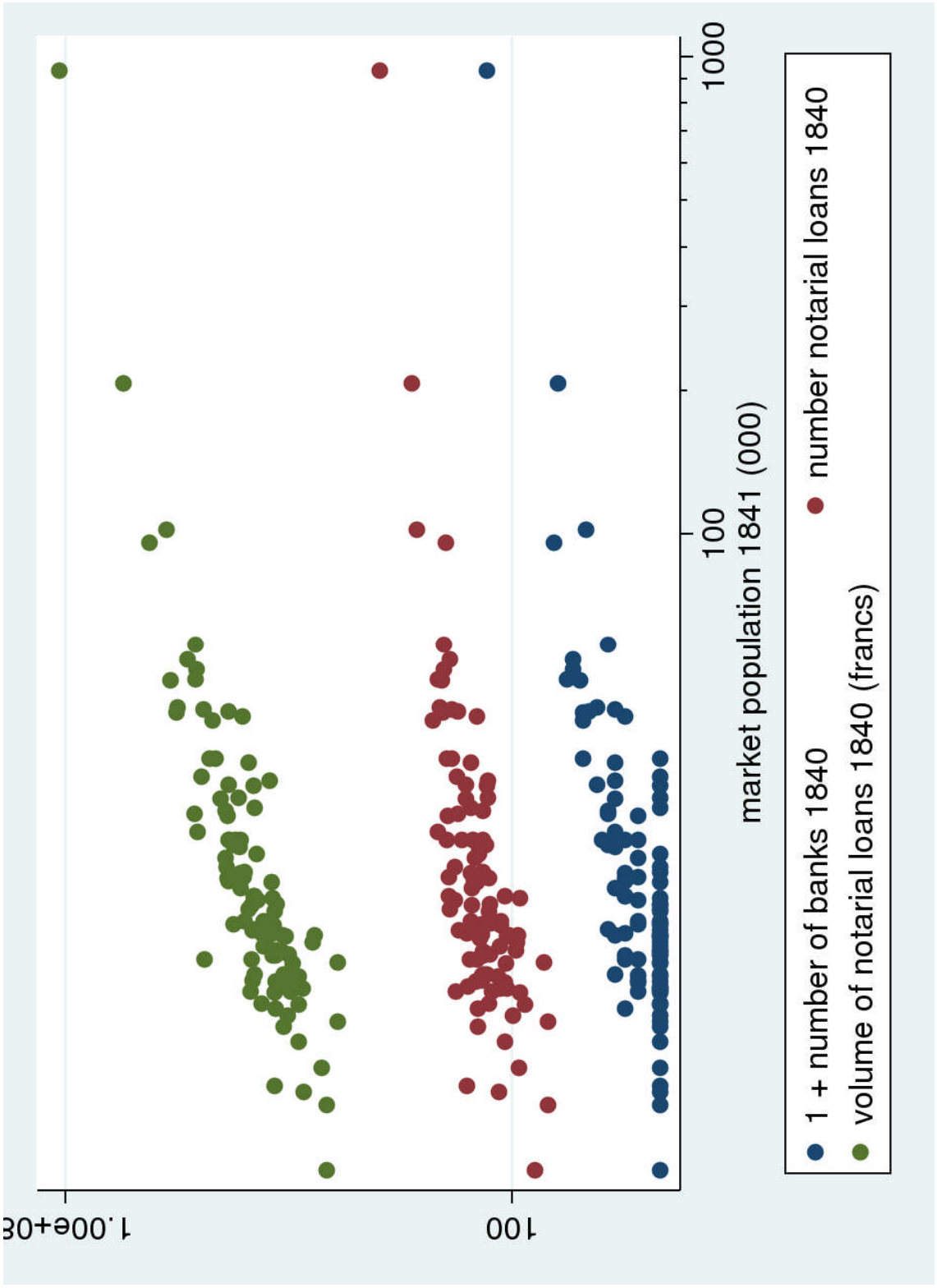

Figure 3. Banks, notarial lending, and market population 1840

