PEPPERDINE UNIVERSITY

The Journal of Entrepreneurial Finance

Volume 7
Issue 1 *Spring 2002*

Article 7

December 2002

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Steven G. Craig
University of Houston

Polly T. Hardee
University of Houston

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Steven G. Craig and Polly T. Hardee
University of Houston

1. INTRODUCTION°

The advent of the Internet has opened many opportunities for bankers to access new customers, increase convenience and expand product ranges in many markets, including that of small businesses. Yet anecdotal evidence reveals that smaller banks are reluctant to employ Internet technology in the small business market for fear of damaging the customer relationship developed through personal contact. These smaller, more simply structured banks tend to specialize in small business lending, possessing a comparative advantage in that market (Craig and Hardee, 2001). This is particularly so in relationship driven credits where personal knowledge of the borrower is paramount over financial ratios produced through credit scoring models (Berger and Udell, 1995, 1994). However, with technological advances, large banks have captured a greater share of the small business loan market (Ely and Robinson, 2001; Mester, 1997). Furthermore, large complex financial institutions have made greater inroads in establishing an Internet presence on the World Wide Web and have the most ambitious online banking agendas (Furst, Lang and Nolle, 2000).

Within the financial services industry consolidations are ongoing and information technologies rapidly improve. The result is much larger, complex banks participating more in small business lending (SBL) relative to the fewer small, simply structured ones—in contrast to what older evidence reveals (Ely and Robinson, 2001). Consequently, the purpose of this paper is to determine if, with advanced technologies along with the changing face of the industry, bank structure continues to impact SBL; and if specifically Internet banking "levels the playing field" in that market. We define an Internet bank as any commercial bank maintaining a World Wide Web site on which banking transactions may be conducted electronically. These range from basic Internet services such as account inquiries to total financial management of a customer's assets.

We base our analysis on a conceptual framework encompassing acute private information asymmetries inherent in small business borrowers. Since these firms generally do not obtain financing from publicly traded securities markets, they produce little, if any, public information. Consequently, they are primarily dependent on bank financing as a source of external funds (Cole & Wolken, 1995; Elliehausen and Wolken, 1990). The borrowing needs of small firms sometimes require a lender to possess a working knowledge of the business operations and/or an intrinsic feel for the character, integrity and productive potential of the firm's owner(s). Therefore, *vis a vis* large business loans the information asymmetry problem for small business borrowers is more acute. Thus, private information becomes crucial in determining the credit worthiness of the firm.

° The authors wish to thank Sharon O'Donnell, University of Houston, for technical assistance on the data.

However, in a larger consolidated bank private information may be hampered by corporate governance. That is, managerial diseconomies of scale may impede the flow of private information necessary to determine creditworthiness of the small firm (Nakamura, 1994). For example, holding company or branching policies may result in inflexible loan procedures curtailing small business credit availability.

Yet large more complex banking institutions are more diversified, both in terms of financial products and geographical markets. Their broader range of products and wider geographical exposure make them less likely to suffer from local economic shocks. The diversity of their portfolio allows greater risk toleration. Therefore, to the extent that small business loans are riskier than some other bank investments (such as large business loans or bonds), these more diversified financial institutions can withstand greater credit exposure to small firms, thereby potentially overcoming any ostensible comparative advantage inherent in small banks. Furthermore, with the loss of some large business loans to commercial paper financing, the diversified banks are turning more to the small loan market (Mester, 1997).

Since the Internet offers an additional avenue for banks to collect information generated by small business firms and their owners, its use as a remote delivery channel for banking services may help to mitigate informational asymmetries, regardless of bank structure. Additionally, to the extent the Internet expands geographical exposure and market access at a lower cost than physical branching, credit availability may be increased, particularly to price sensitive small firm borrowers. However, a small firm's exclusive use of the Internet does not allow for personal contact which may be important for private information, particularly for unsecured loans relying on the character and productive capacity of the owner.

Theory indicates that banks exist to overcome information asymmetries between borrowers and lenders in the financial intermediation process (Bernanke, 1993). However, theory does not provide implications on optimal bank structures for overcoming the acute private information asymmetries inherent in small business loans (SBL). Since conceptually there are reasons why the Internet may encourage or discourage SBL; and since consolidations among financial services firms are producing larger, more complex organizations; we empirically investigate the impact of bank structure and Internet technology on SBL. We build on our previous SBL research (Craig and Hardee, 2001) not only by differentiating banks employing the Internet, but by updating and expanding our data. Specifically, our sample extends beyond the Texas banks to include all banks in the United States. We use more recent data in order to capture new information technology. Furthermore we focus on more extensive organizational variables at the holding company level to more clearly account for consolidation effects.

Our competing hypotheses are diversity provided by a large complex banking organization allowing its member banks to engage more in small business loans versus smaller, more simply structured banks having less hampered private information flows. Since we find the behavior of rural and urban non-Internet banks statistically differ, and since we are unclear of the role of our competing hypotheses in Internet banks, we separately test the information versus diversity hypothesis on these three separate banking sectors--i.e. Internet, urban non-Internet and rural non-Internet banks.

