Geographic Diversification in Banking and its Implications for Bank Portfolio Choice and Performance

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Abstract

This paper documents the trend in geographic diversification among U.S. bank holding companies since 1994, and investigates how diversification relates to BHC portfolio choice and performance. Diversification is associated with significantly higher loan-asset ratios at BHCs of all sizes, but *not* with improvements in loan performance or returns (on assets or equity). Diversification increases the lending capacity of banks and the banking system, but it does not increase the profits of individual banks or reduce the risk in their portfolios.

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I. Introduction

U.S. banks are not just getting bigger, they are also getting *wider* with big bank holding companies (BHCs) spreading their operations across many markets within and across the U.S. The implications of bigger banks have been much studied in the literature on bank mergers and the scale literature. Relative to those literatures, the question of how width affects bank performance has been relatively understudied. Hence our paper. We document the increased extent of geographic diversification since 1994 using geo-coded data reported by banks to the FDIC, and we investigate how diversification is associated with BHC portfolio choices and performance.[2]

We think of geographic diversification across markets as an improvement in the risk/return tradeoff facing a given bank. A key point is that diversification does *not* necessarily imply safer banks; depending on their preferences, some bank owner may respond to the improved investment set by taking additional risks, via increasing leverage, increased holding of risky assets, or both. We investigate that possibility directly by looking at how diversification is related to bank leverage, loan ratios, loan performance, and the bottom line (ROA and ROE).

Our data come from the annual Summary of Deposits (SOD), wherein banks report the amount of deposits at each and every branch and the location of those branches. These are the most detailed comprehensive balance sheet data available on banks geographic reach, and we are the first to use them to study diversification in this manner (to our knowledge). We quantify geographic diversification using an index that measures the diffusion of a bank's deposits across more than 350 urban and rural banking markets. We analyze the data at the bank holding company (BHC) level, rather than the bank level, because we expect a unit bank affiliated with a diversified BHC to operate like it (the bank) is diversified. Our data are for all commercial banks operating from 1994 through 2001, a relatively quiet time in banking (and thus, one that might understate any safety gains from diversification). We estimate panel regressions relating BHC-level portfolio ratios to the BHC's geographic diversification, allowing for differences in diversification effects across different BHC asset-size categories: small (asset < $1 billion), medium ($1 billion<assets<$50 billion), and large (assets > $50 billion). We report ordinary least squares

[2] Of course we say, "should," because a bank's performance depends on other factors besides the economic conditions in the regions where the bank operates (for example, not all banks in Texas failed).

estimates, both with and without BHC-fixed effects. We also report results for tests relating geographic diversification to BHCs risk adjusted returns during the 1994-2001 period.

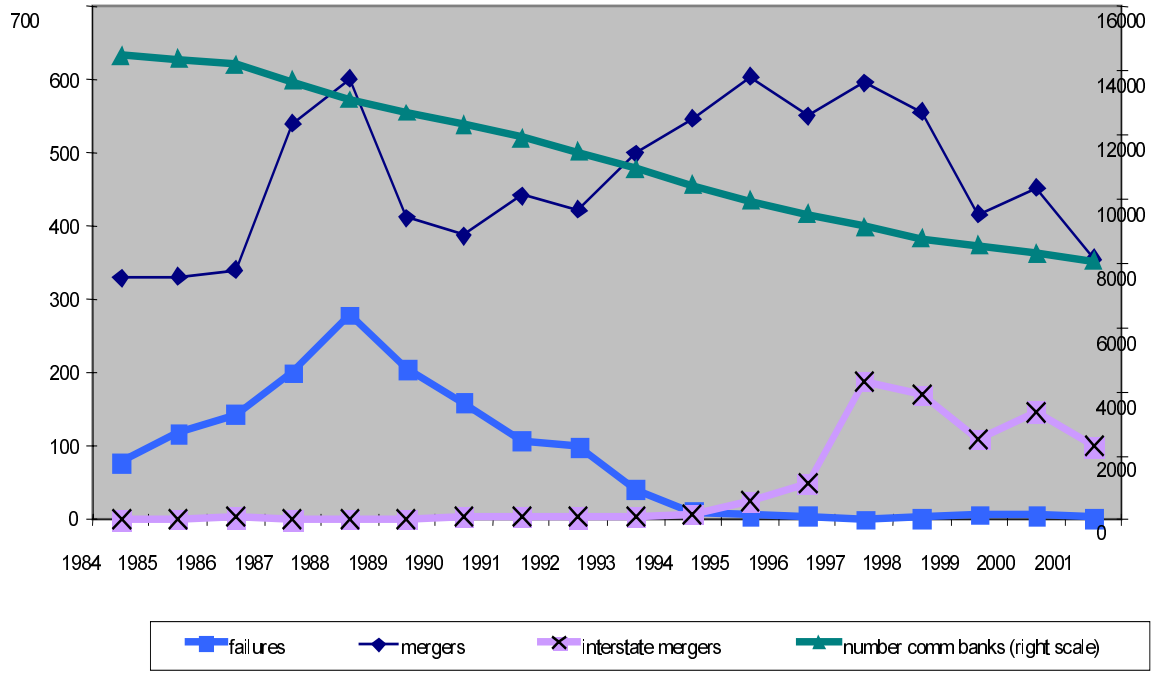
The most robust finding from our panel estimates is that loan-to-asset ratios increase with geographic diversification. The result holds even after controlling for bank size in a variety of ways, so we take it as evidence of a diversification benefit, rather than simply a scale-related effect. Beyond that, however, our results tend to depend on bank size, but we do not really find what we expected. Diversification is not associated with improvements in loan quality performance, not even in 2001 (the most economically tenuous year in our sample). Nor does diversification translate into increased ROA or ROE. Subject to some caveats about our diversification measure, we conclude that geographic diversification increases the lending capacity of banks and our banking system, but profits and loan performance of individual banks are unimproved. The lack of performance gains from geographic diversification is not inconsistent with the findings of Acharya, Hasan, and Saunders (2002), who study diversification by Italian banks.

The next section reviews some of well-known facts about consolidation and argues that the diversification benefits have gone understudied. Section III describes our measure of geographic diversification and presents some trends. Section IV discusses diversification as a shift in the risk-return frontier facing banks, and draws inferences about banks' portfolio choices and performance. Section V presents the results. Section VI concludes.

II. Geographic Diversification: The Understudied Dimension of Bank Consolidation

Bank failures and mergers over the last fifteen years has reduced the number of U.S. commercial banks from nearly 14000 in 1984 to about 8000 in 2001 (chart 1).

Figure 1: Mergers, Failures, and Bank Consolidation



Note the change in the nature of merger activity illustrated in Figure 1. In the 1980s and early 1990s, merger activity was all *within* state and often was associated with resolving problem institutions in the banking industry. *Inter*state mergers were essentially proscribed by state and federal laws against cross-state banking and branching. With the gradual elimination of those laws in the mid-1990s, interstate merger activity has risen dramatically. As early as 1975, some states began permitting bank acquisitions by out-of-state bank holding companies. In 1982, the Garn St-Germain Act of Congress allowed the acquisitions of failed banks by out of state BHCs (regardless of state laws).[3] Regional agreements among states allowed branching across state lines in many parts of the country by 1990 (Calomiris 1997). Finally, the Riegle-Neal Interstate Banking and Branching Efficiency Act of 1994 mandated interstate banking across the country and gave states the option to permit interstate branching as of January 1, 1997.

[3] But BHC acquisitions located in different states had to be operated as separately chartered commercial banks.

It is partly this shift in the regulatory landscape and in merger activity (toward interstate mergers) that motivates our interest in diversification. State economies and the banking markets within them are imperfectly correlated, so this spreading of bank assets provides potential diversification benefits. Note, however, that the sample period for our study—1994-2001—is a relatively healthy one, when the insurance benefits of diversification may not be so pronounced.

The most obvious consequence of this consolidation in banking, and the most studied, is the growth of average bank size. Average real assets of U.S. commercial banks increased from $241 million in 1984 to $708 million in 2001.[4] Of the many interesting aspects of this consolidation (see Berger, Demsetz, and Strahan (1999) for a broad overview), size and scale benefits had drawn the most attention from researchers. There is a large econometrics literature that tries to estimate the returns to scale in banking, and this is not the place to survey it. The consensus of that literature seems to be that average costs in banking are a relatively flat, U-shaped function of size, with "middle"-sized banks slightly more efficient than smaller banks or larger banks (Berger et. al. 1993).[5] There is disagreement, however, about precisely where the middle is with ranges from $300 million to $900 million (Peristiani 1997).[6] There is also a large literature that studies directly how mergers affect bank performance.[7] Mergers rarely lead to lower average

[4] Bergstrasser (2002) provides a useful overview of regulatory factors influencing U.S. Bank Merger activity.

[5] The literature that looks for economies of scale in banking conceives of banks as firms that use labor, deposits, and other inputs to produce loans, leases and other outputs. Using data on individual banks, researchers estimate a cost function that relating costs to output, holding the price of inputs constant. The estimated cost function then allows the researcher to determine the efficient scale of operation.

[6] In general, the estimates of the efficient scale appear to increase as the size of the banks included in the sample studied increase (McManus and McAllister 1993).

[7] There were at least 39 bank merger-efficiency studies between 1980-1993 (Rhoades 1994). The early studies tend to focus on the potential cost benefits, in part because bank consultants and managers emphasize the costs savings. Roughly half of the studies look at market *prices*, testing whether the price of the merging banks stock increases near the merger. The other half look directly at the bank *performance*, to see if in fact cost performance improves following the mergers. Despite the differences in methodology, the results from both types of studies have been largely negative; on average, the *combined* stock prices of the merger banks do not increase following mergers, nor does the cost performance of the merging banks improve. Performance fails to improve even when there is large degree of market overlap, or a large efficiency gap between the acquiring bank and its target. A small number of *case* studies of mergers suggest reasons why costs may not improve.

costs, even when the merger is between banks with largely overlapping markets, where the potential cost savings seem greatest.

With their focus on cost and scales benefits, researchers have largely ignored the implications of consolidation for bank risk and diversification.[8] This lack of interest in diversification may be partly theory based. Generally speaking, investors can diversify themselves so they do not need the firm (or bank) to do it for them. Shareholders may view diversification at the firm level as more of a problem if it reduces performance pressure on managers. The well-documented diversification "discount" for non-financial firms (where the whole firm is worth less than its parts) suggests that investors prefer focused firms with managers that stick to their core business. In banking, diversification *is* a core business so its seems plausible to expect some upside for banks that, after deregulation, are allowed to offer more of that business. Diversification of internal cash flows can also benefit firms when there are frictions in external capital markets (Houston, James, and Marcus 19xx).

There have been a few studies in the scale and merger literature that considered risk and diversification implications. McAllister and McManus (1993) were one of the early exceptions. They find that increases in the size of a bank's loan portfolio, which presumably proxies for the opportunities to diversify, are associated with lower risk; a billion dollar portfolio is only about one ninth as risky as a million dollar portfolio they estimate. Hughes et. al. (1996) find that once one incorporates risk and financial capital into the production frontier techniques favored in the scale literature, the estimate *financial* returns to scale (largely through capital savings) are considerably larger than when risk and capital are ignored.

