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How bad is a bad loan? Distinguishing inherent credit risk from inefficient lending (does the capital market price this difference?)

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How Bad Is a Bad Loan?

Distinguishing Inherent Credit Risk from Inefficient Lending

(Does the Capital Market Price This Difference?)

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ABSTRACT

We develop a novel technique to decompose banks' ratio of nonperforming loans to total loans into two components: first, a minimum ratio that represents **best-practice lending** given the volume and composition of a bank's loans, the average contractual interest rate charged on these loans, and market conditions such as the average GDP growth rate and market concentration; and, second, a ratio, the difference between the bank's observed ratio of nonperforming loans and the best-practice minimum ratio, that represents the bank's **proficiency at loan making**. The best-practice ratio of nonperforming loans, the ratio a bank would experience if it were fully efficient at credit-risk evaluation and loan monitoring, represents the **inherent credit risk** of the loan portfolio and is estimated by stochastic frontier techniques.

We apply the technique to 2013 data on top-tier U.S. bank holding companies. We divide them into five size groups. The largest banks with consolidated assets exceeding \$250 billion experience the highest ratio of nonperformance among the five groups. Moreover, the inherent credit risk of their lending is the highest among the five groups. On the other hand, their inefficiency at lending is one of the lowest among the five. Thus, the high ratio of nonperformance of the largest financial institutions appears to result from lending to riskier borrowers, not inefficiency at lending. Small community banks under \$1 billion also exhibit higher inherent credit risk than all other size groups except the largest banks. In contrast, their loan-making inefficiency is highest among the five size groups.

Restricting the sample to publicly traded bank holding companies and gauging financial performance by market value, we find the ratio of nonperforming loans to total loans is on average negatively related to financial performance except at the largest banks. When nonperformance is decomposed into inherent credit risk and lending inefficiency, taking more inherent credit risk enhances market value at many more large banks while lending inefficiency is negatively related to market value at all banks. **Market discipline appears to reward riskier lending at large banks and discourage lending inefficiency at all banks.**

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How Bad Is a Bad Loan?

Distinguishing Inherent Credit Risk from Inefficient Lending (Does the Capital Market Price This Difference?)

1. Introduction

The ratio of nonperforming loans to total loans a bank experiences reflects both the inherent credit risk the bank targets and the bank's proficiency at evaluating credit risk and monitoring the loans it has made. In our 2013 data on U.S. banks, we find that small community banks and the largest financial institutions on average experience the highest ratios of nonperforming loans. How much of this nonperformance is due to inherent credit risk and how much, to their proficiency at loan making? To answer this question, we develop a novel technique based on stochastic frontier estimation and apply it to data on large as well as small banks to compare their lending performance. The ratio of banks' nonperforming loans is decomposed into two components: first, a minimum ratio that represents **best-practice lending** given the volume and composition of a bank's loans, the average contractual interest rate charged on these loans, and market conditions such as the average GDP growth rate and market concentration; and, second, a ratio, the difference between the bank's observed ratio of nonperforming loans and the best-practice minimum ratio, that represents the bank's **proficiency at loan making**. The best-practice ratio of nonperforming loans represents the **inherent credit risk** of the loan portfolio – the nonperforming loan ratio a bank would experience if it were fully efficient at credit evaluation and loan monitoring. This best-practice minimum is obtained by estimating a stochastic lower envelope of nonperforming loan ratios conditioned on variables associated with inherent credit risk. The stochastic frontier estimation eliminates the influence of luck, statistical noise, and gauges systematic failure to achieve the best-practice minimum.

Stochastic frontier techniques have been applied in numerous studies of cost, production, and profit. Greene (2012) offers a textbook description while Kumbharkar and Lovell (2000) and Coelli, Rao, and Battese (1998) give an encyclopedic treatment. Hughes and Mester (2010, 2015) and Berger and Mester (1997) discuss how these techniques are applied to analyze the

performance of financial institutions. Hughes, Jagtiani, Mester, and Moon (2017) apply our technique to commercial and industrial loans and to commercial real estate loans made by community banks.¹ They find that large community banks are more efficient at lending for these two types of loans than small community banks.

We estimate the frontier over 710 banks of all sizes – privately held as well as publicly traded – that have a focus on lending. The size of these banks ranges from \$92.7 million to \$2.4 trillion in consolidated assets. At the largest banks, we uncover evidence of dichotomous lending strategies for maximizing value that differs between large and small banks. While the largest banks exhibit the largest ratio of nonperforming loans, we find that nonperformance at these institutions results from inherently more risky lending, not a lack of proficiency at credit evaluation and loan monitoring.

