



Entry, information, and financial development: A century of competition between French banks and notaries ☆

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Abstract

Poorly developed financial markets are widely believed to block economic growth, because only modern financial intermediaries such as banks can mobilize large amounts of financial capital at low cost. This claim is supported by cross country regressions, but the regressions assume that credit intermediation is measured accurately before modern financial intermediaries arrive. If traditional intermediaries were mobilizing large amounts of financial capital before banks or other modern intermediaries appear, then the strength of the relationship between financial development and economic growth would be cast into doubt. Using an original panel dataset from nineteenth-century France, we provide the first estimates of how much financial capital key traditional intermediaries (notaries) were mobilizing for an entire economy during its first century of economic growth, and we analyze the lending that the notaries made possible in French mortgage market. The amount of capital they mobilized turns out to be large. We then analyze the effect that financial deepening had on the notaries as banks spread and find that the banks' and notaries' services were in all likelihood complements. The implication is that the link between financial development and economic growth may therefore be weaker than is assumed.

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1. 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

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

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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, the cost of credit intermediation is high and the volume of loans is low.³ 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 boost the supply of loanable funds, lower interest rates, and presumably displace traditional intermediaries.

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. And although banks did diffuse in France in the nineteenth century, the process was supposedly slow and is claimed to have retarded economic development. However, in 1807, long before banks had begun to spread, the stock of mortgage debt in France still amounted to 10% of GDP, despite the damage done to credit markets by years of war and rapid inflation during the French Revolution. Relative to GDP, the stock of mortgage debt was comparable to the level in the United States after the shock of the Great Depression and World War II. And by 1840, mortgage debt originated outside of the banking system came to 27% of GDP, roughly the same level as total mortgage debt in the US in the 1950s.⁴ 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, for instance, are more efficient 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, because the banks and the traditional intermediaries are complements, 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 dataset that we have assembled for France across the nineteenth century. Our data yield the first estimates of how a major fraction of traditional lending evolved across a long time period in an entire economy. Because collecting data on traditional credit intermediation is difficult, other estimates have either been snapshots at one time (Goldsmith, 1969) or have concerned only one city (Hoffman et al., 2000; Lindgren, 2002). We overcame the difficulties by relying on tax records from a stratified sample of French credit markets; the tax records in turn let measure the volume and stock of traditional lending in a major credit market, the market for mortgage loans, at four points between 1807 and 1899.

Beyond that, we also use our data to determine who was involved in this market and to estimate the impact that the most important form of financial deepening—the diffusion of banks—had on traditional intermediaries. Although our dataset does not allow us to directly test the effect that traditional lending had on economic growth, it does suggest that the modern intermediaries—banks—were not more efficient substitutes for the traditional intermediaries—notaries—in the mortgage market, which would point to financial development's have less of an effect on growth once traditional lending is taken into account. As late as 1899 traditional intermediaries were providing 83% of mortgage funding even though

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. Temin and Voth (2013) blame slow growth during the Industrial Revolution on interest rate ceilings and crowding out that hindered the development of British financial markets.

³ The term "cost of credit intermediation" is taken from Bernanke (1983). It would include the costs of screening and monitoring borrowers and would be covered by recoveries from defaulting lenders and the spread between the cost of funds lent and the interest rate earned on loans.

⁴ The stock of US mortgage debt was 11% of GDP in 1944 and averaged 31% in the 1950s according to the Federal Reserve bank data at <http://www.federalreserve.gov/releases/z1/Current/data.htm>.

Table 1
Mortgage lending and notarial credit in France, 1807–1899.

Year	1807	1840	1865	1899
Volume new loans (million francs)	320	774	923	1085
Notarial	320	749	727	902
Notarial/all	1.00	0.97	0.79	0.83
Number of outstanding loans (millions)	0.65	1.24	1.29	1.21
Notarial	0.65	1.24	1.27	1.14
Notarial/all	1.00	1.00	0.99	0.94
GDP (billion francs)	11.7	13.4	20.9	32.6
Stock of outstanding debt (billion francs)	1.12	3.64	4.25	8.01
Notarial	1.12	3.58	3.42	6.03
Notarial/all	1.00	0.98	0.80	0.75
All/GDP	0.10	0.27	0.20	0.25

Source: See [Appendix A](#).

Note: The figures for notarial lending are calculated by dropping mortgage backed credit lines and loans made by the *Crédit Foncier*. Rounding error makes the notarial/all figures for contracts outstanding equal one in 1840, even though banks were making mortgage loans (852 of them, we estimate, in 1840).

banks were free to enter the mortgage market and did make some mortgage loans, and even though the French government had created and guaranteed the securities of a modern mortgage bank (Table 1). 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 provide lower cost substitutes for mortgages, because they did not have the traditional intermediaries' informational advantages. In fact, it seems that bank and traditional mortgage credit were large in the same places. The reason, again, was simple: the banks and traditional intermediaries complemented one another by providing different sorts of credit intermediation. Precisely how the two sorts of intermediaries then contributed to economic growth is a topic that we will take up in future research.

