Nothing Special about Banks: Competition and Bank Lending in Britain, 1885-1925

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ABSTRACT

We investigate the impact of increasing bank concentration on bank loan contracts in a lightly regulated environment. This environment allows us to abstract from possible confounding effects of regulation to focus on the "pure" effects of competition on bank lending. Borrowers in counties with high bank concentration received smaller loans and posted more collateral than borrowers in low concentration counties. In high concentration counties, the quality of loan applicants had improved, which suggests that banks restricted credit, rather than that the quality of loan applicants had worsened. In addition, counties with a more concentrated banking system had worse economic outcomes.

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The effects of bank concentration on credit extension and the economy are complicated phenomena. Contemporary bank mergers, the usual path to a concentrated banking system, are politically sensitive issues in most countries. Such mergers are usually strictly vetted by national (and sometimes state) regulators. In their everyday activities, banks are regulated by a maze of rules and guidelines. For example, at the start of 2014, the U.S. had 18 bank regulatory authorities, which together had issued 8872 pages of regulations.[1]

The high, and changing, degree of regulation in contemporary financial markets makes empirical conclusions about the effect of concentration on the economy hard to interpret, as regulation can affect both the degree of banking competition and the behavior of banks and borrowers. Regulation may impact the workings of the financial system directly (e.g. a minimum capital ratio must be adhered to) or indirectly (e.g. managers and borrowers may adjust their behavior following a change to minimum capital ratios). Hence, any contemporary study of bank competition and lending runs the risk that the results will be influenced by regulatory issues. We resolve this issue by studying the laissez-faire British economy at the turn of the twentieth century, where banking regulation was minimal and infrequently changed. While technology and financial innovation have clearly taken place since the early twentieth century, the basic banking issue of borrowing money to extend loans has not, which makes our study relevant.

We construct a data set of over 30,000 loans granted by about forty English and Welsh banks between 1885 and 1925. We observe various loan characteristics: the amount, duration, and interest rate of the loan, and the collateral posted. We complement this information with balance sheet data for all banks that operated in England and Wales during our sample period and data on the economic conditions at the county level. We relate county-level banking concentration to banks' loan provisions, banks' risk taking, and ultimately to local economic outcomes.

In this unregulated environment, we find results consistent with the traditional view of bank concentration, whereby a decrease in competition is harmful for borrowers and leads banks to pursue safer investment strategies. In counties characterized by high banking concentration, banks granted smaller loans with shorter maturities. A one standard deviation increase in the county Herfindahl index of banking concentration leads to a roughly 25% decrease in the value of loans granted to a customer, a 25% increase in the collateral to loan ratio, and a 4% decrease

[1] See *Code of Federal Regulations*, 2014 edition, U.S. Government Printing Office.

in the duration of the loan. As bank concentration increased in a county, the quality (as internally assessed by the bank) of successful loan applicants also improved, which suggests that the banking oligopoly restricted credit to marginal loan applicants, rather than inducing riskier borrowers to take out loans.

These loan-level results are confirmed by an analysis of the banks' balance sheets. Banks that mainly operated in highly concentrated counties invested more in safe securities and lent less to entrepreneurs and households. A one standard deviation increase in market concentration, in the county in which a bank had the most branches, increased banks' holdings of safe, marketable securities by over 50%, and decreased loans by 9%. Bank concentration was associated with worse economic performance at the county level. For instance, counties with higher bank concentration had higher proportions of the population employed in agriculture (vis-à-vis industry and services) and experienced slower economic growth.

The local degree of banking concentration could be correlated with omitted factors likely to affect the loan terms granted to borrowers. Our historical setting however allows us to construct an instrumental variable analysis based on the local deposit (rather than lending) market which we will detail below.

A study of the British financial system between 1885 and 1925 has several advantages compared to studies relying on a more contemporary setting. First, we analyze banking in a setting without bank supervision, mandatory capital ratios, deposit insurance, or merger legislation. From 1858 onwards banks were, according to Grossman (2010, p. 183): "essentially governed by corporation law."[2] Government-sponsored bank bailouts did not take place in this era, and only in one case the Bank of England (which was privately owned) coordinated a private sector bailout of one merchant bank.

The unregulated environment is important, as it removes any confounding effect that regulation may generate. To take one example, contemporary bank mergers in the U.S. were facilitated by "good citizenship" standing under the Community Reinvestment Act (CRA) (see Calomiris and Haber (2014), pp. 216-222). The CRA required banks to pledge a certain amount of lending to low credit rating borrowers in order to obtain regulatory approval for a merger. Agarwal, Benmelech, Bergman, and Seru (2012) document that U.S. banks increased lending in

[2] Formal supervision by the Bank of England only began with the Bank Act of 1979. Deposit insurance was introduced in 1982 (see Saunders and Wilson (1999)). In contrast, many U.S. states maintained usury laws until the late nineteenth century (see Benmelech and Moskovitz (2010)).

CRA-tracts around the time of regulatory exam dates. As a result, if there is a decline in competition at the same time as riskier bank lending, it is difficult to disentangle whether this is purely due to competitive pressures or the effect of the CRA regulation.[3] Recent regulations imposed on banks in developed economies may exacerbate the confounding effect. Large banks (or banks considered globally systemically important) are now regulated differently than small banks (see Moenninghoff, Ongena, and Wieandt (2015)). To the extent that large banks are more likely to operate in less competitive banking systems, it is difficult to understand to what extent lending practices are the results of the special regulation vis-à-vis market competition.

A second benefit is that we study bank concentration and lending within a bank merger wave. The share of deposits held by the largest 10 banks in the U.K. rose from 33% in 1880 to 74% in 1920 (see Capie and Rodrik-Bali (1982)). The merger wave generated large time-series and cross-sectional variation in local banking concentration. In contrast, the U.S. bank merger wave of the 1990s raised the national level of concentration while leaving the local level little changed, making it more difficult to identify the connections between changes in local concentration and lending.

A third advantage of our study is that, due to the passage of time, records that are not typically available for studies of banking are available to us. In particular, together with loans granted to individuals and companies, we also record any comments made by the bank on the quality of the borrower, which were the precursors to modern internal credit ratings.

The debate on whether a concentrated or dispersed banking market better serves the economy has not been resolved. The traditional argument has been that concentration is bad for borrowers, since banks exert market power to raise loan interest rates and restrict the supply of credit (e.g., see Klein (1971), Monti (1972), Pagano (1993), and Guzman (2000)). Berger and Hannan (1989), Hannan (1991), and Hannan and Prager (1998) show that a more concentrated banking market leads to lower deposit rates for bank customers. Carlson and Mitchener (2009) show that increased competition arising from new bank branches during the 1920s lead incumbents to become more efficient, extend more loans, and be more likely to survive the Great

[3] Deposit insurance may have a similar confounding effect. Banks may choose to invest in risky assets in order to exploit the put options embedded in a deposit insurance scheme (see Merton (1977)). Riskier investment strategies may be reflected in banks' M&A policies; for instance, banks may acquire other riskier banks. This strategy would both reduce local competition and increase the risk profile of the acquiring bank. Moreover, the lack of regulation in the U.K. market at the turn of the twentieth century also means that there was little need to bribe officials to obtain banking permits and licenses (see Shleifer and Vishny (1993)).

Depression. Canales and Nanda (2012) find that decentralized banks in Mexico restrict credit when they have market power.

In contrast, theories of information asymmetry indicate that a more concentrated banking market may be good, at least for younger firms, or firms that operate with new technologies (see Petersen and Rajan (1995). Marquez (2002) finds that in a more concentrated banking market the interest rate charged on loans is lower since larger banks are more effective at screening borrowers.[4] Our environment also helps to test these theories since we study banking in a period of technological change, the so-called Second Industrial Revolution (see Mokyr (1992), pp. 113-148, and Braggion and Moore (2013)). We test whether the effects of bank concentration were different for firms that worked in the "NewTech" sector (e.g., electricity) than for the traditional sectors (e.g., railways or textiles) where asymmetric information was less pronounced.

We measure the degree of local banking competition at the historic county level. For each county we construct annual values of the Hirschmann-Herfindahl index, *County HHI*, based on the distribution of bank branches in England and Wales.[5] Clearly, our county measure of banking concentration may be endogenous. However, the micro dimension of our data allows us to run specifications controlling for either county or borrower fixed effects. Fixed effects mitigate concerns that our results are due to some omitted factors that jointly determine banking concentration and lending.

We further attempt to alleviate endogeneity problems by exploiting our historical setting. We use an instrumental variable for local banking concentration: the number of Post Office Saving Banks (POSBs) in a county in 1885. POSBs were established in 1861 with the intention of teaching the working classes to entrust their savings to financial institutions rather than keeping them at home (see the Treasury survey of 1875, as reported by Horne (1947), pp. 228-231).

Our identification assumption is that, after controlling for local population, local income, and literacy, the number of POSBs in a county captures features of the local deposit market (but

[4] Cetorelli and Gambera (2001) show that higher bank concentration is good for small firms that are dependent on external finance, although the aggregate effect of concentration is slower economic growth. Bonaccorsi and Dell'Ariccia (2004) show that in Italian provinces with a more concentrated banking sector there is faster creation of new firms. Zarutskie (2006) finds that following the Riegle-Neal Interstate Banking and Branching Efficiency Act of 1994, which increased the competitiveness of U.S. banking markets, young firms were less likely to use debt to finance their investments. In contrast, Degryse and Ongena (2007) report that in more concentrated markets there is less, rather than more, relationship banking.

[5] We do not observe assets or liabilities at the branch level.

not of the lending market) that may have affected the degree of commercial bank competition. First, POSBs were only allowed to take deposits but not to make loans; their deposits were brought to London and used to retire Treasury bonds. This institutional feature reduces the possibility that the distribution of their network may directly affect local lending practices. Second, POSBs could not absorb all the savings available in a certain geographical area, as the law imposed strict limits on the amount of deposits per customer they could accept. As a result, their geographical distribution is unlikely to greatly depend on local income, a factor that may also directly affect lending. Since the amount of deposits POSBs could collect was capped, they did not have strong incentives to open new branches in response to a positive income shock. Third, POSBs were located in the same building as post offices. Most post offices locations were established between the eighteenth and the nineteenth centuries and they are predetermined in our time period. The distribution of post offices essentially depended on mail volume, which is related to population, a variable we control for.

At the same time, a large number of POSBs may have reduced the entry costs in the local area for commercial banks, as they contributed to the education of the population in the use of banking services. In this way, a high number of POSBs in a county signaled an attractive deposit market for commercial banks, which led them to enter the market and offer banking services. This conjecture is confirmed by our first stage regressions that show that a larger number of POSBs in a county were associated with lower commercial banking concentration.

Our conclusion, that borrowers in more concentrated markets receive worse loan terms, is consistent with two competing theories. On the one hand, loan applicants with riskier projects could be those who are more likely take loans in more concentrated markets, with the result that banks rationally charge higher interest rates and demand more collateral as protection (Boyd and De Nicoló (2005)). On the other hand, banks may use their market power to restrict the supply of loans, which cuts off the funding to marginally profitable borrowers, and leaves only the best quality borrowers to be served. To disentangle these two explanations we look at the comments that banks' loan officers made about their borrowers. Such comments provide the loan officers' assessment of the character and trustworthiness of the borrower. If riskier borrowers were more likely to take loans in concentrated banking markets, we would expect a deterioration in the quality of the average borrower; if the market power explanation is correct, we might see banks granting loans to higher quality borrowers. We employ linguistic software and also personally read the comments to generate scores indicating the degree of positivity and negativity embedded in each comment. We then relate these scores to the local degree of banking concentration. In more concentrated areas, the perceived quality of the borrower is higher; a result that lends support to the market power explanation.

Although we have collected a large number of loan records, we cannot be sure that our sample of loans is a random sample of the entire population of loans granted in England and Wales at the turn of the twentieth century.[6] To overcome this problem, we analyze the balance sheet ratios of *all* British banks in our time period and we relate them to the degree of concentration of the banks' main areas of operations. While this test does not allow us to control for a range of fixed effects and borrower characteristics, it does not suffer from selection bias. Balance sheet results confirm the findings of the loan analysis. Banks that operated in areas with less competition had a lower loan to asset ratio and they invested more heavily in liquid and safe assets, such as Treasury bonds and railway preference shares.

Our work also provides empirical evidence on alternate theories that relate the level of banking concentration to risk taking. On the one hand, several theoretical papers argue that increased market concentration leads banks to embark on safer business strategies (e.g., Smith (1984), Keeley (1990), Besanko and Thakor (1993), Hellmann, Murdock, and Stiglitz (2000), Matutes and Vives (2000), and Repullo (2004)). The main reason for this is that greater market power increases the value of a bank franchise (or the "charter value"). This increases the cost to a bank of failing and leads it to act more prudently. On the other hand, other studies emphasizes that banks in uncompetitive markets are more likely to originate risky loans. For instance, Mishkin (1999) argues that banks in concentrated systems are more likely to be subject to "too big to fail" policies that encourage risk-taking behavior by bank managers. Boyd and De Nicoló (2005) argue that by increasing lending rates, banks in less competitive markets exacerbate moral hazard problems with their borrowers, which induces borrowers to undertake riskier projects. As a result, banks that face less competition hold riskier loans in their portfolios.[7]

[6] The amount and quality of our loan data depends on the availability of the original records in the archives of Lloyds, Barclays, HSBC, and RBS.