The publicly traded banks in our sample allow us to investigate whether capital market pricing distinguishes between inherent credit risk and lending inefficiency. We find that Tobin's q ratio is negatively related to the nonperforming loan ratio for all but the largest 9 banks. For 8 of the largest 9 banks, the relationship is positive and statistically significant. The dichotomy in the treatment of nonperforming loans by the capital market suggests that credit-risk strategies of the largest banks differ from those of smaller banks. When the nonperforming loan ratio is decomposed into the inherent credit risk (the best-practice minimum ratio) and the lending inefficiency ratio, a statistically significant positive relationship is found between Tobin's q ratio and inherent credit risk at many large banks. While the relationship is negative at many smaller banks, it is not statistically significant. The evidence that the capital market rewards higher credit risk at the largest banks is consistent with their higher ratio of nonperformance and suggests that market discipline may not enhance financial stability through the lending channel at these large banks. On the other hand, lending inefficiency undermines value at banks of all sizes.²

¹ An earlier version of this paper, Hughes, Jagtiani, and Mester (2016), has been superseded by Hughes, Jagtiani, Mester, and Moon (2017).

² Hughes, Mester, and Moon (2016) find a similar relationship between the equity capital ratio and financial performance based on market value measures. At the margin, the largest financial institutions improve financial performance by increasing financial leverage while smaller institutions, by reducing leverage.

2. The Data

To estimate the frontier, we start with data on 807 top-tier holding companies at year-end 2013 whose balance-sheet and income statement information is reported on the Y9-C report. The 807 companies are obtained after dropping one company with no nonperforming loans and all companies without data on small business loans (commercial and industrial loans with an origination amount under \$1 million). The data on small business loans are obtained by summing the loan amounts of subsidiaries of the top tier company from the Call Report data.³ In this section, we provide details on trimming the full sample to achieve a sample of banks whose focus on lending is sufficient to allow the estimation of a stochastic best-practice loan performance frontier.

The average ratio of total loan volume to consolidated assets is 0.636, bounded by a minimum of 0.055 and a maximum of 0.962. **Table 1** sorts the data by the ratio of total loan volume to consolidated assets for those companies with ratios less than 0.40. The 4 companies with the smallest loan ratios, less than 0.15, are not focused on the loan-making function of commercial banks and, thus, are trimmed from the data used to estimate best-practice loan making.

In addition, some companies exhibit unusually large ratios of nonperforming loans to total loans. Nonperforming loans include loans past due less than and more than 90 days plus nonaccruing loans, lease financing receivables, placements, and other assets (BHCK525+BHCK5524+BHCK5526)⁴; gross charge-offs (BHCK4635); and other real estate owned (BHCK2150). Since some banks are more aggressive in charging off past-due loans and, consequently, would appear to have a lower ratio of past-due loans, gross charge-offs are added to past-due loans to eliminate distortions caused by differences among banks in charge-off strategies. **Table 2** summarizes loan performance of banks with the highest nonperforming loan ratios. Those whose ratio exceeds 0.15 are trimmed to estimate the best-practice performance frontier. **Table 3** summarizes loan performance of banks with the lowest nonperforming loan ratios. Those whose nonperforming loans constitute a proportion less than 0.01 of total loans are also trimmed to estimate the best-

³ These data are used in Hughes, Jagtiani, Mester, and Moon (2017) and constructed by Quinn Maingi of the Federal Reserve Bank of Philadelphia.

⁴ The BHCK numbers refer to categories in the Y9-C regulatory reports filed by bank holding companies.

practice performance frontier. The log transformation of the volume of nonperforming loans is plotted in **Figure 1** against the log transformation of the volume of total loans for the trimmed sample of 710 top-tier holding companies. In **Figure 2**, where the ratio of nonperforming loans to total loans is plotted against the log transformation of total loans, a higher ratio of nonperformance for the largest banks is evident. In addition, the smallest banks also exhibit higher ratios of nonperformance.

Table 4 shows that banks in all but the largest category have similar mean and median values of the ratio of loans to assets. Banks in the largest group, whose consolidated assets exceed \$250 billion, allocate on average 51.74 percent of their assets to loans while banks in the other size groups allocate on average 63.22 to 66.78 percent of their assets to loans.

As suggested in **Figure 2**, the mean ratio of nonperforming loans to total loans is higher in the smallest size group, community banks with assets less than \$1 billion, and in the largest size group, banks whose consolidated assets exceed \$250 billion. On average 4.61 percent of loans at these small community banks are nonperforming while loans at the largest banks exhibit a mean nonperformance rate of 6.10 percent. In contrast, loans in the next largest group (assets between \$50 billion and \$250 billion) default at 3.07 percent. **Table 5** shows the details of nonperformance for the banks whose consolidated assets exceed \$50 billion.