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% 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 and competing directly against traditional intermediaries.⁶ It also dovetails with a theoretical argument that explains how informational advantages allow traditional financial intermediaries to survive alongside their modern counterparts.⁷ The old and new intermediaries may thus be complements in general, 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. In developing countries without such institutions, traditional intermediaries may not have been able to do as much lending. Nonetheless, the volume of traditional lending has still been underestimated in many cases, and so in all likelihood has the efficiency of traditional intermediaries, who may supply forms of credit that complement the lending done by banks and other modern 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

⁵ The estimates for Britain are derived from [Sheppard \(1971\)](#) and [Offer \(1981\)](#); for details, see [Hoffman et al. \(2010\)](#). 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 et al., 2011.](#)

⁷ See, for example, [Banerjee et al. \(1994\)](#) and [Ghatak and Guinnane \(1999\)](#).

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.

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 and to analyze who is involved in the mortgage market. We then analyze how the diffusion of banks affected the traditional intermediaries. We start with a simple model in which banks are superior substitutes for traditional intermediaries, because they offer loans at a lower cost. An alternative and ultimately more realistic 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.

2. Financial intermediaries in nineteenth-century France

Mortgage loans formed a major part of credit market in France and in other nineteenth-century economies. In France, most mortgages were arranged by notaries, semi private court officers who preserved records, handled estates, brokered real estate transactions, and also provided legal and financial advice. Unlike banks, they did not take money on deposit, but instead simply matched up borrowers and lenders, by making use of information they possessed about who had money to

lend, what collateral was worth, and who was a good credit risk (Hoffman et al, 2000). Having matched up the borrowers and lenders, they would also draw up the mortgage loan contract. Similar traditional intermediaries (attorneys and scribes in England, notaries in many other civil law countries) did much the same in mortgage markets elsewhere in Europe (Anderson, 1969; Miles, 1981; Habakkuk, 1994; Neal, 1994; Quinn, 2004).

Although securities markets were important, banks were the chief modern financial intermediary in France, as in the rest of Europe. The banks secured short term funds from depositors, and then used the deposits and the bank owners' equity to fund short-term commercial loans and also to make long-term investments in industry that, it has been argued, were critical for Europe's nineteenth-century growth.⁸ The French banks were overwhelmingly partnerships or sole proprietorships before the 1850s, but thereafter a number of corporate banks appeared, which had the ability to open branches. In both periods, only the Bank of France could issue banknotes, and banks' ability to issue debt securities was closely supervised. But otherwise there were few regulations limiting what banks could do and no barriers to bank entry.

In particular, there were no legal obstacles that prevented banks from lending long term or from making mortgage loans, although they could not refinance loans of this sort at the bank of France, which only accepted high grade commercial paper for rediscount. Doing so was obviously risky because mortgage debt was illiquid and had a much longer maturity than banks' deposits. But French bankers did engage in mortgage lending by supplying mortgage backed credit lines, which were, roughly speaking, the nineteenth-century equivalent of home equity lines today.⁹ There were also no legal obstacles to their imitating bankers in the United States who funded industrialists' long term investments by rolling over short term loans (Lamoreaux, 1994; Davis, 1972:349).¹⁰ One could imagine similar accommodations in France, with the banks' diversification reducing

⁸ The argument, which has focused on large universal banks, begins with Gerschenkron, 1962, 12–14. For recent evidence in favor of it, see Calomiris (1995) and for a recent criticism, Fohlin (2007, 2).

⁹ In our sample we describe below, mortgage backed letters of credit on average constituted 5% of new mortgage lending in 1840, 17% in 1865, and 14% in 1899; for details, see Table 2 below. The averages here are unweighted.

¹⁰ In the United States, the industrialists who borrowed often owned part of the bank making the loan, which gave them some assurance that their credit would not be cut off.

the risk that a borrower would suddenly find his credit cut off. The banks' access to cheap short term capital might have allowed them to fund any of these substitutes for a mortgage at a lower cost than a loan that a notary could broker. If so, then the banks' lending could have reduced the demand for the notary's mortgages.

It has been argued that France had "too few" banks and that the country therefore paid a price in slower industrialization and economic growth (Cameron, 1967 110–111, 127). But that argument has been challenged by O'Brien and Keyder (1978), Roehl (1976), Lévy-Leboyer (1964), Lévy-Leboyer and Bourguignon (1985), and Lescure and Plessis (1999), and it is in any case clear that French bankers were closely involved with financing not just trade but industry as well (Gille, 1959; Cameron, 1961; Lévy-Leboyer, 1964). It is also clear that banks spread rapidly in France from 1800 on, as one would expect from the lack of any regulation or barriers to their entry. Knowing precisely how many banks there were requires a systematic source, which does not appear until 1829, when commercial almanacs began to provide the addresses of bank offices. At this point, there were already 762 bank office in France (of which 153 were in Paris).¹¹ As the century wore on, banking spread to smaller cities. In 1829, only two out of every three French cities with populations over 20,000 had a bank office; by 1851 all of them did. For cities between 5000 and 10,000, the fraction with banks jumped from one third in 1829 to 87% in 1862.

