Geographical Segmentation of US Capital Markets

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Abstract. Is the US capital market integrated geographically? If not, does segmentation affect economic outcomes? Has deregulation changed the extent of segmentation? This paper attempts to answer these questions using demographic variation in savings behavior. Metropolitan areas with a large fraction of seniors have higher local volumes of bank deposits. Since many banks are dependent on deposit financing, this is likely to affect local loan supply and economic activity. Using the fraction of seniors as an instrument I show that the effect of deposit supply on local economic outcomes, including the number of firms, the fraction of small firms, and the number of new firms started. Manufacturing firms are examined in particular because they are the least likely to be affected by local demand conditions, and since data is available further back. As predicted, deposit supply has a strong positive effect on outcomes. The supply is more important in industries that are heavily dependent on external finance. The base-line results are robust to variation in the definition of local market, and to the inclusion of controls for local wealth, as well as the use of lagged demographic variables. Finally, deregulation of intrastate branching cut the effect of local deposit supply significantly, suggesting that a benefit of deregulation is improved geographical capital allocation.

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1. Introduction

In most economies, banks play a large role in the intermediation of capital from suppliers to users. Unlike financial markets, banks are principally local intermediaries. This applies to both sides of the balance sheet. On the liability side, banks rely heavily on deposits for funding (Kashyap and Stein (2000)) and most deposits are local. On the asset side, much bank lending is local (Petersen and Rajan (2002)). For these reasons, it is possible that local variation in the supply of deposits may translate to local variation in the availability and cost of capital for borrowers.

Geographical segmentation is difficult to identify empirically, however. A direct approach is to explore a possible link between local lending volumes and local economic outcomes. In practice, this approach suffers from a severe endogeneity problem since the volume of local bank lending is likely to respond to both supply and demand. The demand for loans is trivially correlated with economic outcomes. Hence, to evaluate whether the local supply of capital affects local economic outcomes, a source of exogenous variation in the supply of bank loans is useful. This paper utilizes demographic variation in the supply of deposits as just such a determinant of local capital supply. Seniors[1] tend to hold higher levels of bank deposits than other groups – both in absolute terms and as a fraction of portfolios. Hence, a large fraction of seniors in an area will cause a higher supply of intermediated finance, relative to local demand for external financing. Since, on the other hand, seniors do not participate very much in the labor market, or operate businesses, and since they consume less than other groups, the impact of a large fraction of seniors on the local demand for business finance is small and perhaps negative. These circumstances make the fraction of seniors a potentially useful instrument for the local supply of finance (relative to demand).

There is substantial demographic variation within the US, both across and within states. I use metropolitan statistical area[2] level-variation in seniors. This allows estimation with state fixed

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[1] The term "seniors" is used to refer to that part of the population aged 65 and over.

[2] MSAs are defined by the Office of Management and Budget as a Federal statistical standard. An area qualifies for recognition as an MSA if it includes a city of at least 50,000 or an urbanized area of at least

effects, which control for state-level regulation as well as much variation in the local economies. At the MSA level, I show that a high fraction of seniors corresponds to a high supply of deposits which is associated with local economic outcomes. Using seniors as an instrument, I show that MSAs with high levels of deposits have more firms, more manufacturing firms and establishments, relatively more small firms (0-19 employees) and fewer large firms (500+ employees), and more new firm starts. Using industry external finance dependence based on Rajan and Zingales (1998), I show that the effect of the local deposit supply is stronger in more externally dependent industries.

I next go on to examine the robustness of these results to several possible concerns. To address whether the market definition is too wide, results are presented for smaller areas (zip codes) within the major cities, also showing a significant effect of instrumented deposits. To address the potential endogeneity of seniors, demographic predictions are used in the place of actual data on seniors (middle aged people 20-30 years in advance), and the results are largely robust. I next redefine local markets to be zip codes within MSAs. Smaller MSAs tend not to contain many zip codes, so I focus on the three largest cities (New York, Los Angeles, Chicago). Instrumented deposits affect outcomes with this narrower market definition, with an estimated effect of slightly smaller magnitude. To address the possibility that seniors proxy for wealth average local house values and per capita income are included in regressions and the results remain. Finally, time series results, although exploiting very limited variation in the data (the fraction of seniors is very stable) finds a positive, borderline-significant effect of deposits on outcomes.

A final set of robustness tests address the issue of where integration is weakest, i.e. where local deposits have the strongest impact on local outcomes. There are multiple potential channels for geographical reallocation of savings, in either of the steps from depositor to intermediary and on to borrower. Furthermore, internal and external capital markets may allow funds to be transferred from bank branches in high deposit areas to branches with lower deposit supply (or higher loan demand). These frictions can involve regulation, agency problems, and information

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50,000 with a total metropolitan area population of at least 100,000. MSAs typically incorporate several counties, and sometimes straddle state borders.

problems. In Section 6, evidence is presented showing that deregulation of intrastate branching (see Krozsner and Strahan (1999)) reduced the effects of geographical variation by approximately a third. This suggests that one of the important benefits of deregulation has been better geographical integration of capital markets.

This paper is related to findings in diverse contexts that the supply of loans affects economic outcomes. Peek and Rosengren (1997, 2000) show that variation in Japanese banks' lending in the US, induced by Japanese economic events, has had a large effect on construction activity in California, Illinois and New York. Ashcraft (2003) shows that in two cases when the FDIC closed healthy banks (to cover losses at affiliated banks), bank loans and local incomes declined. In contrast to these results, Driscoll (forthcoming) uses estimated state-specific shocks to the demand for money to instrument for loan supply and finds a positive relation to the volume of bank lending, but no effect on output. The results in this paper complement and expand on these findings in several ways. The instrument is more generally available, not depending on infrequent regulatory action (like the Texas bank closures) or specific foreign episodes (like the Japanese boom). This offers opportunities for broader uses, e.g. comparisons over time or international comparisons of financial systems. Also, the instrument is available at fine geographical levels (e.g. MSAs).

This paper is also related to research showing that there is substantial within-country variation in financial systems. Jayaratne and Strahan (1996) analyze variation in bank regulation across US states, and find that deregulation of entry and mergers substantially increased output growth rates. Cetorelli and Strahan (2004) report that, at the state level, the number of firms is more sensitive to bank competition in industries with high dependence on external financing. In US data, Garmaise and Moskowitz (2004) use bank mergers as an instrument for local bank competition, and also find negative effects on loan supply and economic activity following a bank merger, lasting about three years. Using Italian data, Guiso, Sapienza and Zingales (2004) show that financial development[3] is largely determined by regulatory restrictions on bank entry. They find that financial development affects rates of entry, growth of firms (especially

[3] Guiso et al measure financial development as the probability that a household is shut off from the credit market, controlling for observables.

small firms) as well as product market competition. My findings match this literature in suggesting that local credit markets matter for economic outcomes. In particular, reduced geographical segmentation provides one channel through which the large economic effects identified by Jayaratne and Strahan (1996) act. The main difference from most previous research is that my focus is not on variation in local competitiveness and institutional quality, but on geographical segmentation of capital markets. The implications are therefore different. In particular, much of the literature has suggested that bank competition is beneficial and therefore implicitly or explicitly (e.g. Sapienza (2002) and Garmaise and Moskowitz (2004)) that mergers may be harmful. The evidence on segmentation in fact suggests a cost of a dispersed banking system – it may exacerbate geographical segmentation. These policy implications are not inconsistent. Bank mergers that improve geographical integration may be beneficial while mergers that reduce local market competitiveness are detrimental. Some mergers may be detrimental in one respect and beneficial in the other.

Variation in the availability of capital in all likelihood implies welfare costs. If the marginal productivity of capital is declining (for each MSA), locations with a higher local supply of deposits will employ more capital, hence at a lower productivity, than locations with less capital, and aggregate output is reduced compared to a frictionless world.[4] The magnitude of welfare costs depends primarily on the rate at which capital productivity declines with capital intensity, and may vary by sector and over time.