In their study of publicly-traded bank holding companies (BHCs), Demsetz and Strahan (1997) found that the larger BHCs were better diversified across census regions and loan types, and that such diversification reduced the volatility of banks' stock returns.[9] In a study closest to ours, Acharya, Hasan, and Saunders (2002) study how diversification affects profitability of Italian

[8] Dietsch and Oung (2003), reach a similar conclusion in their study of bank mergers in France: "One of the preliminary findings in this article is that market-driven merger strategies based on cost synergies do not seem to be empirically justified. On the other hand, there seems to be an underused potential for income synergies and risk diversification gains."

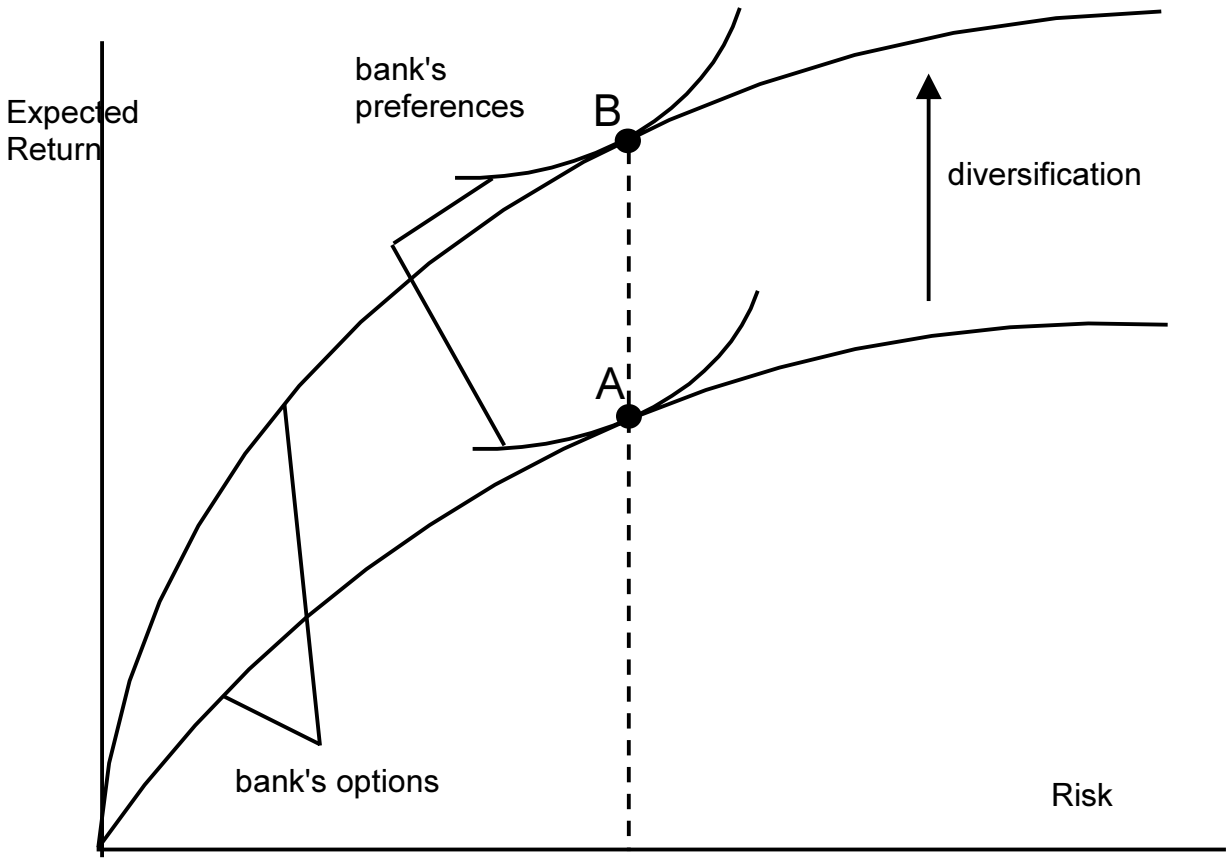
[9] See also Liang and Rhoades (1988).

banks between 1993 and 1999. They find that diversification across industrial loan groups is associated with *lower* bank returns. They also report that their broad measure of geographic diversification improved the risk return tradeoff for banks with low levels of risk—measured using data on doubtful and nonperforming asset or stock returns where available.

III. Thinking about Diversification

We think of the expanded geographic powers of banks relaxed as an outward shift in the risk-return frontier facing banking firms, as illustrated in Figure 2.

Figure 2: Diversification does not always reduce risk



The thick lines are the set of risk and return options facing a bank; the efficient portfolio set is such that the bank can expect higher returns only by accepting greater risk. A greater ability to diversify implies an upward shift in the risk-return frontier. How bank owners' respond to this shift depends on their risk preferences. The thin set of curves reflects the bank's aversion to risk; the slope indicates how much expected returns must increase to compensate the bank for a given increase in risk. As illustrated here, the bank would move from A to B with the increase in its ability to diversify. At B, expected returns are higher, but the overall level of risk is the same. A bank that was less risk averse, however (with a flatter set of indifference curves), would choose higher returns *and* risk.[10] Whether overall risk goes up or down after diversification increases depends, in the end, on a bank's appetite for risk; some banks may choose less risk, but others may choose more. But whatever the actual portfolio choice along the improved risk-return tradeoff, risk-adjusted returns should be higher at more diversified banks.

In thinking about how banks might actually up their risk levels (in pursuit of returns), we consider the usual portfolio ratios: leverage or capital ratios, loan-to-asset ratios, and loan performance (past-due loans). All else equal, we expect diversified banks will operate with lower capital ratios, and higher loan-to-asset ratios.[11] The relationship between loan performance and diversification is harder to assess. Given underwriting standards, one would expect lower past-due loans at more diversified banks. If diversified banks lower their underwriting standards in order to increase their loan-to-asset ratios. If the marginal loan for the more diversified bank is riskier, its past-due loans may be higher (than for a less diversified bank).

We prefer to think of the improved opportunity set as an exogenous shift associated with the gradual lowering of regulatory barriers to entry in different markets. There is also an endogenous aspect to diversification that we simply do not deal with here. That is, banks that choose to expand outward are probably different from their more inward competitors, and those differences may be correlated with the performance and portfolio measures that serve as our

[10] Imagine the flatter indifference curve through point A, then shift the curve upward until it is tangent to the higher risk-return frontier; the tangency is to the right of B. A bank that was more risk averse than the one shown, with steeper set of indifference curves, would choose less risk.

[11] Demsetz and Strahan (19xx) find indirect evidence for this hypothesis in their study of bank size and risk. Bigger banks are necessarily safer (than smaller ones), because bigger banks tend to hold less capital and more loans.

dependent variables. Those endogenous differences may explain why certain results are at odds with our expectations.

Spreading out financial operations over a broader space does not come without costs, of course. Berger and DeYoung (2002) find that inefficiencies tend to increase with the distance between a bank holding companies headquarters and its subsidiaries, presumably because the managers at a faraway subsidiary have more leeway for mismanagement or shirking.
In general, distinguishing diversification effects from scale effects will be difficult, as they tend to happen together—banks get bigger (more assets) and wider (more markets) at the same time. The costs associated with scale changes (past the minimum) may confound or conceal the savings and risk effects we expect to find from diversification across markets.

IV. Measuring Diversification

Every June, U.S. banks supplement their usual Call Reports to regulators with detailed information on the amount and location of deposits at all of the branches. Regulators use these annual Summary of Deposit (SOD) data to assess deposit insurance liabilities, define banking markets, and for other purposes.[12] We use to measure diversification across U.S. banking markets. We are the first (to our knowledge) to use these data to study for this purpose.

We analyze the data at the bank holding company (BHC) level. Measuring at the bank level, the natural alternative, would ignore the implicit diversification provided to a bank by its

[12] SOD data are the only geographic balance sheet data available for all US commercial banks. They are branch-level records that report the address and the deposits for all domestic branches of US commercial banks. SOD data are most commonly used in antitrust analysis to measure the concentration of local deposit markets, however, with the broadening scope of banks' geographic activities they are increasingly being used to study other bank activities such as small business lending. U.S. Banks do report application-level data on home mortgage applications, but many home mortgages are sold in the secondary mortgage market instead of being held in the originating bank's portfolio. Banks also report census tract-level data on small loans originated to businesses and farms. However, small bank are not required to report these data.

holding company. There is considerable evidence of those benefits in the literature on internal capital markets in banking (Houston, James, and Marcus). [13]

We consider diversification across U.S. banking markets. For urban areas, we follow bank regulators and use the Metropolitan Statistical Area (MSA) as the market definition. We treat all *rural* counties in a state as one market. The basic idea is the operating in two adjacent rural counties provides less diversification than would operating in different MSAs or in rural counties in different states.[14]

Figure 3 plots various trends from the data over 1994-2001, our sample period. U.S. bank holding companies are still not very diversified on average, although the trend is clearly upward. The share of BHCs operating in a single market fell from 85 percent to about 75 percent between 1984 and 2001. The mean number of markets rose from 1.4 to 1.7 over that period. These are not big changes because U.S. banking is still dominated by small banks (or BHCs) operating in just one or two markets.[15]

[13] We aggregate data for commercial banks that are affiliated with the same holding company into BHC-level measures for each "market". For commercial banks that *are* the holding company (i.e., the only commercial bank affiliate), the BHC and bank data are the same.

[14] In measuring geographic diversification within the US, we tested two definitions of local banking markets. To approximate the market definitions used in bank antitrust analyses, defining local banking markets as Metropolitan Statistical Areas for urban area and as counties for rural areas. We also employed a definition of geographic markets that uses MSAs for urban areas; but counts all non-MSA counties in a given state as a single "rural" market. Compared to the first definition [which classifies every non-MSA county as a separate market in measuring a bank's geographic diversification] this method effectively places more weight on lending to different MSAs and on lending to rural areas in different state than on lending to rural counties within a given state. The idea is simply that lending to two neighboring rural counties is likely to result in less diversification across economic conditions than lending to two different MSAs or rural counties in two different states. [We consistently examined the robustness of our results across these methods of defining local markets.]

[15] The data presented here at the BHC-level. We constructed these data from bank-level data that is described more fully below.