The strikingly higher average ratio of nonperformance among the largest banks and, to some degree, among the small community banks, raises the question of whether these banks are on average less efficient at credit evaluation and loan monitoring or whether they may be lending to riskier borrowers who have a higher expected rate of default.

3. Best-Practice Loan Performance and the Efficiency of Lending

We use stochastic frontier techniques to distinguish between nonperformance due to less effective credit evaluation and loan monitoring and nonperformance due to the bank's choice of the overall credit risk of its loan portfolio. The frontier is a stochastic lower envelope of the nonperforming loan ratios conditioned on the volume of loans and the composition of the loan

portfolio by types of loans it holds. In addition, we include variables that characterize inherent credit risk, such as the average contractual loan rate, an index of market concentration, and the GDP growth rate in banks' local lending markets. As a stochastic lower envelope of nonperforming loan ratios, it eliminates the influence of luck, statistical noise, on loan performance and takes into account the observed loan performance of all banks in the sample. As such, it represents **observed best practice**, the minimum ratio of nonperforming loans a bank could obtain if it were fully efficient at credit evaluation and loan monitoring given its loan volume, the composition of its loan portfolio, its average contractual lending rate and the economic conditions in its local lending markets.

The control variables characterize banks' exposure to credit risk. Default probabilities differ by the type of loan, and so it is important to include variables that characterize the composition of the loan portfolio. In addition, the contractual interest rate charged on a loan includes a credit risk premium and, itself, influences the quality of loan applicants through adverse selection.⁵ In addition, conditions in the markets in which a bank lends, such as the macroeconomic growth rate and the bank's market power, influence loan performance. Petersen and Rajan (1995) find that a bank with market power is able to price a loan to a young business at a lower-than-competitive rate to reduce the probability of default. As the firm gains experience and continues to borrow from the bank, the bank recovers its implicit subsidy by lowering the loan rate but not as much as would occur in a competitive market. Thus, the degree of market concentration can influence loan performance.

The choice of specifying the frontier in terms of the ratio of nonperforming loans to total loans is motivated by the need to obtain an unbiased estimate of the best-practice minimum ratio of nonperforming loans to total loans, which will be used to gauge inherent credit risk. If the log transformation of the amount of nonperforming loans or the log transformation of the ratio were used as the dependent variable in the frontier estimation, an unbiased estimate of the degree of inefficiency can be obtained; however, the estimate of the minimum ratio of nonperforming loans to

⁵ Morgan and Ashcraft (2003) find that the interest rates charged by banks on business loans predict future loan performance.

total loans computed from the log transformation is not unbiased. Thus, we avoid the log transformation.

Defining the frontier in terms of the ratio of nonperforming loans provides two important advantages. First, it gives an unbiased estimate of inherent credit risk; and, second, it decomposes the nonperforming loan ratio into two ratios capturing inherent credit risk and lending inefficiency.

We use maximum likelihood estimation to estimate a *best-practice loan performance frontier* that determines the minimum of the nonperforming loan ratio, NP = nonperforming loan volume/total loan volume, conditional on the total loan volume (expressed in 100 billions), the average contractual interest rate, macroeconomic conditions and market concentration in the bank's markets, and the composition of the loan portfolio. That is,

$$NP_i = \alpha_0 + \alpha_1 (\text{Total loans}_i (100 \text{ billions})) + \mathbf{X} \cdot \boldsymbol{\beta} + \varepsilon_i. \quad (1)$$

where NP_i = ratio of nonperforming loans to total loans at bank i ,

and \mathbf{X} is a vector of other control variables:

x_1 = Contractual lending rate $_i$,

x_2 = Herfindahl index of market concentration across bank $_i$'s markets,

x_3 = GDP growth rate across bank $_i$'s markets,

x_4 = Small business loan volume $_i$ / Total loans $_i$,

x_5 = Total business loan volume $_i$ / Total Loans $_i$,

x_6 = Consumer loan volume $_i$ / Total Loans $_i$,

x_7 = Residential real estate loan volume $_i$ / Total Loans $_i$,

x_8 = Commerical real estate loan volume $_i$ / Total Loans $_i$,

and $\varepsilon_i = \nu_i + \mu_i$ is a composite error term.