A few caveats are in order. Bank lending data is not available by bank branch, so I cannot examine the effect of deposit supply on the composition and pricing of local loans. Instead, bank behavior is tentatively inferred from the behavior banks headquartered in an MSA, which implies a lot of noise (because a bank may have much of its deposits and lending outside its headquarter MSA). Second, time series variation is very limited for the fraction of seniors, so time-series results must be considered provisional.

[4] Note that such welfare costs are not as obvious for time-series variation in the supply of loans, such as that induced by monetary policy. Cross-sectional variation, however, is almost certainly harmful.

The rest of the paper is organized as follows. Section 2 examines the deposit holdings of seniors and their labor market participation. Section 3 discusses the conditions under which local deposits affect bank lending and those under which bank lending are likely to affect economic activity. Section 3 presents the data used, and Section 4 the basic empirical results. Section 5 introduces additional control variables and robustness tests, section 6 discusses what the results imply about the nature of financial frictions and presents some tests of frictions, and Section 7 concludes.

2. Seniors as an instrument for local capital supply

The empirical strategy in this paper entails using seniors as an instrument for local capital supply. This implies two main requirements on the consequences of local seniors. The measure of local capital supply is bank deposits (in local branches), so it is necessary that seniors have a positive effect on deposits. Second, for seniors to be a valid instrument for local capital supply it is paramount that the fraction of seniors not affect local capital demand. This section addresses the plausibility of these two assumptions in turn.

Loan supply: seniors tend to hold bank deposits

Seniors tilt their portfolios substantially toward deposits, and hold substantially higher levels of deposits than any other group. Using the 2001 Survey of Consumer Finances (SCF) relative portfolio allocations are calculated for different age groups. For each age group, average and median portfolio shares of deposits out of total financial assets are reported. Figure 1 shows portfolio shares for each age group. Clearly, senior tilt their portfolios heavily toward deposits, more so than any other group except those less than 35 years (who have low total holdings of financial assets). In terms of absolute levels of deposits, seniors are the only age group where more than 90% of individuals held transaction accounts[5], and where more than 20% held certificates of deposits in. Median holdings of certificates of deposits from various SCFs are reported in Table 1. As expected, the holdings of seniors are higher than those of other age groups.

[5] For other forms of deposits (transaction accounts and savings accounts) the holdings are much smaller than for certificates, but again, the holdings of seniors are higher than those of other groups. The 75+ age group (with the highest holdings in both 1995 and 1998) had median transaction account holdings of $5.6 thousand 1995 and $6.1 in 1998.

Loan Demand: seniors have low labor market participation and consumption

For the instrument to be valid, it is also important that seniors do not increase demand for loans. This probably holds since seniors produce and consume less than other age groups.[6] Seniors participate less in the labor force than other groups. The median retirement age in the US is about 62 years (Gendell and Siegel (1992)). In 1997, the labor force participation of people aged 65-69 was 24.4%, of those aged 70-74 it was 13.5% and of those aged 75 or more, 5.3% (Wiatrowski (2001)). These numbers probably overstate the labor supply of seniors somewhat, since part-time work is common in older groups (51% of employed seniors according to Wiatrowski (2001)). Also, seniors tend to be less active as entrepreneurs than other age groups. Moskowitz and Vissing-Jorgensen (2002) report that 10% of owners of private equity were 65 or older in the pooled 1989, 1992, 1995 and 1998 Surveys of Consumer Finances, while constituting about 13% of the overall population. Again, the level of activity conditional on participation is probably lower than for other age groups. Heaton and Lucas (2000) report that seniors hold a smaller fraction of their portfolio in proprietary business than other age groups (e.g. 2.4% of liquid assets for seniors vs. 6.8% for the 50-64 age group in 1995). Finally, seniors consume less than other age groups. In 2002, median (average) money income before taxes of households headed by a senior was $23,683 ($29,711) compared to an overall average for the population of $43,381 ($49,430) according to the 2002 Consumer Expenditure Survey.

3. Data

Base-line tests are performed at the level of Metropolitan Statistical Areas, as defined by the US Census and reported in the Federal Register.[7] In 2000, about 82% of the US population resided

[6] It is not necessary (for the validity of the instrument) that seniors do not participate at all in the labor market. As long as seniors hold more deposits, in absolute terms, than non-seniors, banks will face a higher supply of deposits (relative to demand for financing) in areas with many seniors. This holds even if seniors work and consume as much as other age groups.

[7] See http://www.census.gov/population/www/estimates/metrodef.html for current and historical definitions

in MSAs. MSAs sometimes appear or disappear between census dates, so panel data based on MSAs is unbalanced.[8]

Data on population and age structure is from the decennial Censuses of 1970, 1980, 1990 and 2000. In 2000, the MSAs with the highest fraction of seniors were Fort Pierce--Port St. Lucie, Florida (24.9%); Fort Myers--Cape Coral, Florida (25.4%) and Sarasota--Bradenton, Florida (28.5%). Outside Florida, Johnstown, Pennsylvania (19.1%) had the highest fraction in 2000. The lowest fractions of seniors were in Anchorage, Alaska (5.5%); Provo--Orem, Utah (6.4%) and Bryan--College Station, Texas (6.7%). The state with the highest fraction (straight average across MSAs) was Florida (17.5%) and the lowest (except for Alaska which contains only one MSA, Anchorage) was Utah (7.4%). The fraction of seniors is highly stable over time, and MSA fixed effects explain 81% of the variation in seniors (with year dummies as well, the fraction is 93%).

Individual bank lending and balance sheet data are from the Federal Deposit Insurance Corporation's Call Reports. Interest income and balance sheet items (total assets, net loans, securities holdings) are available by bank, but not by branch. MSA deposit data is summarized in State and Metropolitan Area Data Books (see e.g. US Bureau of the Census (1998)). In later years, deposit data is also available for each bank branch separately (from the FDIC).

Per capita income is from the Bureau of Economic Analysis' regional accounts. Other economic outcomes are collected from State and Metropolitan Area Data Books. House prices (in 2000) are from the census. Firm starts are from the Small Business Administration.

Crime rate data is collected from the Federal Bureau of Investigation's Uniform Crime Reports. They refer to total volumes of property (burglary, larceny-theft, motor vehicle theft) and violent crimes (murder, forcible rape, robbery, and aggravated assault) per 100,000

[8] To some extent, this can be counteracted by using non-contemporary Census reports, reflecting updated MSA definitions. Here, 1978 MSA definitions have been used for 1970 and 1980 data, 1996 definitions for 1990 and 2000 data.

inhabitants.[9] Because property crimes are more numerous, the overall number is more closely correlated with property crime rates. The numbers were re-scaled (to make tables easier to read) so that the numbers represent crime rates per 100 inhabitants.

Data by zip code on demographics, number of establishments and house prices are from the census for 2000 (establishment data is lagged three years).

Table 2 provides summary statistics for the sample as well as the correlations of some key variables. In single-year cross-sections, the correlation between the fraction of seniors and the log of bank deposits per capita is 0.27 in 1970, 0.20 in 1980, 0.23 in 1990 and 0.21 in 2000. The fraction of seniors is slow moving and the correlation between successive cross-sections is 0.92 on average.

Bank financing and local seniors

This section examines the effect of seniors in individual bank data. For each MSA, I calculate median values (across banks) for the amount of deposits per branch, lending and securities holdings per branch, and interest charged on lending. There are two important caveats for this test. First, the amount of lending by individual branches is not generally public.[10] Instead this section presents evidence based on headquarters locations of banks. This will introduce noise in the dependent variables, since banks with a presence in multiple markets are matched to the aggregate deposits supply they face, but to the supply of deposits in the local market where their headquarter is located. Second, no borrowers characteristics are observed, so the average interest rate of each bank is not adjusted for risk in any way. This may introduce noise in the interest rate variable.