[7] A large number of studies have tested these competing hypotheses (see Berger et al. (2004) for a survey). Using concentration as a proxy for banks' market power, De Nicoló et al. (2004) show that systems that are more concentrated are more likely to experience crises. In contrast, Beck, Demirguc-Kunt, and Levine (2006) present evidence that concentrated banking systems are more stable. Beck, De Jonghe, and Schepens (2013) relate banking competition with country institutional features and find that competitive banking systems are more fragile in countries with stricter activity restrictions, better developed stock exchanges, and more generous deposit insurance.

Our analysis also contributes to the large body of studies that document the effects of the financial sector on the real economy. Cross-country studies have shown a strong correlation between financial sector development and future economic growth (e.g., see King and Levine (1993), Levine and Zervos (1998), Levine, Loayza, and Beck (2000), and Bekaert, Harvey, and Lundblad (2005)). A related set of works look at the various stages of U.S. banking deregulation and their effects on banks' lending, entrepreneurship, M&As, and economic growth (see Jayaratne and Strahan (1996), Black and Strahan (2002), Kerr and Nanda (2009), Erel (2011), and Rice and Strahan (2010)). These papers study the effects of the deregulation of branching restrictions, while some elements of banking regulation were kept in place (e.g., deposit insurance, capital ratios, and bank supervision) and others were changing (e.g., the gradual weakening of Glass-Steagall in the 1980s and 1990s). We fully abstract from all regulation, and cleanly test how competition, and only competition, relates to bank behavior.

Last, but not least, this paper makes a contribution to the literature that studies the relationships between the structure of the British banking sector and the, so called, British economic decline. At the turn of the Twentieth century, the UK lagged behind the US and Germany in terms of technology adoption and productivity growth. A view that dates back to Keynes sees British banks among the main responsible for this phenomenon, as, it was claimed, they refused to provide long term loans to industrial firms and to establish close, supportive relations with their industrial clients (see Stamp, 1931). While throughout history this perspective has had both supporters (Kennedy, 1987) and opponents (McCloskey, 1970; Cottrell, 1980, pp. 194-247), our micro level dataset sheds new light on the issue. Our results suggest that, while banks were becoming safer and safer, increased concentration in the banking sector indeed reduced the amount of loans available to the British entrepreneurs.

I. The British Banking Market

Schaeck, Cihak, and Wolfe (2009) find, in a cross-country analysis, that more competitive banking systems are less likely to experience a systemic crisis. Berger et al. (2008) relate various measures of banking competition in 23 countries to several proxies of risk taking and they find that banks with a higher degree of market power also have less overall risk exposure. Martinez-Miera and Repullo (2010) present a unified framework where they combine both the "charter value" hypothesis and the Boyd and De Nicoló (2005) model.

We consider the banking system of England and Wales from 1885 until 1925. Scotland and Ireland were subject to different banking laws and those markets were not integrated with England and Wales. In 1885 the British banking system was still largely unregulated (see Grossman (2010), pp. 175-183). Banks' lending and underwriting practices were not restricted, and limits on capital, branching, and deposit insurance did not exist.[8] Limited liability incorporation was permitted for banks after 1858 (see Grossman (2010), p. 183, and Turner (2014), p. 124), and the Companies Act of 1879 required audited financial statements from the banks.[9] The lack of regulation in England and Wales stands in contrast to the heavily regulated U.S. market. In the U.S., banking regulation had become entrenched following passage of the National Bank Act of 1864, when a regulator, the Office of Comptroller of the Currency, was established.

Whether or not the Bank of England would come to the aid of a bank in crisis was unclear ex-ante. Investors were aware that bank failures could occur (see Goodhart and Schoenmaker (1995)) and several small public banks failed, without intervention by the government, during the 40-year period we consider.[10] The City of Glasgow Bank was also allowed to fail in 1878. On the other hand, the Bank of England facilitated a private sector response for Barings Bank during its crisis in 1890, although whether this was a bank bailout, as currently understood, is still debated (see Ferguson (2008), Eichengreen (2008), p. 34, and Cassis (1994)). All joint-stock banks hastily invoked limited liability protection soon after the failure of the City of Glasgow Bank, and all bank shareholders in our sample are covered by limited liability.[11]

In 1870 a total of 387 banks were operating in England and Wales (see Capie and Rodrik-Bali (1982)). British banks were mainly commercial banks involved in various types of business

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[8] Private banks were not even required to be registered before passage of the Private Banks Act, 1892.

[9] The alternatives to joint-stock and private banks were trustee savings banks, building societies, or the POSB system. These alternative financial institutions catered to small depositors, comprised a small part of total deposits, and paid a fixed interest rate (see Mackenzie (1932), pp. 42-44). The building society sector, the largest domestic competitor for the commercial banks, was less than 10% of the size of the banking sector (see Report of the Chief Registrar of Friendly Societies for the year 1925).

[10] London and General Bank (1892), Dumbell's Bank (1900), Carlton Bank (1901), Cheque Bank (1901), Economic Bank (1905), London Trading Bank (1910), Birkbeck Bank (1911), and Civil Service Bank (1914).

[11] Banks operated under a system of "reserve liability" (see Turner (2014), pp. 126-7), where additional capital could be called up by banks only if they were unable to repay their depositors.

activities: they provided short-term credit to local firms and attracted deposits.[12] Only domestic banks operated branch networks within England and Wales, although many foreign banks had a single branch in London, as London was the world's financial capital at the time.

In addition, English and Welsh banks did not operate branches abroad (with the exception of two or three branches just north of the Scottish border). Very large banks set up some small subsidiaries in Europe in the early 1910s, but no serious foreign expansion was undertaken until after the end of World War One (see Jones (1982)).

Towards the end of the nineteenth century the British banking industry experienced considerable growth in M&A activity. Between 1870 and 1921 there were 264 bank mergers (or "amalgamations" as contemporaries referred to them). By 1920 only 75 banks were left in the U.K., of which just 20 were English or Welsh public (also known as joint-stock) banks (see Capie and Rodrik-Bali (1982) and *The Economist*'s Banking Supplement)).[13]

The merger wave was mostly characterized by London-based banks (and provincial banks that had relocated to London) taking over other banks (see Sykes (1926)). Large provincial banks would often take over a London-based bank that was a member of the clearing house (in order to obtain clearing house membership), and then subsequently relocate to London.[14] Over the period 1885 to 1905, takeovers of private and small targets were more common and the two merging banks' branch networks were usually geographically diverse.

The British consolidation process was almost entirely driven by voluntary mergers, although a few smaller banks were taken over while in financial distress. After the report of the Treasury Committee on Bank Amalgamations in 1918, mergers required the de facto approval of the Treasury and the Board of Trade, which was always given.[15] The result of this process was the emergence of the "Big Five" banks in Britain by 1918: Barclays, Lloyds, Midland, National Provincial, and Westminster. The concentration of banking power generated fears of increased

[12] In contrast to German banks British banks did not purchase large equity stakes in industrial concerns, nor would they lend at long durations for the acquisition of property, plant, and equipment (see Fohlin (1998) and Collins and Baker (2003), p. 63).

[13] Part of the rationale for the U.K. merger wave was technological progress. There was a spread of financial and general journalism, along with improved accounting techniques and the widespread publication of balance sheets (Ackrill and Hannah (2001), pp. 49-50). These factors provided broader access to information for prospective lenders. The expansion of railways, telegraph, and (later) telephone lines and the spread of head office "best practice" managerial techniques (see Collins and Baker (2003), pp. 107-111) brought the various British provinces "closer" to London. These technological improvements offered a head office greater control over a dispersed branch network.

[14] In this way Barclays, Lloyds, and Midland Bank all became London-based.

[15] See *Times of London*, May 22, 1918, p. 10.

monopoly power in the financial industry. The Treasury Committee report stated that: “there is at present no idea of a Money Trust [although] it appears to us not altogether impossible that circumstances might produce something approaching to it at a comparatively early date.”

Scholars have defined the British banking industry, after the merger wave was complete, as: “a highly cartelized and rigid system” (see Griffiths (1973), p. 3, and Capie and Billings (2004)).[16]

Table I shows that in 1880 the top five banks in England and Wales held 26.4% of deposits. This figure increased to 80% by 1920, while the deposit share of the top 10 banks rose from 36.2% to 96.6%. A Herfindahl index based on deposits, one measure of industry concentration, increased from 0.020 in 1880 to 0.125 in 1920 for England and Wales (see Table II). In 1880 the U.K. banking system resembled the dispersed system of Germany in the late 1990s (see Table III), whereas by 1920 the British system was closer to countries that have a high contemporary degrees of concentration, such as Belgium and the Netherlands.

Braggion, Dwarkasing, and Moore (2015) describe the behavior of county-level Herfindahl indexes in England and Wales between 1885 and 1925. Most of the counties experienced an increase in banking concentration. However, in a few counties banking concentration remained unaltered or even decreased. This result is in stark contrast with the recent experience in the U.S., where, despite the intense merger activities during the 1990s, there has not been a systematic increase in the concentration of local banking markets (see Rhoades (2000) and Pilloff (2004)).

II. Empirical Method

In order to empirically test the effect of a shift in concentration on loan conditions we estimate the following baseline regression:

$$Y_{i,j,k,t} = \alpha + \alpha_k + \alpha_t + \beta County\ HHI_{j,t-1} + Controls_{i,j,k,t} + \varepsilon_{i,j,k,t}.$$

[16] On April 14, 1919, the government presented to Parliament the Joint Stock Banks Amalgamation Bill. If approved, the bill would have made mergers subject to formal approval by the Treasury and the Board of Trade, forbidden interlocking directorships, and banned the sale of any bank assets to a rival bank. Discussion of legislation restricting bank mergers proceeded for years in Parliament (e.g., November 19, 1919, April 13, 1921, and February 26, 1924), although none was ever passed.

$Y_{i,j,k,t}$ indicates the size of loan *i* granted by branch located in county *j* of bank *k* in year *t*; whether loan *i* was secured by collateral (0/1 variable), its spread, its collateral over loan ratio, and its duration. *County HHI* is the main independent variable, constructed annually by county:[17]

$$\sum_{i=1}^{N}\left(\frac{Number\ of\ Branches_{ijt}}{\sum_{i=1}^{N} Number\ of\ Branches_{ijt}}\right)^2.$$

County HHI measures the Herfindahl index of industry concentration at the county level. The closer the index is to 1, the closer the local market structure is to monopoly.[18] Our specifications always control for bank fixed effects (α_k), year fixed effects (α_t), and in some cases also county fixed effects.

To control for other factors that may affect our loan conditions we include an exhaustive set of control variables on the loan, bank, and county level. We consider whether loan *i* is a renewal or not, whether it is an overdraft, and the number of previous loans a bank customer had obtained from the bank at the moment of the origination of the loan. The latter variable is a rough proxy of the strength of the relationship between the bank and the customer.

We also include bank-level controls, in particular the number of bank branches as a proxy of the size of the bank, return on assets (ROA) as a measure of profitability, and deposits scaled by assets as a measure of the bank's leverage. Also, to control for any differences in lending practices by rural versus urban branches, we include an indicator that identifies whether or not a

[17] We use the Association of British Counties' *Gazetteer of British Place Names*, www.gazetteer.co.uk, for county locations. We treat the North, East, and West Ridings of Yorkshire as separate counties. In unreported robustness tests we also compute a Herfindahl index at the city/town level. Results are similar to those where we use *County HHI*. The use of a city Herfindahl index has the drawback that we lose observations, as for some banks we only know the county of the branch that granted the loan, not the city.

[18] While the Herfindahl index has been widely used as a proxy of competition, it suffers from various drawbacks, and it may overestimate the degree of monopoly power enjoyed by market participants. For instance, a system with only two banks, to which the Herfindahl index will attribute an almost monopoly score, could be still be very competitive if the banks compete á la Bertrand. Other competition proxies, based on profitability measures, might be able to overcome this problem (for instance, see Lerner (1934)). However, it is virtually impossible for us to construct a competition measure based on banks' profitability, as our study looks at local market competition (within a county or a city) for which profit and loss statements are not available.

branch was in a metropolitan area.[19] At the borrower level, we control for various borrower characteristics: a borrower's gender, occupation, and whether the borrower is a company or an individual. At the county level, we include the log of the county's population. When the specifications do not allow us to control for county fixed effects, we also include the degree of county literacy in 1885 (as a broad measure of local human capital) and the county agricultural tax revenue in 1885 (as a measure of local economic performance).

To determine how a shift in banking concentration affects the real economy we also use the same baseline regression. However, we replace our dependent loan condition variables by measures that capture the state of the real economy at the county level: tax revenues, employment ratios, firm creation rates, and crime rates.

A. *Instrumental Variable Analysis*

Bank concentration (*County HHI*) could affect credit extension and the economy directly. However, a natural concern is that all financial and economic factors are jointly determined or perhaps correlated with some omitted variables that are also likely to affect the banking system and the economy (see Berger et al. (2004) for an overview of endogeneity concerns within the bank concentration literature). For instance, local concentration may be correlated with local income or investment opportunities, hence measuring factors related to the demand rather than the supply of credit. In order to address possible endogeneity issues, we exploit an instrumental variable approach, and we instrument *County HHI* with the number of POSBs at the county level in 1885.