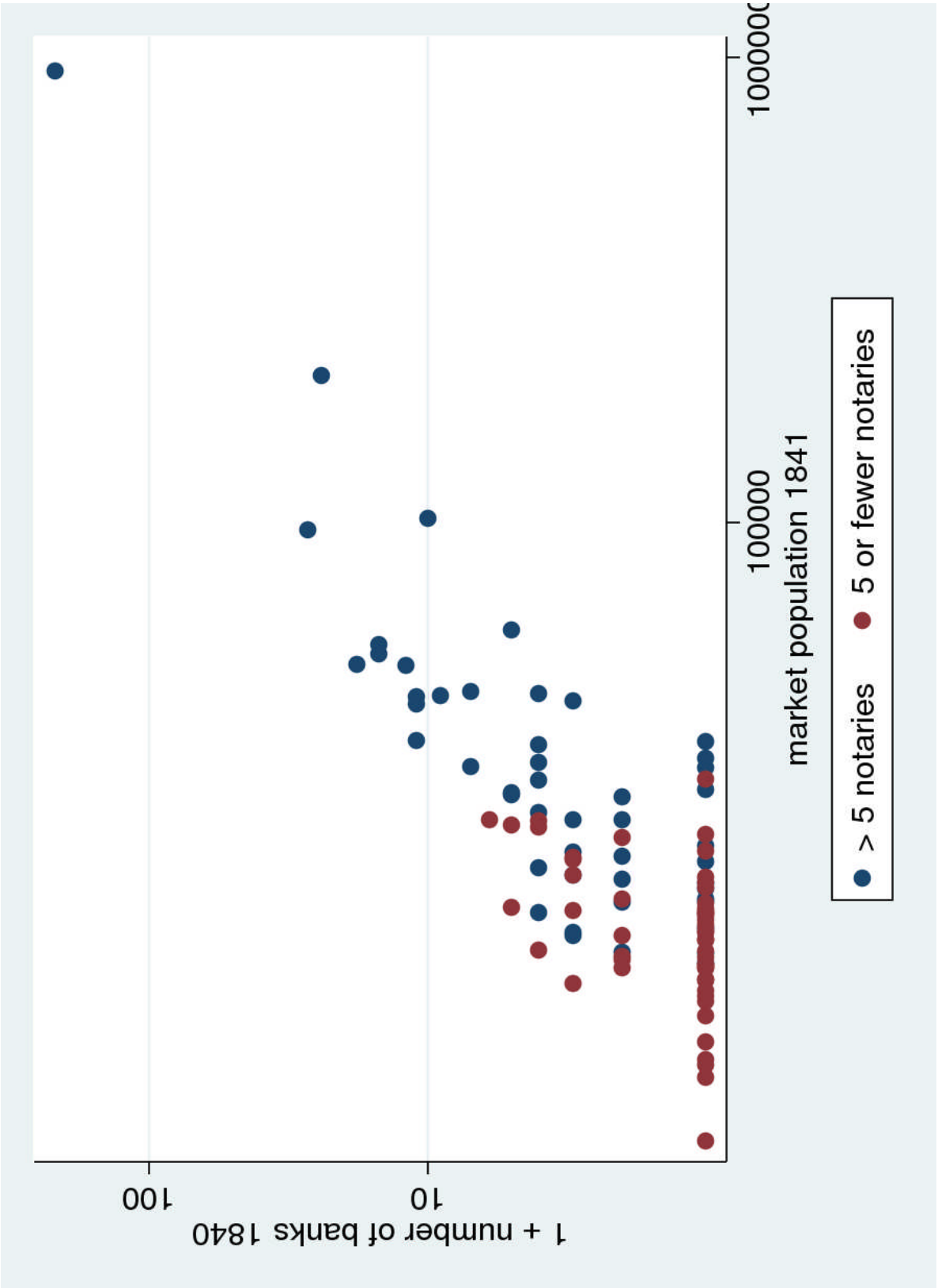

Figure 4: Number of banks and notaries and market population, 1840-41.