Our analysis proceeds in four sections. In section two we provide a conceptual framework suggesting further how size, structure and other variables might affect a bank's ability for overcoming the acute private information asymmetries inherent in small business. In section

three we describe the data, its sources and the research methodology employed in the data analysis. In section four we present the empirical results. Overall we find a domination of the information hypothesis, particularly in the rural non-Internet banks. However, elements of diversity are reflected throughout all three sectors, implying that technological advancements are narrowing the comparative advantage of small more simply structured institutions. Finally, our results show that Internet technology does not alter a bank's behavior significantly from urban banks in relation to SBL, and is a positive factor for rural banks on the World Wide Web. Section five contains our conclusion.

2. CONCEPTUAL FRAMEWORK

There are two key conflicting aspects governing the extent to which a bank may engage in small business lending. One is the ability of a bank to process private information inherent in SBL. The other is the diversification of the bank improving its risk tolerance, thereby increasing its capacity to participate in SBL. Our empirical work, therefore, seeks to explain SBL both as a function of the attributes that affect a bank's ability to process private information, and its diversification improving its ability to tolerate risk. Our hypothesis is that large banks and those with complex structures will process private information less well but nonetheless will have a greater ability to diversify. Small, simple banks may be able to better process private information, but clearly will not have the relative ability to diversify risk. Regarding Internet banks, we are unclear as to the role of our competing hypotheses. On the one hand, Internet technology adds to the information pool and provides additional financial products, thus may increase SBL. On the other hand, the strictly impersonal interaction of online banking may dampen the ability to build long-term customer relationships with small business firms.

Empirically, if diversification is more important than private information in SBL, then the coefficients on most variables representing large complex banking structures ought to show more SBL activity. If private information is more important, then we should find that the coefficients on most variables indicate smaller and simpler banking structures show a greater tendency for SBL. Thus if the variables in our regressions successfully capture our ideas, diversity versus private information, we should see the coefficients are consistent in the results. Comparisons can then be made between Internet and non-Internet urban and rural banks. Our reduced form specification is:

SBL = f (BANK SIZE, HOLDING COMPANY ORGANIZATION, EXTENT OF BRANCHING, BANK AGE)

The first three sets of variables--bank size, holding company organization and extent of branching--capture larger size and complexity of structure, thereby implying greater diversification; whereas small size and simplicity of structure imply better private information. Bank age is included to control for performance differences inherent in newly formed banks (Goldberg and DeYoung, 1999; Goldberg and White, 1998; Sullivan, 2000). The state in which the bank is domiciled is also used in order to control for differences in market and operating conditions across state boundaries. For similar reasons, an urban variable is employed in the Internet sector.

2.1 Dependent Variables

Our tests use three alternative measures of lending activity to illustrate the extent to

which the institutional variables described above alter banks' participation in a market that is presumably bank dependent for credit. Since approximately one-third of all the banks have business loans of $100,000 or less, and since large banks are increasing their presence in this category (Ely and Robinson, 2001), we use the natural log of SBL not exceeding $100,000 as our standard dependent variable [Ln (SBL100)].

The second measure of SBL activity in our view presents a clearer test of bank size as a determinant in our competing hypotheses. Small banks may specialize in SBL because capital constraints limit these banks' participation in the large loan market. The default of a large loan can render a small bank insolvent. Thus, in our second measure we put capital constraints aside by disaggregating SBL into the difference between the natural log of small commercial and industrial (SCI) loans and small commercial real estate (SCRE) loans [Ln (SCI/SCRE)]. This last distinction is particularly important, since assessing credit risk may be more difficult in SCI loans as compared to SCRE. Real estate collateral is generally straightforward to appraise, improves loan liquidity, and allows for easier assessment of risk exposure. Under conditions of stable or rising real estate prices SCRE loans require less monitoring. So, real estate may be obtained as collateral perhaps to overcome information gaps; whereas SCI loans include unsecured loans, or monitor-intensive loans made in some cases solely on the character of the borrower. Hence, they encompass relationship driven credits. Thus, the more information sensitive subset of small business loans is SCI as opposed to SBL secured by commercial real estate.

Our third way of measuring the dependent variable is to compare SBL to large business loans (LBL), or business loans in excess of $100,000 produced in domestic banking offices[1], while holding other bank assets constant. We use the natural log of the ratio of these loans [ln SBL100/LBL)]. Again, as with our primary dependent variable, we perform a real estate test to remove the effects driven primarily by capital constraints. We disaggregate our small business loans into the ratio of small C&I to small real estate secured business loans. We do the same with the large loans. We then put these in ratio form of a small to large real estate ratio. The ratios are done in levels rather than logs to compensate for the nonlinear transformational effects. Mathematically this ratio is the following form: [small(C&I/ real estate)/large (C&I /real estate)].