The Herfindahl index of market concentration is a weighted average of banking market concentration in each state in which the bank operates. The weights are the proportions of deposits located in each state. The GDP growth rate is a 10-year weighted average state GDP growth rate in the states in which the bank operates. The weights are the same as those used to compute the Herfindahl index. The composite error term, $\varepsilon_i = \nu_i + \mu_i$, is the sum of a two-sided, normally

distributed error term, $v_i \sim \text{iid } N(0, \sigma_v^2)$, that captures statistical noise, and a term, μ_i , which is a positive, half-normally distributed error term, $\mu_i (\geq 0) \sim \text{iid } N(0, \sigma_\mu^2)$, that gauges systematic excess nonperformance.

Figure 3 illustrates the frontier. The frontier value, FNP_i , is defined by the deterministic kernel of the stochastic frontier,

$$FNP_i = a_0 + a_1 (\text{Total loans}_i (100 \text{ billions})) + \mathbf{X} \bullet \boldsymbol{\beta}, \quad (2)$$

and represents the ‘expected’ best-practice nonperforming loan ratio, conditional on the values of the control variables. This is the ratio that would be achieved were the bank totally efficient at credit evaluation and loan monitoring. As such, it represents the inherent credit risk of the bank’s loan portfolio.

The excess nonperformance is expressed as a proportion of total loans and is given by the difference between the observed nonperforming loan ratio adjusted for noise and the frontier value of the nonperforming loan ratio:

$$\text{Lending Inefficiency} = \mu_i = (NP_i - v_i) - FNP_i, \quad (3)$$

which measures the effectiveness of the bank’s credit evaluation and loan monitoring.

The excess, μ_i , cannot be directly measured so, following Jondrow, Lovell, Materov, and Schmidt (1982), we define bank-specific excess nonperformance or lending inefficiency by the expectation of μ_i conditional on ε_i :

$$E(\mu_i | \varepsilon_i) = E[\mu_i | (v_i + \mu_i)] = [NP_i - E(v_i | \varepsilon_i)] - FNP_i. \quad (4)$$

A bank’s best-practice value of nonperformance from the frontier indicates its inherent credit risk, given the size and composition of its loan portfolio and its market conditions such as GDP growth rate and market concentration. In the analysis that follows, the best-practice value of the nonperforming loan ratio will be obtained from the stochastic frontier. The stochastic frontier, $SFNP_i$, comprises the deterministic kernel and the two-sided error term:

$$\begin{aligned} \text{Best Practice Nonperforming Loan Ratio} &= SFNP_i = FNP_i + v_i \\ &= a_0 + a_1 (\text{Total loans}_i (100 \text{ billions})) + \mathbf{X} \bullet \boldsymbol{\beta} + v_i. \end{aligned} \quad (5)$$

This best practice ratio of nonperforming loans obtained from this frontier gauges the inherent credit risk of the loan portfolio. It takes into account the average contractual loan rate, the composition of the loan portfolio, and the weighted average market concentration and GDP growth rate in the markets in which the bank operates. The distance from the best-practice frontier of a bank's observed nonperforming loan ratio gauges its lending inefficiency.

The hypothetical bank whose loan performance is illustrated in **Figure 3** has total loans of 0.08 (expressed in 100 billions⁶) and experiences a nonperforming loan ratio adjusted for statistical noise, $NP_i - v_i$, of 0.025, which is an excess of 0.015 over the 'expected' best-practice minimum, FNP_i , of 0.01. Thus, its *lending* inefficiency is 0.015.

3.1 The Estimation of the Best-Practice Loan Performance Frontier

The sample is restricted to holding companies with a loan volume that exceeds 15 percent of consolidated assets and nonperforming loans, broadly defined, that are at least 1 percent and no more than 15 percent of the total loan volume. In addition, data on small business lending obtained from the Call Reports of subsidiaries of the holding company must be available. These restrictions yield a sample of 710 bank holding companies whose nonperforming loan ratios are plotted in **Figure 2**.

Table 6 shows the estimated parameters of the frontier specified in equation (1). We find that for any given volume of loans, a higher contractual interest rate is associated with a higher best-practice nonperforming loan ratio, while a higher GDP growth rate and a higher proportion of small business loans are associated with a lower best-practice ratio of nonperforming loans. The significantly positive coefficients on the proportions of total loans made up of residential real estate loans and consumer loans imply a positive correlation of residential real estate loans and consumer loans with the nonperforming loans ratio.⁷ The coefficients on the ratios of total business loans and

⁶ The Y9-C data report amounts in 1000s, and so 0.08 (in 100 billions here) corresponds to 8,000,000 (in thousands) in the Y9-C data report.