Our identification assumption is that the POSB network captures features of the local deposit market that are not markedly correlated with lending opportunities. POSBs were explicitly prohibited to lend to anybody in their local area, so that their distribution is likely to capture elements related to the local deposit rather than the local lending market. The interest rate offered to depositors was identical across the country and fixed at 2.5%.

The growth of POSBs was rapid and by 1891 there were 5.8 million depositors (see Rubinstein (1986), p. 92). A survey of depositors, undertaken in 1896, reveals that about 90% of

[19] Metropolitan areas are defined as London, Birmingham, Bristol, Liverpool, Manchester, Newcastle, Sheffield, and Leeds.

the deposits were held by the working classes. More than 25% of the deposits were held by women and about 20% by children and students. Children were especially targeted by POSBs with the intention of teaching them the habit of thrift and acquainting them with the use of banking facilities (see Johnson (1985), p. 95). An important goal of POSBs was to encourage and educate people in banking, rather than purely following local income, a variable that could jointly determine lending and deposits.

Deposits at POSBs were subject to a limit of £30 per person per year and no more than £150 in total; this provision prevented the geographical diffusion of POSBs from being driven by a sudden increase in local income. In other words, as POSBs were capped in the amount of deposits they could take, they had fewer incentives to change their branch network according to income shocks. The deposit limits were only changed once, to £50 and £200, in 1893, and were set in nominal terms.[20]

At the turn of the twentieth century, commercial banks became increasingly interested in the "small" deposit market (see Horne (1947), p. 287), and a county with many POSBs may have been one with attractive and unexploited deposit-taking opportunities. The limits imposed on POSBs meant they could not collect all the savings available in a certain region. Commercial banks may have been able to access savings more easily in areas with greater numbers of POSBs, as savers were already becoming used to banking services, hence reducing transaction costs related to the collection of new deposits. If our conjecture is correct, counties with more POSB branches in 1885 would have experienced a larger inflow of commercial banks and more banking competition later on. This should be reflected in a negative correlation between the number of POSB branches in 1885 and *County HHI*.

As we take the number of POSBs at the beginning of our time period, the instrumental variable analysis cannot control for county fixed effects. To make sure that the number of POSBs does not capture elements related to local income we control for a proxy of county income and literacy. An advantage of a time invariant instrument measured at the beginning of the sample period is that it mitigates concerns related to reverse causality.

[20] During World War One those limits were temporarily lifted. When the two stage least squares regressions are re-run excluding war years, the results remain unaltered. In our sample period the average inflation rate was about 2% per year with peaks of 4% and 20% around the turn of the twentieth century and during World War One respectively. Consumer price index data are available from the Bank of England at http://www.bankofengland.co.uk/research/Pages/onebank/threecenturies.aspx.

III. Data

We collect data on the loan registers of banks from the archives of Barclays, HSBC, Lloyds, and the Royal Bank of Scotland. These four banks are the descendants of the vast majority of banks in our sample. The loans in our sample were usually considered by a branch manager or loan committee or, if the bank was small, by the board of directors.

The vast majority of loans in the register were approved. This is likely to be explained by two processes. First, borrowers who would have (with high likelihood) been denied a loan by the bank, if an application were made, may have self-censored and failed to apply for a loan. Second, verbal enquiries about the likelihood of obtaining a loan may have been unfavorable at the lower levels of bank management and consequently no paperwork was submitted to the branch manager or board of directors. We have collected 31,785 loans from 37 banks, ranging from the very small (Altwood Spooner, 19 loans) to the very large (Barclays, 5628 loans; Lloyds, 1720 loans; and London City and Midland Bank, 5325 loans).

The loan registers cover branches in 31 of the 54 counties of England and Wales. The loans we observe are determined by the survival of archival records. Nonetheless, we have good sample sizes in most of the larger counties. We observe 4862 loans from Lancashire (Liverpool and Manchester), 9882 from Middlesex (London), 1039 from Warwickshire (Birmingham), and 4081 from the West Riding of Yorkshire (Bradford, Leeds, and Sheffield).

The loan registers often provide information about the occupation/industry of the borrower. On other occasions, we could recognize the occupation/industry from the name of the firm (e.g., Yorkshire County Publishing Company, Wearmouth Steam Shipping Company). We use the 1911 census to classify each borrower into 24 occupational categories. For about 10,000 loans, the bank records do not report any occupation. These 10,000 loans are placed into a 25th category, "no occupation".

In Table IV we report summary statistics of the loan data. The average loan size was £5,158, with a median size of £716. Only one third of all loan contracts had specified interest rates (the default rate, often unspecified, was that charged by the Bank of England). If the rate was specified, it averaged 486 basis points, which was a spread of seven basis points over the Bank of England rate. The average loan duration was 210 days, with a median duration of 180 days. Roughly 75% of all loans required collateral to be posted, with the average collateral requirement being 147% of the loan size.[21] The average loan was the fourth made to that particular borrower in our sample (and given truncation at the beginning of the sample it is likely that an even higher rate of repeat loans were made). A little under 38% of loans were overdrafts, and 33% of our borrowers were businesses. Women made up 3.6% of the borrowers, and loans to the *NewTech* sector, made up of electricity, chemicals, and automobiles (which follows Braggion and Moore (2013)), were 2.5% of the total.

The average bank making a loan operated 484 branches, of which almost 40% were metropolitan. Banks obtained a ROA of slightly over 1%, and funded 85% of their assets with deposits. The county in which the average loan was made contained a touch under three million people and 482 POSBs. *County HHI* averaged 0.157 with a standard deviation of 0.078.

Data on bank profitability, assets, liabilities, and the branch network are retrieved from *London Banks and Kindred Companies*, *The Banker's Magazine*, and *The Banking Almanac*. We obtain balance sheet information from *The Economist*'s Banking Supplement, published semi-annually in May and October. We construct the entire branch network for all banks in England and Wales annually between 1885 and 1925.

We collect county-level data on population, employment by industry, tax revenues, land ownership, rainfall, crime, new company formation, and corporate bankruptcies. The employment and population data come from Lee (1979). Data on crime are collected from the annual issues of *Judicial Statistics, England and Wales*. New company formation data were recorded by the government in the annual publication, *Joint Stock Companies*. Tax revenues were reported in *Reports of the Commissioners of Her/His Majesty's Inland Revenue*. Rainfall data come from the Met Office Hadley Centre.[22] For our measure of literacy we use the percentage of the population denoted as literate by the books of the Church of England day and evening schools for the year 1867 (see Stephens (1987), p. 360).

IV. Results

A. Loans

[21] These figures are remarkably similar to those showed by Erel (2011), who finds that 73% of bank loans originating in the U.S. between 1987 and 2003 were secured by collateral.

[22] http://www.metoffice.gov.uk/hadobs/hadukp/data/download.html.

To measure the impact of bank concentration on the financial sector we first examine how banks' loan making decisions were affected by changing concentration in a particular county. Banks rarely varied the interest rate from the Bank of England rate and when it did differ it was typically 0.5% above that rate.[23] In Table V(a) we run ordinary least squares (OLS) regressions of individual loan sizes on *County HHI* (lagged one year).[24] We find that increasing *County HHI* is associated with lower loan sizes (columns (1) to (3)): a one standard deviation increase in *County HHI* is associated with a 26% to 29% smaller loan size on average.[25] Since many borrowers are repeat customers of the same bank, in column (4) we report results with borrower fixed effects. Even for the same borrower, if bank concentration increases in a particular county that borrower will receive smaller loans. In columns (5) to (7) we report the OLS results for the sub-sample of business-only loans. We define a business loan as one that is granted either to a business partnership or to a limited liability company. We find statistically significant correlations of smaller business loan sizes with increased banking concentration, although the economic significance is lower than that for the full sample. A one standard deviation increase in *County HHI* is associated with roughly a 20% decrease in business loan sizes. When including borrower fixed effects for business loans, column (8), the economic significance drops to around 10%.

In Table V(b) we regress the other loan characteristics on lagged *County HHI* and controls. A loan decision is a joint determination by the bank and the customer on the amount, interest rate, collateral, and duration of the loan. Since these four loan characteristics are determined as part of a package, we run separate regressions of each characteristic on *County HHI* and the controls. The loan spread, although of marginal statistical significance and zero

[23] Using original data from the profit and loss accounts of all branches of the Midland Bank between 1881 and 1925, we compute the average spread between the interest rates applied on loans and deposits, which is about 4 percentage points, a figure comparable to contemporary spreads. Cottrell (1980, pp. 207-208) describes that interest rates on loans around 1909 were commonly linked to the Bank of England rate in urban areas, whereas in rural areas loans were charged a fixed interest rate of 5%.

[24] We present results in which we cluster the standard errors by bank. We also run specifications where we cluster standard errors either by county or we double cluster by bank and county; results are unchanged in either case. Since we do not have a very large number of clusters (between 33 and 37, depending on the clustering dimension and the specification), we also perform regressions where we take group averages of the observations either by bank/year or by county/year. Results are still unchanged.

[25] In unreported specifications, we also run regressions where we use the Herfindahl index computed at the city/town level; the results remain unaltered. We prefer to present regressions with *County HHI*, as for some borrowers we only know the county where the loan was originated but not the city.

economic size, is positively related to *County HHI*. Increasing concentration is strongly associated with increased collateral requirements for borrowers. A one standard deviation increase in *County HHI* is associated with a 6% increase in the likelihood a loan will have any collateral demanded generally, with an 11% increase in likelihood for business loans. In columns (3) and (7) we regress collateral divided by the loan amount on *County HHI* and controls. We find that a one standard deviation increase in *County HHI* correlates with a 26% increase in the collateralization of all loans, and a 19% increase for business loans. This result also goes through when we control for county fixed effects. Increasing banking concentration is also associated with shorter loan durations, which may indicate the bank is monitoring the loan more carefully. The economic size is modest, around a 2% to 3% decrease in duration for a one standard deviation increase in *County HHI*.

In aggregate the results indicate that increasing local market concentration in banking is associated with smaller loan sizes and tighter terms for borrowers, especially in the form of tighter collateral requirements. Loans tend to be for smaller amounts, for shorter durations, and require more collateral than equivalent loans in counties with low levels of banking concentration. Together these results lend support to the traditional argument that higher levels of bank concentration are bad for borrowers.

In Table V(c), we analyze whether bank mergers also have a direct impact on the size of loans granted and their conditions. Like Sapienza (2002) and Focarelli and Panetta (2003), we distinguish between "in-market" mergers and "out-of-market" mergers. In-market mergers are mergers between banks with part or all of their branches operating in the same geographical area. Out-of-market mergers are mergers between banks that do not have a geographical overlap of their branching networks.

The variable *In-market Merger* takes the value of one if, in a certain county during the previous five years, at least one bank that used to operate in that county was taken over by another bank that continued to operate in the county. *Out-of-market Merger* takes the value of one if, in a certain county during the previous five years, at least one bank was taken over by another bank that had not previously operated in that county.[26]

Table V(c) shows that in-market mergers in the county are associated with smaller loan amounts. The result is statistically and economically significant. At least one in-market merger in

[26] We also try shorter time periods, such as 2, 3, and 4 years; the results are unchanged.

the county during the previous five years leads to a reduction in loan sizes of between 14% and 16% depending on whether the specification controls for county or borrower fixed effects. In-market mergers are also associated with a higher likelihood of having a loan secured by collateral: at least one in-market merger during the previous five years leads to about a 5% increase in the likelihood of having a loan secured by collateral.

We do not find strong results for out-of-market mergers. It appears that out-of-market mergers tend to reduce the loan spread. Although the result is statistically significant at the 1% level, the economic significance is negligible.

B. Loans and Technological Change

We also investigate the idea, first introduced by Petersen and Rajan (1995), that increasing credit market concentration may be beneficial for certain types of firms. Their empirical results show that young, credit-constrained firms benefit from a more concentrated local banking market. Due to data constraints we do not observe the age of the firm receiving a loan; however, we do observe which industry they operate in.[27] The late nineteenth and early twentieth centuries witnessed the expansion of Second Industrial Revolution technologies such as bicycles (which led to automobiles), chemicals, and electricity generation. In Table V(d) we find that *NewTech* firms' borrowing prospects suffer when banking becomes more concentrated, although they suffer less than more mature industries. Increasing bank concentration by one standard deviation reduces loan sizes for *NewTech* firms by 14% to 20% (compared to 28% for traditional firms). The same increase in *County HHI* increases collateral requirements for *NewTech* firms by 10% (compared to 28% for traditional firms). The results lend mild support to the asymmetric information view. *NewTech* companies enjoyed better treatment than other firms, but in more concentrated markets they still received smaller loans and had to post more collateral than in less concentrated markets.

C. Instrumental Variable Analysis

[27] In these regressions we exclude borrowers for which we do not have information about industry and occupation, as we cannot classify them as old or new technology (*NewTech*).

Since there are obvious endogeneity concerns in the relationship between the extension of credit and the structure of the banking industry, we now turn to our instrumental variable approach. In Table VI we present the results of our first stage instrumental variable regression. In column (1) we see that *County HHI* is has a strong negative association with the number of POSBs in the county. Since our instrument is county specific and time invariant, a possible concern is that using a loan granted by a bank to a specific customer as the unit of observation unduly inflates the t-statistics by keeping a large number of observations in the sample. To address this problem, we take county averages of all the variables in our sample and re-run the regression on the cross-section of counties (see column (2)). This corresponds to clustering standard errors at the county level (and at the same time takes into consideration that our loan sample has a small number of clusters. For details, see Angrist and Pischke (2009), p. 320). We still observe a negative and statistically significant relationship between *County HHI* and the number of POSBs.