2.2 Separate Regressions

Statistically, Internet banks are not poolable with the universe of banks. This, coupled with our uncertainty regarding the outcome of these banks under the diversity or information hypotheses, causes us to examine them separately. The non-Internet banks are subdivided into urban and rural banks. These two categories contain statistically different coefficients, therefore also require separate regressions. The dependent variables described above are thus applied separately to each banking sector, namely Internet, urban non-Internet and rural banks.[2]

[1]Since small business loans are reported as those produced in domestic banking offices only, we use only large loans produced domestically. However results from both domestic and foreign offices are qualitatively the same.

[2] Our F test rejecting pooling is significant at the 1% level. Additionally, across banking sectors, for coefficients of an independent variable having the same sign, we disclose if the difference is statistically significant. Also, within the Internet sector, an F test revealed that the coefficients are not statistically different between urban and rural banks.

3. DATA AND EMPIRICAL SPECIFICATION

The unit of observation for our empirical analysis is at the bank level and includes all commercial banks insured by the Federal Deposit Insurance Corporation (FDIC). This encompasses all banks in the United States and a small number in protectorates. Banks not having any business lending or which make only large business loans are eliminated.[3] This results in approximately 9,000 banks with about 700 having transactional Web sites as of June 30, 1999--the date of our data.

Internet transactional Web sites[4] allow customers at a minimum to make real-time queries about accounts, update account information, transfer funds, and make bill payments. Some sites offer more services than others. These include small business services such as loan applications and cash management. No distinction of the level of services is in the data.[5]

The data on small business loans are extracted from the 1999 bank Call Reports and is combined with the number of branch offices. Holding company data are obtained from the Federal Reserve's Bank Holding Company Data file.[6]

There are four categories of loan size data available. Data on business loans are categorized by dollar volume for $100,000 and less; $100,001 through $250,000; between $250,001 through $1,000,000, and over $1 million. Although we define SBL as loans up to $100,000, and large business loans as greater than $100,000, the results for SBL defined to be $1 million or less and large business loan greater than $1 million are qualitatively the same.

We employ a semi-logarithmic OLS model in our empirical specification.[7] Its general form is presented in the previous section, and captures the elements of diversity versus the information hypothesis with its vector of variables representing organizational size and complexity. Each regression is a function of the specific independent variables described below.

In accordance with the literature, BANK SIZE consists of the bank's total assets (TA). We use the natural log of TA [ln TA)], since empirically we find increasing marginal impact of TA on SBL. In our regression using our primary dependent variable (LnSBL100), the coefficient

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[3] Primarily, these are credit card banks having no business loans.

[4] The authors thank Cynthia Bonnette with the FDIC and Jim Bruene of Online Banking Report for supplying transactional Web sites as of November and September 2000 respectively; and Kelly Klemme of the Dallas Federal Reserve for providing individual bank's Web URL addresses for June 30, 1999.

[5] Little formal data about the universe of banking Web sites exist. Most of the information gathered thus far has resulted from informal monitoring by banking regulators. Additionally, the Web site of Online Banking Report edited by Jim Bruene appears to contain the most comprehensive listing of depository institutions' transactional Web sites. Two recent surveys by regulatory agencies analyze the Internet services offered by the banks under their aegis--nationally chartered banks (Furst, Lang and Nolle, 2000) and banks within the Tenth Federal Reserve District (Sullivan, 2000).

[6] The SBL data are reported annually at the end of the second quarter. The data is relatively new, being originally reported in the 1993 June Call Report. In order to avoid undue reporting burdens upon the banks, small businesses and farms are defined by the size of their original loan amount, rather than the size of the firm. Size of the business rather than size of the loan is a preferred measure. However, Scanlon (1984) has indicated that original loan size serves as a good proxy for borrower size. All of the data was downloaded from separate files posted on the Federal Reserve Bank of Chicago's World Wide Web site, www.chi.frb.org.

[7] For reasons previously explained, the real estate regression of Table 4 does not utilize the logarithmic transformation of the dependent variable, thus is not truly a semi-logarithmic model.

estimate is elasticity. Because this measures the bank's share of SBL as TA expands, we can ascertain if the proportion of TA invested in SBL is constant, falling or rising with increased bank size. For instance, an inelastic estimate (less than one) implies the share of SBL is falling as a bank grows. Consequently, we separately test if the estimate is statistically significantly different from one.

The HOLDING COMPANY variables consist of a continuous variable (Lnbhcta) that reflects the natural log of the holding company assets (less the equity share of the bank's assets)[8], as well as a series of dummy variables measuring different organizational characteristics. Three dummy variables differentiate subsidiary banks from those with no holding company affiliation, the omitted category. The first is the simplest holding company structure consisting of only one bank (Bhc1bank) with its parent company located within the state. The second dummy variable represents a multibank holding company domiciled within the state of the individual member bank (Insmbhc). The third is a bank belonging to a holding company domiciled outside of the state (Outsbhc) predominately containing multiple banks.[9] Other dummy variables are Multilayer to account for tiered holding company relationships--i.e., a holding company owned by another holding company; and Pubtrade to designate if the holding company's stock is publicly traded in the securities market. Finally, Majforgn represents banks which have a majority of foreign ownership, whether through its holding company or as a stand-alone bank.