3. The panel data and the French mortgage market

To estimate the extent of traditional lending in France as a whole, we gathered data on over a hundred thousand mortgage loans drawn from 105 credit markets scattered through the country (see Fig. 1 for a map). These markets were *cantons*, small administrative districts averaging some 150 km² in size that typically included a town or city and neighboring communities. The markets were chosen to yield a stratified sample of towns and cities that would reflect the French economy as a whole. They include Paris; other big cities such as Lyon; medium sized urban centers with 10,000 to

70,000 habitants, such as Grenoble; and smaller towns with populations as low as 500 people.

All the mortgage loan contracts were drawn up by notaries. The loans themselves could in theory have been arranged by anyone, and banks could have provided the capital. But in practice, notaries had matched up the lenders and the borrowers, and the lenders were individuals, not banks. There were only two exceptions: the 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. Beyond drawing up the contracts, they verified the 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.¹² The information we collected includes the number and size of new loans and loan durations; it allowed us to estimate the volume of new loans and stock of outstanding debt in each market for 4 years: 1807, 1840, 1865, and 1899. (See Appendix A 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 the devastating 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. Henceforth, traditional credit (and as synonyms, notarial credit or notarial lending) will refer to all of these loans except for *Crédit Foncier* loans and mortgage backed credit lines, while the total of all mortgage debt (with the *Crédit Foncier* and mortgage credit lines included) will simply be called mortgage lending.

The market for mortgage debt was large. Both total mortgage lending and traditional credit were highly

¹¹ The almanacs 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).

¹² The 105 fiscal bureaus' geographic purview changed over time and did not necessarily equal the *canton*, which served as the basis for our markets. For consistency and to allow for proper comparison over time, we limited the notaries in a given market to those who reside in the *canton* where the fiscal bureau was located.

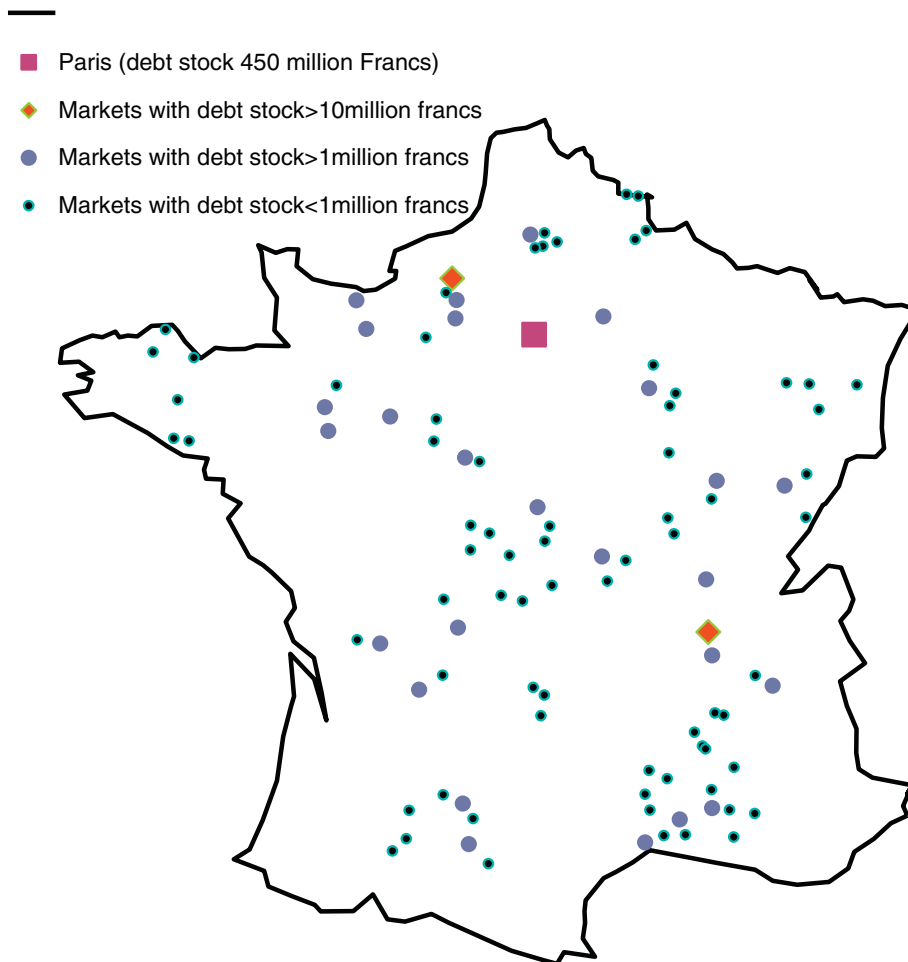


Fig. 1. Markets in our sample with their stock of outstanding debt in 1807. The stock of outstanding debt is estimated by multiplying the volume of new loans in each market in 1807 times average durations for each type of loan.

correlated with market population.¹³ If we therefore use population data to extrapolate from our sample to the whole country, we find that there were nearly seven hundred thousand mortgages outstanding in 1807 and over a million thereafter. Nearly all of these loans (94% in 1899 and even more before then) were traditional