⁷ Since the proportion of assets allocated to lending is one of the control variables, a variation in any category of loans implies an offsetting variation in the omitted categories of loans. The exception is a variation in small business loans since the proportion of total business loans is a control variable. These omitted categories include leases, agricultural loans, loans to nondepository institutions, and other loans.

commercial real estate loans are all insignificantly positive. The negative coefficient on the Herfindhal index of market concentration is not significant; however, the sign is consistent with the hypothesis of Petersen and Rajan (1995).

In **Table 7**, the sample is partitioned into five size groups and summary statistics of lending inefficiency (4) and the stochastic frontier measure of inherent credit risk (5) are reported. The observed ratio of nonperforming loans is divided into the best-practice minimum ratio and the difference between the observed ratio and the best-practice ratio – the measure of lending inefficiency.

3.2 Credit Risk and Lending Efficiency at Community Banks

In **Table 7** both the mean and median values of the ratios of observed nonperforming loans to total loans is larger at small community banks (under \$1 billion in assets) than at the groups of other banks with assets less than \$250 billion. For example, the mean 0.0461 at these small banks exceeds the value 0.0383 at large community banks, 0.312 at banks with assets between \$10 billion and \$50 billion, and 0.0307 at banks with assets between \$50 billion and \$250 billion. The contrast of loan performance at small community banks with that at larger banks under \$250 billion raises the question of whether these banks are lending to riskier borrowers or whether they are less efficient at lending. The mean average contractual lending rate at small community banks is the highest of the groups of banks with assets less than \$250 billion, which suggests either that these community banks are lending to riskier borrowers or that they are pricing the loans to cover their relatively high default rate that could result from a lack of proficiency at lending.

The inherent credit risk of their loans can be gauged by the stochastic frontier nonperforming loan ratio – the best practice ratio of nonperforming loans given the volume of loans, their composition, their average contractual interest rate, and the GDP growth rate and concentration in banks' local markets. The mean value of inherent, best-practice credit risk at small community banks, 0.0123, is higher than the mean value, 0.0109, at large community banks and

0.0096 at banks in the range \$10 billion to \$50 billion. This pattern across size groups is similar to that of the average contractual lending rate.

The distance of the observed ratio of nonperformance from the minimum, best-practice ratio on the stochastic frontier constitutes lending inefficiency (4). The mean inefficiency, 0.0338, of these small community banks exceeds 0.0274 at large community banks, 0.0217 at banks in the range \$10 billion to \$50 billion, 0.0179 at banks from \$50 billion to \$250 billion, and 0.0186 at banks whose assets exceed \$250 billion. Thus, small community banks appear less efficient at lending.

3.3 Credit Risk and Lending Efficiency at the Largest Banks

The seven largest banks with consolidated assets exceeding \$250 billion experience the highest mean ratio of nonperformance, 0.0610, among the five groups. Moreover, the mean average contractual lending rate, 0.0538, and the mean inherent credit risk of their lending, 0.0424, are the highest among the five groups. On the other hand, their mean inefficiency at lending, 0.0186, is the second lowest among the five. Banks in the range \$50 billion to \$250 billion exhibit an inefficiency ratio, 0.0179; in the range \$10 billion to \$50 billion, 0.0217; in the range \$1 billion to \$10 billion, 0.0274; and less than \$1 billion, 0.0338. Thus, the high mean ratio of nonperformance of the largest financial institutions appears to result from lending to riskier borrowers rather than inefficiency at lending.

Table 8 shows the values of lending inefficiency, the best-practice ratio of nonperforming loans measuring inherent credit risk, and the observed ratio of nonperforming loans for large banks with consolidated assets greater than \$50 billion. Nonperforming loans as a percentage of total loans range from 7.16 percent for Bank of America to 1.46 percent for Comerica. The best-practice percentage spans from 5.89 percent for Bank of America to 0.17 percent for Northern Trust. The lending inefficiency ranges from 3.07 percent for PNC to 0.93 percent for Comerica.

3.4 Factors that Influence Lending Inefficiency

Factors that potentially explain a bank's lending inefficiency are explored in **Table 9** in regressions specified by the general-to-specific modeling strategy, which is a well-grounded method to search for the best model specification.⁸ It is statistically consistent in reaching the true model when the true model is included in the set of candidate models. The general specification generously includes many regressors to reflect the existing literature and our presumptions. From the pool of the general specification and all possible restrictive specifications, we then select the one with the smallest AIC – the specific specification. Maddala (2001, p. 483) aptly describes this approach as “intended overparametrization with data-based simplification.”