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[9] A few MSAs lack rape data in 1980 and 1990, because their reporting was not consistent with UCR guidelines. These MSAs were given a score based on the other crime categories only (rapes are a very small fraction of crime compared to e.g. assault or burglary, so this should affect numbers very little).

[10] Deposit data are widely available for branches due to FDIC rules.

The regressions presented in the first three columns Table 3 relate the financing choices of single-msa banks[11] to the fraction of seniors in the local population, controlling for state fixed effects. Deposits constitute a larger fraction and equity a smaller fraction of financing when local deposit supply is high (i.e. many seniors). Debt is unaffected. This fits the findings of Kashyap and Stein (2000) and Bassett and Brady (2002) that only the largest banks use non-deposit debt financing to any significant extent. Single-MSA banks all fall in the size categories that use little or no outside debt. This universal absence of debt for smaller banks suggests that it is natural to find that the location of a bank does not affect debt financing.

What about the financing of multi-MSA banks? Since such banks face different deposit supply in different areas, there is no direct way to test their overall financing choices against local seniors. Instead, I relate deposits at the branch level to deposit supply. In the fourth column of Table 3, branch level deposits of banks with a presence in more than one MSA are regressed on local seniors, and state dummies. As with single-MSA banks, the effect of seniors is highly significant. An increase in seniors of one standard deviation (0.034) corresponds to an increase in branch level deposits of 5.3%. In the next column, institution fixed effects are included. The coefficient is slightly larger in this specification (a one standard deviation increase in seniors results in a 5.8% increase in deposits). These increases in deposits per branch might not add up to more deposits in an area if, for some reason, a high fraction of seniors were accompanied by relatively fewer bank branches. The last column in Table 3 reports an MSA-level regression of number of branches on local seniors. As with the extent of deposit financing, the effect of seniors on bank density is positive and highly significant. A one standard deviation increase in seniors corresponds to a 6.9% increase in the number of bank branches per capita.

The results suggest that deposit supply at the MSA level affects the local banking sector significantly. The next step is to relate this to local outcomes. Banks ability to reallocate capital (so as to reduce or offset the variation in deposit supply across locations) is revisited in Section 6. For the moment, notice that most small banks do not have access to non-deposit finance apart from equity, and that especially early in the sample, few banks had internal capital

[11] This includes all unit banks with only one branch, but also banks with multiple branches as long as they are all located in a single MSA.

markets spanning multiple MSAs (the latter largely due to regulation). The next section uses the main data set of aggregate MSA-level variables to examine the effect of deposit supply on local economic outcomes.

4. Loan supply and economic outcomes

In this section, I show that deposits have a large positive effect on local economic outcomes. The base-line regression is an IV regression with seniors used as an instrument for deposits. The regression is run in a pooled panel with state-year interaction fixed effects. The fixed effect dummies control for state-specific regulatory and economic factors affecting the dependent variable, even if they vary by time. Because errors are clustered by MSA, allowing correlation between observations (i.e. years) within an MSA, any significant results are mainly driven by cross-sectional variation.

First stage regression

Let H represent deposits, P the log of population, the index t the year of the observation and the index i an MSA and $s(i)$ the state to which MSA i belongs. Finally let S_{it} be the fraction of seniors in the local population. The, first stage regressions are as follows[12]:

$$H_{it} = \alpha + \beta S_{it} + \gamma P_{it} + X_{t \cdot s(i)} \qquad (1)$$

Table 4 presents first stage regressions of deposits per capita on seniors (the fraction of the MSA's population that is 65 years and above) and state-year fixed effects. Notice that the fixed effects imply that only within-state and –year variation in seniors is exploited, whereas all between-state variation is discarded. Columns two and three show that the effect of seniors on deposits holds for both large and small MSAs. Column four and five show that the effect has declined over time (1990 and 2000 vs. 1970 and 1980) but that it remains significant in the later period. Columns six to nine successively include additional controls for city size (population) and local income and wealth (house prices). The fraction of seniors is highly significant in all specifications and adds between 6% and 10% to the R-squared (compared to a regression with

[12] The IV estimation is presented as 2SLS estimation. This is an intuitive way of thinking about the results, and correct, but the standard errors are calculated differently than for OLS (based on the predicted rather than actual instrumented variable).

dummies and controls only). Based on the coefficient estimate in the first column, a one standard deviation increase in the fraction of seniors (0.034) corresponds to an 11% increase in deposits per capita.

Economic outcomes: base-line

The key test of whether the local loan supply matters is based on local economic outcomes. The particular variables used reflect which suitable outcomes are measured and available for MSAs. Second stage regressions are presented in Table 5.

The first dependent variable is (the log of) the number of firms. Also, the fractions of firms that are small (<20 employees) and large (≥500 employees) are used. Small firms have few alternatives to bank loans for raising finance, and are likely to respond more to bank loan supply (see e.g. Gertler and Gilchrist (1994)). For ex, Petersen and Rajan (1994) argue that external financing problems are likely to be most severe for small firms, for which information is likely to be scarce and "soft". Large firms can likely access bank loans further away, as well as market finance. Hence, deposits should be positively correlated with the fraction of small firms and negatively with the fraction of large firms. Firm size data is available for 1990 and 2000.

It is possible that seniors demand a different mix of local services than younger people, possibly involving a larger number of firms (e.g. restaurants and health care). For this reason, the number of manufacturing firms is used as a dependent variable, manufacturing firms being the least likely to reflect local demand. The fraction of large manufacturing firms is also examined. Establishment level data is used as well, because it is available for all sample years. The final dependent variable is firm starts. New firms are likely to be particularly dependent on local financial institutions (see e.g. Petersen and Rajan (1995)).

Table 5 reports two stage least squares regression results for the economic outcome variables. Second stage regressions are as follows:

$$Y_{it} = \alpha' + \beta'\hat{H}_{it} + \gamma' P_{it} + X_{t \cdot s(i)} \tag{2}$$

where Y is an outcome variable, $\hat{H}$ instrumented deposits, P the log of population, and where the index t represents the year of the observation and the index i represents an MSA and $s(i)$ the state to which MSA i belongs. All regressions include state-year interaction fixed effects X.[13]

The second stage works well for all outcome variables. The coefficients are highly significant and of the predicted sign. A one standard deviation increase in the log of deposits per capita (0.41 units[14]) corresponds to a 13% increase in the number of firms; a 2.3% increase in the fraction of firms that are small, a 0.9% drop in the fraction of firms that are large, a 50% increase in the number of manufacturing firms, and an 21% increase the number of firms starts. These fairly large magnitudes indicate that the local deposit supply is an important determinant of local economic outcomes.

5. Robustness and extensions

This section tackles several possible concerns with the base-line results. First, section 5.1 examines industry level data, offering verification that the effect of local deposit supply is largest in industries with high dependence on external finance. Second, section 5.2 addresses whether seniors are exogenous in relation to economic outcomes. Seniors are replaced by a lagged prediction of seniors, based on demographics. Third, Section 5.3 verifies that local wealth is unlikely to cause an omitted variable bias. Controls are added for local per capita income and house prices. Fourth, recent evidence suggests that MSAs may be too large to capture local bank markets. This is especially relevant for the larger MSAs that contain millions of inhabitants and tens of thousands of firms. Section 5.4 presents results for narrower geographical areas. Finally, section 5.5 examines the time series evidence using changes in seniors.

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[13] The number of observations is slightly reduced because some MSAs do not belong to a single state and were excluded (e.g. Kansas City MSA contains counties in both Kansas and Missouri). An alternative procedure would be to apply both state dummies and including a dummy for multiple state-MSAs. I tried this method, with results similar to the base-line.