¹³ Scatterplots and regressions (available from the authors) of the volume of traditional credit or of total mortgage lending on market population reveal a strong positive linear relationship with market population. The regressions were run with fixed effects; the results are similar when the sample is restricted to markets with populations under 50,000 people. Graphs and similar regressions with per capita lending suggest that it has no clear linear relationship with market population or with the population of the largest municipality in each canton. There is, however, a quadratic relationship between mortgage lending, on the one hand, and population and per capital wealth; we take this relationship into account in our regressions below. In any case, using market population to extrapolate from our sample and estimate lending totals for France as a whole does reasonable.

credit (Table 1). The value of the outstanding mortgage debt ranged from 10% of GDP right after the Revolution (in 1807) to 27% in 1840; 75% or more of it was traditional.

Who then were the borrowers and lenders in all these loans? In 1840 there was very nearly one loan outstanding for every 20 people in France. That would suggest that roughly 20% of families were borrowing, if we allot one borrower to each family of 4 people and ignore individuals who take out multiple loans. If we judge borrowers by their occupations (and for female borrowers, use their husband's occupation), then the nineteenth-century borrowers were resoundingly middle class (Table 2, panel A). Occupations are of course an imperfect guide to income or wealth, and even less so to real property that as collateral gave access to the mortgage market, but the evidence still seems clear. A quarter or more of the borrowers were described as property owners, and the large contingent from agriculture

Table 2
Borrowers and lenders in our sample, 1807–1899.

Year	1807	1840	1865	1899
<i>Panel A: Social distribution of borrowers by occupation (percent)</i>				
Agriculture	40.9	34.3	29.6	19.0
Crafts/industry	15.3	15.6	13.4	15.5
Lower class	5.7	6.5	4.3	3.6
Commerce/services	93.8	9.3	11.1	16.9
Civil servants	1.7	2.5	2.3	3.9
Construction	2.4	3.9	5.3	5.7
Transport	1.3	1.5	2.0	1.7
Proprietors	22.2	25.3	30.0	30.2
Bankers	0.0	0.4	0.6	1.3
Other	0.7	1.1	2.1	3.6
N	7091	18,156	24,073	12,873
<i>Panel B: Social distribution of lenders by occupation (percent)</i>				
Agriculture	15.7	10.5	14.9	6.6
Crafts/industry	15.8	10.5	10.1	8.4
Lower class	4.7	7.4	6.7	2.8
Commerce/services	22.7	18.7	15.1	14.5
Civil servants	5.3	6.9	4.1	5.7
Construction	2.7	1.8	2.6	1.6
Transport	0.8	1.4	1.1	1.1
Proprietors, nobles, rentiers	27.8	33.8	39.2	46.8
Bankers	0.2	2.1	3.1	8.0
Other	4.4	7.1	3.1	4.4
N	6753	17,569	22,850	13,573
<i>Panel C: Share women among borrowers and lenders (percent)</i>				
Share borrowers	11.9	9.9	11.2	16.6
Share lenders	13.0	15.3	20.4	30.4
<i>Panel D: Fraction of borrowers and lenders living in the same municipality (percent)</i>				
	66	53	49	48

Source: See [Appendix A](#) and text.

Note: Both the share of women and the fraction of borrowers and lenders living in the same municipality are calculated using the number of loan contracts. For the share of women, loan contracts without reported gender are excluded, as are married couples. For the fraction of borrowers and lenders who coreside, all loans without information about residence are assumed to involve a borrower and lender who inhabit the same municipality.

were in all likelihood property owning farmers. Some 10% were merchants and 15% craftsmen, but in France both could easily own property or other assets. Only 6% or less were workers or stemmed from the lower classes, where collateral would be harder to find.

The lenders, not surprisingly, stood higher up on the social scale ([Table 2](#), panel B). Although some did hail from the middle classes (among them, many merchants, but they might well have been wealthy wholesalers who also dabbled in banking), the lenders were much more likely than the borrowers to be nobles, rentiers, or property owners who likely had more assets than the property owners who borrowed.

Women made up a sizeable and growth fraction of the borrowers (17% in 1899), and an even larger percentage of the lenders ([Table 2](#), panel C). The results

(which set aside all loans in which married couples borrow or lend) are similar if we weight loans by the size of the debt. Clearly, the mortgage market was working well enough to allow women to invest and, if they had property, to borrow.

It also functioned well enough to match borrowers with lenders from outside their own community. Only half of borrowers and lenders lived in the same municipality, even if we assume that all the borrowers and lenders without residences must have dwelled in the same town ([Table 2](#), panel D), and the fraction of borrowers and lenders who resided in the same place fell over time. That is a sign, albeit far from a perfect one, that mortgage debt was escaping the narrow geographical constraints imposed by the limited information that lenders would typically have about the

creditworthiness of potential borrowers — information that would be essential for deciding whether to make a loan and that would often be limited to people dwelling nearby. A lender could perhaps assess a borrower's creditworthiness if they both worked in the same profession or sector of the economy. (Borrowers and lenders were highly unlikely to be relatives.) But at least lending was not limited to borrowers in the same town, or even to using nearby notaries. That and the broad social background of borrowers suggest that the primary intermediaries in the French mortgage market—the notaries—were effective.