In the general specification we account for the asset size of the bank, which influences the diversification of credit risk and the techniques used to evaluate and monitor credit risk. We characterize size, first, by the log transformation of consolidated assets and its square and, second, by the number of states in which the bank operates and by the interaction of the number of states and the total number of branches. The economic conditions in a bank's lending markets are described by the 10-year weighted average growth rate of state GDP and by a weighted average of banking market concentration in each state in which the bank operates where the weights are the proportions of deposits located in each state. Additionally, we account for the proportion of total assets allocated to loans, which accounts in part for a bank's focus on lending and the lending experience it is likely to have developed. We include the ratio of Tier 1 equity capital to consolidated assets to account for the cushion protecting a bank from loan losses and, hence, a component of the opportunity cost of loan losses. Since the credit analysis and monitoring of some types of loans are more difficult than other types, we control for important categories of loans as proportions of total loans in the general specification. Moreover, we include the average contractual interest rate on loans to account for a bank's choice of credit risk. We find that it is important to allow for size effects and flexibility in the specification of the average contractual rate so we include the rate, the rate squared, and the interaction of the rate and the log transformation

⁸ Hendry (1983) provides the first complete application, and Campos, Ericsson, and Hendry (2005) survey this technique.

of assets, the interaction of the rate squared and the log transformation of assets, the interaction of the rate and the squared log transformation of assets, and the interaction of the squared rate and the squared log transformation of assets. The parameter estimates of all regressors in the general specification are reported in the second column of **Table 9**. The general specification is narrowed with an AIC-based search that estimates all possible specifications with all combinations of the above-mentioned regressors. The fourth column shows the parameter estimates of the regressors that survive the AIC-based search and define the specific specification.

The best specific specification reported in the fourth column of **Table 9** provides evidence that higher ratios of loans to assets and equity capital to assets as well as a higher GDP growth rate are associated with lower lending inefficiency. The magnitude of the coefficient estimate on the capital ratio is notable. The median capital ratio of the full sample is 0.0960, and the median inefficiency, 0.0216. Hence, an increase of 0.01 in the capital ratio is associated with a decrease of 0.0014365 in the inefficiency ratio, which is a 6.7 percent decline in inefficiency. On the other hand, lending inefficiency is positively related to the number of states in which a bank operates. While operating in more states may tend to diversify credit risk, it also increases organizational complexity and makes managerial control more difficult. An increase by 1.0 in the number of states on average increases lending inefficiency by 0.0023, which is an increase of 10.7 percent over the median value of inefficiency, 0.0216. Increasing the number of branches, controlling for the number of states, is associated with reduced lending inefficiency, but the effect is quite small in magnitude and does not seem economically significant. While an increase in total business loans as a proportion of total loans is associated with increased lending inefficiency, an increase in the proportion of small business loans, holding the proportion of total business loans constant, is associated with reduced lending inefficiency – this is a substitution of small business loans for larger business loans. The magnitude of these loan composition effects is small. For example, increase of 0.01 in the proportion of business loans implies an increase of 0.0004096 in lending inefficiency while a like increase in small business loans, a decrease of 0.0009910 in lending inefficiency. Given the median value of lending inefficiency for the full sample, 0.0216, the 0.01

increase in the business loan ratio implies an increase of 1.9 percent of the median inefficiency and the 0.01 increase in the small business loan ratio, a 4.6 percent decrease in the median inefficiency. The association of the average contractual interest rate with lending inefficiency is given by the derivative of inefficiency with respect to the interest rate.⁹ This derivative is positive for 704 of the 710 banks and statistically significant for 701; and, it is negative for 6 banks and statistically significant for 4 of the 6 banks. Thus, the higher credit risk associated with a higher contractual interest rate is also associated with higher lending inefficiency, which suggests these loans involving higher credit risk are more difficult to make and to monitor.

4. Do Capital Markets Distinguish between Inherent Credit Risk and Lending Efficiency

To obtain evidence on whether capital markets price inherent credit risk and lending inefficiency, in **Table 10** we compare lending characteristics and financial performance between banks in the halves of the sample with lower and higher observed ratios of nonperforming loans. The half that experiences lower ratios of nonperformance holds on average less total assets, makes more loans as a proportion of assets, charges a lower average contractual rate on loans, takes on lower inherent credit risk, and is more efficient at lending. The higher mean Tobin's q at these banks suggests capital markets price these lower ratios of nonperformance.