[14] Note that a one standard deviation increase in deposits corresponds to a substantial increase in the fraction of seniors (approximately 12 percentage points).

5.1 Economic outcomes: industry variation

Firms in some industries are more dependent on external financing (such as bank loans) than others. Rajan and Zingales (1998) introduce a measure of industry external finance dependence based on a sample of Compustat firms. They show that countries with better financial development exhibit faster growth in industries with high external dependence to a larger extent than in industries with low external dependence. I apply the same logic here: if firms in some industries are typically more dependent on external financing for technological reasons, they will respond more to local supply of bank loans. Following Rajan and Zingales, I calculate capex minus cash flow from operatins, divided by capex for Compustat firms, using a 10 year period and taking average across years for each firm, and then the median across firms in an industry to get an industry number. Using Compustat firms, which are large and likely to be the least financially constrained of all firms, is appropriate for capturing demand for financing. I depart from Rajan and Zingales in defining the measure over 1985-95, and for 2-digit NAICS industries instead of 3-digit ISIC manufacturing industries.[15] While the measure applies most intuitively to manufacturing, data suppression for Census data on fine industry definitions makes it very difficult to use finer industries than at the 2-digit level.

Table 6 presents results from second stage regressions of outcomes on bank deposits interacted with external dependence:

$$Y_{ij} = \alpha' + \beta' H_i \times E_j + X_i + Z_j \tag{3}$$

where Y is an outcome variable, $H_i \times E_j$ deposits in MSA i times external dependence of industry j, and fixed effects X and Z for MSAs and industries. The instrument for $H_i \times E_j$ is fraction of seniors in the local population times industry dependence: $S_i \times E_j$. Dependent variables available at the industry level are establishments, employees and sales. All numbers are from the 1997 Economic Census. The number of firms is unavailable, and so is data from the most Economic Census (2002). I use 2000 data on seniors since this is closest to 1997 in time,

[15] NAICS 51, "Information", and NAICS 95, "Auxiliaries, exc. corp, subsidiary, & regional managing offices", are excluded for lack of data on establishments and other outcomes.

but 1990 seniors data produces indistinguishable results (as could be expected with the high correlation between years).

The first column in Table 6 shows that after controlling for industry and MSA fixed effects, the interaction of bank deposits and external dependence has a positive and significant (10% level) effect on the number of establishments. This can be interpreted as follows: in an industry with external dependence one standard deviation (0.85) above the mean, the elasticity of the number of establishments with respect to bank deposit supply is 0.18 higher than at the mean external dependence. Note that the fixed effects absorb almost all variation (the R-squared is above 0.9 and only slightly affected by including the interaction). The second and third columns present similar regressions for employees and sales, which are slightly more significant and slightly larger economically. The next column present results for establishments when NAICS 62 (health care & social assistance) is excluded. This has virtually no impact on the estimated coefficient. Finally, the last column uses the rank of industry external dependence instead of the actual number. The rank is less sensitive to outliers and to the particular details of estimated dependence, but relies exclusively on the industry order of external dependence. The ranking is from low to high, so that a positive interaction indicates that industries with higher external dependence are more responsive to deposit supply. The coefficient is positive and significant (10%) and implies a magnitude similar to the one estimated in the first column.

Industries which tend to rely more on external financing for their investment are more sensitive to the local supply of deposits. This is consistent with a supply effect from seniors working through bank loans. The regressions have controlled for MSA fixed effects, so omitted variables are unlikely to be a large concern in these regressions.

5.2 Mobility and the exogeneity of seniors

One possible concern with the results is reverse causality, i.e. that there are many seniors in areas where capital demand is high. For example, interest rates offered by banks to depositors might affect where seniors chose to live. To address this, a measure of seniors determined well ahead of economic outcomes is useful. A simple prediction of the fraction of seniors is the fraction of middle-aged people a few decades earlier. I replace the fraction of seniors in 1990 and 2000 with the fraction 45-64 year-olds in 1970. These middle-aged inhabitants of an MSA are 65-84 years old in 1990 and 75-94 years old in 2000. The measure is a relatively weak predictor of actual senior numbers (correlation 0.33). Importantly, however, this measure of seniors in 1990 and 2000 is determined ahead of the economic outcomes, and any positive results with this variable cannot be affected by mobility in the post-1970 period.

The new variable is used in place of seniors in IV regressions for the panel sample including only the 1990 and 2000 cross sections. Panel A of Table 7 presents first stage regressions showing that predicted seniors affects deposits positively. The magnitude is slightly lower than for the actual seniors variable (cf. Table 4). The second stage results, presented in Panel B, are similar in magnitude to the base line regression and have the same sign throughout. In two cases (the fraction of small and large firms) the coefficient on deposit loses significance, but in three of the regressions (firms, manufacturing firms, manufacturing establishments), deposits are highly significant, despite using a coarse proxy for actual seniors. This suggests that mobility does not drive the base-line results, and that reverse causality cannot explain the positive effect of instrumented deposits on outcomes.

5.3 Additional controls

One concern with the base-line results is that there is no control for variation in wealth across MSAs. Measuring wealth properly is obviously difficult, but some reasonable proxies are easy to identify. First, house prices may proxy for local wealth for obvious reasons. This is measured as the log of median house prices. A second control is the log of per capita income, also likely to be related to local wealth levels. House prices are available for 2000, and income for all years.

Results with additional controls are in Table 8, for all six dependent variables. House prices and population are included as controls. The estimated effects of the wealth controls themselves are significantly positive for firms. For other dependent variables, one or neither of the control variables is significant. Notably, high house prices predict more firm starts, and income predicts firm size variables. Controlling for wealth tends not to affect the magnitude and significance of the estimated effect of deposits. The estimated deposit coefficient is positive, similar to base-line results. This suggests that the baseline results on deposits are not driven by omitted variable bias due to wealth, but only insofar as wealth is accurately captured by incomes and house prices.

5.4 What is the relevant local market?

Some previous research on bank competition (e.g. Garmaise and Moskowitz (2004), Petersen and Rajan (1995)) has suggested that much lending is very local. MSAs may be to large to capture market size ideally. As a robustness test, it is useful to look at a narrower market definition, avoiding the pooling of distinct markets into one observation. For this purpose, I use zip code level data. Many smaller MSAs intersect only one or two zip codes, but for larger cities, the number of zip codes may be in the hundreds. I therefore look at zip code results for New York, Los Angeles and Chicago, the MSAs cities with the largest populations. Counting all zip codes that cover any part of each greater city (based on the Census concept of a CMSA, larger than an MSA), but excluding all zip codes with less than 1000 residents, New York has 890, Los Angeles 505 and Chicago 340. At the zip-code level, very little economic information is available. The dependent variable is number of establishments. Median house values are used to control for wealth.

Results for zip codes are presented in Table 9. The first stage (Table 9, Panel A) shows that the fraction of seniors has a large positive effect on deposits whether or not local house values are controlled for. The estimated coefficients are slightly higher than the MSA-level numbers (see Table 4) and highly significant.

5.5 Time series results

If the level of deposits affects economic outcomes, it is natural to ask if changes in deposits affect changes in economic outcomes. The empirical approach used here is ill suited to such tests, unfortunately. Since the fraction of seniors is so stable, identification based on changes in the fraction uses very marginal variation at best. Even at ten-year intervals, the correlation of the fraction in consecutive cross-sections is 0.92. To increase the amount of useful variation, time series regressions are run for changes over the maximum time span -- 1970 to 2000. This limits the dependent variable to manufacturing establishments, and the number of observations to 146 (MSA that remained from 1970 to 2000 and for which demographic data and bank deposits is available for both years).