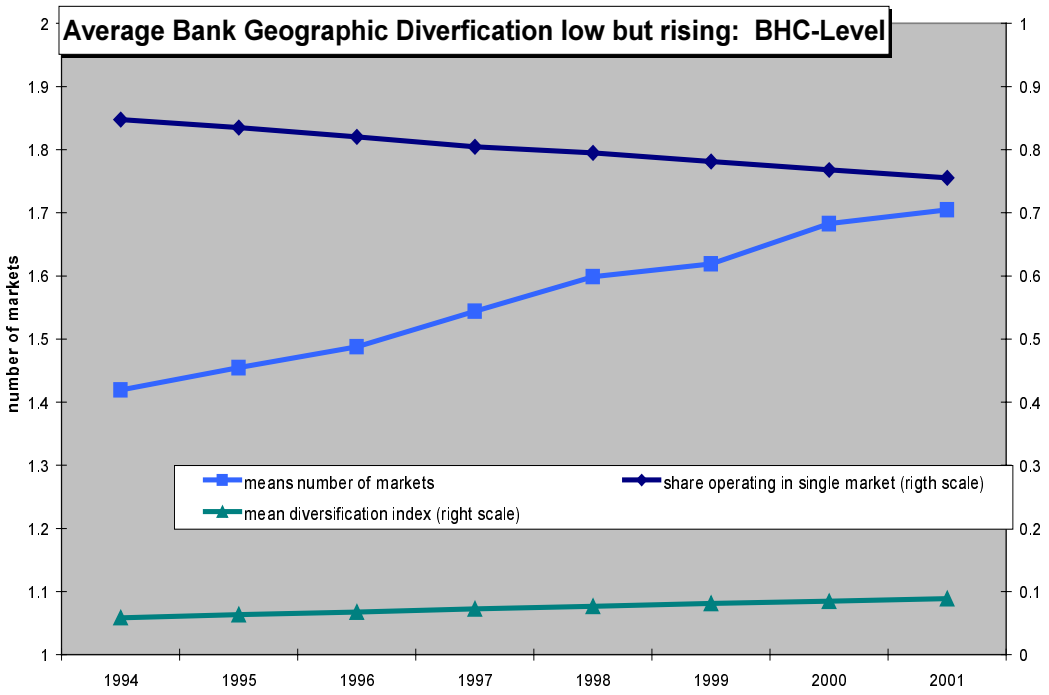


Figure 3

The *diversification* index plotted in figure 3 is the measure of geographic diversification we use in our regression analysis later. For each BHC (i), the index is one minus sum of squared deposit shares in each market:

$$geographic\ diversification_i = 1 - \sum_j (\ market\ j\ deposits / total\ deposits_i)^2$$

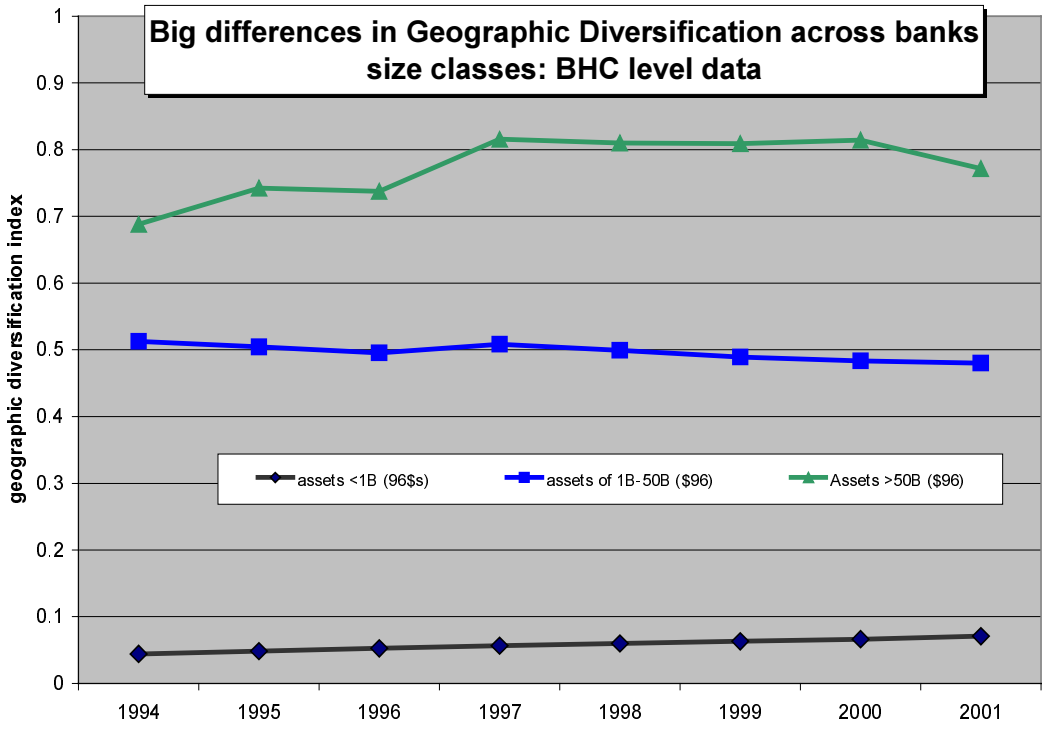
We have to use deposit-taking as a proxy for loan-making because U.S. banks do not report comprehensive information on where loans they hold were originated.[16] Note also that our measure simply ranks banks by how concentrated their activities are across markets. A more

[16] See footnote 13.

sophisticated measure would also take into account the degree of correlation or covariance in conditions among those markets.

Figure 4 plots the average of the geographic diversification index for three asset classes: "small" (assets < 1 billion), "big" (assets > 50 billion), and "medium." Bigger banks are clearly more geographically diversified, and the upward trend is most evident for the biggest BHCs . The positive relationship between geographic diversification and bank size suggests scale-related differences in the ability of banks to geographically diversify efficiently.

Figure 4

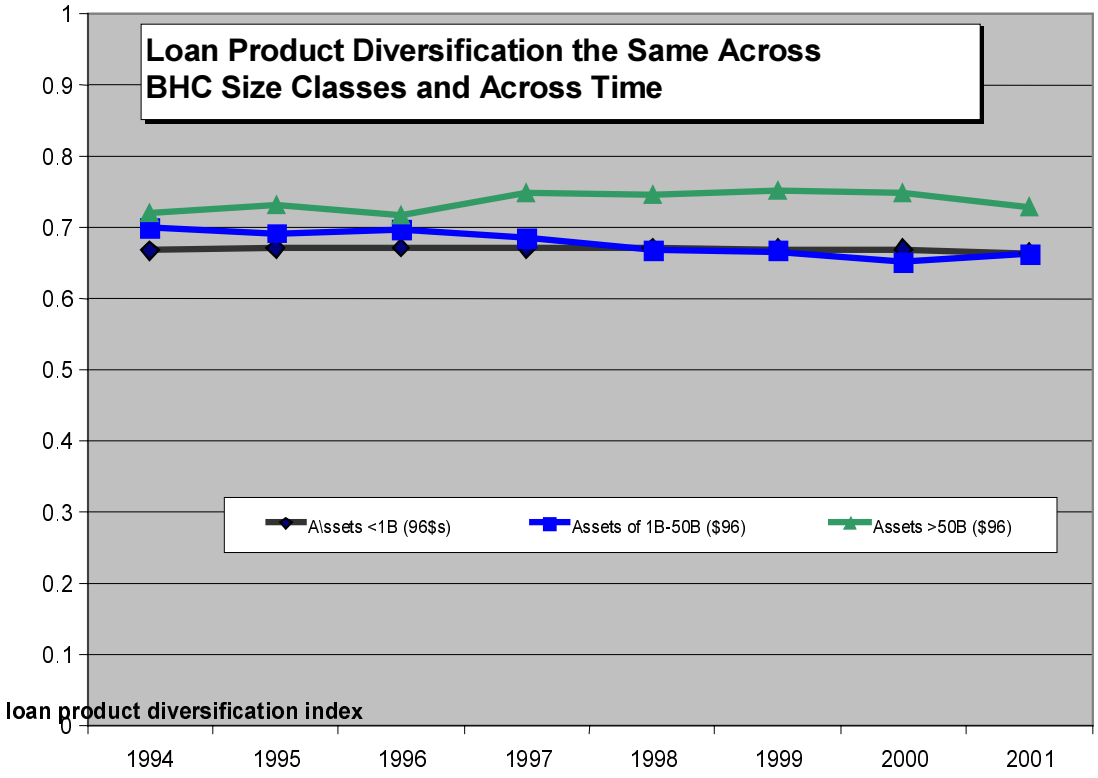


We do not find size-related differences in the extent to which banks diversify by making different *types* of loans. An obvious alternative to geographic diversification, we measure differences in loan product diversification across banks using a similar index:

$$PROD\_DIV_j = 1 - \sum_k (share_k)^2,$$

where *share k* is the share of bank *j*'s total loans and leases in 1) C&I loans; 2) commercial real estate loans; 3) home mortgage loans; 4) consumer loans, 5) agricultural loans; and 6) other loans.

Figure 5



This loan product diversification index is remarkably constant across time, and bank size (Figure 5). We found this constancy a little surprising; evidently, there seems to be an optimal mix of different loan products—at least on average. If so, spreading out across regions may be one of the few diversifying margins left to banks.

V. Data and Results

To construct our BHC-level panel data set, we started with all commercial banks that reported summary of deposit data in any year from 1994 through 2001. We dropped observations where an institution reported no loans, no assets, or no equity from our sample. We also dropped observations identified as credit card lenders or wholesale banks, since their mainstay does not include the operation of traditional retail deposit networks.[17] Finally, we excluded observations where the banks is less than five years old, since young banks, that tend to be small banks, can have very extreme portfolio and performance ratios, which we did not wish to distort our results for small banks. From the remaining commercial banking data, we compiled panel data set by aggregating the data for all banks affiliated with the same BHC into a single holding-company-level measure of the commercial banking organization.

Definitions and summary statistics for our data and various controls are in Table 1.[18] Because we hope to distinguish scale effects from diversification effects, size is key control variable for us. We use both the log of real (1996) assets, *and* size dummy variables. Apart from that, we control for whether the bank is headquartered in a rural market, whether it is an agricultural (AG) bank, and whether it is part of a BHC or a unit bank. We include year dummies to control for aggregate trends. We also control for product diversification, and for foreign loan exposures (using an index of domestic and foreign loans). Because the data indicate such stark differences in geographic scope for banks in the different size cohorts, we tested how size is related to the effects of diversification by running tests that interact each of the diversification indices with the bank size-class dummy variables.[19]

Using our panel data set, we estimated regressions of the form

$$P_{it} = \alpha_0 + \alpha_{1i} BHC_i + \alpha_{2t} Year_t + \alpha_{3j} Size_{i=j,t} + \alpha_4 Assets_{it} + \alpha_{5j} GEODIV_{it} * Size_{i=j,t} + \beta X_{it} + \varepsilon_{it} ,$$

[17] To identify wholesale banks, we used information reported for the purposes of the CRA, that identifies whether an institutions is considered a wholesale banks in the context of CRA assessments. The HMDA and CRA data are calendar year data. Here we also used year-end BHC data. Since the SOD data are reported for June of each years, we merger adjusted these data to reflect the year-end bank and BHC-affiliates status before constructing our geographic diversification indices.

[18] This is a standard cost ratio called an efficiency ratio in the FDIC Quarterly Banking Profile, which summarized portfolio and performance trends in the banking industry.

[19] Technically, we demeaned our panel data set before running our regressions rather than including thousands of dummy variables, so the fit of our regressions is lower than if we included bank dummies since a fair amount of the total variation in performance across banks is explained by average differences.

where P_{it} denotes a particular portfolio or performance ratio for bank *i* in year *t*. BHC_i is a dummy indicating the BHC (we also report estimates without a BHC fixed effect). $Year_t$ indicates the year (excluding 2001). $Size_{i=j,t}$ indicates the BHC's size class in year *t* in (*j=small, medium, or large*) small, medium, or large in year *t*. The main variable of interest is the geographic diversification index for each BHC, $GEODIV_{it}$. Note that we allow the performance-diversification relationship to vary with bank size class by interacting *GEODIV* and *Size*. We also report results without these interactions. X_{it} is the set of other controls summarized in Table 1. Tables 3 and 4 summarize the results from a variety of specifications (full results, including all the controls, are in the appendix): with size-diversification interactions (top panel) and without (bottom); without a BHC fixed effect (table 3) and with a BHC fixed effect (Table 4).