In **Panels A and B of Table 11** these two groups composed of banks with lower and higher ratios of nonperforming loans are each further divided into the more and less efficient at lending. In both groups, the more efficient experience significantly lower ratios of overall nonperformance; however, strikingly, there is little or no difference in the mean inherent credit risk and the contractual lending rate between the more and less efficient subsamples in each group although, as reported in **Table 10**, the group with a higher mean ratio of nonperformance is exposed to higher inherent credit risk and charges on average a higher contractual lending rate. While, in **Table 10**,

⁹ From Table 9, the derivative is given by $\partial(\text{lending inefficiency})/\partial(\text{contractual interest rate}) = 2.73758 + [-1.02265][\text{contractual interest rate}][\log(\text{Book Value Assets}(1,000s))]$.

publicly traded banks in the half of the sample with lower ratios of nonperformance on average experience a higher Tobin's q ratio, in **Table 11**, banks in the more efficient partitions on average obtain a higher Tobin's q ratio than those in the less efficient partitions.

These differences in the mean Tobin's q ratio raise the question of whether capital markets simply penalize differences in nonperformance or whether these markets distinguish and price differently inherent credit risk and lending proficiency. Before investigating this issue, we compare the efficient halves of the banks with lower and higher ratios of nonperformance in **Panel C of Table 11**. The efficient banks with a higher ratio of nonperformance are on average larger than the efficient banks with a lower ratio of nonperformance. Moreover, they assume higher inherent credit risk and charge a higher average contractual lending rate, and, while belonging to the more efficient half of the group with higher overall nonperformance, their mean lending inefficiency is significantly higher than that of the efficient half of the group with lower overall nonperformance. The lower q ratio in the efficient half of the group with a higher ratio of nonperformance suggests that nonperformance is penalized by capital markets.

4.1 Relationship of Financial Performance to Nonperforming Loans

To obtain evidence on whether the capital market prices inherent credit risk and lending inefficiency, the sample is restricted to 244 publicly traded, top-tier holding companies at year-end 2013. Financial performance is measured by the market value of assets, expressed by Tobin's q ratio. **Tobin's q ratio** is given by the ratio of the market value of assets to the replacement cost of assets, whose commonly used proxy is the sum of the market value of equity and the book value of liabilities to the book value of assets.¹⁰ Market value has the advantage over accounting measures of performance in capturing the market's expectation of the discounted value of the firm's current and future cash flow where the discount rate reflects the market's assessment of the relevant risk attached to the cash flow. In addition, market values permit investigation of investment incentives provided by the capital market.

¹⁰ See Hughes and Mester (2010, 2015) for a review of the finance literature that uses Tobin's q ratio to measure performance.

We first investigate the relationship of Tobin's q ratio to the nonperforming loan ratio. From Table 4, we learned that small community banks and the largest banks on average charge relatively high contractual loan rates and exhibit relatively high ratios of nonperformance compared to the other three size groups. Are these high average ratios of nonperformance associated with better financial performance, which is to ask if the higher average contractual interest rate associated with the riskier lending results in a higher discounted cash flow that more than compensates for higher expected loan losses. After answering this question, we investigate the relationship of financial performance to the decomposition of the nonperforming loan ratio into inherent credit risk and lending inefficiency. We are particularly interested in answering the question, is the higher inherent credit risk of the largest banks associated with higher market value.

The relationship of Tobin's q ratio to the nonperforming loan ratio is reported in **Table 12**. In the first column, the regressors of the general specification are listed and their parameter estimates and p -values, in the second and third columns. We include among the regressors the log transformation of the book value of assets and the square of this variable to control for differences among banks related to size, such as the potential for economies of scale due to better diversification, network economies, and spreading overhead costs. In addition, we account for the importance of lending in the business model of the bank by controlling for the ratio of loans to assets and the square of this ratio. We include the ratio of nonperforming loans to total loans and its square. And, we add its interaction with the log transformation of assets since size-related diversification may influence the risk associated with any given nonperforming loans ratio.

The general specification is narrowed with an AIC-based search that estimates all possible specifications with all combinations of the regressors in the general specification and declares the specification with minimum AIC the best specification. The fourth column shows the parameter estimates of the regressors that survive the AIC-based search and define the specific specification. The key parameter estimates are those of the nonperforming loan ratio, -2.8247 , and its interaction with the log transformation of assets, 0.1553 . The sign of the derivative of the q ratio with respect to the nonperforming loan ratio switches from negative to positive at assets equal to

\$79.3 billion. Thus, the derivative is positive for the 14 largest banks and negative for the 230 smaller banks; however, none of the 14 positive values of the derivative is statistically significant while 183 of the 230 negative values are statistically significant. Hence, financial performance and the nonperforming loans ratio are negatively related at 183 of the 244 banks.