Table 1. Descriptive statistics

Year	1807	1840	1865	1899
Variable	Per market means (standard deviations)			
Number of banks	3.6 (15.9)	4.6 (21.6)	7.1 (38.4)	12.5 (84.8)
Wealth (per capita property tax, francs per person)	--	4.6 (1.3)	4.5 (1.4)	19.1 (10.0)
Market Population (000)	25.7 (65.0)	32.5 (93.5)	46.1 (182.5)	57.9 (255.7)
Volume of notarial mortgage loans (million francs)	0.94 (6.31)	1.99 (12.20)	1.72 (8.98)	1.85 (9.21)
Volume of mortgage backed bank credit lines (million francs)	0.00 (0)	0.10 (0.67)	0.51 (4.17)	0.38 (3.34)
Volume of Crédit Foncier mortgage loans (million francs)	0.00 (0)	0.00 (0)	0.81 (7.95)	0.58 (4.86)

Source: See appendix.

Note: Since each observation in the regressions is a market, the means are per market averages for the 105 markets in the panel data set. The lending volumes are the mean values of total lending for each category of loans. The per capita wealth measure changed in 1899. None of the means in this table are adjusted for the stratification of the underlying sample of loans. See the appendix for further information on the wealth measure and the sample of loans.

Table 1 (continued). Descriptive statistics

Year	1807	1840	1865	1899
Variable	Per market means (standard deviations)			
Wealth^2	--	22.82 (12.50)	21.96 (13.30)	464.86 (485.61)
Market Population^2 (*10^10)	0.48 (4.21)	0.97 (8.66)	3.51 (33.10)	6.81 (64.40)
Wealth*Market Population (*10^6))	--	0.17 (0.60)	0.22 (0.94)	2.13 (12.70)

Table 2. Notarial lending regressions for the panel data set

Regression number	1	2	3	4	5
Dependent variable	volume notarial loans	volume of notarial loans	volume notarial loans	volume of notarial loans	volume of notarial loans
Estimation	fixed effects	1 without Paris	fixed effects	3 without Paris	two-stage first differences; banks 10 years earlier as instrument
	Coefficients (standard errors) for selected explanatory variables				
Number of banks	55406 (27385)*	41144 (24774)	59572 (17210)**	38702 (25316)	135518 (35586)***
Wealth	49117 (17192)**	-49.11 (9251)	35370 (31165)	28549 (26105)	976 (35638)
Population	-41.83 (11.91)***	5.38 (1.68)**	2.02 (3.02)	9.76 (7.38)	10.48 (4.54)*
Wealth^2			-1228 (888)	-657 (584)	-276 (980)
Population^2 (*10^-5)			-1.88 (0.21)***	-0.59 (2.09)	-2.70 (0.38)***
Wealth* Population			0.28 (0.033)***	-0.013 (0.20)	0.14 (0.066)*
N	301	298	301	298	198

* $p < 0.05$ ** $p < 0.01$ *** $p < 0.001$
Source: See appendix.

Note: Variable definitions and units as in Table 2. Regressions 1 through 4 included time dummies; regressions 5 through 8 included first differences of time dummies. Standard errors are clustered. For the instruments used in regressions 5 thru 8, see the text.

Table 2 (continued). Notarial lending regressions for the panel data set

Regression number	6	7	8
Dependent variable	volume notarial loans	volume notarial loans	volume notarial loans
Estimation	5 without Paris	two stage first differences; banks 5 years earlier as instrument	7 without Paris
	Coefficients (standard errors) for selected explanatory variables		
Number of banks	72834 (38969)	83547 (30986)**	82870 (30512)**
Wealth	7637 (36244)	11645 (35326)	5909 (33148)
Population	10.01 (8.82)	4.55 (4.40)	10.38 (8.98)
Wealth^2	-161.28 (905)	-623.68 (1008)	-114.06 (812)
Population^2 (*10^-5)	-0.91 (2.30)	-2.14 (0.36)***	-0.98 (2.32)
Wealth* Population	0.0041 (0.16)	0.23 (0.057)***	-0.0043 (0.15)
N	196	198	196

* $p < 0.05$ ** $p < 0.01$ *** $p < 0.001$

Table 3. Notarial lending regressions for the panel data set with the Crédit Foncier and mortgage backed letters of credit