The most robust result is that greater geographic diversification is most consistently associated with greater bank lending as a share of total assets. Beyond that, the results tend to differ by size class. And results in regressions that do not allow for this (panel B of each table) reflect relationships evident for small BHCs that dominate the population of U.S. commercial banks. We also find some difference in the effects associated with within banks changes in geographic diversification, compared to effects the capture both cross-sectional and within bank variation in geographic scope (table 3). However, in terms of portfolios and performance ratios, we do not find a number of the expected benefits of geographic diversification.

The results for funding through small [core] deposits and for bank capitalization are more sensitive to how one controls for asset size and bank fixed effect in the regressions. The results reported here suggest that greater geographic diversification is associated with greater funding through core deposits (the exception being that within-bank increases in geographic diversification among the very largest BHCs are associated with lower core deposit funding (Table 4)). In contrast with the conjecture that greater diversification should reduce required capitalization, we generally find a positive relationship between geographic scope and equity-to-asset ratios (the exception being that within-bank increases in geographic diversification among small BHCs are associated with lower capitalization (Table 4).

In terms of performance, greater geographic diversification was associated with lower profitability (measured in terms of ROA and ROE) among smaller banks; for the largest we generally find no effect. These profitability results are consistent with finding for both asset quality and costs. Among smaller BHCs, greater geographic diversification was associated with higher noncurrent loan ratios and higher noninterest expense ratios during the 1994-2001 period.

We also estimated cross-sectional regressions to see whether geographic diversification was associated with better risk-adjusted returns during our study period. We computed the sample-period means and standard deviations of ROA and ROE, respectively, for every BHC that was present in the panel data set for at least half of the sample period. This yielded a cross-sectional of 6738 observations. Table 2 summarizes the variables use in measuring the link between geographic diversification and risk-adjusted returns over the 1994-2001 period. We use the mean of the geographic diversification index for each BHC as our measure of geographic diversification in these tests. We constructed a set of control variables comparable to those used in the panel data tests, except we used means over 1994-2001 instead of year-specific observations. For example, a BHC's asset size categorization is based on its average assets reported during the sample period (in 1996 dollars). Using these data we estimated cross-section regression equations of the form

$$R_i = \ + {}_{2j}\, Size_{i=j} + {}_{3}Assets_i + {}_{4j}\, Size_{i=j} * Geodiv_i + \beta * X_i + \ \varepsilon_i ,$$

where R_i measures BHC *i's* risk or return over the sample period. $GEODIV_i$ is the mean geographic diversification index for BHC *i*. $Size_{i=j}$ indicates the BHC's asset size class (*j=small, medium, or large*) based on its average asset size during the sample period (in 1996 dollars). X_i is the list of other control summarized in Table 2.

We find no evidence that geographic scope was associated with better risk-adjusted returns. As reported in panel A of Table 5, among small- and medium-sized banks, we generally find that greater geographic diversification was associated with lower risk-adjusted returns, measured both in terms of ROA and ROE. Average profitability was lower and the variability of returns was higher for small- and medium-seized BHC's that were more geographically spread out than other

BHCs of similar size. Among large BHCs, we found no significant association between geographic diversification and risk-adjusted returns.

In sum, except for an increase in bank lending capacity, we generally do not find that greater geographic diversification has translated into an improved risk-return tradeoff during the past decade. Importantly, all of our tests control for loan product diversification, diversification through foreign lending, and for financial size. All of these factors are significant in explaining bank portfolio and performance ratios, and their inclusion allows us to interpret our results as evidence about geographic diversification rather than evidence about other factors associated with financial scale. (Appendix tables 1-6 present results for all of the control variables included in our tests.)

Finally, to test whether the lack of positive effects from diversification on bank performance during this time may reflect the generally good economic conditions in most US regions, we estimated separate regressions for the year 2001, a recession year and the worst year for banks in our sample period (judging from past-due loans). We did not find the more geographically diversified institutions performed had lower past-due loan rates than less diversified banks. Indeed, results for other portfolio and performance measures for 2001 were very similar to those found using the full panel dataset.

VI. Conclusion

Consolidation in the U.S. banking industry has not just made banks bigger, it has made them wider as well. The average bank holding company operated in 1.7 banking markets in 2001, compared to just 1.4 in 1994. The gains for the largest BHCs have been more pronounced. Reasoning from simple portfolio theory, we argued that diversification should not necessarily translate into lower risk because banks might opt instead to increase their lending or to shed capital. We found that diversification *is* associated with higher loan-to-asset ratios across banks of all sizes, but the high loan ratios did *not* translate into improved asset quality, or improvements in ROA or ROE.

Given increased lending, the absence of improvements on the bottom line is puzzling. All we can do here is speculate.[20] Since geographic diversification has been achieved largely through mergers and acquisitions, merger-related costs may obscure the longer-run performance gains associated by broadening geographic scope? Or perhaps diversification increases lending capacity for the banking system as a whole, as our results suggest, but the profit gains for diversifying banks get competed away? It could also be that the marginal credits being produced as banks spread out are riskier than the average credit (hence the absent improvement in relative loan performance)? A fourth and final possibility; our diversification measure, though more detailed than any thus far in the literature, may not be detailed enough. We may need to measure the correlation among markets, and not simply the number. A bank spreading just one market over may not get as much benefit as one moving into a far- away (less correlated) market.

We conclude as we began, that the greater width of U.S. banks is the understudied dimension of U.S. bank consolidation (compared to greater size). Our paper documents that trend using better data than heretofore, and shows that diversification has improved lending capacity for the banking system. Further research is needed to explain why that increased capacity does not translate into improvements in loan performance and the bottom line for individual banks.

[20] While it could reflect that our sample period (1994-2001) was a relatively quiet one for the banking industry where diversification did not pay off, we did not find better performance for diversified banks even in 2001, a recession year.

Table 1: Variables used in Panel Data Tests: Description and Summary Statistics

Commercial bank data aggregated to the BHC level: 1994-2001

		Mean	Std dev
Dependent Variables:			
Small deposits/assets	Deposits<$100,000 per account/assets	0.752	0.094
Equity/assets	Year-end equity capital/total assets	0.103	0.038
Total Loans/ assets	Year-end gross loans and leases/total assets	0.579	0.141
ROA	Annual net annual Income/average total assets	0.011	0.008
ROE	Annual net income/average equity	0.114	0.089
Noncurrent loans/total loans	year end noncurrent loans and leases/total loans and leases	0.011	0.015
Cost ratio (overhead costs)	Annual non-interest expenses/(annual net interest plus noninterest income)	0.645	0.143
Control variables			
Y94	Y94=1 if year=1994	0.145	0.352
Y95	Y95=1 if year=1995	0.140	0.347
Y96	Y96=1 if year=1996	0.133	0.340
Y97	y97=1 if year=1997	0.127	0.333
Y98	Y98=1 if year=1998	0.120	0.325
Y99	Y99=1 if year=1999	0.114	0.318
Y00	Y00=1 if year=2000	0.111	0.314
RURAL	Rural=1 if headquartered in rural county	0.591	0.492
Ag bank	Instag=1 if Ag loans/total loans and leases >.25	0.289	0.454
BHCDUM	BHCDUM=1 if inst is BHC	0.731	0.444
Small BHC	Small BHC=1 if assets<1B (96$s)	0.967	0.179
Medium BHC	Medium BHC=1 total assets between 1B-50B (96$)	0.032	0.175
Large BHC	Large BHC=1 if assets>50B (96$s)	0.001	0.038
log(assets)	Log of assets (96$)	11.261	1.233
Fgn_div	Foreign diversification index	0.001	0.021
Fgn_div*small	Foreign diversification index*Small BHC	0.001	0.015
Fgn_div*medium	Foreign diversification index*Medium BHC	0.000	0.011
Fgn_div*large	Foreign diversification index*Large BHC	0.000	0.010
Prod_div	Loan Product diversification index	0.669	0.113
Prod_div*small	Loan Product diversification index*Small BHC	0.646	0.163
Prod_div*medium	Loan Product diversification index*Medium BHC	0.021	0.120
Prod_div*large	Loan Product diversification index*Large BHC	0.001	0.027
Geographic diversification variables			
Geo_div	Geographic Diversification index	0.072	0.170
Geo_div*small	Geographic Diversification index*Small BHC	0.056	0.143
Geo_div*medium	Geographic Diversification index*Medium BHC	0.015	0.098
Geo_div*large	Geographic Diversification index*Large BHC	0.001	0.029

Notes for the BHC-level panel data set: we started with all Commercial Banks that reported Summary of deposit data in a given year from 1994 through 2001. We dropped observations where an institution reported no loans, no assets, or no equity from our sample. We also dropped observations identified as credit card lenders or wholesale banks, since their mainstay does not include the not operation of traditional retail deposit networks. Finally, we exclude observations where the banks is less than five years old, since young banks, that tend to be small banks, can have very extreme portfolio and performance ratios, which we did not wish to distort our results for small banks. From this banks level data set, we compiled a BHC level panel data set by aggregating the data for a given holding company affiliates into a single holding company level measure of the commercial banking organization--excluding, of course the entities that were dropped from the bank-level data set as outlined above. We have 52442 observations in our eight year panel data set.

Table 2: Cross sectional Tests: Geographic Diversification and Risk-adjusted Profitability: Summary Statistics

Sample period means of commercial bank data aggregated to the BHC level

		Mean	Std dev
Dependent Variables:			
Risk-adjusted ROA	Log of (Mean ROA)/(STD Dev of ROA)	1.569	0.938
Risk adjusted ROE	Log of (Mean ROE)/(STD Dev of ROE)	1.538	0.915
Mean ROA	Mean ROA	0.011	0.006
Mean ROE	Mean ROE	0.115	0.059
Std Dev ROA	Standard Deviation of ROA	0.003	0.005
Std Dev ROE	Standard Deviation of ROE	0.036	0.057
Control Variables			
Rural Hdqts.	Equals 1 if headquartered in a non MSA county for more than half the sample period	0.589	0.492
AG Bank	Equals one if avg AG loans/total loans>.25	0.290	0.454
BHC	Equal one if BHC affiliates	0.736	0.441
Assets	log(mean assets (96$))	11.296	1.234
Small size	Average assets < 1B (96$)	0.965	0.183
Medium Size	Average assets between 1B and 50B (96$s)	0.033	0.179
Large Size	Average assets greater than 50B (96$s)	0.001	0.037
Fgn_div	Mean Foreign diversification index	0.001	0.020
Fgn_div*small	Mean Foreign diversification index*Small BHC	0.001	0.014
Fgn_div*medium	Mean Foreign diversification index*Medium BHC	0.000	0.011
Fgn_div*large	Mean Foreign diversification index*Large BHC	0.000	0.010
Prod_div	Mean Loan Product diversification index	0.669	0.107
Prod_div*small	Mean Loan Product diversification index*Small BHC	0.646	0.161
Prod_div*medium	Mean Loan Product diversification index*Medium BHC	0.022	0.123
Prod_div*large	Mean Loan Product diversification index*Medium BHC	0.001	0.027
Geographic diversification variables			
Geo_div	Mean Geographic Diversification index	0.074	0.164
Geo_div*small	Mean Geographic Diversification index*Small BHC	0.057	0.136
Geo_div*medium	Mean Geographic Diversification index*Medium BHC	0.015	0.098
Geo_div*large	Mean Geographic Diversification index*Large BHC	0.001	0.029

Notes: We constructed a cross-sectional sample of the mean and standard deviation of ROA and ROE, respectively, for BHCs that were in our panel dataset for more than half of the sample period (1994-2001), which contains 6,738 observations. However, measures of risk-adjusted returns are not well defined for institutions having negative average ROA and ROE. Thus, we restricted the construction of risk-adjusted profitability measure to include only BHCs that had positive average profitability measures during the sample period. Our sample of observations on risk-adjusted profitability measures consists of 6621 observations.