Table 10, column one presents the results of the following second stage regression

$$\Delta Y_i = \alpha + \beta\Delta\hat{H}_i + \gamma\Delta P_i + X_{s(i)} \tag{4}$$

where ΔY is the change in the log of manufacturing establishments 1970-2000, $\Delta\hat{H}$ is the change of deposits instrumented by the change in seniors, ΔP is the change of log of population, X is a state dummy, and the index i represents an MSA and $s(i)$ the state to which MSA i belongs. After dummies have been included, there is limited variation left to test for the effect of changes in deposit volumes. The coefficient on deposits is only significant at the 11% level, and similar in magnitude than the cross-sectional estimates. The second column includes changes in per capita income as a control. This variable is not significant. Deposits are now significant at the 10% level with a positive coefficient of 1.52. The implied effect of a one standard deviation increase of the change in log bank deposits per capita (0.32 for the three decades) is a 62% increase in the number of establishments, corresponding to a difference in annual growth rates of 1.6%. Because changes in seniors are small, this test has limited power. An additional instrument might therefore be useful. One possibility is to use the initial level of seniors, which might be useful if, for example, the 1970 level of seniors has not always filtered through to deposits and lending in 1970. In the last two columns the initial level of seniors is included as a second instrument for changes in bank deposits. Now the effect of deposits is estimated to be significant (at the 10% or 5% level depending on whether income changes are included). Despite the limited information available for the time series, these results support the cross-sectional conclusion that deposits have a positive effect on the local economy.

6. Geographically segmented financial markets: what impedes reallocation?

The evidence that local deposit supply affects economic outcomes implies that geographical frictions exist between MSAs and that they are economically important. This does not pinpoint the source of geographical frictions nor exactly what conditions reduce geographic segmentation. For example, are external or internal capital markets more important for geographic re-allocation among banks? As pointed out in the introduction, there are several ways in which capital could be moved across areas: firm borrowing from banks far away or non-bank financing from other sources; sources of bank financing that is less local than deposits (equity and bonds markets); and transfers between branches of a bank with a presence in multiple areas (internal capital markets). Regulation and financial contracting frictions of many kinds could affect all these avenues. This section examines some plausible predictions for where local deposits are likely to be most important, and tests some of these predictions. In particular, substantial US bank deregulation over the last few decades has increased access of banks to internal capital markets spanning broad geographic areas.

Unlike actual market structures, which may be endogenous to capital supply, bank regulation provides a way of identifying when capital markets are geographically segmented which is more reliably exogenous. Regulation of intrastate branching, studied by e.g. Jayaratne and Strahan (1996) and Kroszner and Strahan (1999), prohibited any formation of internal capital in banks. Deregulation is likely to have provided an improvement to the ability of banks to allocate capital geographically. The final test of this section is based on the idea that deregulation should have reduced the importance of local capital supply.

Firm financing

The literature on what is called the "credit channel" of monetary policy transmission has emphasized the different ways in which bank lending is special as a source of firm financing (i.e. does not have close substitutes). This literature has mostly examined time-series variation in lending.[16] In cross-sectional tests, Peek and Rosengren (1997) as well as Ashcraft (2003) suggest that local economies can be substantially affected by lending. Alternative financing, such as public equity, is not available for most firms.

Even if banks constitute the sole possible source of external finance for most firms, could they not borrow from far-away banks? Petersen and Rajan (2002) show that distances between US borrowers and lenders are increasing. Nevertheless, the distances are generally short. In their sample, the median distance between borrower and bank is 2 miles for lending relationships started in 1973-79, 4 miles for relationships started in 1980-89, and 5 miles for relationships started in 1990-93. Brevoort and Hannan (2004) suggest that distance may be of increasing importance in commercial lending. These results suggest that for many firms, borrowing at a distance is still expensive or impossible.

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[16] See e.g. Bernanke and Blinder (1988), Kashyap and Stein (1994, 2000) and Bernanke and Gertler (1995).

Bank financing

Kashyap and Stein (2000) show that banks in general, and banks below the 75^{th} percentile by asset size in particular, rely very heavily on deposit financing: "the smallest banks have a very simple capital structure – they are financed almost exclusively with deposits and common equity". Houston, James and Marcus (1997) find that the lending of bank holding companies is linked to the internally generated cash and available capital, i.e. they are liquidity constrained. Driscoll (forthcoming) also confirms banks' dependence on deposits: he finds that shocks to deposit volumes affect lending at both the state and regional levels. While small and medium-sized banks are heavily dependent on deposits, large banks have better access to market-mediated finance. This suggests that the local supply of deposits is most important when banks are small. Similarly, banks that are not listed on a stock exchange likely face more obstacles to equity financing. Even banks listed on stock exchanges face costs of issuing equity.[17] However, it seems reasonable to predict that areas with many listed banks are less subject to the constraints of local deposit supply.

Multi-MSA banks

One likely channel for geographic reallocation of capital is transfers between branches of the same bank or between banks owned by the same holding company. In 1980, more than half of all US banks were unit banks (had only one branch), in 1990 a little less than half were unit banks, and in 2000, about a third of all banks were unit banks. These unit banks obviously have no ability to transfer funds to other locations through internal capital markets. Of multi-branch banks, about 25% had branches in only one MSA in 2000. For bank companies with a presence in several MSAs, there are legal and organizational checks to transfers across branches.[18] Finally, organizational reasons not to transfer funds from deposit-rich to deposit-poor areas may exist as well. For example, it may be optimal to allow a certain local discretion in capital

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[17] For example, the cost of issuing equity could be due to asymmetric information as in Myers and Majluf (1984). For the fact that firms are reluctant to issue equity, see Welch (2004). For evidence that bank stock prices fall when they issue equity, see Slovin et al (1991).

[18] Banks with multiple branches (or bank holding companies with multiple banks) face regulatory limits to transfers between branches. For example, the Community Reinvestment Act (CRA) "is intended to encourage depository institutions to help meet the credit needs of the communities in which they operate"

allocation decisions, as in the model of Stein (2002), which is likely to limit the extent of transfers across branches. Recent empirical work has gone some way toward identifying the extent to which internal capital markets are active in banks, at least on the year-to-year margin. Houston et al (1997), Houston and James (1998) and Campello (2002) all find that the lending of many banks with access to internal capital markets is less constrained. These findings suggest that MSAs where banks are local will be more exposed to local deposit supply than MSAs with many multi-MSA banks.

6.1 Bank regulation

The size of local banks (and hence their access to both non-deposit financing and internal capital markets) may be exogenous to the local economic environment. I exploit the timing of bank deregulation, as reported in Krozsner and Strahan (1999), to identify the regulatory limits to the creation of banks with internal capital markets spanning several cities (and states). Starting around 1970, US states deregulated their bank markets in several stages, first allowing mergers, later intrastate branching, and finally cross-state border banking. This deregulation happened at different rates in different states. Krozsner and Strahan (1999) identify the most important step as allowing within state bank mergers, which for the first time allowed integration of branch networks. This deregulation happened before 1970 in some states, was implemented in some states at some later point, and was not implemented until the federal deregulation of 1994 in other states. I test if the local capital supply had a larger effect on the local economy pre-deregulation that post. To do this, I interact a dummy for state-years where intrastate mergers are deregulated with local bank deposits. Most of the variation in deregulation is early in my sample, so the only dependent variable used for this test is manufacturing establishments (which is available from 1970). Table 11 presents the results of IV regressions including the interaction of deregulation with deposits, controlling for MSA and year fixed effects. In column one, the effect of deposits is significant and positive, and the interaction of deposits with deregulation is negative and significant, as expected. The magnitude is cut by about a third after deregulation (from 0.69 to 0.44). Column two presents a specification including population and income controls. Again, the interaction is significant and negative, approximately one third the size of the pre-deregulation coefficient.