4. Bankers and notaries as competitors in the mortgage market

What effect did the diffusion of banks have on the notaries? At one extreme, one could imagine that the banks might compete with the notaries. The banks did offer mortgage backed credit lines, which were substitutes for the notaries' mortgages, and they could also roll over short term loans, as bankers in the United States did. Perhaps superior information or an ability to pool risks would allow them to offer these substitutes for the mortgages that notaries arranged at a lower cost than the notaries could. If so, they would encroach on the notaries' business and potentially even drive them out of the mortgage market. Bank entry would, in short, diminish notarial lending. In that case economic growth might be even more sensitive to financial development than has been believed. At the other extreme, the banks might not compete at all with notaries, but their short term commercial loans might complement the notaries' business arranging mortgages. The diffusion of banks would then boost notarial credit, and economic growth might be less sensitive than we suppose to financial development.

We will examine both possibilities below, along with a more realistic alternative between the two extremes. Let us start with the extreme in which the banks are competing with the notaries and offering lower cost substitutes for notarial credit. Assume for the moment that there is a single credit market, 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. The assumption of constant marginal cost is reasonable because the notaries all possessed lengthy records of past business doing lending and arranging other property transactions, from sales and leases to inheritances. The costs of gathering information on creditworthiness and the value of collateral were therefore sunk, and they could hire clerks to write up the

loans at constant marginal cost.¹⁴ 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_{in}^0 ($D_i(r_n) = V_{in}^0$). Unlike notaries, banks did not have an extensive record of property transactions when they open their doors, and any experience they had making unsecured short term commercial loans would reveal little about the value of collateral. They would have to build up the information, which would imply that their marginal cost would be increasing. For simplicity, assume 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_{in}^0 done before the bank entered, then the resulting equilibrium will have total mortgage lending $V^e_i = V_{in}^0$ with the bank making V_b in loans while the notaries lend $V^e_{in} = V_{in}^0 - V_b$. The notaries' lending will obviously fall after the bank has entered. If the single bank finds it profitable to make more loans than V_{in}^0 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 mortgage lending will be $V^e_i = V_{in}^0 = m V_b + V^e_{in}(m)$. 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 $m V_b < V_{in}^0$. 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 traditional lending, except in small markets.

One can build in more subtle assumptions about notaries that would allow for markets to differ in terms of

¹⁴ One might worry about the cost of supervising all the clerks, but that seems not to have been a problem. In Paris notaries hired enough clerks to draw up over a thousand contracts a year.

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 traditional lending. It is true that the extreme situation we are modeling here makes a number of simplifying assumptions. It is static and makes simplifying assumptions about marginal costs. It also supposes that there is just one credit market, and not distinct markets for different types of credit, such as long term mortgage loans or short term lending. We will relax those assumptions below.

For the moment, let us stick with the simplifying assumptions and the extreme situation of banks competing with notaries and see 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 mortgage lending $V^e_i = D_i(r_n) = mV_b + V^e_{in}(m)$. In other words, mortgage 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), but 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 dataset 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 dataset. Along with market population and our measure of wealth, these fixed effects will control for demand. The resulting regression will be

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

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.¹⁵

¹⁵ We have no count of banks before 1829 or wealth measure before 1840, so the 1807 cross section is omitted from the regression.

The wealth measure is per-capita property taxes, which controls for the changes in the value of collateral in the mortgage market. Because both it and population have a non linear relationship with the demand for mortgage loans, the regression includes quadratic terms in both variables.¹⁶

We start by setting aside any problems of endogeneity and run a naive regression of traditional credit on banks in the same year. Rather than running regression (1) directly, we use first differences because they require weaker conditions to get an unbiased estimate of the coefficient of interest (a) than does the fixed effects estimator.¹⁷ The first differences equation is

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

Here t' is the year of the previous sample cross section, so that $t' = 1865$ if t is 1899, etc. When we run the first differences regression, the coefficient of the number of banks turns out to be positive, not negative (see Table 3 for the descriptive statistics and Table 4, regression (1) for the regression itself). The results (available from the authors) are similar if we exclude Paris (an obvious outlier) or if we simply estimate Eq. (1) using fixed effects or if we drop the two largest urban markets (Paris and Lyon).

This regression is of course naïve, because bank entry and exit and hence the variable $(m_{it} - m_{it'})$ in Eq. (2) are endogenous. Our estimate of the coefficient of interest (a) may therefore be biased. Under our assumption that wealth and population are exogenous, the first difference estimator of a will be unbiased if $E(m_{it} - m_{it'}, u_{it} - u_{it'}) = 0$ for every t in $\{1840, 1865, 1899\}$. 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 $E(m_{it'}, u_{it'}) \neq 0$, which could happen if a demand shock boosted mortgage lending but banks took longer than a year to enter markets and compete with notaries for business. The other possibilities—either that $E(m_{it}, u_{it'}) \neq 0$ or that $E(m_{it'}, u_{it}) \neq 0$ —can be ruled

¹⁶ The quadratic terms include wealth and population squared and the product of wealth and population. Since our wealth measure is per capita property taxes, the product of wealth and population is total wealth. In all of our regressions, the estimated marginal effect that wealth and population have on traditional credit is always positive at average wealth and population levels, as we would expect.