Table 3: Geographic Diversification and Bank Portfolio and Performance ratios: BHC level panel data

Coefficient estimates for BHC asset size variables and the geographic diversification index and standard errors (in parenthesis) estimated over BHC-year panel data: 1994-2001.

A. Panel data regressions include size interactions with diversification indices but no BHC level fixed effects

	Dependent variables																					
	Core dep/ assets			Equity/ assets			Total loans/ assets			ROA			ROE			Noncurrent loans/ loans			Cost ratio		
INTERCEP	0.911	***		0.180	***		0.507	***		-0.003	***		-0.096	***		0.030	***		1.264	***	
	(0.005)			(0.002)			(0.009)			(0.001)			(0.006)			(0.001)			(0.009)		
Medium Size	-0.173	***		-0.018	***		-0.167	***		0.002			0.032	**		0.009	***		-0.055	***	
	(0.012)			(0.005)			(0.019)			(0.001)			(0.012)			(0.002)			(0.019)		
Large Size	-0.391	***		-0.045			-0.713	***		-0.016	*		-0.145			0.006			0.457	***	
	(0.095)			(0.041)			(0.154)			(0.09)			(0.100)			(0.017)			(0.153)		
Log(assets)	-0.022	***		-0.003	***		0.013	***		0.001	***		0.015	***		-0.001	***		-0.051	***	
	(0.000)			(0.000)			(0.001)			(0.000)			(0.000)			(0.000)			(0.001)		
Geo div*small	0.034	***		-0.014	***		0.080	***		-0.004	***		-0.027	***		0.002	***		0.103	***	
	(0.003)			(0.001)			(0.004)			(0.000)			(0.003)			(0.000)			(0.004)		
Geo_div*medium	0.116	***!!!		0.008	**!!!		0.089	***		-0.001	!!!		-0.024	***		-0.001	!!		0.073	***!!	
	(0.008)			(0.003)			(0.012)			(0.001)			(0.008)			(0.001)			(0.012)		
Geo_div*large	0.196	***!!		0.032			0.280	**!		0.007	!		0.031			-0.003			0.066		
	(0.071)			(0.030)			(0.115)			(0.007)			(0.074)			(0.013)			(0.114)		
R-square	0.220			0.126			0.093			0.032			0.053			0.022			0.129		
Mean	0.752			0.103			0.579			0.011			0.114			0.011			0.645		

B. Panel data regressions: no size interactions with diversification indices and no BHC level fixed effects

	Dependent variables																					
	Core dep/ assets			Equity/ assets			Total loans/ assets			ROA			ROE			Noncurrent loans/loans			Cost ratio		
INTERCEP	0.905	***		0.179	***		0.504	***		-0.003	***		-0.094	***		0.031	***		1.260	***	
	(0.005)			(0.002)			(0.009)			(0.001)			(0.006)			(0.001)			(0.009)		
Medium Size	-0.049	***		0.009	***		-0.063	***		-0.002	***		-0.014	***		0.003	***		0.042	***	
	(0.003)			(0.001)			(0.004)			(0.000)			(0.003)			(0.000)			(0.004)		
Large Size	-0.067	***		0.020	***		-0.104	***		-0.004	***		-0.045	***		0.004	**		0.158	***	
	(0.010)			(0.004)			(0.017)			(0.001)			(0.011)			(0.002)			(0.017)		
Log(assets)	-0.022	***		-0.003	***		0.013	***		0.001	***		0.015	***		-0.001	***		-0.051	***	
	(0.000)			(0.000)			(0.001)			(0.000)			(0.000)			(0.000)			(0.001)		
GEODIV	0.046	***		-0.011	***		0.085	***		-0.004	***		-0.028	***		0.002	***		0.103	***	
	(0.003)			(0.001)			(0.004)			(0.000)			(0.003)			(0.000)			(0.004)		
	0.216			0.124			0.091			0.031			0.053			0.021			0.128		
	0.752			0.103			0.579			0.011			0.114			0.011			0.645		

Notes: Regressions estimated using OLS. Each specification includes dummies identifying rural banks, Ag banks, and BHCs, respectively. Panel A Regressions include the foreign diversification index (interacted with the asset size dummies and the loan product diversification index interacted with the asset size dummies as described in table 1. . Panel B regressions include the foreign diversification index and the loan product diversification index, but neither are interacted with the asset size dummies. ***; **; * Estimated effect is significantly different from zero at the 1%, 5% , 10% significance level, respectively. !!!; !!; ! Estimated effect is significantly different from the estimated effect for small banks at the 1%, 5%, 10% significance level, respectively.

Table 4: Geographic Diversification and Bank Portfolio and Performance ratios: BHC level panel data

Coefficient estimates for BHC asset size variables and the geographic diversification index and standard errors (in parenthesis) estimated over BHC-year panel data: 1994-2001.

A. Panel data regressions include size interactions with diversification indices and BHC level fixed effects

	Dependent variables																	
	Core dep/ assets		Equity/ assets		Total loans/ assets		ROA		ROE		Noncurrent loans/ Total loans		Cost ratio	
INTERCEP	0.000		0.000		0.000		0.000		0.000		0.000		0.000	
	(0.000)		(0.000)		(0.000)		(0.000)		(0.000)		(0.000)		(0.000)	
Medium Size	-0.003		0.002		-0.007		0.004	***	0.033	***	-0.003	*	-0.041	***
	(0.006)		(0.002)		(0.009)		(0.001)		(0.010)		(0.002)		(0.013)	
Large Size	0.042		-0.011		0.090	**	0.005		0.061		-0.004		-0.081	
	(0.027)		(0.010)		(0.041)		(0.004)		(0.048)		(0.008)		(0.060)	
Log(assets)	-0.036	***	-0.028	***	0.007	***	-0.001	***	0.014	***	-0.003	***	-0.076	***
	(0.001)		(0.000)		(0.001)		(0.000)		(0.002)		(0.000)		(0.002)	
Geo div*small	0.032	***	0.006	***	0.053	***	-0.005	***	-0.058	***	0.004	***	0.125	***
	(0.003)		(0.001)		(0.005)		(0.000)		(0.006)		(0.001)		(0.007)	
Geo_div*medium	0.028	***	0.036	***!!!	0.036	***	-0.001	!!!	-0.049	***	0.005	**	0.114	***
	(0.007)		(0.003)		(0.011)		(0.001)		(0.013)		(0.002)		(0.017)	
Geo_div*large	-0.798	***!!!	0.033	*	0.485	***!!!	0.001		-0.049		-0.012		-0.195	*!!!
	(0.051)		(0.019)		(0.079)		(0.008)		(0.091)		(0.016)		(0.115)	
R-square	0.336		0.148		0.163		0.013		0.008		0.007		0.054	
Mean	0.000		0.000		0.000		0.000		0.000		0.000		0.000	

B. Panel data regressions: no size interactions with diversification indices, but includes BHC level fixed effects

	Dependent variables																	
	Core dep/ assets		Equity/ assets		Total loans/ assets		ROA		ROE		Noncurrent loans/ Total loans		Cost Ratio	
INTERCEP	0.000		0.000		0.000		0.000		0.000		0.000		0.000	
	(0.000)		(0.000)		(0.000)		(0.000)		(0.000)		(0.000)		(0.000)	
Medium Size	-0.027	***	0.009	***	-0.023	***	0.003	***	0.028	***	-0.003		-0.032	***
	(0.005)		(0.002)		(0.008)		(0.001)		(0.009)		(0.002)		(0.012)	
Large Size	-0.013		0.018		-0.019		0.003		0.010		-0.003		-0.029	
	(0.022)		(0.008)		(0.034)		(0.003)		(0.039)		(0.007)		(0.049)	
Log(assets)	-0.036	***	-0.027	***	0.005	***	-0.001	***	0.014	***	-0.003	***	-0.075	***
	(0.001)		(0.000)		(0.001)		(0.000)		(0.002)		(0.000)		(0.002)	
Geo_div	0.029	***	0.008	***	0.053	***	-0.004	***	-0.057	***	0.004	***	0.123	***
	(0.003)		(0.001)		(0.005)		(0.000)		(0.006)		(0.001)		(0.007)	
R-Square	0.331		0.144		0.161		0.012		0.008		0.007		0.054	
Mean	0.000		0.000		0.000		0.000		0.000		0.000		0.000	

Notes: Regressions estimated using OLS. Each specification includes dummies identifying rural banks, Ag banks, and BHCs, respectively. Panel A regressions include the foreign diversification index (interacted with the asset size dummies and the loan product diversification index interacted with the asset size dummies as described in table 1. . Panel B regressions include the foreign diversification index and the loan product diversification index, but neither are interacted with the asset size dummies.

***; **; * Estimated effect is significantly different from zero at the 1%, 5%, 10% significance level, respectively.

!!!; !!; ! Estimated effect is significantly different from the estimated effect for small banks at the 1%, 5%, 10% significance level, respectively.

Table 5: Geographic Diversification and Risk-adjusted Profitability
Cross-sectional BHC-level Tests

Coefficient estimates for BHC asset size variables and the geographic diversification index and standard errors (in parenthesis) estimated using a cross-section of sample-period means between 1994 and 2001.

A. Cross-sectional regressions include size interactions with diversification indices

	Dependent variables					
	Risk-adjusted ROA	Risk-adjusted ROE	Mean ROA	Mean ROE	Std. Dev ROA	Std. Dev. ROE
Intercept	-1.718 ***	-1.819 ***	-0.003 ***	-0.072 ***	0.015 ***	0.156 ***
	(0.159)	(0.160)	(0.001)	(0.010)	(0.001)	(0.010)
Medium BHC	-1.625 ***	-1.396 ***	0.005 **	0.044 **	0.024 ***	0.146 ***
	(0.346)	(0.347)	(0.002)	(0.022)	(0.002)	(0.022)
Large BHC	-2.411	-3.061	0.055	0.456	0.007	0.036
	(11.975)	(12.003)	(0.074)	(0.760)	(0.060)	(0.762)
Log(assets)	0.253 ***	0.254 ***	0.001 ***	0.014 ***	-0.001 ***	-0.008 ***
	(0.013)	(0.013)	(0.000)	(0.001)	(0.000)	(0.001)
Geo div*small	-0.571 ***	-0.570 ***	-0.004 ***	-0.020 ***	0.002 ***	0.031 ***
	(0.085)	(0.085)	(0.001)	(0.005)	(0.000)	(0.005)
Geo_div*medium	-0.616 ***	-0.605 ***	-0.002	-0.027 *	0.003 ***	0.028 *
	(0.227)	(0.228)	(0.001)	(0.014)	(0.001)	(0.014)
Geo_div*large	0.537	0.561	-0.002	-0.071	0.000	-0.010
	(5.753)	(5.766)	(0.035)	(0.365)	(0.029)	(0.366)
R-Square	0.080	0.081	0.056	0.114	0.080	0.048
Dependent Variable Mean	1.580	1.541	0.011	0.115	0.003	0.036

B. Cross-sectional regressions do not include size interactions with diversification indices

	Dependent variables					
	Risk-adjusted ROA	Risk-adjusted ROE	Mean ROA	Mean ROE	Std. Dev ROA	Std. Dev. ROE
Intercept	-1.772 ***	-1.864 ***	-0.002 **	-0.069 ***	0.015 ***	0.162 ***
	(0.159)	(0.159)	(0.001)	(0.010)	(0.001)	(0.010)
Medium BHC	-0.306 ***	-0.318 ***	-0.001 ***	-0.011 **	0.001 ***	0.005
	(0.075)	(0.075)	(0.000)	(0.005)	(0.000)	(0.005)
Large BHC	-0.653 **	-0.656 **	-0.003 *	-0.035 *	0.002	0.015
	(0.318)	(0.318)	(0.002)	(0.020)	(0.002)	(0.020)
Log(assets)	0.253 ***	0.254 ***	0.001 ***	0.014 ***	-0.001 ***	-0.008 ***
	(0.013)	(0.013)	(0.000)	(0.001)	(0.000)	(0.001)
Geo_div	-0.531 ***	-0.539 ***	-0.004 ***	-0.023 ***	0.001 ***	0.026 ***
	(0.080)	(0.080)	(0.000)	(0.005)	(0.000)	(0.005)
		0.080	0.054	0.113	0.055	0.041
R-Square	0.078	1.541	0.011	0.115	0.003	0.036

Notes: Regressions estimated using OLS. Each specification includes dummies identifying rural banks, Ag banks, and BHCs, respectively. Panel A regressions include the mean foreign diversification index (interacted with the asset size dummies and the mea loan product diversification index interacted with the asset size dummies as described in table 2. . Panel B regressions include the mean foreign diversification index and the mean loan product diversification index, but neither are interacted with the asset size dummies.