The extent of branching is defined by a dummy and a continuous variable. Branchbank is the dummy variable designation for banks with at least one banking office in addition to its main branch. Unit banks, or banks without branches is the omitted variable. In addition, we use the natural log of the number of bank branches (Lnofficenum) to account for the number of physical locations.

The final group of variables accounts for an urban location on Internet banks, the bank age, and the state in which the main bank office is domiciled. A dummy variable (Urban) equals one for Internet banks with main offices located in metropolitan statistical areas. Lnbankage indicates the natural log of the age of a bank in years. In the state dummy variables, Texas is omitted.

Definitions of all the dependent and independent variables are presented in Table 1, while Table 2 presents their mean and standard deviation of the variables. Since many of the variables have been non-linearly transformed to the natural log, Table 2 also includes the levels and shares of relevant variables.[10]

4. EMPIRICAL RESULTS

Overall our results are consistent with the information hypothesis, particularly with rural non-Internet banks, though elements of diversity are reflected throughout all three sectors. Additionally, Internet technology does not appear to significantly alter bank behavior from urban non-Internet banks in relation to small business lending, although its use does appear somewhat

[8] The equity share of the bank=s assets are removed from the size of the holding company to eliminate multi-colinearity with bank size. This is particularly severe with one-bank holding companies, where the primary asset of the holding company is the bank.

[9] In all holding company categories, in a tiered relationship, the domicile of the highest holding company is used.

[10] State dummy variables are not included, but are furnished on request.

favorable for rural banks.

The first set of triple columns in Table 3 presents our results of Internet as well as urban and rural non-Internet bank participation in the SBL sector, using the primary dependent variable (LnSBL100). Results of the related real estate (RE) regressions are in the second set of triple columns for the respective sectors. On the semi-logarithmic specifications, the coefficient estimates of continuous variables are elasticities. Where the OLS regression errors are heteroscedastic (as determined by the White test), we report the robust errors as taken from the White heteroscedasticity-consistent variance-covariance matrix, although the outcome has no substantive differences from the original OLS results. Table 4 presents results of small to large business lending in an analogous fashion, and pertinent findings are discussed with the results of Table 3.

4.1. Size Variables

The size variable reveals mixed results of the two hypotheses. Table 3 reflects that the coefficients on the LnSBL100 regressions are positive and significant, but inelastic, with values of .461, .467 and .826 in the Internets, urban and rural non-Internets respectively. Additionally, these estimates are significantly less than one at the 1% level. Because the coefficients are inelastic, this implies that small banks have a higher percentage of total assets in SBL than large banks. That is, as banks grow larger, they are devoting less share of their assets to SBL, with the penalty for banks in the Internet and urban sectors being greater. For example, as all banks increase assets by a factor of 10%, those in urban non-Internet and Internet sectors increase SBL lending by approximately 5%, while rural banks increase SBL by greater than 8%.[11] These results support the information hypothesis--i.e., the disadvantage of a less personal touch in a large bank outweighs the advantage of diversity incumbent with size.

Since some of this activity may be a function of capital constraints effectively limiting the participation of small banks to smaller loans, we look to the real estate regressions for a removal of these constraints. Here we see in Table 3 that diversity is the prevalent outcome in the Internet and urban non-Internet banks, with coefficients of .535 and .323, respectively. As these banks grow larger they are participating more in the informational sensitive SBL over those secured by real estate.[12] In contrast, rural banks are participating less in C&I loans as they grow larger--an outcome which supports the information hypothesis.

The small to large business loan regressions (Table 4) reflect statistically significant negative coefficients in all three bank sectors respectively (-.489, -.573, -.316).[13] This implies that as all banks grow, they are participating less in SBL than LBL (while holding the third asset pool constant), with the penalty of a lower allocation of assets to SBL being lighter in rural banks. Although this outcome supports a dominance of information over diversity, it is strongly influenced by bank size, since large banks are not as constrained by the capital limitation on large

[11] A separate test on these coefficients reveals that this difference is statistically significant at the 1% level.

[12] These two coefficient estimates are statistically significantly different at the 5% level. That is, the urban banks are doing relatively more real estate lending. Some of this may be attributed to more demand and supply of innovative C&I loan products in the Internet banks.

[13] The rural bank coefficients are statistically significantly different from the Internets at the 5% level and the urban banks at the 1% level.

loans. Therefore, again we look to the real estate regressions for clarification. Here we see support for the information hypothesis with the negative and significant coefficient in the Internet banks (-77.3).

4.2. Holding Company Variables

In the LnSBL100 regression (Table 3), we also find a dominance of the information hypothesis in that the simplest holding company structure, the single in-state bank holding company, has positive and significant effect on SBL across all three banking sectors respectively (.689, .417, .307). One-bank holding companies are formed to avail banks of profit opportunities more readily seized through the holding company organization. Accordingly, in these simplest structures management may be more proactive in processing private information, giving rise to greater participation in the SBL market over no holding company banks.[14]

In this same regression (Table 3), we find in the non-Internet banks significantly positive coefficients on banks owned by in-state multibank holding companies (.441, .270). Although these are more complex organizations than the single bank holding company, the location of the corporate offices within the same state as the member bank may result in better information flows. Accordingly, the out-of-state holding company variable (Outsbhc) has a significantly negative coefficient for the rural banks (-.359) in the real estate regression. Surprisingly, the size of the holding company (Lnbhcta) had generally a neutral effect.