¹⁷ Under our assumption that wealth and population are exogenous, for the fixed effects estimate of a will be unbiased if $E(m_{it}, u_{it}) = 0$ for every s, t in $\{1840, 1865, 1899\}$. The first difference estimator of a will be unbiased if $E(m_{it} - m_{it'}, u_{it} - u_{it'}) = 0$ for every t in $\{1840, 1865, 1899\}$, which is less demanding.

Table 3
Descriptive statistics for regressions.

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 A.

Note: Since each observation in the regressions is a market, the means are per market averages for the 105 markets in the panel dataset. 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 Appendix A for further information on the wealth measure and the sample of loans.

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

Table 4
Notarial lending regressions for the panel dataset.

Regression number	1	2	3	4
Dependent variable	Volume notarial loans	Volume of notarial loans	Volume notarial loans	Volume of notarial loans
Estimation	First differences	Two-stage first differences; banks 10 years earlier as instrument for banks	As in regression (2), but with volume of Crédit Foncier loans and mortgage backed credit lines added as exogenous independent variables	As in regression (2), but with Crédit Foncier loans and mortgage backed credit lines endogenous; banks 5 years earlier and fraction of population urban 9 years earlier as added instruments.
<i>Coefficients (standard errors) for selected explanatory variables</i>				
Number of banks	96,307 (23,535)***	135,518 (35,586)***	86,014 (27,484)**	86,282 (28,470)**
Volume of mortgage backed bank credit lines			0.67 (0.40)	0.50 (1.34)
Volume of Crédit Foncier mortgage loans			–0.32 (0.094)**	–0.28 (0.25)
N	198	198	198	198

Source: See Appendix A.

Note: Variable definitions and units as in Table 3. All the regressions include wealth, population, wealth squared, population squared, the product of wealth and population, and differences of time dummies. Standard errors are clustered. For the instruments used in regressions (2) thru (4), see the text.

** $p < 0.01$.

*** $p < 0.001$.

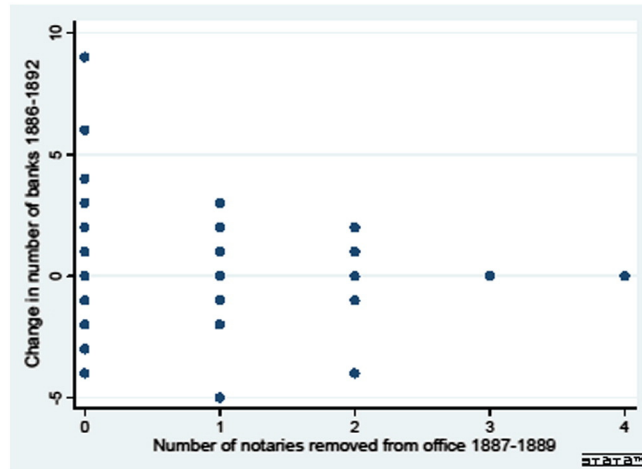


Fig. 2. Change in the number of banks 1886–1892 and the number of notaries forced out of office for fraud or bankruptcy 1887–1889. The data here come from an exhaustive list (compiled by the authors) for all French cantons, not just those in our sample.

$m_{it} - m_{it'}$ that makes it possible to estimate Eq. (2) by two stage least squares.¹⁸ The instrument is $m_{it-10} - m_{it'-10}$. First stage regressions (available from the authors) show that it is a good predictor of $m_{it} - m_{it'}$. 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 independent evidence on banking exit and entry shows that French banks entered and exited 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} .¹⁹

When we estimate Eq. (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 and first differences of time dummies), the coefficient of the number of banks is still positive and even larger than before (Table 4, regression (2)). The results are similar if we exclude Paris.

¹⁸ 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 Eq. (2). The lack of suitable instruments also rules out using differences in differences to estimate a .

¹⁹ The evidence (available from the authors) comes from a complete list of French banks at 14 dates between 1829 and 1898. Over this period, the annual exit rate for banks in French cantons varied between 5 and 14% per year; their annual entry rate varied between 4 and 14% per year; and the mean age of a bank rose from 5 years in 1829 to 18 years in 1899. The list of French banks was derived from the same commercial almanacs used to construct our panel dataset.

To interpret the regressions as implying that notarial credit did not suffer from bank entry does admittedly require that some important assumptions hold. First, we must assume that there is only one credit market and not distinct markets for different types of loans. This assumption is certainly an oversimplification, but banks did offer substitutes for the loans notaries arranged, and the question of whether they could do so at lower cost than the notaries is an important. We will in any case relax this assumption below. Second, our results depend on our assumption that notaries have constant marginal cost. That assumption seems justified, but it too will be relaxed when we consider bank entry below. Third, because our estimation strategy is static, it ignores dynamic effects such as the option value of learning about the profitability of a market, which could cause a bank to wait a long time before exiting. Yet at the individual bank level turnover was empirically substantial (from 1830 to 1899 over the whole of France the annual exit rate was 5.1% and the entry rate 6.9%). The high rate of adjustment suggests a static model is not unreasonable. Finally, our approach requires that future wealth and population levels could be little affected by current lending. This last assumption is one our low frequency data cannot evaluate.