***; **; * Estimated effect is significantly different from zero at the 1%, 5%, 10% significance level, respectively.

!!!; !!; ! Estimated effect is significantly different from the estimated effect for small banks at the 1%, 5%, 10% significance level, respectively.

Appendix Table 1: Geographic Diversification and Bank Portfolio and Performance ratios: BHC level panel data

	Dependent variable																			
	Core dep/assets		Equity/assets		Total loans/ assets		ROA		ROE		Noncurrent loans/ loans		Cost ratio	
INTERCEP	0.911	***	0.180	***	0.507	***	-0.003	***	-0.096	***	0.030	***	1.264	***
	(0.005)		(0.002)		(0.009)		(0.001)		(0.006)		(0.001)		(0.009)	
Y94	0.067	***	-0.009	***	-0.052	***	0.001	***	0.012	***	0.000		-0.008	***
	(0.001)		(0.001)		(0.002)		(0.000)		(0.002)		(0.000)		(0.002)	
Y95	0.052	***	-0.003	***	-0.048	***	0.001	***	0.015	***	-0.001	**	-0.025	***
	(0.001)		(0.001)		(0.002)		(0.000)		(0.002)		(0.000)		(0.002)	
Y96	0.043	***	-0.002	***	-0.033	***	0.001	***	0.015	***	0.000		-0.039	***
	(0.001)		(0.001)		(0.002)		(0.000)		(0.002)		(0.000)		(0.002)	
Y97	0.032	***	0.000		-0.019	***	0.002	***	0.017	***	-0.001	***	-0.042	***
	(0.001)		(0.001)		(0.002)		(0.000)		(0.002)		(0.000)		(0.002)	
Y98	0.028	***	-0.001		-0.029	***	0.001	***	0.011	***	-0.001	***	-0.027	***
	(0.002)		(0.001)		(0.002)		(0.000)		(0.002)		(0.000)		(0.002)	
Y99	0.014	***	-0.004	***	-0.008	***	0.001	***	0.011	***	-0.002	***	-0.019	***
	(0.002)		(0.001)		(0.002)		(0.000)		(0.002)		(0.000)		(0.002)	
Y00	-0.001		0.000		0.007	***	0.001	***	0.014	***	-0.002	***	-0.023	***
	(0.002)		(0.001)		(0.003)		(0.000)		(0.002)		(0.000)		(0.002)	
Rural Hdqts	-0.012	***	0.008	***	-0.011	***	0.001	***	0.006	***	-0.001	***	-0.056	***
	(0.001)		(0.000)		(0.001)		(0.000)		(0.001)		(0.000)		(0.001)	
Ag Bank	-0.001		0.006	***	-0.024	***	0.000	**	-0.003	***	0.001	**	-0.039	***
	(0.001)		(0.000)		(0.002)		(0.000)		(0.001)		(0.000)		(0.002)	
BHC	0.021	***	-0.017	***	0.038	***	0.001	***	0.023	***	-0.003	***	-0.002	
	(0.001)		(0.000)		(0.001)		(0.000)		(0.001)		(0.000)		(0.001)	
Medium Size	-0.173	***	-0.018	***	-0.167	***	0.002		0.032	**	0.009	***	-0.055	***
	(0.012)		(0.005)		(0.019)		(0.001)		(0.012)		(0.002)		(0.019)	
Large Size	-0.391	***	-0.045		-0.713	***	-0.016	*	-0.145		0.006		0.457	***
	(0.095)		(0.041)		(0.154)		(0.009)		(0.100)		(0.017)		(0.153)	
Log(assets)	-0.022	***	-0.003	***	0.013	***	0.001	***	0.015	***	-0.001	***	-0.051	***
	(0.000)		(0.000)		(0.001)		(0.000)		(0.000)		(0.000)		(0.001)	
Fgn_div*small	-0.856	***	-0.006		-0.177	***	-0.015	***	-0.144	***	0.030	***	0.361	***
	(0.025)		(0.011)		(0.040)		(0.002)		(0.026)		(0.005)		(0.040)	
Fgn_div*medium	-0.601	***!!!	-0.014		-0.341	***!!	-0.012	***	-0.106	***	0.004	!!!	0.299	***
	(0.034)		(0.015)		(0.055)		(0.003)		(0.036)		(0.006)		(0.055)	
Fgn div_large	-0.484	***!!!	0.023		0.079	!!	0.004	!	0.022	!!	0.013		0.236	**
	(0.071)		(0.030)		(0.115)		(0.007)		(0.074)		(0.013)		(0.114)	
Prod_div*small	0.077	***	-0.048	***	-0.095	***	-0.003	***	0.013	***	-0.006	***	0.019	***
	(0.003)		(0.001)		(0.005)		(0.000)		(0.004)		(0.001)		(0.005)	
Prod_div*medium	0.206	***!!!	-0.023	***!!!	0.056	*!!!	-0.010	***!!!	-0.058	***!!!	-0.013	***!!	0.185	***!!!
	(0.018)		(0.008)		(0.030)		(0.002)		(0.019)		(0.003)		(0.029)	
Prod_div*large	0.309	*	-0.011		0.483	*!!	-0.002		0.061		-0.001		-0.334	
	(0.173)		(0.075)		(0.282)		(0.016)		(0.182)		(0.032)		(0.280)	
Geo div*small	0.034	***	-0.014	***	0.080	***	-0.004	***	-0.027	***	0.002	***	0.103	***
	(0.003)		(0.001)		(0.004)		(0.000)		(0.003)		(0.000)		(0.004)	
Geo_div*medium	0.116	***!!!	0.008	**!!!	0.089	***	-0.001	!!!	-0.024	***	-0.001	!!	0.073	***!!
	(0.008)		(0.003)		(0.012)		(0.001)		(0.008)		(0.001)		(0.012)	
Geo_div*large	0.196	***!!	0.032		0.280	**!	0.007	!	0.031		-0.003		0.066	
	(0.071)		(0.030)		(0.115)		(0.007)		(0.074)		(0.013)		(0.114)	
R-square	0.220		0.126		0.093		0.032		0.053		0.022		0.129	
Mean	0.752		0.103		0.579		0.011		0.114		0.011		0.645	

Notes: Regressions estimated using OLS. Standard errors are reported in parentheses. Variables are defined in Table 1. ***; **; *Estimated effect is significantly different from zero at the 1%, 5%, 10% significance level, respectively. !!!; !!; ! Estimate is significantly different from the estimate for small banks at the 1%, 5%, 10% significance level, respectively.

Appendix Table 2: Geographic Diversification and Bank Portfolio and Performance ratios: BHC level panel data

	Dependent variable																			
	Core dep/assets		Equity/assets		Total loans/ assets		ROA		ROE		Noncurrent loans/ Total loans		Cost ratio	
INTERCEP	0.905	***	0.179	***	0.504	***	-0.003	***	-0.094	***	0.031	***	1.260	***
	(0.005)		(0.002)		(0.009)		(0.001)		(0.006)		(0.001)		(0.009)	
Y94	0.067	***	-0.009	***	-0.052	***	0.001	***	0.012	***	0.000		-0.008	***
	(0.001)		(0.001)		(0.002)		(0.000)		(0.002)		(0.000)		(0.002)	
Y95	0.053	***	-0.003	***	-0.048	***	0.001	***	0.015	***	-0.001	**	-0.025	***
	(0.001)		(0.001)		(0.002)		(0.000)		(0.002)		(0.000)		(0.002)	
Y96	0.044	***	-0.002	***	-0.033	***	0.001	***	0.015	***	0.000		-0.039	***
	(0.001)		(0.001)		(0.002)		(0.000)		(0.002)		(0.000)		(0.002)	
Y97	0.032	***	0.000		-0.019	***	0.002	***	0.017	***	-0.001	***	-0.042	***
	(0.002)		(0.001)		(0.002)		(0.000)		(0.002)		(0.000)		(0.002)	
Y98	0.028	***	-0.001		-0.029	***	0.001	***	0.011	***	-0.001	***	-0.027	***
	(0.002)		(0.001)		(0.002)		(0.000)		(0.002)		(0.000)		(0.002)	
Y99	0.015	***	-0.004	***	-0.008	***	0.001	***	0.011	***	-0.002	***	-0.019	***
	(0.002)		(0.001)		(0.002)		(0.000)		(0.002)		(0.000)		(0.002)	
Y00	-0.001		0.000		0.007	***	0.001	***	0.014	***	-0.002	***	-0.023	***
	(0.002)		(0.001)		(0.003)		(0.000)		(0.002)		(0.000)		(0.002)	
Rural Hdqts	-0.012	***	0.008	***	-0.011	***	0.001	***	0.006	***	-0.001	***	-0.056	***
	(0.001)		(0.000)		(0.001)		(0.000)		(0.001)		(0.000)		(0.001)	
Ag Bank	0.000		0.006	***	-0.024	***	0.000	**	-0.003	***	0.000	***	-0.038	***
	(0.001)		(0.000)		(0.002)		(0.000)		(0.001)		(0.000)		(0.002)	
BHC	0.020	***	-0.017	***	0.038	***	0.001	***	0.023	***	-0.003	***	-0.002	
	(0.001)		(0.000)		(0.001)		(0.000)		(0.001)		(0.000)		(0.001)	
Medium Size	-0.049	***	0.009	***	-0.063	***	-0.002	***	-0.014	***	0.003	***	0.042	***
	(0.003)		(0.001)		(0.004)		(0.000)		(0.003)		(0.000)		(0.004)	
Large Size	-0.067	***	0.020	***	-0.104	***	-0.004	***	-0.045	***	0.004	**	0.158	***
	(0.010)		(0.004)		(0.017)		(0.001)		(0.011)		(0.002)		(0.017)	
Log(assets)	-0.022	***	-0.003	***	0.013	***	0.001	***	0.015	***	-0.001	***	-0.051	***
	(0.000)		(0.000)		(0.001)		(0.000)		(0.000)		(0.000)		(0.001)	
FGN_DIV	-0.774	***	-0.016	**	-0.240	***	-0.013	***	-0.116	***	0.021	***	0.336	***
	(0.018)		(0.008)		(0.030)		(0.002)		(0.019)		(0.003)		(0.030)	
PR_DIV	0.085	***	-0.047	***	-0.089	***	-0.004	***	0.011	***	-0.006	***	0.024	***
	(0.003)		(0.001)		(0.005)		(0.000)		(0.003)		(0.001)		(0.005)	
GEODIV	0.046	***	-0.011	***	0.085	***	-0.004	***	-0.028	***	0.002		0.103	***
	(0.003)		(0.001)		(0.004)		(0.000)		(0.003)		(0.000)		(0.004)	
R-square	0.216		0.124		0.091		0.031		0.053		0.021		0.128	
Dependent variable Mean	0.752		0.103		0.579		0.011		0.114		0.011		0.645	

Notes: ***; **; * Estimated effect is significantly different from zero at the 1%, 5%, 10% significance level, respectively.
Regressions estimated using OLS. Standard errors are reported in parentheses. Variables are defined in Table 1.