Regression number	1	2	3	4
Dependent variable	volume notarial loans	volume notarial loans	volume notarial loans	volume notarial loans
Two stage first differences estimate with	Banks endogenous	As in 1 but Paris excluded	Banks, Crédit Foncier, and mortgage backed credit lines endogenous	Banks, Crédit Foncier, and mortgage backed credit lines endogenous
Instruments	Banks 10 years earlier	Banks 10 years earlier	Banks 10 years earlier, banks 5 years earlier, change in urban population between 19 and 4 years earlier	Banks 10 years earlier, banks 5 years earlier, fraction of population urban 9 years earlier
	Coefficients (standard errors) for selected explanatory variables			
Number of banks	86014 (27484)**	58093 (28512)**	86282 (28470)**	91789 (28624)**
Volume of mortgage backed bank credit lines	0.67 (0.40)	0.95 ().42)*	0.50 (1.34)	2.09 (4.19)
Volume of Crédit Foncier mortgage loans	-0.32 (0.094)**	0.72 (0.64)	-0.28 (0.25)	-0.66 (1.02)
N	198	196	198	198

* $p < 0.05$ ** $p < 0.01$ *** $p < 0.001$

Table 3. Notarial lending regressions for the panel data set with the Crédit Foncier and mortgage backed letters of credit (continued)

Regression number	5	6
Dependent variable	volume notarial loans	volume notarial loans
Two stage first differences estimate with	Banks, Crédit Foncier, and mortgage backed credit lines endogenous	As in 3 but Paris excluded
Instruments	Banks 10 years earlier, banks 5 years earlier, change in urban population in past 10 years	Banks 10 years earlier, banks 5 years earlier, change in urban population between 19 and 4 years earlier
	Coefficients (standard errors) for selected explanatory variables	
Number of banks	82552 (22990)***	65175 (108984)
Volume of mortgage backed bank credit lines	0.54 (1.83)	0.37 (6.22)
Volume of Crédit Foncier mortgage loans	-0.41 (0.57)	0.81 (4.80)
N	198	196

* $p < 0.05$ ** $p < 0.01$ *** $p < 0.001$

Source: See appendix.

Note: Variable definitions and units as in Table 2, save for the instruments. For them, see the text. Standard errors are clustered. All the regressions include first differences of time dummies and of linear and quadratic controls for wealth and population. Coefficients and standard errors for those variables are available from the authors.

Table 4. Negative binomial regressions of the number of banks on notarial lending

Regression number	1	2	3
Dependent variable	number of banks 1829	1 without Paris	number of banks in 1840
Estimation	negative binomial	negative binomial	negative binomial
	Coefficients (standard errors) for selected explanatory variables		
Volume of notarial loans in 1807 (*10^-7)	-11.90 (1.96)***	-8.76 (5.88)	-3.94 (6.73)
N	98	97	97

* p < 0.05 ** p < 0.01 *** p < 0.001

Source: See appendix.

Note: Regressions 1 and 2 include the market population in 1831 alone as a control for demand since no wealth measure is available for 1829; regression 3 includes linear and quadratic terms in 1840 wealth and 1841 market population.

Table 5. Negative binomial regressions controling for the number of notaries

Regression number	1	2	3	4	5	6	7
Dependent variable	number of banks 1840	number of banks 1865	number of banks 1898	number of banks 1840	number of banks 1865	number of banks 1898	number of banks 1898
Estimation	negative binomial; 1840 cross section	negative binomial; 1865 cross section	negative binomial; 1899 cross section	negative binomial; 1840 cross section	negative binomial; 1865 cross section	negative binomial; 1899 cross section	negative binomial 1899 cross section
	Coefficients (standard errors) for selected explanatory variables						
dummy variable: 5 or fewer notaries same cross section	-0.74 (0.33)**	-0.57 (0.17)**	-0.36 (0.12)**				
dummy variable: 5 or fewer notaries previous cross section				-0.85 (0.32)**	-0.70 (0.17)***	-0.42 (0.12)**	-0.30 (0.14)*
notarial lending in the same cross section (*10^-8)	-3.29 (19.90)	-10.06 (12.30)	-7.04 (5.27)				
notarial lending in the previous cross section (*10^-8)				-58.5 (59.9)	-15.4 (8.20)	-6.84 (7.33)	-11.5 (8.42)
CFF lending in 1865 (*10^-7)							11.6 (25.6)
mortgage backed credit lines 1865 (*10^-7)							65.8 (37.3)
N	102	101	99	97	101	97	97

* $p < 0.05$ ** $p < 0.01$ *** $p < 0.001$

Source: See appendix.