The results are therefore not absolutely conclusive. But there is at least some independent evidence that supports what the regressions in Table 4 suggest. It comes from an exhaustive list of all the banks in France by canton for the years 1886–1892 and data on the number of all French notaries who were forced out of office in each canton for fraud or bankruptcy in the

years 1887–1889.²⁰ Such a loss of office was presumably an unexpected shock to notarial lending that should have driven borrowers and lenders to other intermediaries. If so and if banks were more efficient substitutes for the notarial lending in the same credit market, then banks should have entered the markets as notaries departed. But that was clearly not the case (Fig. 2).²¹

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 $V_{icf}^e(m) = D_i(r_n) - mV_b - V_{icf}$ 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 would count as mortgage lending (provided 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 4, regression (3)). The *Crédit Foncier*, however, has a negative and statistically significant coefficient, which implies that 100 francs of *Crédit Foncier* loans cut notarial lending by 32 francs, but the coefficient becomes positive and insignificant when Paris is excluded. Overall, it appears that banks did not offer lower cost substitutes for notarial credit. The only possible exception was *Crédit Foncier*—the results depend on the inclusion of Paris—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. A 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, $m_{it-5} - m_{it'-5}$) are potential instruments that can be used to reestimate regression (2).²² 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, $c_{it-4} - c_{it-19}$.²³ 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 Eq. (2), since the *Crédit Foncier* and banks

²⁰ The bank data come from the same commercial almanacs used to construct our panel dataset. The list of all notaries who were forced out of office for fraud or bankruptcy in the years 1887–1889 was taken from Archives Nationales BB19/700, "Etat statistique des notaires suspendus, ayant reçu injonction de céder ou destitués de 1888 à 1898 par ressort de cour d'appel."

²¹ Regressions (available from the authors) that also take into account change in canton populations lead to a similar conclusion.

²² 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.

²³ 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.

offering mortgage credit lines could adjust rapidly to market conditions.

If we estimate Eq. (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 first stage regressions show that all three pass are strong predictors of the endogenous variables. The estimate for Eq. (2) again yields positive coefficients for banks and mortgage credit lines (Table 4, regression (4)). As for coefficient of the Crédit Foncier lending, it is negative and close to that obtained in Table 4 regression (3) (0.28 as opposed to 0.32), but it is no longer statistically significant, and once again it turns positive when Paris is dropped. Using two alternative measures of urbanization as instruments in place of $c_{it-4} - c_{it-19}$ leads to similar results.²⁴ The coefficients for the Crédit Foncier and mortgage credit lines never turn out to be negative and significant.

Although the results are only suggestive because of the assumptions involved, banks seem not to have provide much of a lower cost substitute for notarial lending, 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, for it disappears when we take into account the endogeneity of Crédit Foncier lending or exclude Paris from the regressions. 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.²⁵ 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

²⁴ 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.

²⁵ If regression (3) in Table 3 is re-estimated without the largest 10% 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.

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 98,000 francs on average in markets outside of Paris, versus 953,000 francs for notarial lending in the same markets.

Apart perhaps from the government backed Crédit Foncier, the regressions suggest that banks could not supply much in the way of lower cost substitutes for mortgages. 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 outcome 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.²⁶

5. Banks and notaries as complements

The first extreme we considered (a single credit market in which banks providing large numbers of loans that substituted for notarial mortgages) is clearly unrealistic. But so is the other extreme: there the banks' short term commercial loans complemented the notaries' business arranging mortgages, but the bankers and notaries were in distinct markets and did not at all compete with one another. That is implausible because bankers did offer some substitutes for notarial credit — namely, the mortgage backed line of credit and the Crédit Foncier's loans. So there was some competition between banks and notaries.

A more reasonable alternative would be to allow banks to engage in some competition with notaries but to let their short term commercial lending complement the notaries' business arranging mortgages. Bank entry could then increase the demand for mortgages, if the banks supplied only modest number of substitutes for the notaries' mortgages and the substitution effect was therefore smaller than the complementary effect of

²⁶ All these regressions results are available from the authors.

commercial lending. The increased competition in the mortgage market would then be offset by more commercial lending.

It is easy to see how that could happen. 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 — an assumption that is not at all unrealistic.²⁷ 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 via loans such as mortgage backed credit lines), 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, where loans secured by mortgages dominated, while bankers served primarily industry and trade, where what mattered were movable goods and reputation. 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 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' different services.

What would the implications be for bank entry? We would expect it to be positively associated with notarial lending, so as long as some common variables enter the demand for both intermediaries' service with the same sign. Bank entry and notarial lending would therefore be positively correlated. Both should be positively correlated with population and wealth too, for one would expect larger and richer towns to have a higher demand both for banks' services and for notarial lending. As towns get larger and wealthier, 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.