We present second stage instrumental variable results in Table VII by regressing the various characteristics of the loans in our sample on the fitted values of *County HHI*, as well as appropriate controls. In general, using an instrumental variable makes our results stronger. The impact of *County HHI* on *Loan Size* remains statistically significant with a modestly larger impact. A one standard deviation increase in *County HHI* leads to a 34% decrease in *Loan Size*. *County HHI* does not have a statistically significant effect on *Loan Spread*, and the economic size is miniscule. A one standard deviation increase in bank concentration causes a 45% increase in the collateralization rate for all loans, although the statistical significance is much reduced. Increases in local bank market concentration also reduce the duration of loans made. We do not report the results for business loans; if anything, they are slightly stronger than the results for the full sample.

The results for the collapsed sample are in Table VII, columns (5) to (8): The relation between *County HHI* and *Loan Size* is still negative and statistically significant. *Loan Spread* still maintains a positive and statistically significant relationship, although the collateral ratio does not. The coefficient on *Loan Duration* becomes positive and significant with the collapsed sample.

D. Addressing Possible Issues with the IV analysis

A possible concern regarding our instrumental variable strategy is that the number of POSBs might act as a proxy for an omitted variable, which is also correlated with loan conditions or banks' lending policies. For instance, in urban counties, banks' lending policies may systematically differ from those of banks in rural counties, as the pattern of diversification opportunities may differ. In particular, banks that operated in rural areas may be overly specialized in lending to agriculture and hence less diversified vis-à-vis peer banks that operated in urban areas.

We address this issue and check whether the relationship between lending patterns and local market competition differs when we compare national (i.e. well diversified banks) with local (i.e. less diversified) banks. The results of this test indicate that there are neither economically nor statistically significant differences between the two types of banks and their lending policies.[28] We also address this concern by including an extra control variable in our regressions—population density—as rural areas are usually characterized by low population densities in comparison to urban areas. We measure population density as the ratio of total population living in a county divided by the size of the county measured in acres (see Lee (1971)). The results are unaltered by the inclusion of this extra control variable.

Another possible issue with our instrument relates to the political economy of banking. The existing literature has indicated that political influences shape credit markets. Rajan and Ramcharan (2011), for instance, highlight the power the elite had in the early twentieth-century U.S. to shape local credit markets in order to serve their interests. In particular, landed elites restricted the access of banking institutions in the areas under their control, so as to maintain monopoly power in the deposit and lending market. Our instrumental variable, the number of POSBs, could be correlated with the strength of the political elite. For instance, the number of POSBs could be the outcome of political lobbying, where landed elites prevented POSBs from entering the county in which they controlled the collection of savings. Though we have not found any historical or anecdotal evidence indicating the role of the political landed elite in determining the functioning of local deposit markets in Britain, we tackle this possibility in an econometric test. We include in our instrumental variable regressions a proxy for the presence of a landed

[28] Results are available upon request.

elite, with a Gini index based on the distribution of the land within the county.[29] Higher values of the Gini index indicate that land ownership is particularly concentrated and capture the strength of the landed elite. The inclusion of the Gini index in the two-stage least squares regressions leave our results unchanged.

E. Borrower Quality

Our results, that borrowers in more concentrated markets receive worse loan terms, could emanate from two (competing) theories. Boyd and De Nicoló (2005) argue that loan applicants with riskier projects are those that accept loans in more concentrated markets. Therefore banks rationally charge higher interest rates and demand more collateral as protection. Alternatively, banks may use their market power to restrict the supply of loans, which cuts off the funding to marginally profitable borrowers and serves only the best quality borrowers. If Boyd and De Nicoló are correct, then we might expect to find evidence that banks in more concentrated markets are more concerned about the credit quality of their customers (i.e., the perceived quality of the average borrower deteriorates); if the market power story is correct, we might expect to find that banks have more confidence in the clients to whom they make loans.

To discriminate between these two alternatives we examine banks' internal comments about their borrowers. Written comments are recorded for a little over 9,000 of the loans in our sample. These are internal comments made by bank officers, hence a candid reflection on the banks' clients. These comments are usually matter-of-fact sentence fragments, (e.g., "to be paid in instalments[*sic*]", "to assist them in continuing their furnaces in full work"), which suggest neither a positive nor a negative outlook on that particular client. However, some of these comments carry a connotation as to the credit quality of the borrower. Since the vast majority of loans that appear in the banks' books are approved loans, the majority of these comments are generally positive in nature (e.g. "very respectable, I believe both of them to be excellent men of business. Many yrs [*sic*] in business, never failed. 24 yrs [*sic*] connected to the bank, capital unknown."). To quantify how positive (or negative) a certain comment is we feed the comments into the Linguistic Analysis and Word Count (LIWC) software. For each comment we obtain a positivity score and a negativity score, out of 100. For example, the "very respectable" comment

[29] We follow Rajan and Ramcharan (2011), who rely on a similar measure.

above receives a score of 7.41 for positivity and 3.7 for negativity. We then regress the positivity scores and negativity scores (in separate regressions) on lagged *County HHI*, as well as bank and customer characteristics (see Table VIII, columns (1) to (4)). Counties with higher bank concentration tended to give their borrowers fewer positive comments, although this is statistically insignificant. High concentration counties also had loans with fewer negative comments, which is statistically significant at the 5% level and of substantially greater magnitude.

One drawback of the LIWC software is that it does not handle the slightly archaic language well, nor does it accurately deal with negated phrases or irony. For example the most colorful comment in our sample, “A good judge of hares and cattle but a bad businessman, he lies like the devil and rather than go 100 yards straight he’ll go a mile crooked, 2 years in business”, is given a score of 3.45 for positivity (presumably for expert hare and cattle judging) and 3.45 for negativity. A human reader of this comment would presumably note the need to watch that particular borrower very carefully. To address this issue with the LIWC software, we personally read all comments and score them as positive (zero or one) and negative (zero or one), with a neutral comment having a zero for both positivity and negativity. We run linear probability model regressions with this subjective measure of client quality. Counties with higher bank concentration are associated with more subjectively positive comments (see columns (5) and (6)) and fewer subjectively negative comments (columns (7) and (8)). The subjective results are of statistical significance and sizable magnitude. A one standard deviation increase in *County HHI* means that, if a comment were made, it is 15% to 18% more likely to be positive, and 23% to 25% less likely to be negative. We conclude therefore that increasing bank concentration appears to have gone hand in hand with a better quality of borrower, at least as judged by the bank making the loan. In counties with higher interest rates, smaller loans, and more collateral demands, banks are (internally) noting more positive characteristics about those to whom they grant credit.

F. Balance Sheets Analysis

As the results presented in Tables V through VIII come from a sample consisting of bank loans that we have been able to locate in bank archives, there is the possibility that some bias may have entered our results due to, for example, a policy of selective record retention by banks. To alleviate concerns that our results are driven by an examination of (possibly) non-random loan records, we examine bank behavior in the aggregate.

Table IX reports summary statistics of the bank-year data we have collected on balance sheets. The mean return on a bank's equity was 1.2% per year, albeit excluding dividends, which were the major form of payout by firms, with a standard deviation of 3.5%. The mean bank had 87 branches, although there is high skewness in the data, since the median is just 20 branches. Banks earned 1.4% on their assets, on average, with a standard deviation of 0.7%. On average banks held 14.8% of their assets as cash, or cash equivalents, 18.5% was held as marketable securities, and 62.4% was extended as loans. The average level of assets, across all bank-years, is £16.5 million. There is a lot of skewness in assets, both across time and across banks, and the median level of assets is £3.4 million. Banks had an authorized capital of 34.3% of their assets, on average.

Banks may compete in different markets at the same time and face different degrees of competition in each market. We capture this notion with the variable *Bank HHI,* a bank-specific weighted average of *County HHI*s, where the weights are given by the fraction of the bank's branches in a particular county.

We compute *Bank HHI* for every bank and every year in our sample and it is our main independent variable in the balance sheet analysis.[30] The mean figure of this across bank-years is 0.135. The mean bank had taken over 0.44 banks within the previous five years, and experienced asset growth of 24% over the same period.

In Table X, panel A, we show the OLS results (which include year, bank, and main county of operation fixed effects), and in panel B we present instrumental variable estimates, with the number of POSBs in 1885 as the instrument.[31] The results indicate that banks in more concentrated markets tended to reduce their cash holdings, although the estimates are not statistically significant. Concentration acted to increase the share of safe, marketable investments (usually Treasury bonds and blue-chip railway preference shares) in a bank's balance sheet, and the effect is statistically significant in both the OLS and instrumental variable regressions. In

[30] The results do not change if we measure county-level bank concentration in the county in which the bank had the largest number of branches in that year.

[31] In these regressions we do not control for local literacy or income as we already control for main county of operation fixed effects.

more concentrated markets loans decrease as a share of assets in both regressions and are significant at the 5% level.

The economic effects of increasing concentration are sizeable; the fixed effect results indicate that a one standard deviation increase in *Bank HHI* is associated with a 5% decrease in *Cash to Assets*, a 27% increase in *Investments to Assets*, and a 7% decrease in *Loans to Assets*. Once we instrument for *Bank HHI*, the economic impacts are stronger. A one standard deviation increase in *Bank HHI* leads to a 45% increase in *Investments to Assets* and a 12.6% decrease in *Loans to Assets*. We do not find a consistent relationship between *Bank HHI* and authorized capital.

In conclusion, increased bank concentration was associated with fewer loans and increased holdings of low-risk securities, which was likely to have had a net effect of lowering bank risk taking.

G. Real Effects

We turn now to study the possible relation between local bank concentration and the real economy. Given the paucity of the information, we do not have economic performance data for every county in every year; we prefer to interpret these results as correlations. We report OLS regressions that control for county and year fixed effects, as well as a set of observable county characteristics. Instrumental variable results are in line with the OLS analysis, but often are not statistically significant. Probably due to the patchy nature of the data in a good number of specifications, the instrument is also weak, and this might explain the lack of statistical power in the second stage.

As the main independent variable, we consider the local degree of concentration both with a one-year and a five-year lag. The latter measure allows for the possibility that the effects of bank concentration may take some time to have an impact on economic conditions. We also control for *In-market Merger* and *Out-of-market Merger*.

First, we use the census data to look at the relations between local bank concentration and the distribution of male employment in various economic sectors in British counties. The census reports the number of workers employed in 27 different industries for each decade, starting in

1881.[32] In Table XI(a), columns (1) to (2) show that in counties with more concentrated banking markets employment was lower as a share of population, and a larger proportion of the male population worked in agriculture than in industry or services. As we are studying Britain at the turn of the twentieth century, we consider the allocation of local employment to agriculture as one measure of relative economic underdevelopment. The economic significance is also large: a one standard deviation increase of either *County HHI* (one- or five-year lag) yields a 20% increase in the proportion of the population employed in agriculture.

Columns (3) to (4) in Table XI(a) perform a similar exercise, but look at the proportion of the county male population working in *NewTech* sectors. Local banking concentration appears to have little effect on the proportion of employment in the *NewTech* sectors. The estimates on *County HHI* (one-year lag) or *County HHI* (five-year lag) have opposite signs and neither is statistically significant. This is consistent with the results from Table V(d), that Second Industrial Revolution firms received better treatment than other companies, although they were still harmed by increasing bank concentration.

In Table XI(a), columns (5) to (8) relate local banking concentration to the growth rates of income tax revenues in the counties. As we do not have data on counties' GDP growth during the time period we consider, we use counties' income tax revenues as a proxy of local GDP. Income tax rates were set by the central government and they were the same in each county. Any differences among the counties' tax revenues have to be driven by differences in local income, or the percentage of the population earning below the tax-free threshold, rather than tax rates.[33] In Table XI(a), columns (5) to (6) look at the growth rate of income tax revenue related to agriculture; columns (7) to (8) present the results for growth rates of tax revenues related to activities classified as industry and trade.[34] We find that *County HHI* (one-year lag) is negatively related to the growth of agricultural tax revenues, while five-year lagged *County HHI* has a negative correlation with the growth rate of industry and trade tax revenues. The economic significance of *County HHI* (five-year lag) is large: a one standard deviation increase of *County*

[32] The employment data are hence available for 1881, 1891, 1901, 1911, 1921, and 1931. Welsh counties are compacted in two categories, broadly corresponding to northern and southern Wales. A detailed explanation of how the industry classification is constructed is reported by Lee (1979, pp. 6-38).

[33] Data for industry and trade tax revenues are only available for all counties between 1885 and 1895. Between 1896 and 1911 data are only available for 14 counties, and this information is not available after 1911. Data for tax revenues related to agricultural activities are available for all counties between 1885 and 1911.

[34] We run two different sets of regressions for agriculture and industry tax revenues as the data are only available for each county over a short time period.

HHI subtracts two percentage points from the industry and trade tax revenue growth rate.[35] The estimated effect of bank concentration on tax revenue is large but very sensitive to the econometric specification. *In-market Merger* is also negatively related to the growth rate of industry and trade tax revenues. We find that in-market mergers subtracted about two percentage points from the growth rate of tax revenues.

Table XI(b) looks at the dynamics of firm creation and destruction in each county and relates it to local banking concentration. We do not have data on the establishment of all new firms, such as partnerships and sole-traders, only on the incorporation of new joint-stock companies in counties. The data on new incorporations at the county level are available only for the first half of our sample period, between 1886 and 1901.