Again in Table 3, in the Internet banks the negative and significant results on the Multilayer variable (-.231), as well as the Pubtrade variable (-.180) in the rural banks, may suggest that additional holding company tiering or publicly traded stock adds to complexity, thus impeding information flows over and above the added diversity these variables may represent. However, in the RE regressions, public-traded urban and rural banks are making relatively more C&I loans. Additionally, urban non-Internet banks do so as the size of their holding company increases (Lnbhcta, .027), though the value is highly inelastic. These results are consistent with a dominance of the diversity hypothesis. One explanation may be that public-traded and large bank holding companies offer more sophisticated C&I type products rather than unsecured relationship credits; for in C&I lending more product innovation may occur relative to commercial real estate credits. However, testing this exceeds the limitation of our data.

Finally in banks with a majority of foreign ownership the -1.097 significant coefficient for the urban non-Internet banks in the LnSBL100 regression (Table 3) and in Table 4 the statistically significant -.814 Internet coefficient as well as the -.470 significant coefficient for urban banks in the small to large business loan regressions provide evidence of a domination of the information hypothesis. That is, foreign ownership may not be as attuned to the local banking community. Thus obtaining private information on small businesses may be more difficult for these institutions, resulting in SBL having a low priority. Although we see positive results for these banks in the real estate regression, it is possible that this may be due more to the

[14] In the past these profit opportunities have been primarily related to tax advantages and/or financial services acquisitions. Tax loopholes have since been removed. Additionally, under current banking regulations acquisitions can be done directly by the bank. However, the mere formation of the holding company may proxy for more proactive management behavior. Also, the difference in the coefficient values between the Internet and rural banks is statistically significant at the 5% level. This may be a more proactive stance on the part of the Internet banks, as evidenced by this sector employing electronic technology.

nature of operations with foreign owned banks--i.e., providing more C&I type products such as drawings under letters of credit relating to international transactions or trade.

4.3. Branching Variables

The outcome on the branching variables in both Table 3 and Table 4 reveal that overall, banking offices are good for SBL. While this supports diversity, it also augments private information. That is, personal contact may be an important determinant in the amount of small business loans. Even though a bank has Internet capabilities, the participation in SBL increases with the number of brick and mortar locations. This is consistent with a recent financial media program reporting some virtual Internet banks are constructing physical locations to appease preferences of customers and maintain relationships (Nightly Business Report, 2001). We also find that branching is a positive determinant for SBL in the non-Internet banks, with coefficients on both the dummy and continuous variables being significantly positive in the LnSBL100 regression (Table 3).[15] In the small to large business loans (Table 4), as the number of offices increases there is relatively more SBL activity for both Internet and urban non-Internet banks. Thus the face-to-face people contact inherent in branch banking supports the information argument. That is, valuable private information may be conveyed through the skill of the loan officer in determining the productive capacity as well as the character and integrity of the borrower. This is especially important in extending unsecured loans.

In sum, within the first set of triple columns for both Tables, the only indication that branching is not good for SBL is in Table 4, where the -.136 urban Branchbank coefficient is significant. However, the .259 significantly positive coefficient on Lnofficenum has some offsetting effect. That is, as the number of offices expands, the positive effects of a unit bank promoting information flows may be offset entirely.[16]

The real estate regressions also bear out the strength of branching, though to a lesser extent. In the Internet banks, the dummy variable coefficient is positive and significant (.521), indicating that branch banks make relatively more of the information sensitive loans as compared to unit banks. However, as the number of offices increases, the significantly negative coefficients (-.499, -.224) imply a tendency for these banks as well as urban non-Internet banks to secure SBL by real estate. Taken together, this may suggest that as the number of branches increase beyond some point, it may offset the positive effect of a branch bank in terms of information flows. However, in the rural sector, unit banks make more of the informational sensitive loans, although beyond some point, it is beneficial to have more physical locations.

Overall, the branching results support both diversity and information. The additional branches add complexity, which implies diversity; but serve as an additional measure of face-to-face contact, which may be important for information flows. This is underscored in the Internet sector by the significantly positive coefficient of Lnofficenum. If SBL could be efficiently produced exclusively through the Internet, this coefficient would be zero.

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[15] The Internet banks' coefficient of .344 is not statistically different from that of urban banks (.269), but both are significantly different from rural banks (.066) at the 1% level. The fact that rural banks are highly inelastic *vis a vis* the other two sectors implies that while being a branch bank is an important determinant in the rural areas, expanding the number of offices does not greatly augment SBL.

[16] The sign change between the dummy and continuous variable indicates it is important statistically to differentiate between a branch bank per se, and a branch bank with increasing branch locations. Utilizing the mean of the relevant variables, one can calculate the number of branches added to the mean value that offsets the opposite effect of the dummy variable. The method for employing this is initially specified by Halvorsen and Palmquist, 1980, and further refined by Kennedy, 1981.