These results suggest that intrastate bank deregulation significantly reduced the geographic segmentation of capital markets. In fact, Jayaratne and Strahan (1996) show that branching deregulation raised annual growth rates of state personal income by between 0.5% and 1%. They suggest that deregulation increased loan quality through more active markets for corporate control or better management discipline. My results point to another channel – deregulation leads to reduced geographical segmentation. Hence, one benefit of deregulation would be better within-state allocations of capital. This is consistent with the findings of Jayaratne and Strahan that deregulation was beneficial for state economies. The relative contribution of these effects cannot be assessed from my results.

The tests of where local capital supply matters most suggest that geographical segmentation varies substantially and in the way theory would suggest. Banks with access to external and internal capital markets reduce the effect of local capital supply. Intrastate banking deregulation significantly decreased the effect of segmentation. What share of improved integration is due to internal vs. external capital markets is not clear from these results, and remains an important topic for future research.

7. Conclusions

I use the fraction of seniors as an instrument for the local supply of deposits, and hence of bank loans. A higher supply of deposits translates increased loan volumes and lower loan interest rates. Economic outcomes are affected as well: when deposits are high there are more firms, especially small, both overall and in manufacturing, and more new firms. The results are robust to several alternative specifications: using demographic predictions of future senior numbers, including controls for local wealth, reducing area size from MSA to zip code. Time series evidence, though based on limited variation in seniors, supports the main cross-sectional findings.

If capital has a declining marginal productivity at the MSA level, the welfare implications of variations in the supply of capital to firms are negative. Capital will be used at lower marginal productivity in locations with higher loan supply, whereas in a frictionless world, this capital could be reallocated to a different location with higher marginal productivity of capital.

Bank regulation has been extensively analyzed for its effect on economic outcomes (see Jayaratne and Strahan (1996)). In terms of mechanisms, the focus has been on bank competition. My results suggest that the effect of bank deregulation on geographical allocation of capital may be important as well. I estimate that the effect of local deposit supply on the local economy is a third weaker after deregulation as before it. This suggests that US state-level deregulation reduced geographical segmentation (perhaps through increased bank size improving access to internal and external capital markets). This improved geographical allocation may well have important welfare benefits.

These results have important regulatory implications. A banking system with small and fragmented institutions (as e.g. Spain, the US and Italy have had historically[19]) may be inefficient because it aggravates the geographical segmentation of capital markets. This is likely to be especially severe in geographically large countries and in countries with substantial geographical variation in the supply of capital, as well as in economies where deposit-financed institutions play a large role in financial intermediation.

Several extensions of these results would illuminate the effect of capital market segmentation. First, along the lines of Campello (2002), are banks in low deposit areas more exposed to monetary shocks? Second, after deregulation, are areas with many small, local banks more exposed to local deposit supply? Third, does bank loan data show a loan pricing effect of local deposit supply? These and other extension will be addressed in future work.

[19] See e.g. Cetorelli and Gambera (2001) for evidence that bank consolidation varies dramatically between developed countries, and affects industry growth rates.

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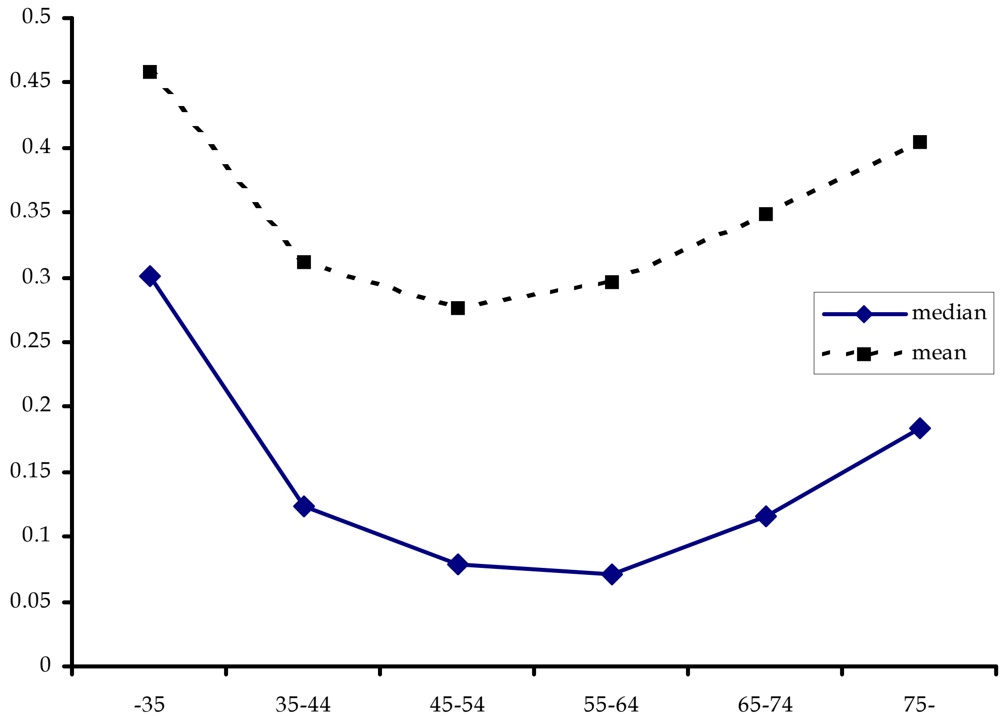
Figure 1 – Portfolio composition by age group

Portfolio shares of bank deposits across all households in an age group. Based on the 2001 Survey of Consumer Finances. The first table reports shares for checking and savings accounts, and the second graph for checking and savings accounts as well as certificates of deposit (fixed term bank deposits).



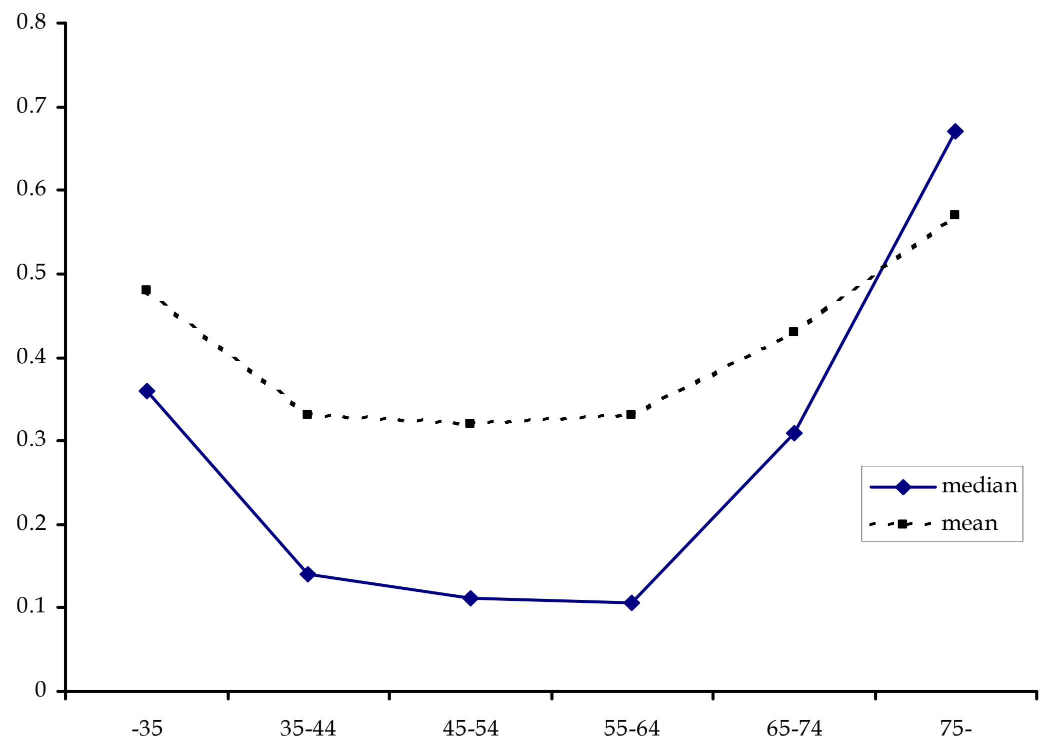


Table 1 – Deposit holdings by age

Summary statistics from the 1983, 1995 and 1998 Survey of Consumer Finances. Certificates of deposists are fixed term bank deposits. The 1983 number represent the median over families with any holdings in certificates, whereas the 1995 and 1998 numbers represent median family holdings across all families. Age group refers to the head of family. Thousands of current dollars.