Note: All regressions include linear and quadratic controls for wealth and population.

Table A.1 Descriptive statistics for the sample of mortgage loans

Cross section	1807	1840	1865	1899
	Number of mortgage loans			
All	23739	40046	30557	19325
Notarial	23738	39887	29762	18268
	Mean loan size and GDP per capita (francs)			
All	2178	2869	4876	7651
Notarial	2178	2755	3600	6235
GDP/capita	396	389	549	846
	Volume of new loans (million francs)			
All	52	115	148	148
Notarial	52	110	107	114
	Average loan duration (years)			
All	2.9	3.0	4.1	6.6
Notarial	2.9	3.0	3.6	4.9
	Estimated volume of new mortgage loans for France as whole (million francs)			
All	470	840	1161	1159
Notarial	470	817	952	957
Notarial/All	1.00	0.97	0.82	0.83
	Estimated stock of outstanding mortgage debt for France as a whole (billion francs)			
All	1.79	3.69	4.75	7.93
Notarial	1.79	3.68	4.07	5.90
GDP	11.7	13.4	20.9	32.6
All/GDP	0.15	0.28	0.23	0.24
Notarial/GDP	0.15	0.27	0.19	0.18

Source: See appendix.

Note: Mean loan durations and sizes are unweighted totals for our sample of loans. GDP per capita is calculated using the census closest to the dates of our cross sections (1806, 1841, 1866, 1896). For the estimates for France as a whole, see the appendix.

Table A.2 Additional notarial lending regressions for the panel data set: selected coefficients

Regression number	1	2	3	4	5
Dependent variable	volume notarial loans	volume notarial loans	volume notarial loans	volume notarial loans	number of banks
Estimation	Fixed effects	1 without Paris	Fixed effects	3 without Paris	First differences; first stage regression for table 2, regression 5
	Coefficients (standard errors) for selected explanatory variables				
Number of banks	56220 (30187)	41146 (24682)	-41010 (1649)***	52209 (25074)*	
Number of banks 10 years earlier					0.431 (0.083)***
Wealth			31407 (26632)	4687 (9914)	0.126 (0.066)
Population	-41.10 (13.11)**	5.37 (2.31)*			-0.0000316 (0.0000217)
N	301	298	301	298	198

* $p < 0.05$ ** $p < 0.01$ *** $p < 0.001$

Source: See appendix.

Note: Variable definitions and units as in Table 2. Regressions 1 through 4 include time dummies. Regression 5 includes first differences of time dummies and of quadratic terms in wealth and population. Standard errors are clustered. The F test for weak identification in regression 5 is $F(1, 100) = 27.25$ ($p < 0.001$); the Kleibergen and Paap (2006) test for underidentification with clustered errors yields chi-square (1) = 5.53 ($p = 0.0187$).

Table A.3 First stage regressions for Table 3, regression 3: selected coefficients

Regression number	1	2	3
Dependent variable: first difference of	Number of banks	Volume of Crédit Foncier mortgage loans	Volume of mortgage backed bank credit lines
	Coefficients (standard errors) for selected explanatory variables		
Instruments			
First difference of number of banks 10 years earlier	0.233 (0.084)**	-198937 (51258)***	-51359 (18539)**
First difference of number of banks 5 years earlier	0.466 (0.081)***	148098 (47387)**	39457 (17998)*
Change in urban population between 19 and 4 years earlier	-0.0000365 (0.0000374)	-29.76 (21.62)	0.709 (7.34)
F test of excluded instruments F(1, 100) =	57.3 (p < 0.001)	19.2 (p < 0.001)	18.84 (p < 0.001)
N	198	198	198

* p < 0.05 ** p < 0.01 *** p < 0.001

Source: See appendix.

Note: The regressions also include first differences of time dummies and of linear and quadratic terms in wealth and population. Standard errors are clustered. The Kleibergen and Paap (2006) test for underidentification with clustered errors and three endogenous variables yields chi-square (1) = 3.43 (p = 0.0639).