4.4. Urban Internets, Bank Age

In both tables, the significantly negative coefficients for the Urban variable in the Internet sector (-.182, -.217) support the information argument. In the more populated areas where there is more density and flux, it may be more difficult to extract private information, thereby dampening SBL. Furthermore, census data reflect the number of small businesses in urban areas is much higher than in rural markets (County Business Patterns, 1990), which should lead to a positive coefficient, if the demand effect dominates. This negative result also bodes well for Internet technology in rural areas. That is, these banks may be able to expand their SBL market exposure through the World Wide Web.In both the SBL and the small to large business loan regressions we find that older banks are participating more in small business loans.[17] This may imply that as a bank ages, it accumulates more private information on its market, allowing it to engage more in SBL. However, we do find in the real estate regressions that younger banks are engaging in the more information sensitive counterpart of SBL, perhaps due to a willingness to establish customer relationships in a younger, growth-oriented bank.

5. CONCLUSION

Technological improvements and consolidations continue in the banking industry. Yet financial intermediation theory remains ambiguous as to the impact of bank structure and the Internet on small business lending. Thus, empirical examination is required. Therefore this paper investigates whether small, simply structured banks are better at small business lending because of possible efficiencies in processing private information; whether large banks with more complex structure are better because of diversity allowing greater risk capacity to invest in SBL; and if Internet banking alters the role of these competing hypotheses. We find in our reduced form model that private information dominates over diversity as a determinant of SBL. However, elements of diversity are present, implying technology improvements may undermine small banks' comparative advantage. We also find that Internet banks do not behave significantly different from urban banks operating without transactional Web sites, though there is some evidence that the Internet is a positive factor for SBL in rural banks. On a cautionary note, as of the date of this data research reflects that Internet usage was not widespread, and was confined primarily to consumer banking (Furst, Lang and Nolle, 2000; Couch and Parker, 2000). Later research may point to different results as more small and more rural banks employ online technology geared towards small firms; and/or as larger, complex banks more aggressively attempt to capture new SBL customers via the Internet.

Overall, the evidence from our reduced form model weighs toward better information flows in more simplistic structures, in contrast to diversity allowing for higher investment in SBL. Despite this, there is a limit to the private information argument. Banks without a holding company organization do not have higher SBL activity; size of the holding company is generally neutral in its effect; and branching is an important determinate in SBL. This may indicate that

[17] This is opposite to the findings of previous research indicating new or "de nova" banks were filling any ostensible credit shortfall to SBL arising from consolidations (Goldberg and DeYoung, 1999; Goldberg and White, 1998). However, in line with the previous research, SBL defined as one million and less (the definition of SBL in these prior studies) reflects a negative and significant relationship in the non-Internet banks only for the primary dependent variable regressions. The small to large ratio had similar results for both small business loan sizes.

some diversity is good for small business lending, but people contact is important as technology advancements allow more large bank participation. Nevertheless in the face of consolidations, the results of this research imply that private information appears to be the more important motivation, with or without Internet banking.

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Table 1: EXPLANATORY VARIABLE DEFINITIONS

RHS VARIABLES	DEFINITION
Size Variable	
LNTA	the natural log of the bank's total assets
Holding Company Variables	The omitted variable is unaffiliated banks--i.e., banks without any holding company structure, or "No-Holding-Company-Banks"
Bhc1bank	a dummy variable for membership in a single bank holding company domiciled in the same state as the member bank
Insmbhc	a dummy variable for membership in a multibank holding company domiciled within the state of the member bank
Outsbhc	a dummy variable for membership in a bank holding company located outside the state of the member bank
Lnbhcta	the natural log of (total assets of the highest holding company less the equity share*bank's assets)
Multilayer	a dummy variable for a tiered relationship in a bank holding company—i.e., multiple holding company levels
Pubtrade	a dummy variable a bank holding company whose equity shares are publically traded in the capital markets.
Majforgn	a dummy variable for over 50% foreign ownership at the holding company or bank level
Branching Variables	For the dummy variable, unit banks (banks having no branches) is the omitted variable
Branchbank	a dummy variable if the bank has at least one banking office in addition to its main location.
Lnofficnum	the natural log of number of branches of a particular bank
Location, Age	
Urban	a dummy variable equaling one for an urban location of the main office of the bank, zero otherwise
Lnbankage	the natural log of the time in years since the bank was chartered

Table 1(con't): DEPENDENT VARIABLE DEFINITIONS

LHS VARIABLES	DEFINITION
Ln SBL100	the natural log of small business loans of $100,000 and less; and the primary dependent variable
Ln (SCI/SCRE)	the natural log of the ratio of small business C&I loans to small commercial real estate loans. It is the allocation of small business loans of $100,000 and less into the more information sensitive C&I loans versus the real estate secured counterpart
Ln (SBL/LBL)	the natural log of the ratio of small business loans of $100,000 and less to large business loans of greater than $100,000
small (C&I/RE)/ large (C&I/RE)	the ratio of small business C&I loans to small commercial real estate loans divided by the ratio of large business C&I loans to large commercial real estate loans. This ratio is in levels rather than logs to compensate for the nonlinear transformational effects of a logarithmic specification.