Appendix Table 3: Geographic Diversification and Bank Portfolio and Performance ratios: BHC level panel data

Dependent variable	Core dep/assets		Equity/assets		Loans/assets		ROA		ROE		Noncurrent loans/loans		Cost Ratio	
INTERCEP	0.000		0.000		0.000		0.000		0.000		0.000		0.000	
	(0.000)		(0.000)		(0.000)		(0.000)		(0.000)		(0.000)		(0.000)	
Y94	0.056	***	-0.016	***	-0.055	***	0.000	*	0.012	***	-0.002	***	-0.029	***
	(0.001)		(0.000)		(0.001)		(0.000)		(0.001)		(0.000)		(0.002)	
Y95	0.043	***	-0.009	***	-0.051	***	0.000	***	0.014	***	-0.002	***	-0.041	***
	(0.001)		(0.000)		(0.001)		(0.000)		(0.001)		(0.000)		(0.002)	
Y96	0.035	***	-0.007	***	-0.035	***	0.001	***	0.014	***	-0.001	***	-0.052	***
	(0.001)		(0.000)		(0.001)		(0.000)		(0.001)		(0.000)		(0.001)	
Y97	0.026	***	-0.004	***	-0.020	***	0.001	***	0.014	***	-0.002	***	-0.051	***
	(0.001)		(0.000)		(0.001)		(0.000)		(0.001)		(0.000)		(0.001)	
Y98	0.023	***	-0.004	***	-0.030	***	0.001	***	0.009	***	-0.001	***	-0.033	***
	(0.001)		(0.000)		(0.001)		(0.000)		(0.001)		(0.000)		(0.001)	
Y99	0.011	***	-0.006	***	-0.008	***	0.000	***	0.010	***	-0.002	***	-0.023	***
	(0.001)		(0.000)		(0.001)		(0.000)		(0.001)		(0.000)		(0.001)	
Y00	-0.003	***	-0.001	***	0.008	***	0.001	***	0.013	***	-0.002	***	-0.025	***
	(0.001)		(0.000)		(0.001)		(0.000)		(0.001)		(0.000)		(0.001)	
Rural Hdqts	-0.008	***	-0.003	***	-0.039	***	0.001		0.012	***	-0.001		-0.027	***
	(0.002)		(0.001)		(0.004)		(0.000)		(0.004)		(0.001)		(0.005)	
Ag Bank	-0.001		0.001	**	-0.014	***	0.000		-0.001		0.000		-0.014	***
	(0.001)		(0.000)		(0.002)		(0.000)		(0.002)		(0.000)		(0.002)	
Medium Size	-0.003		0.002		-0.007		0.004	***	0.033	***	-0.003	*	-0.041	***
	(0.006)		(0.002)		(0.009)		(0.001)		(0.010)		(0.002)		(0.013)	
Large Size	0.042		-0.011		0.090	**	0.005		0.061		-0.004		-0.081	
	(0.027)		(0.010)		(0.041)		(0.004)		(0.048)		(0.008)		(0.060)	
Log(assets)	-0.036	***	-0.028	***	0.007	***	-0.001	***	0.014	***	-0.003	***	-0.076	***
	(0.001)		(0.000)		(0.001)		(0.000)		(0.002)		(0.000)		(0.002)	
Fgn_div*small	-0.270	***	0.039	***	-0.147	***	-0.020	***	-0.218	***	0.009		0.075	
	(0.034)		(0.012)		(0.052)		(0.005)		(0.060)		(0.010)		(0.076)	
Fgn_div*medium	-0.349	***	0.057	***	-0.020	!!!	-0.007	!	-0.149	*	0.016		0.030	
	(0.044)		(0.016)		(0.067)		(0.007)		(0.078)		(0.013)		(0.098)	
Fgn_div*large	-0.894	***!!!	0.071	***	-0.027		0.000	!	-0.127		0.002		-0.245	!!
	(0.067)		(0.024)		(0.104)		(0.010)		(0.119)		(0.021)		(0.150)	
Prod_div*small	0.054	***	-0.016	***	-0.056	***	-0.007	***	-0.046	***	0.009	***	0.121	***
	(0.004)		(0.001)		(0.006)		(0.001)		(0.007)		(0.001)		(0.009)	
Prod_div*medium	0.019	**!!!	-0.022	***!!!	-0.076	***!!	-0.009	***!!!	-0.059	***	0.009	***	0.142	***!
	(0.007)		(0.002)		(0.010)		(0.001)		(0.012)		(0.002)		(0.015)	
Prod_div*large	0.957	***!!!	0.012		-0.682	***!!!	-0.015	*	-0.126		0.030	*	0.583	***!!!
	(0.054)		(0.020)		(0.084)		(0.008)		(0.096)		(0.017)		(0.122)	
Geo div*small	0.032	***	0.006	***	0.053	***	-0.005	***	-0.058	***	0.004	***	0.125	***
	(0.003)		(0.001)		(0.005)		(0.000)		(0.006)		(0.001)		(0.007)	
Geo_div*med.	0.028	***	0.036	***!!!	0.036	***	-0.001	!!!	-0.049	***	0.005	**	0.114	***
	(0.007)		(0.003)		(0.011)		(0.001)		(0.013)		(0.002)		(0.017)	
Geo_div*large	-0.798	***!!!	0.033	*	0.485	***!!!	0.001		-0.049		-0.012		-0.195	*!!!
	(0.051)		(0.019)		(0.079)		(0.008)		(0.091)		(0.016)		(0.115)	
R-square	0.336		0.148		0.163		0.013		0.008		0.007		0.054	
Mean	0.000		0.000		0.000		0.000		0.000		0.000		0.000	

Notes: Regressions estimated using OLS. Standard errors are reported in parentheses. Variables are defined in Table 1.

***; **; * Estimated effect is significantly different from zero at the 1%, 5%, 10% significance level, respectively

!!!; !!; ! Estimated effect is significantly different from the effects estimated for small banks at the 1%, 5%, 10% significance level, respectively.

Appendix Table 4: Geographic Diversification and Bank Portfolio and Performance ratios: BHC level panel data

	Dependent variable																							
	Core dep/assets			Equity/assets			Loans/assets			ROE			ROA			Noncurrent loans/loans			Cost Ratio		
INTERCEP	0.000			0.000			0.000			0.000			0.000			0.000			0.000		
	(0.000)			(0.000)			(0.000)			(0.000)			(0.000)			(0.000)			(0.000)		
Y94	0.056	***		-0.016	***		-0.055	***		0.000	*		0.012	***		-0.002	***		-0.028	***	
	(0.001)			(0.000)			(0.001)			(0.000)			(0.001)			(0.000)			(0.002)		
Y95	0.043	***		-0.009	***		-0.051	***		0.000	***		0.014	***		-0.002	***		-0.041	***	
	(0.001)			(0.000)			(0.001)			(0.000)			(0.001)			(0.000)			(0.002)		
Y96	0.036	***		-0.007	***		-0.036	***		0.001	***		0.014	***		-0.001	***		-0.052	***	
	(0.001)			(0.000)			(0.001)			(0.000)			(0.001)			(0.000)			(0.001)		
Y97	0.026	***		-0.004	***		-0.021	***		0.001	***		0.014	***		-0.002	***		-0.051	***	
	(0.001)			(0.000)			(0.001)			(0.000)			(0.001)			(0.000)			(0.001)		
Y98	0.023	***		-0.004	***		-0.030	***		0.001	***		0.009	***		-0.001	***		-0.033	***	
	(0.001)			(0.000)			(0.001)			(0.000)			(0.001)			(0.000)			(0.001)		
Y99	0.011	***		-0.006	***		-0.008	***		0.000	***		0.010	***		-0.002	***		-0.023	***	
	(0.001)			(0.000)			(0.001)			(0.000)			(0.001)			(0.000)			(0.001)		
Y00	-0.003	***		-0.001	***		0.008	***		0.001	***		0.013	***		-0.002	***		-0.025	***	
	(0.001)			(0.000)			(0.001)			(0.000)			(0.001)			(0.000)			(0.001)		
Rural Hdqts	-0.008	***		-0.003	***		-0.039	***		0.001			0.012	***		-0.001			-0.027	***	
	(0.002)			(0.001)			(0.004)			(0.000)			(0.004)			(0.001)			(0.005)		
Ag Bank	-0.001			0.001	**		-0.014	***		0.000			-0.001			0.000			-0.014	***	
	(0.001)			(0.000)			(0.002)			(0.000)			(0.002)			(0.000)			(0.002)		
Medium Size	-0.027	***		0.009	***		-0.023	***		0.003	***		0.028	***		-0.003			-0.032	***	
	(0.005)			(0.002)			(0.008)			(0.001)			(0.009)			(0.002)			(0.012)		
Large Size	-0.013			0.018			-0.019			0.003			0.010			-0.003			-0.029		
	(0.022)			(0.008)			(0.034)			(0.003)			(0.039)			(0.007)			(0.049)		
Log(assets)	-0.036	***		-0.027	***		0.005	***		-0.001	***		0.014	***		-0.003	***		-0.075	***	
	(0.001)			(0.000)			(0.001)			(0.000)			(0.002)			(0.000)			(0.002)		
Fgn_div	-0.309	***		0.049	***		-0.133	***		-0.015	***		-0.201	***		0.011			0.061		
	(0.029)			(0.011)			(0.045)			(0.004)			(0.052)			(0.009)			(0.065)		
Prod_div	0.054	***		-0.016	***		-0.057	***		-0.007	***		-0.046	***		0.009	***		0.122	***	
	(0.004)			(0.001)			(0.006)			(0.001)			(0.007)			(0.001)			(0.009)		
Geo_div	0.029	***		0.008	***		0.053	***		-0.004	***		-0.057	***		0.004	***		0.123	***	
	(0.003)			(0.001)			(0.005)			(0.000)			(0.006)			(0.001)			(0.007)		
R-Square	0.331			0.144			0.161			0.012			0.008			0.007			0.054		
Mean	0.000			0.000			0.000			0.000			0.000			0.000			0.000		

Notes: ***, **, * Estimated effect is significantly different from zero at the 1%, 5%, 10% significance level, respectively
Regressions estimated using OLS. Standard errors are reported in parentheses. Variables are defined in Table 1.