Age group	Certificates of deposit, $ thousand			
	1983	**1995**	**1998**	**2001**
-34	4.0	5.6	2.5	4.0
35-44	8.7	5.6	8.0	6.0
45-54	8.3	12.7	11.5	12.0
55-64	12.2	14.9	17.0	19.0
65-74	19.9	21.2	20.0	20.0
75+		13.8	30.0	25.0

Table 2 – Summary statistics

Summary statistics for the 1980, 1990 and 2000 samples. Only the MSAs for which bank data is available are included in the sample. Bank deposits and per capita income are in 2000 dollars.

Panel A – Levels

		1970	1980	1990	2000
Metropolitan Statistical Areas	Number	279	314	270	283
Fraction of population 65+	Min	0.020	0.020	0.036	0.055
	Median	0.092	0.106	0.120	0.124
	Average	0.095	0.107	0.125	0.127
	Max	0.300	0.300	0.322	0.285
Bank deposits per capita	Min	$516	$725	$3,161	$4,767
	Median	$1,782	$3,820	$7,319	$11,437
	Average	$1,886	$4,205	$7,649	$12,319
	Max	$9,765	$23,427	$28,985	$42,809
Per capita income	Min	$6,771	$7,189	$11,521	$13,238
	Median	$13,583	$17,842	$21,661	$26,405
	Average	$13,483	$18,105	$22,371	$27,360
	Max	$19,400	$30,270	$42,799	$58,702

Panel B – Time series of the fraction of seniors

	Fraction old			
	1970	1980	1990	2000
Fraction old, 1970	1.00			
Fraction old, 1980	0.89	1.00		
Fraction old, 1990	0.84	0.94	1.00	
Fraction old, 2000	0.72	0.86	0.96	1.00

Panel C – Correlations (pooled sample)

	Fraction old	Log of pop.	Log bank dep. per cap.	Log per cap. income	Log number of firms
Fraction old	1.00				
Log of population	-0.02	1.00			
Log of bank deposits per capita	0.40	0.27	1.00		
Log per capita income	0.36	0.35	0.67	1.00	
Log number of firms	-0.10	0.98	0.34	0.53	1.00

Table 3 – Bank balance sheets – the effect of local seniors

Regressions of 1990 bank balance sheet items on seniors and fixed effects, and (last column) regression of total number of branches in an MSA on seniors. State dummies refer to dummies for the location of a bank branch, and institution dummies to the identity of the bank. The sample consists of all domestic banks with branches in metropolitan areas. The first three columns report regressions for single-MSA banks, and the last two columns report regressions for branch level deposits for multi-MSA banks. Robust standard errors, clustered by MSA, are reported under the coefficients. A plus sign (+) denotes a significant coefficient at the 10% level, one star (*) denotes significance at the 5% level, two stars at the 1% level.

	Single-MSA banks			Branches of multi-MSA banks		All MSAs
	Deposits as fraction of total liabilities	Other debt as fraction of total liabilities	Equity as fraction of total liabilities	Log of deposits	Log of deposits	Log number of bank branches per capita
Seniors (fraction of population 65+)	**0.17+**	**-0.02**	**-0.15+**	**1.53****	**1.68****	**1.93****
	0.10	0.05	0.09	0.41	0.47	0.51
State dummies	Yes	Yes	Yes	-	Yes	-
State-Year dummies	-	-	-	-	-	Yes
Institution dummies	-	-	-	Yes	Yes	-
R-squared	0.10	0.06	0.08	0.27	0.27	0.74
N	2,044	2,044	2,044	29,768	29,768	632

Table 4 – First stage regression of local deposits on seniors

First stage regression of log deposits per capita on log of population (control) and the instrument: the fraction of seniors in the population (i.e. the share of population that is 65 years or older). Each observation is one metropolitan statistical area (MSA). Robust standard errors, clustered by MSA, are reported under the coefficients. A plus sign (+) denotes a significant coefficient at the 10% level, one star (*) denotes significance at the 5% level, two stars at the 1% level.

	Log of Deposits per Capita								
	(1)	(2) Population < 250,000	(3) Population > 250,000	(4) 1970, 1980	(5) 1990, 2000	(6)	(7)	(8)	(9)
Fraction seniors	**3.13****	**3.79****	**2.81****	**3.63****	**2.57****	**3.64****	**3.76****	**2.96****	**3.09****
	0.44	0.55	0.75	0.50	0.54	0.45	0.59	0.41	0.55
Log of Population						**0.14****	**0.04**	**0.07****	**0.02**
						0.019	0.02	0.02	0.03
House prices							**0.59****		**0.33**
							0.08		0.22
Income per capita								**0.77****	**0.51**
								0.17	0.39
State x Year interaction dummies	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
R-squared	0.62	0.76	0.61	0.55	0.40	0.67	0.56	0.75	0.58
Marginal R-squared (Seniors)	0.07	0.11	0.06	0.07	0.08	0.07	0.10	0.17	0.06
N	902	445	457	469	433	879	174	839	174

Table 5 – Local economic outcomes regressed on deposits instrumented by seniors

Second stage regressions of economic outcomes on log deposits per capita (instrumented – see column (2) of Table 4). Each column presents one dependent variable. Each regression is a second stage regression and reports the coefficient on the log of deposits per capita, instrumented with the fraction of seniors. Firms are all active firms. Small firms are those that have 0-19 employees and large firms those that have 500 or more employees. The log of population and state-year interaction dummies are included as controls in all regressions. Robust standard errors, clustered by MSA, are reported under the coefficients, and the number of observations in the row after that. A plus sign (+) denotes a significant coefficient at the 10% level, one star (*) denotes significance at the 5% level, two stars at the 1% level.

	Firms per capita (log)	Small firms (fraction)	Large firms (fraction)	Firms p.c. (log), manufact uring	Establish ments (log), manuf.	Firm births per capita (log)
Log bank deposits per capita (instr.)	**0.30****	**0.055****	**-0.021****	**1.00****	**0.86****	**0.47**+
	0.094	0.014	0.0073	0.23	0.18	0.28
Log of Population	**-0.04****	**0.107****	**-0.014****	**-0.048**	**-0.02**	**-0.00**
	0.014	0.002	0.0011	0.036	0.03	0.05
State x Year interaction dummies	Yes	Yes	Yes	Yes	Yes	Yes
R-squared	0.68	0.63	0.82	0.31	0.41	0.47
N	408	409	409	409	876	380

Table 6 – Industry external finance dependence

Second stage regressions of number of establishments, number of employees and sales in 1997 on log deposits per capita (both dependent variables are in logs). External dependence is the net reliance of Compustat firms in each industry on external finance for 1985-95. External dependence rank is the rank across industries (from low to high external dependence). Deposit interactions are instrumented with the fraction of seniors interacted with external dependence or external dependence rank. Industry and MSA fixed effects are included in all regressions. Robust standard errors, clustered by MSA, are reported under the coefficients and the number of observations in the row after that. A plus sign (+) denotes a significant coefficient at the 10% level, one star (*) denotes significance at the 5% level, two stars at the 1% level.