In Table XI(b), columns (1) to (2) look at the number of newly incorporated firms. The coefficient on *County HHI* (one-year lag) is positive and statistically significant, suggesting that more banking concentration leads to a larger numbers of incorporations. The coefficient on *County HHI* (five-year lag) is also positive, but smaller and statistically insignificant. Columns (3) to (4) in Table XI(b) analyze the pattern of firm deaths, since our data includes whether or not companies are still in operation three years after their date of their incorporation. Our regressions find that, in more concentrated banking markets, new firms are less likely to be in operation shortly after their incorporation. A one standard deviation increase of *County HHI* (one-year lag) leads to an increase of about 10% in the probability that a firm will not be in operation shortly after its incorporation.

In Table XI(b), columns (5) to (6) document the relation between local concentration and the number of commercial bankruptcies, not distinguishing by the age of firm. We find that local banking concentration is mildly associated with a larger number of bankruptcies in a county. The coefficient on *County HHI* (one-year lag) is positive, but small and not statistically significant. The coefficient on *County HHI* (five-year lag) is positive and statistically significant: a standard deviation increase of *County HHI* (five-year lag) correlates with a 4% increase in the total number of bankruptcies. All in all, these results suggest that in more concentrated counties there is both more firm creation and firm destruction, and most of the firm destruction is driven by very young companies. This result does not appear to be consistent with a typical pattern of creative destruction, where the entry of new firms displaces old firms, but it rather indicates

[35] The average industry and trade tax revenue growth rate is about 1.4%.

increased "churning," whereby new businesses are created but tend to disappear more easily. While we cannot directly test the conjecture, this result is indicative of the notion that, in more concentrated counties, new firms are more likely to go bankrupt because they have more problems in obtaining bank finance in the early stages of their existence.

As shown in Table XI(b), columns (5) to (6), out-of-market mergers in the previous 5 years are negatively associated with the total number of bankruptcies. *Out-of-market Merger* is associated with a 6% decline in the total number of bankruptcies.

In the spirit of Garmaise and Moskowitz (2006), Table XI(c) looks at the relation between local market concentration and the number of crimes in a county. We study two of the most prevalent crimes in Britain, simple larcenies and begging. The data are reported annually by county. In Table XI(c), columns (1) to (2) show that there is a positive relationship between *County HHI* (one-year lag) and the number of begging offences in a county. To the extent that the number of begging offences is a rough measure of poverty, it appears that higher banking concentration is associated with higher poverty rates in the county. Columns (3) to (4) in Table XI(c) look at the relation between banking concentration and larcenies. We do not find any relation between the two variables.

V. Conclusion

We present a suite of results that strongly supports the idea that a more concentrated banking sector is harmful for borrowers and may lead banks to pursue safer investment strategies. Counties that experience higher bank concentration tend to be those with lower loan sizes, alongside higher interest rates and more demands for collateral. The duration of loans in those counties is also typically shorter. Banks respond to increasing concentration by holding more marketable securities, which are typically low risk government bonds, and holding fewer of their assets as loans. Our results lend some support to asymmetric information theories: *NewTech* firms (vis-à-vis old technology firms) enjoyed better borrowing conditions in areas with a more concentrated banking market, but they still experienced a contraction in credit and tough collateral requirements. We also find that high bank concentration is associated with a worse performance of the local economy. Increasing concentration is associated with a larger fraction of the population being employed in agriculture, lower tax revenue growth, and more business churning. The turn of the twentieth century merger wave, which drove banking concentration substantially higher in England and Wales, made banks safer, but at the same time, it resulted in bad outcomes for the clients of banks.

References

Ackrill, Margaret, and Leslie Hannah, "Barclays: The Business of Banking, 1690-1996", Cambridge University Press, Cambridge, 2001.

Agarwal, Sumit, Efraim Benmelech, Nittai Bergman, and Amit Seru, "Did the Community Reinvestment Act (CRA) Lead to Risky Lending?", NBER Working Paper 18609, 2012.

Angrist, Joshua, and Jörn-Steffen Pischke, "Mostly Harmless Econometrics", Princeton University Press, 2009.

Barth, James, Gerard Caprio, Jnr., and Ross Levine, "Rethinking Bank Regulation: Till Angels Govern", Cambridge University Press, New York, 2006.

Beck, Thorsten, Asli Demirguc-Kunt, and Vojislav Maksimovic, "Bank Competition and Access to Finance: International Evidence", *Journal of Money, Credit, and Banking*, 36(3), pp. 627-648, 2004.

Beck, Thorsten, Asli Demirguc-Kunt, and Ross Levine, "Bank Concentration, Competition, and Crises: First Results", *Journal of Banking and Finance*, 30(5), pp. 1581-1603, 2006.

Beck, Thorsten, Olivier De Jonghe, and Glenn Schepens, "Bank Competition and Stability: Cross-Country Heterogeneity", *Journal of Financial Intermediation*, 22, pp. 218-244, 2013.

Bekaert, Geert, Campbell Harvey, and Christian Lundblad, "Does Financial Liberalization Spur Growth?", *Journal of Financial Economics*, 77, pp. 3-55, 2005.

Benmelech, Efraim, and Tobias Moskovitz, "The Political Economy of Financial Regulation: Evidence from U.S. State Usury Laws in the 19th Century", *Journal of Finance*, 65(3), pp. 1029-1073, 2010.

Berger, Allen, and Timothy Hannan, "The Price-Concentration Relationship in Banking", *Review of Economics and Statistics*, 71(2), pp. 291-99, 1989.

Berger, Allen, Anthony Saunders, Joseph Scalise, and Gregory Udell, "The Effects of Bank Mergers and Acquisitions on Small Business Lending", *Journal of Financial Economics*, 50, pp. 187-229, 2005.

Berger, Allen, Asli Demirgüç-Kunt, Ross Levine, and Joseph Haubrich, "Bank Concentration and Competition: An Evolution in the Making", *Journal of Money, Credit and Banking*, 36(3), pp. 434-50, 2004.

Berger, Allen, Robert DeYoung, Mark Flannery, David Lee, and Özde Öztekin, "How Do Large Banking Organizations Manage Their Capital Ratios?", *Journal of Financial Services Research*, 34(1), pp. 123-149, 2008.

Besanko, David, and Anjan Thakor, "Relationship Banking, Deposit Insurance, and Bank Portfolio Choice" in Colin Mayer and Xavier Vives, eds, *Capital Markets and Financial Intermediation*, Cambridge University Press, Cambridge, pp. 292–318, 1993.

Black, Sandra, and Philip Strahan, "Entrepreneurship and Bank Credit Availability", *Journal of Finance*, 57(6), pp. 2807-33, 2002.

Bonaccorsi di Patti, Emilia, and Giovanni Dell'Ariccia, "Bank Competition and Firm Creation", *Journal of Money, Credit and Banking*, 36(2), pp. 225-251, 2004.

Boyd, John, and Gianni de Nicoló, "The Theory of Bank Risk Taking and Competition Revisited", *Journal of Finance*, 60(3), pp. 1329-43, 2005.

Braggion, Fabio, and Lyndon Moore, "The Economic Benefits of Political Connections in Late Victorian Britain", *Journal of Economic History*, 73(1), pp. 142-176, 2013.

Braggion, Fabio, Narly Dwarkasing, and Lyndon Moore, "Increasing Market Concentration in British Banking, 1885-1925" in A. Greif, L. Kiesling and J. V.C. Nye, eds, *Institutions, Innovation and Industrialization*, Princeton University Press, Princeton and Oxford, 2015.

Canales, Rodrigo, and Ramana Nanda, "A Darker Side to Decentralized Banks: Market Power and Credit Rationing in SME Lending", *Journal of Financial Economics*, 105(2), pp. 353-366, 2012.

Capie, Forrest, and Ghila Rodrik-Bali, "Concentration in British Banking, 1870-1920", *Business History*, 24, pp. 280-292, 1982.

Capie, Forrest, and Mark Billings, "Evidence on Competition in English Commercial Banking, 1920-1970", *Financial History Review*, 11(1), pp. 69-103, 2004.

Calomiris, Charles, and Stephen Haber, "Fragile by Design: The Political Origins of Banking Crises and Scarce Credit", Princeton University Press, Princeton NJ, 2014.

Carlson, Mark, and Kris Mitchener, "Branch Banking as a Device for Discipline: Competition and Bank Survivorship during the Great Depression", *Journal of Political Economy*, 117, pp. 165-210, 2009.

Cassis, Youssef, "City Bankers: 1890-1914", Cambridge University Press, Cambridge, 1994.

Cetorelli, Nicola, "Real Effects of Bank Competition", *Journal of Money, Credit, and Banking*, 36(3), pp. 543-58, 2004.

Cetorelli, Nicola, and Philip Strahan, "Finance as a Barrier to Entry: Bank Competition and Industry Structure in Local U.S. Markets", *Journal of Finance*, 61(1), pp. 437-61, 2006.

Cetorelli, Nicola, and Michele Gambera, *"Banking Market Structure, Financial Dependence and Growth: International Evidence from Industry Data"*, *Journal of Finance*, 56(2), pp. 617-48, 2001.

Klaus Schaeck, Martin Cihak, and Simon Wolfe, "Are Competitive Banking Systems More Stable?", *Journal of Money, Credit, and Banking*, 41(4), pp. 711-734, 2009.

Collins, Michael, and Mae Baker, "Commercial Banks and Industrial Finance in England and Wales, 1860-1913", Oxford University Press, Oxford, 2003.

Cottrell, Philip, "Industrial Finance, 1830-1913", Methuen, London and New York, 1980.

Degryse, Hans, and Steven Ongena, "Distance, Lending Relationships, and Competition", *Journal of Finance*, 60(1), pp. 231-266, 2005.

Degryse, Hans, and Steven Ongena, "The Impact of Competition on Bank Orientation", *Journal of Financial Intermediation*, 16, pp. 399-424, 2007.

De Nicoló, Gianni, Philip Bartholomew, Jahanara Zaman, and Mary Zephirin, "Bank Consolidation, Internationalization, and Conglomeration: Trends and Implications for Financial Risk", *Financial Markets, Institutions & Instruments*, 13(4), pp. 173-217, 2004.

Eichengreen, Barry, "Globalizing Capital", Princeton University Press, Princeton, 2008.

Erel, Isil, "The Effect of Bank Mergers on Loan Prices: Evidence from the United States", *Review of Financial Studies*, 24(4), pp. 1068-1101, 2011.
Ferguson, Niall, "The Ascent of Money", Penguin, New York, 2008.
Focarelli, Dario, and Fabio Panetta, "Are Mergers Beneficial to Consumers? Evidence from the Market for Bank Deposits", *American Economic Review*, 93(4), pp. 1152-72, 2003.
Fohlin, Caroline, "Relationship Banking, Liquidity, and Investment in the German Industrialization", *Journal of Finance*, 53(5), pp. 1737-1758, 1998.
Garmaise, Mark, and Tobias Moskowitz, "Bank Mergers and Crime: The Real and Social Effects of Credit Market Competition", *Journal of Finance*, 61(2), pp. 495-538, 2006.
Goodhart, Charles, and Dirk Schoenmaker, "Should the Functions of Monetary Policy and Banking Supervision Be Separated?", *Oxford Review of Economic Policy*, 47, pp. 539-560, 1995.
Griffiths, Brian, "The Development of Restrictive Practices in the U.K. Monetary System", *The Manchester School*, 41(1), pp. 3-18, 1973.
Grossman, Richard, "Unsettled Account: The Evolution of Banking in the Industrialized World since 1800", Princeton University Press, Princeton and Oxford, 2010.
Guzman, Mark, "Bank Structure, Capital Accumulation and Growth: A Simple Macroeconomic Model", *Economic Theory*, 16, pp. 421-455, 2000.
Hannan, Timothy, "Bank Commercial Loan Markets and the Role of Market Structure: Evidence from Surveys of Commercial Lending", *Journal of Banking and Finance*, 15, pp. 133-49, 1991.
Hannan, Timothy, and Robin Prager, "Do Substantial Horizontal Mergers Generate Significant Price Effects? Evidence from the Banking Industry", *Journal of Industrial Economics*, 46, pp. 433-52, 1998.
Hellmann, Thomas, Kevin Murdock, and Joseph Stiglitz. "Liberalization, Moral Hazard in Banking, and Prudential Regulation: Are Capital Requirements Enough?", *American Economic Review*, 90, 147-165, 2000.
Horne, Oliver, "A History of Saving Banks", Oxford University Press, London, 1947.
The Investor's Monthly Manual, http://icf.som.yale.edu/imm/.
Jayaratne, Jith, and Philip Strahan, "The Finance-Growth Nexus: Evidence from Bank Branch Deregulation", *Quarterly Journal of Economics*, 111(3), pp. 639-670, 1996.
Johnson, Paul, "Saving and Spending: The Working-class Economy in Britain, 1870-1939", Clarendon Press, Oxford, 1985.
Jones, Geoffrey, "Lombard Street on the Riviera: The British Clearing Banks and Europe 1900-1960", *Business History*, 24(2), pp. 186-210, 1982.
Kahn, Charles, George Pennacchi, and Ben Sopranzetti, "Bank Consolidation and the Dynamics of Consumer Loan Interest Rates", *Journal of Business*, 78, pp. 99-134, 2005.
Kane, Edward, "Accelerating Inflation, Technological Innovation, and the Decreasing Effectiveness of Banking Regulation", *Journal of Finance*, 36, pp. 355-367, 1981.
Keeley, Michael, "Deposit Insurance, Risk, and Market Power in Banking", *American Economic Review*, 80(5), pp. 1183-1200, 1990.
Kennedy, William P., "*Industrial Structure, Capital Markets, and the Origins of British Economic Decline*", Cambridge University Press, Cambridge (MA), 1987.
Kerr, William, and Ramana Nanda, "Democratizing Entry: Banking Deregulations, Financing Constraints, and Entrepreneurship", *Journal of Financial Economics*, 94, pp. 124-149, 2009.