TABLE 2: DESCRIPTIVE STATISTICS

	Internet Banks			**Urban non-Internet**			**Rural non-Internet**		
Dependent Variables	Mean	N	Std Dev	Mean	N	Std Dev	Mean	N	Std Dev
LnSBL100	9.22	689	1.73	8.37	3685	1.64	8.30	4699	1.17
Ln(SCI100/SCRE)	1.15	689	1.80	0.97	3685	2.14	0.78	4699	1.64
Ln(SBL100/LBL)[1]	-1.78	618	1.02	-1.73	3070	1.10	-0.85	2221	0.81
(small/large)CI/RE	71.00	618	703.2	43.22	3070	491.7	20.01	2221	321.5
Explanatory Variables									
Bank Size									
LNTA	1.74	689	12.71	11.75	3685	1.35	10.93	4699	0.92
Holding Company									
Bhc1bank	0.44	689	0.50	0.43	3685	0.49	0.53	4699	0.50
Insmbhc	0.38	689	0.45	0.18	3685	0.38	0.23	4699	0.42
Outsbhc	0.11	689	0.31	0.08	3685	0.27	0.05	4699	0.21
Lnbhcta	8.83	689	5.82	6.88	3685	5.72	7.76	4699	4.52
Multilay	0.20	689	0.40	0.13	3685	0.34	0.10	4699	0.30
Pubtrade	0.39	689	0.49	0.24	3685	0.43	0.15	4699	0.36
Majforgn--Bank	0.03	689	0.16	0.03	3685	0.16	0.00	4699	0.03
Branching									
Branchbank	0.91	689	0.28	0.77	3685	0.42	0.65	4699	0.48
Lnofficenum	2.14	689	1.42	1.29	3685	1.11	0.82	4699	0.78

[1]The number of banks decreases because banks without any large business loans (LBL) are dropped. This applies across all three sectors.

Ln (Bank Age)	3.57	689	1.58	3.32	3685	1.61	4.10	4699	1.03

TABLE 2(con't): DESCRIPTIVE STATISTICS--Levels

	Internet Banks--N=689		**Urban non-Internet**		**Rural non-Internet**	
Relevant Variables	Mean N=689	Share of Total	Mean N=3685	Share of Total	Mean N=4699	Share of Total
SBL100 $000's	45,206	26.49%	14,286	44.77%	7,193	28.74%
SCI100 $000's	34,970	28.71%	10,660	46.81%	4,370	24.47%
SCRE100 $000's	10,237	20.94%	2,626	39.67%	2,823	39.39%
LBL100 $000's	737,942	40.75%	159,779	54.99%	9,688	4.25%
C&I>100 domestic	437,279	43.42%	101,576	53.95%	3,885	2.63%
CRE>100 domestic $000's	195,969	35.83%	58,223	56.93%	5,803	7.24%
small CI/RE $	2,874	44.43%	616	50.94%	44	4.62%
large CI/RE $	2,676	27.70%	1,259	69.73%	36	2.57%
SBL100/TA	1.40%		1.75%		7.75%	
Explanatory Variables						
Bank Size						
TA $000's	3,225,031	39.18%	817,874	53.14%	92,703	7.68%

Holding Company						
Bhc1bank	N=300	6.88%	N=1572	36.07 %	N=2486	57.04%
Insmbhc	N=192	9.94%	N=661	34.21 %	N=1079	55.85%
Outsbhc	N=76	12.71 %	N=301	50.33 %	N=221	36.96%
BHCta[2] $000's	14,360,819	35.37 %	4,100,180	54.01 %	632,212	10.62%
Multilayers	N=135	12.53 %	N=477	44.29 %	465	43.18%
Pubtrade	N=267	14.48 %	N=881	47.78 %	696	37.74%
Majforgn--Bank	N=18	15.00 %	N=99	82.50 %	3	2.50%
Branching						
Branchbank	N=630	9.70%	N=2832	43.60 %	N=3033	46.70%
Office number	43.25	35.41 %	10.52	45.98 %	3.33	18.61%
Bank Age	64.65	7.71%	53.54	32.80 %	76.53	59.79%

[2]Does not include the share of the bank's total assets owned by the holding company.

TABLE 3: Ln (SBL100) and Ln (SCI/SCRE)