Bank entry could also be affected by 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, because it would not change the cost of notarial lending. 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.

What would the consequences for bank entry be? In our more realistic scenario, they would depend on whether the banks were primarily complements or substitutes for notaries. If banks were chiefly interested in providing substitutes for the notaries' mortgages, then we would expect the banks to be more likely to enter a markets with a given demand $D_i(r)$ for mortgages if the number of notaries in the market was small. The banks would simply have more rents to earn if their marginal costs were less than r_n . If, however, the banks are first and foremost in the business of making commercial loans and the commercial loans and mortgages are complements, then they would be less likely to enter markets with a small number of notaries, because the cost of a mortgage would be higher for a given level of demand.

We can therefore determine whether banks were primarily substitutes or complements by regressing the number of banks that enter each market on correlates of demand and a dummy variable for markets with a small number of notaries. The dummy variable's coefficient would have a positive sign if the banks were primarily substitutes and a negative sign if they were primarily complements. 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

²⁷ In Lyon, for instance, the Guérin Bank kept detailed notes on its clients' reputation, which was essential for commercial loans. Although the notes contained some information about clients' wealth and occasionally even their real property, when bankruptcy threatened, the Guérin Bank had to investigate to learn whether the debtor's real property had already been mortgaged (Chassagne, 2012, 108–110, 165–171).

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 4000 to nearly 60,000, while the markets with more than 5 notaries had populations from 9000 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.

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 cross sectional regressions separately for 1840, 1865, and 1899; our 1807 cross section is omitted because bank numbers are unavailable. 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 each cross section is assumed to be distributed as

$$\text{Poisson}(\exp(y_i a + X_i b + d_i c + u_i)). \tag{3}$$

Here the time subscript t is dropped since this is a cross sectional regression; $y_i = V_{in}^e(m)$ 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 linear and quadratic terms in the market population and per-capita wealth; d_i is the dummy variable for a market with 5 or fewer notaries; u_i is the error term; and a , b and c are matrices of coefficients. In the three cross sectional regressions, the expected value of the number of banks (conditional on

the covariates) will then be:

$$E(m_i|y_i, X_i, d_i) = \exp(y_i a + X_i b + d_i c). \tag{4}$$

If banks are a lower cost substitute 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 . If the loans banks and notaries provide are complements, then (provided the same assumptions hold about demand and X_i) the dummy variable should have a negative coefficient.

In the regressions, the coefficient is always negative and significant (Table 5, regressions (1) through (3)). 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 both variables from the previous cross section. The coefficient of the dummy variable for a small number of notaries (available from the authors) is still negative and significant in all the regressions, and the results 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 (the results are available from the authors) the dummy variable has a negative coefficient. That is not what would be predicted if banks were primarily lower cost

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

Regression number	1	2	3
Dependent variable	Number of banks 1840	Number of banks 1865	Number of banks 1898
Estimation	Negative binomial; 1840 cross section	Negative binomial; 1865 cross section	Negative binomial; 1899 cross section
Dummy variable: ≤ 5 notaries, same cross section	-0.74 (0.33) **	-0.57 (0.17) **	-0.36 (0.12) **
Notarial lending, same cross section (* 10 ⁻⁸)	-3.29 (19.90)	-10.06 (12.30)	-7.04 (5.27)
N	102	101	99

Source: See Appendix A.

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

** p < 0.01.

substitutes for notaries, but it is what we would expect if there were primarily complements.

These last 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 where notaries were busy, because their commercial loans and the notaries mortgages were complements. They would not undercut the notaries' business in a significant way 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. But even there the evidence for its ability to provide a substitute for notarial lending was weak.

6. Conclusion

Our original dataset is the first that makes it possible to measure the value of loans arranged by traditional financial intermediaries. It also allows us to analyze whether they were less efficient than modern financial intermediaries. Our analysis of nineteenth-century French credit may involve too many simplifying assumptions to be conclusive, but it does suggest that banks, the modern intermediaries, were not more efficient substitutes than their traditional counterparts, the notaries, in the market for mortgages. Banks were free to enter that market and they did offer substitutes for the mortgages that notaries arranged. But 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.

There is some limited evidence that one bank did manage to 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% of GDP. In doing so, they helped integrate financial markets, and bankers could not simply sweep them aside, even though banks could pool. The problem for the banks was 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. Our low frequency data for France do not allow us to run an economic growth regression with correct measures of financial development, but it is clear that the problems with such regressions will obviously be worse in those countries, poor or rich, that rely heavily on traditional intermediaries — countries that in 1900 would include not just France but the United States and the United Kingdom.²⁸ 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.

²⁸ In 1900, financial institutions held only 35% of outstanding mortgages in the United States and at most 50% of mortgages in the United Kingdom.

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 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 outside organization like a bank to accumulate the information needed 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 accelerate, the diffusion of modern credit intermediaries will likely remain slow and subject to the constraints of demand and information.

Appendix A. 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, and 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 5000 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 km² 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% 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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