King, Robert, and Ross Levine, “Finance and Growth: Schumpeter Might Be Right”, *Quarterly Journal of Economics,* 108(3), pp. 717-37, 1993.
Klein, Michael, “A Theory of the Banking Firm”, *Journal of Money, Credit, and Banking*, 3(2), pp. 205-218, 1971.
Lerner, Abba, “The Concept of Monopoly and the Measurement of Monopoly Power”, *Review of Economic Studies*, 1, pp. 157-175, 1934.
Lee, Clive, “British Regional Employment Statistics, 1841-1971”, Cambridge University Press, Cambridge, 1979.
Levine, Ross, Norman Loayza, and Thorsten Beck, “Financial Intermediation and Growth: Causality and Causes”, *Journal of Monetary Economics,* 46, pp. 31-77, 2000.
Levine, Ross, and Sara Zervos, “Stock Markets, Banks, and Economic Growth”, *American Economic Review*, 88(3), pp. 537-558, 1998.
Mackenzie, Kenneth, “The Banking Systems of Great Britain, France, Germany and the United States of America”, Macmillan and Co., London, 1932.
Marquez, Robert, “Competition, Adverse Selection, and Information Dispersion in the Banking Industry”, *Review of Financial Studies,* 15, pp. 901-926, 2002.
Martinez-Miera, David, and Rafael Repullo, “Does Competition Reduce the Risk of Bank Failure?”, *Review of Financial Studies*, 23(10), pp. 3638-3664, 2010.
Matutes, Carmen, and Xavier Vives, “Imperfect Competition, Risk, and Regulation in Banking”, *European Economic Review,* 44, pp. 1-34, 2000.
May, Trevor, “An Economic and Social History of Britain: 1760-1970”, Longman, New York, 1987.
McCloskey, Donald P., “Did Victorian Britain Fail?”, *Economic History Review*, 23, pp. 446-459, 1970.
Merton, Robert, “An Analytic Derivation of the Cost of Deposit Insurance and Loan Guarantees”, *Journal of Banking and Finance*, 1, pp. 3-11, 1977.
Mishkin, Frederic, “Financial Consolidation: Dangers and Opportunities”, *Journal of Banking and Finance*, 23(2-4), pp. 675-691, 1999.
Moenninghoff, Sebastian, Steven Ongena, and Axel Wieandt, “The Perennial Challenge to Counter Too-Big-to-Fail in Banking: Empirical Evidence from the New International Regulation Dealing with Global Systemically Important Banks”, *Journal of Banking and Finance*, 61, pp. 221-236, 2015.
Monti, Mario, “Deposit, Credit, and Interest Rate Determination under Alternative Bank Objectives,” in G. P. Szego and K. Shell, eds, *Mathematical Methods in Investment and Finance*, North-Holland, Amsterdam, 1972.
Mokyr, Joel, “The Lever of Riches”, Oxford University Press, Oxford and New York, 1992.
Pagano, Marco, “Financial Markets and Growth. An Overview”, *European Economic Review*, 37, pp. 613-622, 1993.
Peek, Joe, and Eric Rosengren, “Collateral Damage: Effects of the Japanese Bank Crisis on Real Activity in the United States”, *American Economic Review*, 90(1), pp. 30-45, 2000.
Petersen, Mitchell, and Raghuram Rajan, “The Effect of Credit Market Competition on Lending Relationships”, *Quarterly Journal of Economics*, 110(2), pp. 407-443, 1995.
Pilloff, Steven, “Bank Merger Activity in the United States, 1994–2003”, *Staff Study* 176, Board of Governors of the Federal Reserve System, 2004.

Rajan, Raghuram, and Rodney Ramcharan, “Land and Credit: A Study of the Political Economy of Banking in the United States in the Early 20th Century”, *Journal of Finance* 66(6), pp. 1895-1930, 2011.

Repullo, Rafael, “Capital Requirements, Market Power, and Risk-Taking in Banking”, *Journal of Financial Intermediation*, 13(2), pp. 156-82, 2004.

Rhoades, Stephen, “Bank Mergers and Banking Structure in the United States, 1980–1998”, *Staff Study* 174, Board of Governors of the Federal Reserve System, 2000.

Rice, Tara, and Philip Strahan “Does Credit Competition Affect Small-Firm Finance?”, Journal of Finance, 65(3), pp. 861-889, 2010.

Rubinstein, William, “Wealth and Inequality in Britain”, Faber and Faber, London, 1986.

Sapienza, Paola, “The Effects of Banking Mergers on Loan Contracts”, *Journal of Finance*, 57(1), pp. 329-67, 2002.

Saunders, Anthony, and Berry Wilson, “The Impact of Consolidation and Safety-net Support on Canadian, US and UK Banks: 1893-1992”, *Journal of Banking and Finance*, 23, pp. 537-571, 1999.

Shleifer, Andrei, and Robert Vishny, “Corruption”, *Quarterly Journal of Economics*, 108(3), pp. 599-617, 1993.

Smith, Bruce, “Private Information, Deposit Interest Rates, and the ‘Stability’ of the Banking System”, *Journal of Monetary Economics*, 14(3), pp. 293-317, 1984.

Stamp, Josiah C., “The Report of the Macmillan Committee”, *Economic Journal*, 41, pp. 424-435, 1931.

Stephens, W.B., “Education, Literacy and Society, 1830-1870: The Geography of Diversity in Provincial England”, Manchester University Press, 1987.

Sykes, Joseph, “The Amalgamation Movement in English Banking, 1825-1924”, P.S. King and Son, London, 1926.

Turner, John, “Banking in Crisis: The Rise and Fall of British Banking Stability, 1800 to the Present”, Cambridge University Press, 2014.

Zarutskie, Rebecca, “Evidence on the Effects of Bank Competition on Firm Borrowing and Investment”, *Journal of Financial Economics*, 81, pp. 503-537, 2006.

Table I
British Bank Deposit Concentration, 1870-1920

Sum of the largest banks' deposits divided by the sum of all banks' deposits. Source: Capie and Rodrik-Bali (1982) Table 3.

	Top 10 banks		Top 5 banks	
	U.K.	England/Wales	U.K.	England/Wales
1870	31.0	32.8	19.6	25.0
1880	32.5	36.2	20.6	26.4
1890	32.0	38.0	21.0	26.5
1900	41.0	46.3	25.5	31.0
1910	56.0	64.7	35.5	43.0
1920	73.7	96.6	65.5	80.0

Table II
British Banking Herfindahl Index, 1870-1920

Sum of squared market shares. Market share of a bank is equal to its deposits divided by aggregate deposits. Source: Capie and Rodrik-Bali (1982) Table 4.

	U.K.	England/Wales
1870	0.014	0.017
1880	0.016	0.020
1890	0.017	0.022
1900	0.022	0.029
1910	0.037	0.053
1920	0.091	0.125

Table III
European Banking Herfindahl Index: 1995 - 2001

Sum of squared market shares. Market share of a bank is equal to its deposits divided by aggregate deposits. Source: Carbó et al (2009) Table 1.

	Herfindahl
Belgium	0.12
France	0.04
Germany	0.02
Netherlands	0.13
U.K.	0.04
European Union	0.07

Table IV

Loan Amount is in thousands of pounds. Loan Spread is the interest rate less the Bank of England rate. Loan Duration is in days. Loan Secured equals one if collateral was required and zero otherwise. Loan Collateral / Loan Amount is the collateral divided by the loan amount. Loan Number is an integer, n, indicating that the loan is the n*th* from that bank to that customer in our database. In-Market Merger equals one if, in the county where the loan was made, there had been a merger between two banks that both had branches in that county within the previous 5 years. Out-of-Market Merger is a dummy variable equal to one if, in the county where the loan was made, there had been a merger between one bank that had branches in that county and another bank that did not have any branches in that county within the previous 5 years. Renewal and Overdraft are equal to one if the loan was a renewal/overdraft and zero otherwise. Borrower Company equals one if the borrower was a company and zero otherwise. Borrower Woman equals one if the borrower was female and zero otherwise. NewTech equals one if the loan was made to the electricity, chemicals, automobile or cycle industries and zero otherwise. Bank branches is the number of branches of the bank which made the loan. Metropolitan Branch equals one if the branch is located in London, Manchester, Birmingham, Liverpool, Newcastle, Bristol, Sheffield or Leeds and zero otherwise. Bank ROA equals profits/assets for the bank which made the loan. Bank Deposits / Assets equals deposits/assets at the bank which made the loan. County Population is the population in thousands of the county where the loan was made. County POSB is the number of postal savings bank branches, in thousands, in the county in which the loan was made in 1885. County HHI is the Herfindahl index of concentration in the county in which the loan was made.

	Obs	Mean	Median	s.d.
Loan Amount (£ '000)	31,785	5.158	0.716	71.17
Loan Spread (basis points)	13,059	7.343	10	8.285
Loan Duration (days)	15,127	210.1	180	414
Loan Secured	31,785	0.746	1	0.435
Loan Collateral / Loan Amount	25,150	1.474	0.916	6.372
Loan Number	31,785	4.345	1	10.89
In-market merger	31,785	0.778	1	0.415
Out-of-market merger	31,785	0.302	0	0.459
Renewal	31,785	0.331	0	0.47
Overdraft	31,785	0.379	0	0.485
Borrower Company	31,785	0.332	0	0.471
Borrower Woman	31,785	0.0364	0	0.187
NewTech	31,785	0.0252	0	0.157
Bank branches	30,656	484.5	160	647.4
Metropolitan Branch	32,041	0.395	0	0.489
Bank ROA	24,092	0.0105	0.01	0.005
Bank Deposit / Assets	24,774	0.855	0.876	0.065
County Population ('000)	31,785	2,943	3,169	2,146
County POSB ('000)	31,785	0.48	0.62	0.310
County HHI	31,785	0.157	0.136	0.0783

Table V(a)

Loan Regression: Baseline Results

We regress the log of Loan Amount on one-year lagged County HHI and the control variables. Standard errors are clustered at the bank level. ***, **, and *, represent coefficients that are statistically different from zero at the 1%, 5%, and 10% levels respectively. Constant is not reported. The bank controls are number of bank branches, ROA, and Deposits/Assets.

	All Loans				Business Loans			
County HHI (1 year LAG)	-4.555***	-4.108***	-3.928***	-2.340***	-2.983***	-2.724***	-3.149***	-1.489**
	(0.627)	(0.675)	(1.111)	(0.642)	(0.697)	(0.693)	(0.898)	(0.644)
Renewal	0.373***	0.392***	0.216***		0.403***	0.421***	0.257***	
	(0.092)	(0.098)	(0.076)		(0.100)	(0.101)	(0.068)	
Overdraft	-0.106	-0.093	-0.090		-0.015	-0.016	-0.014	
	(0.101)	(0.091)	(0.090)		(0.106)	(0.096)	(0.088)	
Log (Loan Number)	0.105	0.103	0.183***		0.089	0.077	0.133*	
	(0.082)	(0.086)	(0.046)		(0.068)	(0.074)	(0.072)	
Metropolitan Branch	0.321***	0.290**	-0.157***		0.190**	0.173	0.019	
	(0.116)	(0.133)	(0.047)		(0.090)	(0.103)	(0.034)	
Borrower Company	0.625***	0.613***	0.583***					
	(0.063)	(0.070)	(0.096)					
Borrower Woman	-0.649***	-0.653***	-0.708***		-1.699***	-1.703***	-1.804***	
	(0.146)	(0.145)	(0.114)		(0.282)	(0.288)	(0.217)	
Log (County Population)	0.133***	0.129***	-0.279*	-0.077	0.303***	0.295***	-0.295	-0.097***
	(0.019)	(0.016)	(0.160)	(0.083)	(0.062)	(0.060)	(0.187)	(0.031)
R^2	0.420	0.420	0.453	0.918	0.357	0.358	0.392	0.927
Obs	29581	23496	23496	15306	9861	8057	8057	5496
Bank Controls	No	Yes	Yes	Yes	No	Yes	Yes	Yes
County FE	No	No	Yes	No	No	No	Yes	No
Borrower FE	No	No	No	Yes	No	No	No	Yes
Occupation/Industry FE	Yes	Yes	Yes	No	Yes	Yes	Yes	No
Bank FE	Yes	Yes	Yes	No	Yes	Yes	Yes	No
Year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Econ Sig. (County HHI)	-0.296	-0.272	-0.261	-0.165	-0.205	-0.189	-0.216	-0.109

Table V(b)

Loan Conditions

We regress Loan Spread, Secured, Collateral/Amount, and Loan Duration on one-year lagged County HHI and the control variables. Standard errors are clustered at the bank level. ***, **, and *, represent coefficients that are statistically different from zero at the 1%, 5%, and 10% levels respectively. Constant is not reported. All regressions use year, bank, and occupation fixed effects. The bank controls are number of bank branches, ROA, and Deposits/Assets.