DependantVariables:		Ln SBL100	Ln SBL100	**RE**	RE	RE
	INETS Ln(SBL100)	No-INET URBAN	No-INET RURAL	**INETS**	No-INET URBAN	No-INET RURAL
	N=689 R5=.658	N=3685 R5=.454	N=4699 R5=.569	**N=689 R5=.658**	N=3685 R5=.212	N=4699 R5=.116
Independent	**Coff.Est.**	Coff.Est.	Coff.Est.	**Coff.Est.**	Coff.Est.	Coff.Est.
Variable	**Std. Error**	Robust Err	Robust Err	**Std. Err**	Robust Err	Robust Err
Intercept	**2.394 .612*** +**	2.287 .439*** +	-1.0660 .345*** +	**-3.995 .882*** +**	-1.369 .701*** +	3.813 .484*** +
Lnta	**.461 .057*** +**	.467 .041*** +	.826 .032*** +	**.535 .082*** +**	.323 .067*** +	-.256 .046*** +
Bhc1bank	**0.689 .182*** +**	.417 .106*** +	.307 .082*** +	**-0.295 .263** +	0.185 .127 +	-0.079 .130 +
Insmbhc	**0.473 .270** +	0.441 .166*** +	.270 .115** +	**-0.424 .390** +	-0.094 .197 +	-0.256 .176 +
Outsbhc	**0.492 .336** +	0.231 .190 +	0.139 .135 +	**-0.312 .484** +	0.032 .233 +	-0.359 .194* +
Lnbhcta	**-0.021 .018** +	-0.005 .012 +	-0.003 .009 +	**0.032 .026** +	0.027 .014** +	0.019 .013 +
Multilayer	**-.231 .140* +**	-0.059 .072 +	-0.008 .039 +	**0.234 .202** +	-0.020 .101 +	0.113 .072 +
Pubtrade	**0.118 .115** +	-0.027 .054 +	-0.180 .039*** +	**0.033 .165** +	.361 .086*** +	.169 .074** +
Majforgn	**-0.135 .302** +	-1.097 .215*** +	-0.107 .406 +	**.991 .435** +**	.834 .251*** +	-0.668 .617 +
Branchbank	**0.182** +	.192 +	.152 +	**.521** +	0.021 +	-.334 +

	.179	.074***	.039***	**.258****	.113	.0781***
Lnofficenum	**.344** **.066*****	.269 .054***	.066 .039*	**-.499** **.095*****	-.224 .082***	.252 .061***
Urban	**-.182** **.111***			**0.146** **.159**		
Lnbankage	**.099** **.035*****	.114 .020***	0.005 .019	**-.420** **.051*****	-.429 .014***	-.065 .029***

***Significant at the 1% level; **Significant at the 5% level; *Significant at the 10% level
State dummy variables are included in all regressions, but are not reported. Results are furnished on request.
+These estimates are inelastic, and are significantly less than 1 at the 1% level. That is, the standard error*2.64 +coefficient<1; (2.64 is the value of the t statistic at the 1% level).

TABLE 4: Ln [(SBL100)/(LBL)] and [small(CI/CRE)/large(CI/CRE)]

DependantVariables:		Ln (SBL/LBL)	Ln (SBL/LBL)	**RE**	RE	RE
	INETS	No-INET URBAN	No-INET RURAL	**INETS**	No-INET URBAN	No-INET RURAL
	N=618 R5=.488	N=3070 R5=.318	N=2221 R5=.181	**N=618 R5=.072**	N=3070 R5=.029	N=2221 R5=.044
Independent	**Coff.Est.**	Coff.Est.	Coff.Est.	**Coff.Est.**	Coff.Est.	Coff.Est.
Variable	**Robust Err**	Robust Err	Robust Err	**Std. Error**	Std. Error	Std. Error
Intercept	**3.807 .694*** **	4.563 .419***	2.449 .344***	**1029.00 480.33** **	-86.446 142.45	221.161 133.76*
Lnta	**-.489 .064*** **	-.573 .039***	-.316 .032***	**-77.27 44.83***	14.028 13.08	-15.592 12.67
Bhc1bank	**0.063 .122**	.074 .077	0.064 .077	**-67.770 129.48**	2.130 35.66	2.637 36.26
Insmbhc	**-0.032 .173**	0.007 .126	-0.117 .108	**-88.380 191.77**	36.605 57.71	28.374 51.72
Outsbhc	**0.070 .212**	-0.140 .152	-0.119 .129	**-136.185 237.04**	-16.109 68.26	-27.203 60.52
Lnbhcta	**-0.004 .012**	0.004 .009	-0.004 .007	**2.658 12.67**	-0.782 3.87	-0.958 3.74
Multilayer	**0.175 .100***	0.001 .063	0.023 .055	**30.380 101.41**	3.811 32.00	78.509 24.07***
Pubtrade	**0.090 .076**	-0.010 .044	-0.024 .045	**74.769 81.35**	20.969 26.27	37.911 1.86*
Majforgn	**-0.814 .255*** **	-.470 .150***	-0.478 .912	**52.284 205.59**	-19.764 56.33	31.554 320.35
Branchbank	**0.076**	-.136	-0.065	**-9.636**	24.646	-27.436

	.164	.063**	.059	**136.69**	29.94	23.78
Lnofficenum	**.222** **.067*****	.259 .046***	0.037 .038	**67.398** **50.25**	-27.602 17.10ms	-1.077 17.03
Urban	**-.217** **.067*****			**-32.343** **81.50**		
Lnbankage	**.115** **.026*****	.189 .010***	0.095 .018***	**-42.791** **25.91****	-16.911 6.86***	-17.485 6.503***

***Significant at the 1% level; **Significant at the 5% level; *Significant at the 10% level
State dummy variables are included in all regressions, but are not reported. Results are furnished on request.