Appendix table 5: Geographic diversification and Risk-adjusted Profitability

BHC level cross-sectional means and standard deviations for 1994-2001 period. Diversification indices interacted with asset size dummies. Coefficient estimates and standard errors (in parenthesis).

	Dependent variables											
	Risk-adjusted ROA		Risk-adjusted ROE		Mean ROA		Mean ROE		Std. Dev ROA		Std. Dev. ROE	
Intercept	-1.718	***	-1.819	***	-0.003	***	-0.072	***	0.015	***	0.156	***
	(0.159)		(0.160)		(0.001)		(0.010)		(0.001)		(0.010)	
Rural HDTV	0.254	***	0.253	***	0.001	***	0.004	**	-0.001	***	-0.013	***
	(0.025)		(0.025)		(0.000)		(0.002)		(0.000)		(0.002)	
Ag Bank	0.041		0.046	*	0.000		-0.004	**	-0.001	***	-0.010	***
	(0.028)		(0.028)		(0.000)		(0.002)		(0.000)		(0.002)	
BHC affiliates	0.033		0.043	*	0.001	***	0.022	***	0.000	***	-0.003	*
	(0.026)		(0.026)		(0.000)		(0.002)		(0.000)		(0.002)	
Medium BHC	-1.625	***	-1.396	***	0.005	**	0.044	**	0.024	***	0.146	***
	(0.346)		(0.347)		(0.002)		(0.022)		(0.002)		(0.022)	
Large BHC	-2.411		-3.061		0.055		0.456		0.007		0.036	
	(11.975)		(12.003)		(0.074)		(0.760)		(0.060)		(0.762)	
Log(assets)	0.253	***	0.254	***	0.001	***	0.014	***	-0.001	***	-0.008	***
	(0.013)		(0.013)		(0.000)		(0.001)		(0.000)		(0.001)	
Fgn_div*small	-2.358	***	-2.424	***	-0.013	***	-0.122	**	0.004		0.038	
	(0.772)		(0.774)		(0.005)		(0.049)		(0.004)		(0.049)	
Fgn_div*medium	-2.838	***	-2.841	****	-0.013	**	-0.099		0.001		0.056	
	(1.005)		(1.007)		(0.006)		(0.064)		(0.005)		(0.064)	
Fgn_div*large	-0.525		0.455		-0.009		-0.089		0.002		0.005	
	(6.165)		(6.179)		(0.038)		(0.391)		(0.031)		(0.392)	
Prod_div*small	0.455	***	0.511	***	-0.003	***	0.017	**	-0.005	***	-0.036	***
	(0.107)		(0.108)		(0.001)		(0.007)		(0.001)		(0.007)	
Prod_div*medium	2.471	***!!!	2.161	***!!!	-0.014	***!!!	-0.062	*!!	-0.040	***!!!	-0.247	***!!!
	(0.540)		(0.541)		(0.003)		(0.034)		(0.003)		(0.034)	
Prod_div*large	1.275		1.963		-0.082		-0.592		-0.010		-0.017	
	(12.028)		(12.056)		(0.074)		(0.763)		(0.060)		(0.765)	
Geo div*small	-0.571	***	-0.570	***	-0.004	***	-0.020	***	0.002	***	0.031	***
	(0.085)		(0.085)		(0.001)		(0.005)		(0.000)		(0.005)	
Geo_div*medium	-0.616	***	-0.605	***	-0.002		-0.027	*	0.003	***	0.028	*
	(0.227)		(0.228)		(0.001)		(0.014)		(0.001)		(0.014)	
Geo_div*large	0.537		0.561		-0.002		-0.071		0.000		-0.010	
	(5.753)		(5.766)		(0.035)		(0.365)		(0.029)		(0.366)	
R-Square	0.080		0.081		0.056		0.114		0.080		0.048	
Dependent Variable Mean	1.580		1.541		0.011		0.115		0.003		0.036	

Notes: Regressions estimated using OLS. Standard errors are reported in parentheses. Variables are defined in Table 2.

***, **, *: Estimated effect is significantly different from zero at the 1%, 5%, 10% significance level, respectively

!!!; !!; ! Estimated effect is significantly different from the effects estimated for small banks at the 1%, 5%, 10% significance level, respectively

Appendix table 6: Geographic diversification and Risk-adjusted Profitability

BHC-level cross-sectional means and standard deviations for 1994-2001 period. No interactions between diversification indices and asset size dummies. Coefficient estimates and standard errors (in parenthesis).

	Dependent variables											
	Risk-adjusted ROA		Risk-adjusted ROE		Mean ROA		Mean ROE		Std. Dev ROA		Std. Dev. ROE	
Intercept	-1.772	***	-1.864	***	-0.002	**	-0.069	***	0.015	***	0.162	***
	(0.159)		(0.159)		(0.001)		(0.010)		(0.001)		(0.010)	
Rural Hdqts	0.253	***	0.252	***	0.001	***	0.004	***	-0.001	***	-0.013	***
	(0.025)		(0.025)		(0.000)		(0.002)		(0.000)		(0.002)	
Ag Bank	0.044		0.049	*	0.000		-0.004	**	-0.001	***	-0.011	***
	(0.028)		(0.028)		(0.000)		(0.002)		(0.000)		(0.002)	
BHC affiliates	0.033		0.043	*	0.001	***	0.022	***	0.000	***	-0.003	*
	(0.026)		(0.026)		(0.000)		(0.002)		(0.000)		(0.002)	
Medium BHC	-0.306	***	-0.318	***	-0.001	***	-0.011	**	0.001	***	0.005	
	(0.075)		(0.075)		(0.000)		(0.005)		(0.000)		(0.005)	
Large BHC	-0.653	**	-0.656	**	-0.003	*	-0.035	*	0.002		0.015	
	(0.318)		(0.318)		(0.002)		(0.020)		(0.002)		(0.020)	
Log(assets)	0.253	***	0.254	***	0.001	***	0.014	***	-0.001	***	-0.008	***
	(0.013)		(0.013)		(0.000)		(0.001)		(0.000)		(0.001)	
Fgn_div	-2.413	***	-2.290	***	-0.012	***	-0.090	**	0.003		0.048	
	(0.558)		(0.559)		(0.003)		(0.035)		(0.003)		(0.036)	
Prod_div	0.538	***	0.581	***	-0.003	***	0.014	**	-0.006	***	-0.045	***
	(0.105)		(0.105)		(0.001)		(0.007)		(0.001)		(0.007)	
Geo_div	-0.531	***	-0.539	***	-0.004	***	-0.023	***	0.001	***	0.026	***
	(0.080)		(0.080)		(0.000)		(0.005)		(0.000)		(0.005)	
R-Square	0.078		0.080		0.054		0.113		0.055		0.041	
			1.541		0.011		0.115		0.003		0.036	

Notes: Regressions estimated using OLS. Standard errors are reported in parentheses. Variables are defined in Table 2.
***, **, *: Estimated effect is significantly different from zero at the 1%, 5%, 10% significance level, respectively.

Bibliography

Acharya, Viral, Iftkhar Hasan, and Anthony Saunders, 2002. "The Effects of Focus and Diversification on Bank Risk and return: Evidence from Individual Bank Loan Portfolios." Proceedings of the Federal Reserve Bank of Chicago Conference on Bank Structure and Competition.

Akhavein, J.D., A. Berger, and D. Humphrey (1997) The Effects of Megamergers on Efficiency and Prices: Evidence from a Bank Profit Function. *Review of Industrial Organization. 12 (February): 95-139.*

Benston, George J., William C. Hunter, and Larry D. Wall (1995) Motivations for Bank Mergers and Acquisitions: Enhancing the Deposit Insurance Put Option versus Earnings Diversification, *Journal of Money, Credit and Banking, 27, 777-788.*

Berger, Alan, Rebecca Demsetz, and Philip Strahan. 1999. *Journal of Banking and Finance*

Berger, Alan and Robert DeYoung, 2001. "The Effects of Geographic Expansion on Bank Efficiency. " Journal of Financial Services Research, 19, pp. 163-184.

Berger, Allen N., Anil K Kashyap, and Joseph M. Scalise (1995) The Transformation of the U.S. Banking Industry: What A Long, Strange Trip It's Been. *Brookings Papers on Economic Activity 2: 55-218.*

Berger, A.N., and Udell, G. F., 1998. "Universal Banking and the Future of Small Business Lending." In Saunders, A., Walter, I. (Eds.), Financial System Design: The Case for Universal Banking, Burr Ridge, Irwin, Homewood, IL, pp. 559-627

Calomiris, Charles. 1997.

Cornett, Marcia M., and Hasan Tehranian (1992) Changes in Corporate Performance Associated with Bank Acquisitions, Journal *of Financial Economics, 31, 211-34.*

Dietsch, Michel, and Vichett Oung. 2002. The Formation of Large Banking Groups in France: Observed and Potential Effects on Costs, Income, and Risks. General Secretariat of the Banking Commission. Research Report.

Demsetz, Rebecca S., and Philip E. Strahan (1997) Diversification, Size, and Risk at Bank Holding Companies, *Journal of Money, Credit, and Banking 29.*

DeYoung, Robert. 1997. Bank Mergers, X-Efficiency, and the Market for Corporate Control, *Managerial Finance, 23, 32-47.*

Ferrier, Gary D, S. Grosskopf, and S Yaisawarng (1993) Economies of Diversification in the Banking Industry, *Journal of Monetary Economics*, 31, 229-49.

FDIC, *FDIC Quarterly Banking Profile*, Third Quarter 2002.

Greenspan, Alan, 1994. ”Optimal Bank Supervision in a Changing World,” Special Address, Proceedings of the Federal Reserve Bank of Chicago Conference on Bank Structure and Competition, pp. 1-8.

Houston, Joel F., and Michael D. Ryngaert (1994) The Overall Gains from Large Bank Mergers, Journal *of Banking and Finance, 18, 1155-76.*

Hughes, Joseph P., William Lang, Loretta J. Mester, Choon-Geol Moon, (1996) Efficient Banking Under Interstate Branching, *Journal of Money, Credit and Banking, 28: 1045-71.*

Liang, Nellie, and Stephen Rhoades (1988)

McAllister, Patrick H., and Douglas A. McManus. 1993. Resolving the Scale Efficiency Puzzle in Banking, Journal *of Banking and Finance, 17 (April): 389-405.*

Peristiani, Stavros (1997) Do Mergers Improve the X-Efficiency and Scale Efficiency of U.S. Banks? Evidence from the 1980s. *Journal of Money, Credit, and Banking, 29.*

Pilloff, Steven J. (1996) Performance Changes and Shareholder Wealth Creation Associated with Mergers of Publicly Traded Banking Institutions, *Journal of Money, Credit, and Banking, 28, 294-310.*

Rhoades, Stephen A. (1993) The Efficiency Effects of Horizonal Bank Mergers, *Journal of Banking and Finance, 17, 411-*

Rhoades, Stephen A. (1994) A Summary of Merger Performance Studies in Banking, 1980-1993, and an Assessment of the Operating Performance and Event Study Methodologies, Staff Economic Studies 167, Board of Governors of the Federal Reserve System, Washington, DC.

Rhoades, Stephen A. (2000) Bank Mergers and Banking Structure in the United States, 1980-98. Staff Studies 174, Board of Governors of the Federal Reserve System, Washington, DC. August 2000.