	All Loans				Business Loans			
	Loan Spread	Loan Secured	Collateral / Amount	Loan Duration	Loan Spread	Loan Secured	Collateral / Amount	Loan Duration
County HHI (1 year LAG)	0.002	0.135	4.360***	-0.505*	0.003*	0.390**	3.219***	-0.290
	(0.002)	(0.143)	(0.803)	(0.249)	(0.002)	(0.180)	(0.706)	(0.347)
Renewal	0.000***	-0.094	-0.391*	-0.011	0.001***	-0.085	-0.258*	-0.014
	(0.000)	(0.064)	(0.211)	(0.046)	(0.000)	(0.068)	(0.138)	(0.036)
Overdraft	0.000	-0.078***	-0.226**	-0.111***	0.000	-0.016	-0.129**	-0.074***
	(0.000)	(0.008)	(0.089)	(0.034)	(0.000)	(0.033)	(0.058)	(0.009)
Log (Loan Number)	-0.000	0.083***	0.029	-0.007	0.000	0.082***	0.116*	0.009
	(0.000)	(0.011)	(0.085)	(0.028)	(0.000)	(0.010)	(0.061)	(0.034)
Metropolitan Branch	-0.001***	-0.036***	-0.453***	0.026	-0.001***	-0.044***	-0.343***	-0.007
	(0.000)	(0.011)	(0.115)	(0.041)	(0.000)	(0.015)	(0.087)	(0.052)
Borrower Company	-0.001**	-0.066***	-0.193***	-0.014				
	(0.000)	(0.014)	(0.053)	(0.010)				
Borrower Woman	0.001***	0.145***	0.392***	-0.000	0.001**	0.273***	0.182***	0.021
	(0.000)	(0.025)	(0.020)	(0.030)	(0.000)	(0.020)	(0.064)	(0.038)
Log (County Population)	-0.000**	-0.027**	0.112	-0.022***	-0.001***	-0.063***	0.019	-0.019
	(0.000)	(0.012)	(0.098)	(0.006)	(0.000)	(0.013)	(0.013)	(0.015)
R^2	0.128	0.131	0.059	0.117	0.182	0.205	0.084	0.117
Obs	10251	23496	18534	12116	3985	8057	6351	4496
Bank Controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
County FE	No	No	No	No	No	No	No	No
Borrower FE	No	No	No	No	No	No	No	No
Econ Sig. (County HHI)	0.000	0.059	0.260	-0.038	0.000	0.112	0.192	-0.022

Table V(c)
Mergers

We regress log of Loan Amount, Loan Spread, Secured, Collateral/Amount, and Loan Duration on one-year lagged County HHI, measures of bank mergers and the control variables. Standard errors are clustered at the bank level. ***, **, and *, represent coefficients that are statistically different from zero at the 1%, 5%, and 10% levels respectively. Constant is not reported. The bank controls are number of bank branches, ROA, and Deposits/Assets. All regressions use bank controls and year and bank fixed effects.

	Loan Amount	Loan Amount	Loan Amount	Loan Spread	Loan Secured	Collateral / Amount	Loan Duration
County HHI (1 year LAG)	-3.981***	-3.745***	-2.691***	0.001	0.076	4.475***	-0.385
	(0.541)	(1.075)	(0.780)	(0.002)	(0.160)	(0.735)	(0.266)
In-Market Merger	-0.015	-0.161***	-0.145***	0.000	0.035***	0.014	-0.003
	(0.075)	(0.048)	(0.015)	(0.000)	(0.005)	(0.048)	(0.013)
Out-of-Market Merger	0.187	-0.044	0.023	-0.003***	0.038	0.044	-0.000
	(0.143)	(0.085)	(0.046)	(0.000)	(0.027)	(0.113)	(0.112)
Renewal	0.381***	0.196**		0.000***	-0.096	-0.408*	-0.008
	(0.102)	(0.077)		(0.000)	(0.063)	(0.213)	(0.045)
Overdraft	-0.072	-0.073		0.000	-0.077***	-0.212**	-0.109***
	(0.084)	(0.081)		(0.000)	(0.008)	(0.092)	(0.033)
Log (Loan Number)	0.137*	0.209***		-0.000	0.085***	0.036	-0.003
	(0.077)	(0.031)		(0.000)	(0.010)	(0.085)	(0.028)
Metropolitan Branch	0.231***	-0.163***		-0.001***	-0.053***	-0.520***	-0.002
	(0.083)	(0.048)		(0.000)	(0.010)	(0.086)	(0.029)
Borrower Company	0.617***	0.586***		-0.001**	-0.069***	-0.196***	-0.013
	(0.071)	(0.098)		(0.000)	(0.014)	(0.053)	(0.009)
Borrower Woman	-0.656***	-0.711***		0.001***	0.148***	0.398***	-0.003
	(0.145)	(0.116)		(0.000)	(0.024)	(0.017)	(0.031)
Log (County Population)	0.140***	-0.260*	-0.056	-0.001***	-0.029**	0.121	-0.018***
	(0.012)	(0.136)	(0.075)	(0.000)	(0.013)	(0.098)	(0.005)
R^2	0.423	0.457	0.900	0.141	0.150	0.058	0.158
Obs	23993	23993	11437	10963	23993	18851	12697
Occupation/Industry FE	Yes	Yes	No	Yes	Yes	Yes	Yes
County FE	No	Yes	No	No	No	No	No
Borrower FE	No	No	Yes	No	No	No	No
Econ Sig. (County HHI)	-0.265	-0.251	-0.188	0.000	0.008	0.268	-0.029
Econ Sig. (In-Market Merger)	-0.015	-0.161	0.145	0.000	0.050	0.010	-0.034
Econ Sig. (Out-of-Market Merger)	0.187	-0.044	0.023	-0.003	0.055	0.034	-0.000

Table V(d)
New Vs. Old Tech

For all observations where we can determine the industry of the borrower (either an individual or a firm) we regress log of Loan Amount, Loan Spread, Loan Secured, Collateral/Amount, and Loan Duration on one-year lagged County HHI and NewTech and the control variables. Standard errors are clustered at the bank level. ***, **, and *, represent coefficients that are statistically different from zero at the 1%, 5%, and 10% levels respectively. Constant is not reported. The bank controls are number of bank branches, ROA, and Deposits/Assets. All regressions use bank controls and year and bank fixed effects.

	Loan Amount	Loan Amount	Loan Spread	Loan Secured	Collateral / Amount	Loan Duration
County HHI (1 year LAG)	-4.386***	-4.288**	0.001	0.334*	4.732***	-0.005
	(0.460)	(1.639)	(0.001)	(0.176)	(1.104)	(0.496)
County HHI (1 year LAG) * NewTech	2.495***	1.562**	0.012	-0.280	-3.020**	0.238
	(0.798)	(0.708)	(0.009)	(0.172)	(1.151)	(0.344)
NewTech	-0.828***	-0.645***	-0.002	0.157***	0.719***	-0.059
	(0.184)	(0.183)	(0.002)	(0.043)	(0.222)	(0.106)
Renewal	0.279**	0.110	0.000***	-0.052	-0.382**	0.146*
	(0.137)	(0.151)	(0.000)	(0.048)	(0.187)	(0.083)
Overdraft	-0.128	-0.083	0.000	-0.079***	-0.048	-0.166***
	(0.108)	(0.110)	(0.000)	(0.013)	(0.036)	(0.036)
Log (Loan Number)	0.235	0.349***	-0.000	0.047***	-0.014	-0.060
	(0.141)	(0.099)	(0.000)	(0.007)	(0.113)	(0.038)
Metropolitan Branch	0.101	-0.214**	-0.001**	-0.118*	-0.373***	-0.193
	(0.188)	(0.080)	(0.000)	(0.060)	(0.110)	(0.132)
Borrower Company	0.639***	0.588***	-0.002*	-0.072***	-0.306***	-0.021***
	(0.084)	(0.116)	(0.001)	(0.017)	(0.096)	(0.007)
Borrower Woman	-0.941***	-0.979***	0.000*	0.170***	0.485***	0.024
	(0.221)	(0.202)	(0.000)	(0.026)	(0.088)	(0.049)
Log (County Population)	0.134***	0.389**	-0.001***	-0.014	0.133	0.002
	(0.015)	(0.177)	(0.000)	(0.017)	(0.105)	(0.013)
R^2	0.423	0.460	0.163	0.134	0.066	0.151
Obs	19596	16106	8150	16106	12753	8960
Occupation/Industry FE	Yes	Yes	Yes	Yes	Yes	Yes
County FE	No	Yes	No	No	No	No
Borrower FE	No	No	No	No	No	No
Econ Sig. (County HHI / NewTech)	-0.139	-0.193	0.001	-0.025	0.105	0.019

Table VI

We regress our potentially endogenous explanatory variable, one-year lagged County HHI, on our instrument, the number of Post Office Savings Bank branches (POSB) located in a county, as well as controls. ***, **, and *, represent coefficients that are statistically different from zero at the 1%, 5%, and 10% levels respectively. The constant, employment to population ratio (1881), tax revenue from agriculture (1885), and literacy are not reported. The bank controls are number of bank branches, ROA, and Deposits/Assets.

County POSB ('000)	-0.154***	-0.373***
	(0.050)	(0.110)
Renewal	-0.012***	0.053
	(0.004)	(0.050)
Overdraft	-0.001	-0.015
	(0.002)	(0.054)
Log (Loan Number)	0.004	0.159***
	(0.003)	(0.051)
Metropolitan Branch	0.062***	0.093**
	(0.005)	(0.035)
Borrower Company	0.001	-0.144
	(0.001)	(0.095)
Borrower Woman	-0.002	-0.229
	(0.002)	(0.590)
Log (County Population)	-0.018*	0.001
	(0.010)	(0.016)
R^2	0.685	0.727
Obs	23496	31
F Statistic	381.24	9.72
Bank Controls	Yes	No
Year FE	Yes	No
Bank FE	Yes	No
Occupation/Industry FE	Yes	No
County FE	No	No

Table VII

We regress Loan Amount, Loan Spread, Loan Collateral/Loan Amount, and Loan Duration on the fitted values of one-year lagged County HHI from Table VI and the control variables. The results in the collapsed sample columns use county averages as the unit of observation. Standard errors are clustered at the bank level. ***, **, and *, represent coefficients that are statistically different from zero at the 1%, 5%, and 10% levels respectively. The constant, employment to population ratio (1881), tax revenue from agriculture (1885), and literacy are not reported. The bank controls are number of bank branches, ROA, and Deposits/Assets. The regressions do not use county or borrower fixed effects.

	Full Sample				Collapsed Sample			
	Loan Amount	Loan Spread	Loan Collateral / Loan	Loan Duration	Loan Amount	Loan Spread	Loan Collateral / Loan	Loan Duration
County HHI (1 year LAG)	-5.367*	-0.007	7.575*	-3.005	-5.296**	0.049**	1.460	5.190**
	(2.887)	(0.013)	(4.191)	(2.438)	(2.275)	(0.024)	(5.807)	(2.524)
Renewal	0.371***	0.001***	-0.375**	-0.020	2.471***	-0.002	-1.500	-0.148
	(0.088)	(0.000)	(0.180)	(0.033)	(0.433)	(0.005)	(0.955)	(0.622)
Overdraft	-0.057	0.000	-0.209**	-0.109***	-0.889*	-0.011**	0.336	0.743
	(0.074)	(0.000)	(0.098)	(0.034)	(0.495)	(0.005)	(0.594)	(0.490)
Log (Loan Number)	0.168***	-0.000*	0.024	0.007	-0.159	-0.010***	0.799	-0.430
	(0.046)	(0.000)	(0.072)	(0.030)	(0.421)	(0.004)	(0.626)	(0.441)
Metropolitan Branch	0.122	-0.000	-0.678**	0.145	0.660**	-0.005	0.706	0.137
	(0.154)	(0.001)	(0.263)	(0.150)	(0.299)	(0.004)	(0.583)	(0.362)
Borrower Company	0.603***	-0.001**	-0.198***	-0.009	2.362***	-0.003	-0.730	-2.036***
	(0.083)	(0.000)	(0.042)	(0.010)	(0.552)	(0.004)	(1.081)	(0.733)
Borrower Woman	-0.660***	0.001***	0.412***	-0.003	1.328	0.017	-9.797	-6.386
	(0.140)	(0.000)	(0.034)	(0.028)	(5.841)	(0.065)	(6.929)	(6.505)
Log (County Population)	0.006	-0.000*	0.208**	-0.014	-0.473***	0.002*	-0.270	0.202
	(0.100)	(0.000)	(0.101)	(0.028)	(0.115)	(0.001)	(0.286)	(0.127)
R^2	0.429	0.139	0.057	0.089	0.834	0.493	0.668	0.697
Obs	23496	10251	18534	12116	31	29	31	29
Bank Controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	No	No	No	No
Bank FE	Yes	Yes	Yes	Yes	No	No	No	No
Occupation/Industry FE	Yes	Yes	Yes	Yes	No	No	No	No
Econ Sig. (County HHI)	-0.340	-0.001	0.453	-0.207	-0.264	0.003	0.088	0.189

Table VIII

We use two measures of loan applicant quality, LIWC (which returns scores from 0 to 100 for the positivity and negativity of the bank's internal comments with regards to the loan application), and a subjective measure (with positive scored as zero or one and negative scored as zero or one). We regress these measures of loan quality on one-year lagged County HHI and borrower and bank characteristics. Client Character is a dummy variable equal to one if the comment of the bank is about the personal character of the borrower and zero otherwise. ***, **, and *, represent coefficients that are statistically different from zero at the 1%, 5%, and 10% levels respectively. Constant is not reported. The bank controls are number of bank branches, ROA, and Deposits/Assets.