Industries:	2 digit NAICS	2 digit NAICS	2 digit NAICS	2 digit NAICS, excluding healthcare	2 digit NAICS
	Establishments	Employees	Sales	Establishments	Establishments
Bank deposits x external finance dependence	**0.21+** 0.12	**0.32*** 0.16	**0.54*** 0.23	**0.22+** 0.13	
Bank deposits x external finance dependence (rank)					**0.045+** 0.027
MSA dummies	Yes	Yes	Yes	Yes	Yes
Industry dummies	Yes	Yes	Yes	Yes	Yes
R-squared	0.97	0.94	0.94	0.97	0.97
N	3,542	3,426	3,177	3,289	3,542

Table 7 – Local outcomes regressed on deposits, instrumented by predicted seniors

Second stage regressions of economic outcomes on log deposits per capita for 1990 and 2000. Deposits are instrumented with the fraction of the local population that was in the 45-64 age group in 1970. Panel A presents first stage regressions. Each column in Panel B presents the regression of one dependent variable (see Table 5 for descriptions) on instrumented deposits. Robust standard errors, clustered by MSA, are reported under the coefficients, and the number of observations in the row after that. A plus sign (+) denotes a significant coefficient at the 10% level, one star (*) denotes significance at the 5% level, two stars at the 1% level.

Panel A – First stage

	Log of Deposits per Capita
Log of Population	**0.13****
	0.020
Fraction 45-64 in 1970	**2.61****
	0.85
State x Year interaction dummies	Yes
R-squared	0.68
Marginal R-squared (Seniors)	0.06
N	796

Panel B – Second stage

	Firms per capita (log)	Small firms (fraction)	Large firms (fraction)	Firms p.c. (log), manufacturing	Establishments p.c. (log), manuf.	Firm births per capita (log)
Log bank deposits per capita (instr.)	**0.42****	**0.010**	**-0.005**	**0.69****	**0.86****	**0.23**
	0.090	0.09	0.006	0.28	0.27	0.17
Log of Population	**-0.048****	**0.017****	**-0.017****	**-0.007**	**-0.01**	**0.03**
	0.016	0.002	0.0010	0.041	0.04	0.03
State x Year interaction dummies	Yes	Yes	Yes	Yes	Yes	Yes
R-squared	0.63	0.80	0.82	0.45	0.41	0.46
N	359	359	359	359	796	342

Table 8 – Local outcomes regressed on deposits, controlling for wealth

Second stage regressions of economic outcomes on log deposits per capita for 2000. Each column head indicates the dependent variable. Each regression is a second stage regression and reports the coefficient on the log of deposits per capita, instrumented with the fraction of seniors (first stage regressions include all independent variables). The log of population and state dummies are included as controls in all regressions. Log of house values are median house prices in 2000 for single-family residential properties, and brokerage firms is the log of firms in NAICS 523 ("Securities, Commodity Contracts, and Other Financial Investments and Related Activities"). Robust standard errors, clustered by MSA, are reported under the coefficients, and the number of observations in the row after that. A plus sign (+) denotes a significant coefficient at the 10% level, one star (*) denotes significance at the 5% level, two stars at the 1% level.

	Firms per capita (log)	Small firms (fraction)	Large firms (fraction)	Firms p.c. (log), manufacturing	Establishments p.c. (log), manuf.	Firm births per capita
Deposits (instr.)	**0.31****	**0.10****	**-0.052****	**1.19****	**1.19****	**0.52+**
	0.10	0.02	0.011	0.27	0.28	0.29
Log of population	**-0.05****	**0.017****	**-0.018****	**0.00**	**0.01**	**0.04**
	0.01	0.002	0.001	0.04	0.04	0.03
Log of house values	**0.12+**	**0.01**	**-0.013**	**-0.25**	**-0.27**	**0.26+**
	0.06	0.02	0.010	0.30	0.31	0.14
Log of per capita income	**0.31***	**-0.09***	**0.055****	**-0.43**	**-0.43**	**0.11**
	0.13	0.04	0.021	0.65	0.66	0.27
State dummies	Yes	Yes	Yes	Yes	Yes	Yes
R-squared	0.78	0.50	0.70	0.34	0.34	0.48
N	175	175	175	175	175	166

Table 9 – Outcomes regressed on deposits: zip-code level evidence

Regressions of economic outcomes on log deposits per capita (instrumented with the fraction of seniors). Panel A presents first stage regressions. Panel B presents second stage regressions. The top and bottom 1% of zip-code with respect to bank deposits per capita have been dropped. Robust standard errors are reported under the coefficients. A plus sign (+) denotes a significant coefficient at the 10% level, one star (*) denotes significance at the 5% level, two stars at the 1% level.

Panel A – First stage

	Log of Deposits per Capita			
Seniors	**5.56**	**6.67**	**6.41**	**6.44**
	0.73	0.69	0.66	0.66
Log of Population	**-0.49**	**-0.29**	**-0.27**	**-0.27**
	0.031	0.035	0.034	0.035
Log of income per capita		**0.58**		**0.08**
		0.089		0.11
Average house values			**0.88**	**0.82**
			0.073	0.095
LA dummy	**-0.21***	**-0.24***	**-0.57**	**-0.55**
NY dummy	**0.11**	**0.08**	**-0.19***	**-0.18***
R-squared	0.23	0.23	0.28	0.28
Marginal R-sq. (Seniors)	0.04	0.05	0.06	0.06

Panel B – Second stage

	Log number of establishments			
Bank deposits (instr.)	**0.18***	**0.28**	**0.28**	**0.26**
	0.07	0.08	0.05	0.07
Log of Population	**0.62**	**0.75**	**0.79**	**0.77**
	0.04	0.07	0.022	0.04
Log of income per capita		**0.06**		**-0.24**
		0.10		0.085
Average house values			**0.43**	**0.56**
			0.06	0.09
LA dummy	**0.21**	**0.21**	**0.05**	**-0.02**
NY dummy	**0.03**	**0.01**	**-0.14**	**-0.18**
R-squared	0.58	0.68	0.74	0.74
N	1,183	1,179	1,177	1,177

Table 10 – Time-series evidence

Second stage regressions of 1970-2000 changes in economic outcomes on changes in log deposits per capita. Deposits are instrumented with the change in seniors 1970-2000. The change in the log of population is included as control. Robust standard errors, clustered by MSA, are reported under the coefficients, and the number of observations in the row after that. A plus sign (+) denotes a significant coefficient at the 10% level, one star (*) denotes significance at the 5% level, two stars at the 1% level.

	Change in number of manufacturing establishments (log)			
Change in bank deposits (instr. with change in seniors)	**1.78**	**1.52+**		
	1.07	0.82		
Change in bank deposits (instr. with change in seniors and 1970 level of seniors)			**1.85+**	**1.54***
			1.02	0.74
Change in population	**-0.03**	**-0.00**	**-0.03**	**-0.00**
	0.39	0.21	0.40	0.21
Change in income per capita		**-1.17**		**-1.18**
		0.78		0.72
State dummies	Yes	Yes	Yes	Yes
R-squared	n/a	n/a	n/a	n/a
N	146	146	146	146

Table 11 – Local economic effects and regulation

Second stage regressions of 1970 to 2000 economic outcomes on log deposits per capita. Deposits are instrumented with the fraction of seniors. The Intrastate mergers deregulated dummy is equal to one if intrastate branching through mergers has been deregulated, and is based on Kroszner and Strahan (1999). Robust standard errors, clustered by MSA, are reported under the coefficients, and the number of observations in the row after that. A plus sign (+) denotes a significant coefficient at the 10% level, one star (*) denotes significance at the 5% level, two stars at the 1% level.

	Number of manufacturing establishments p.c. (log)	
Bank deposits (instrumented)	**0.69*** 0.28	**0.55*** 0.24
Bank deposits x Intrastate mergers deregulated	**-0.25**+ 0.13	**-0.21**+ 0.11
Log of Population		**-0.16**** 0.06
Log of per capita income		**-0.28** 0.28
MSA dummies	Yes	Yes
Year dummies	Yes	Yes
R-squared	0.86	0.90
N	857	841