	LIWC				Subjective			
	Positivity	Positivity	Negativity	Negativity	Positivity	Positivity	Negativity	Negativity
County HHI (1 year LAG)	-0.051	-0.119	-1.142***	-1.720**	0.649**	0.528	-1.082***	-1.200***
	(1.004)	(0.870)	(0.347)	(0.624)	(0.248)	(0.405)	(0.227)	(0.368)
Renewal	-0.037	-0.027	0.054	0.056	-0.026*	-0.028**	0.036	0.055**
	(0.032)	(0.032)	(0.071)	(0.076)	(0.013)	(0.013)	(0.032)	(0.024)
Overdraft	-0.023	-0.041***	-0.031	-0.018	-0.018**	-0.022***	-0.012*	-0.011*
	(0.020)	(0.009)	(0.024)	(0.012)	(0.007)	(0.004)	(0.007)	(0.007)
Log (Loan Number)	-0.065***	-0.059***	-0.043***	-0.042***	-0.040***	-0.038***	-0.012***	-0.012***
	(0.011)	(0.013)	(0.008)	(0.007)	(0.004)	(0.004)	(0.004)	(0.004)
Metropolitan Branch	-0.061	-0.043	-0.003	-0.24	0.034*	0.04	-0.216**	-0.082***
	(0.072)	(0.044)	(0.049)	(0.141)	(0.018)	(0.034)	(0.089)	(0.029)
Borrower Company	-0.020**	-0.007	0.059***	0.055***	-0.008	-0.006	0.047***	0.050***
	(0.010)	(0.008)	(0.011)	(0.013)	(0.007)	(0.007)	(0.016)	(0.014)
Borrower Woman	-0.044***	-0.052***	-0.090***	-0.089***	0.003	0	-0.047***	-0.046***
	(0.002)	(0.009)	(0.006)	(0.005)	(0.003)	(0.001)	(0.008)	(0.007)
Log (County Population)	-0.039	0.015	-0.124	-0.229***	0.03	0.025	-0.112**	-0.005
	(0.112)	(0.058)	(0.082)	(0.074)	(0.032)	(0.019)	(0.042)	(0.041)
R^2	0.086	0.112	0.091	0.1	0.099	0.11	0.101	0.11
Obs	7320	7320	7320	7320	7139	7139	7139	7139
Bank Controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Bank FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Occupation/Industry FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
County FE	No	Yes	No	Yes	No	Yes	No	Yes
Econ Sig. (County HHI)	-0.004	-0.009	-0.085	-0.125	0.188	0.153	-0.23	-0.255

Table IX

We present summary statistics of our bank-year balance sheet data. Bank HHI is the Herfindahl index of the county in which that particular bank had the most branches in that year. We calculate Equity Return on the bank's shares from the start of the year until the end of the year, excluding dividends. Number of Branches is the number of branches of that bank, in any county, in that year. Bank ROA is as defined in Table IV. Assets is the book value of assets, in thousands of pounds. Cash to Assets equals cash, plus cash equivalents, divided by Assets. Investment to Assets equals the book value of marketable securities divided by Assets. Loan to Assets is the book value of loans divided by Assets. Authorized Capital to Assets is the book value of capital that the bank is authorized to issue divided by Assets. County Population is the population of the county in which the bank had the most branches in that year in thousands. # of Acquisitions, past 5, is the number of banks taken over during the previous 5 years. Growth of Assets, past 5, equals the percentage increase in the book value of assets over the previous 5 years.

	Obs	Mean	Median	s.d.
Bank HHI	2,163	0.135	0.120	0.064
Equity Return	1,717	0.012	0.005	0.035
Number of Branches	2,163	87.56	20	206
Bank ROA	2,070	0.014	0.013	0.007
Assets (£ '000)	2,330	16,525	3,421	48,018
Cash to Assets	2,330	0.148	0.134	0.082
Investment to Assets	2,330	0.185	0.166	0.127
Loans to Assets	2,330	0.624	0.632	0.146
Authorized Capital to Assets	1,979	0.343	0.335	0.130
County Population ('000)	2,151	1,743	1,000	1,475
# of Acquisitions, past 5	1,844	0.443	0	1.333
Growth of Assets, past 5	1,629	0.235	0.146	0.349

Table X

Panel A reports OLS regressions of the various balance sheet ratios on one-year lagged Bank HHI plus controls as defined in Table IX. Bank, year, and main county of operation fixed effects are used. Panel B reports 2SLS regressions of the balance sheet ratios. ***, **, and *, represent coefficients that are statistically different from zero at the 1%, 5%, and 10% levels respectively. Constant is not reported.

	Panel A : Fixed Effects			
	Cash/Assets	Investments /Assets	Loans/Assets	Capital (authorized) / Assets
Bank HHI (1 year LAG)	-0.126	0.741***	-0.685**	0.090
	(0.152)	(0.264)	(0.298)	(0.112)
ROA (1 year LAG)	0.775	-2.620***	2.076***	4.151***
	(0.619)	(0.529)	(0.456)	(0.941)
Log Assets (1 year LAG)	0.007	-0.031	0.001	-0.011
	(0.014)	(0.019)	(0.018)	(0.011)
Log Number of Counties	0.017***	-0.014	0.023	-0.032***
	(0.006)	(0.015)	(0.017)	(0.012)
Log # of Acquisitions, past 5	0.001	0.000	-0.004	-0.001
	(0.002)	(0.003)	(0.003)	(0.002)
Log Main County Pop. (1 year LAG)	0.015**	0.008	-0.021**	0.006
	(0.006)	(0.008)	(0.009)	(0.004)
Growth of Assets, past 5	-0.009	-0.014	0.013	-0.008
	(0.007)	(0.011)	(0.010)	(0.008)
R^2	0.702	0.870	0.812	0.953
Obs	1364	1364	1364	1318
Econ Sig. (Bank HHI)	-0.05	0.271	-0.074	0.011
	Panel B : Instrumental Variable			
Bank HHI (1 year LAG)	-0.419	2.807**	-2.647**	-2.275
	(0.582)	(1.181)	(1.327)	(1.457)
ROA (1 year LAG)	0.770	-2.583***	2.041***	4.144***
	(0.624)	(0.761)	(0.669)	(1.496)
Log Assets (1 year LAG)	0.005	-0.019	-0.010	-0.028
	(0.015)	(0.021)	(0.022)	(0.019)
Log (Bank branches) (1 year LAG)	0.024	-0.069*	0.074*	0.031
	(0.017)	(0.038)	(0.040)	(0.031)
Log County Population (1 year LAG)	0.001	0.001	-0.005	-0.002
	(0.002)	(0.003)	(0.003)	(0.002)
Log # of Acquisitions, past 5	0.014**	0.017*	-0.031***	-0.006
	(0.007)	(0.009)	(0.011)	(0.012)
Growth of Assets, past 5	-0.009	-0.017	0.016	-0.005
	(0.008)	(0.012)	(0.011)	(0.010)
R^2	0.699	0.821	0.772	0.887
Obs	1364	1364	1364	1318
Econ Sig. (Bank HHI)	-0.084	0.452	-0.126	-0.198

Table XI(a)

We run OLS regressions of county employment to population ratios and tax revenues on one-year and five-year lagged County HHI, dummy variables for agricultural employment and NewTech employment interacted with county HHI, as well as in-market merger and out-of-market merger. We control for county population, county male/female population ratio, and county annual rainfall all lagged 1 year (coefficients not reported). Employment to population data are reported at the county-year-industry level. The standard errors are clustered at the county level. ***, **, and *, represent coefficients that are statistically different from zero at the 1%, 5%, and 10% levels respectively. Constant is not reported. All regressions use year and county fixed effects.

	Male Employment/ Population		Male Employment/ Population		Tax Revenues Agriculture (Growth)		Tax Revenues Industry and Trade (Growth)	
County HHI (1 year LAG)	-0.011**		0.004		-0.038*		0.067	
	(0.004)		(0.004)		(0.021)		(0.093)	
County HHI (5 year LAG)		-0.009		0.009		0.014		-0.318*
		(0.007)		(0.007)		(0.083)		(0.170)
HHI (1 year LAG) * Agriculture	0.220***							
	(0.040)							
HHI (1 year LAG) * NewTech			0.006					
			(0.006)					
HHI (5 year LAG) * Agriculture		0.239***						
		(0.043)						
HHI (5 year LAG) * NewTech				-0.001				
				(0.005)				
In-market merger	0.000	0.000	0.000	0.000	-0.003	-0.001	-0.024***	-0.036***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.006)	(0.004)	(0.009)	(0.013)
Out-of-market merger	-0.000	-0.000	-0.000	-0.000	-0.001	0.004	-0.003	-0.008
	(0.000)	(0.000)	(0.000)	(0.000)	(0.003)	(0.004)	(0.008)	(0.007)
R^2	0.557	0.560	0.538	0.538	0.939	0.943	0.259	0.327
Obs	6967	6967	6967	6967	765	561	709	505
Econ Sig (County HHI)	-0.012	-0.009	0.074	0.166	-0.04	0.01	0.44	-2.1
Econ Sig (County HHI/Agriculture)	0.229	0.252						
Econ Sig (County HHI/NewTech)			0.112	-0.010				
Industry FE	Yes	Yes	Yes	Yes	No	No	No	No

Table XI(b)

We run OLS regressions of business formation per capita, business dissolution per capita and bankruptcies per capita on one-year and five-year lagged County HHI, in-market merger, out-of-market merger, the log of County Population (lagged), as well as controls for the male/female population ratio and annual rainfall lagged with 1 year. The standard errors are clustered at the county level. ***, **, and *, represent coefficients that are statistically different from zero at the 1%, 5%, and 10% levels respectively. Constant is not reported.

	New Firms (Creation)		New Firms (Dissolution)		Total Bankruptcies	
County HHI (1 year LAG)	1.228*		1.298**		0.429	
	(0.673)		(0.584)		(0.361)	
County HHI (5 year LAG)		-0.411		0.364		0.638*
		(0.513)		(0.518)		(0.377)
In-market merger	-0.018	-0.025	0.018	-0.013	0.030	0.040*
	(0.055)	(0.057)	(0.046)	(0.045)	(0.020)	(0.022)
Out-of-market merger	0.057	0.070	0.010	0.038	-0.060**	-0.062**
	(0.046)	(0.049)	(0.040)	(0.040)	(0.029)	(0.029)
County Population (1 year LAG)	1.608***	1.843***	1.608***	1.990**	-0.681	-0.473
	(0.333)	(0.474)	(0.540)	(0.746)	(0.958)	(0.963)
Male / Female Ratio (1 year LAG)	-1.592	-3.275	-2.301	-4.015	0.376**	0.411**
	(2.202)	(2.972)	(2.070)	(3.223)	(0.142)	(0.181)
Log County Rainfall (1 year LAG)	-0.296	0.035	-0.151	0.025	0.111	0.024
	(0.243)	(0.306)	(0.226)	(0.328)	(0.142)	(0.164)
R^2	0.937	0.942	0.813	0.822	0.944	0.943
Obs	848	636	848	636	1645	1457
Econ Sig (County HHI)	0.114	-0.037	0.121	0.033	0.032	0.047
Year FE	Yes	Yes	Yes	Yes	Yes	Yes
County FE	Yes	Yes	Yes	Yes	Yes	Yes

Table XI (c)

We run OLS regressions of crime per capita on one-year and five-year lagged County HHI, In-market merger, Out-of-market merger, the log of County Population (lagged one year), as well as controls for the male/female population ratio and annual rainfall lagged 1 year. In both regressions the standard errors are clustered at the county level. ***, **, and *, represent coefficients that are statistically different from zero at the 1%, 5%, and 10% levels respectively. Constant is not reported.

	Begging		Larcenies	
County HHI (1 year LAG)	1.438**		-0.035	
	(0.665)		(0.297)	
County HHI (5 year LAG)		0.802		0.256
		(0.676)		(0.263)
In-market merger	-0.016	0.009	0.004	0.008
	(0.049)	(0.048)	(0.023)	(0.020)
Out-of-market merger	-0.040	-0.031	-0.025	-0.033
	(0.060)	(0.061)	(0.026)	(0.025)
County Population (1 year LAG)	0.920***	1.140***	0.113	0.143
	(0.265)	(0.339)	(0.119)	(0.120)
Male / Female Ratio (1 year LAG)	-1.424	-1.547	1.109	0.790
	(1.194)	(1.544)	(0.978)	(0.922)
Log County Rainfall (1 year LAG)	0.200	0.119	0.194	0.148
	(0.215)	(0.241)	(0.136)	(0.135)
R^2	0.176	-0.126	0.978	0.978
Obs	1566	1350	1566	1350
Econ Sig (County HHI)	0.134	0.074	-0.003	0.023
Year FE	Yes	Yes	Yes	Yes
County FE	Yes	Yes	Yes	Yes