The statistically insignificant positive relationship between the q ratio and the nonperforming loan ratio for the largest banks as well as their high average observed ratio of nonperformance suggests there may be dichotomous credit risk strategies for maximizing value that differ between larger and smaller banks, which are not captured by the imprecisely estimated derivative for the large banks. We seek to improve the precision of these estimates by adding an indicator variable for very large banks to the set of regressors of the general specification. To define this indicator variable, we see from **Table 4** that banks in the largest size group with assets exceeding \$250 billion exhibit a much higher average ratio of nonperformance than smaller banks in the other four size groups. When banks are sorted by asset size, the largest 9 banks range in size from \$175.4 billion to \$2.4 trillion. The next largest bank is \$129.7 billion. Thus, we set the lower bound on the indicator variable at \$170 billion, and we interact it with variables involving the nonperforming loan ratio and add these variables to the general specification. The general specification is described in the first column of **Table 13** and its parameter estimates, in the second column. The AIC based search over all possible specifications with combinations of variables taken from the general specification leads to the specific model in the fourth column. Based on the parameter estimates associated with the specific specification in the fourth column, the derivative of Tobin's q ratio with respect to the nonperforming loan ratio is given by

$$\begin{aligned} \partial \text{Tobin's } q / \partial (\text{nonperforming loan ratio}) = & -0.0391 [\ln (\text{Book Value Assets (1,000s)})] \\ & -14.3103 (\text{Indicator Variable Assets} > \$170 \text{ Billion}) \\ & + 0.8325 (\text{Indicator Variable Assets} > \$170 \text{ Billion}) [\ln (\text{Book Value Assets (1,000s)})]. \end{aligned} \quad (6)$$

The third term in the derivative is positive when banks hold assets in excess of \$170 billion, and it increases with the volume of assets. For the nine largest banks, the derivative is positive, and for 8 of the 9 banks, the derivative is statistically significant at stricter than 10 percent. Thus, the

relatively high average observed ratio of nonperforming loans among these banks is associated with a higher market value. In the case of these very large banks, market discipline appears to encourage greater risk-taking in lending and, in this respect, tends to work against financial stability. For the remaining 235 smaller banks, the statistically significant negative sign of the derivative suggests that a higher ratio of nonperformance is associated with poorer financial performance. In the case of these smaller banks, market discipline appears to discourage risky lending.

4.2 Relationship of Financial Performance to Inherent Credit Risk and Lending Inefficiency

The regressions in **Tables 12** and **13** provide evidence that the capital market rewards a lower nonperforming loan ratio at most banks and a higher ratio at the very largest banks. In regressions reported in **Table 14**, we investigate the degree to which the capital market distinguishes nonperformance due to inherent credit risk from that due to lending inefficiency. In the general specification, we substitute variables involving inherent credit risk and lending inefficiency for those involving the nonperforming loan ratio. The specific specification in **Table 14** results from an AIC-based search that estimates all possible specifications with all combinations of regressors in the general specification and declares the specification with minimum AIC the best specification. The relationship of market value to inherent credit risk, the best-practice (stochastic frontier) value of the nonperforming loans ratio, is given by the derivative of Tobin's q ratio,

$$\partial \text{Tobin's } q / \partial (\text{inherent credit risk}) = -6.9464 + 0.4625 [\ln(\text{Book Value Assets (1,000s)})]. \quad (7)$$

Panel A of **Table 15** reports that the sign of the derivative is negative at 140 smaller banks but the derivative is not statistically significant at stricter than 0.10 at any of them. The sign reverses and the derivative becomes positive at 104 banks larger than \$3.3 billion; however, it is statistically significant only at the largest 37 of these 104 banks. At these 37 banks, market discipline appears to encourage riskier lending.

Panel B of Table 15 lists 25 of these 37 banks. They are the largest banks. At these banks, making riskier loans is associated with improved financial performance. To evaluate the economic significance of these derivatives, consider the largest value, 3.047, obtained by JPMorgan Chase. From **Table 8**, the value of JP Morgan's inherent credit risk is 0.0496. An increase of 0.005 in this value, about 10 percent, is associated with an increase of 0.015235, about 1.49 percent, in its q ratio, 1.02368. This incentive to make riskier loans is strongest for the four largest banks.

The value of the derivative of Zions, the smallest of the 17 banks larger than \$50 billion that are subject to enhanced supervision under the Dodd-Frank Act, is 1.306, and for the smallest of the 37 banks exhibiting a positive, significant derivative, 0.783. Thus, the incentive to make riskier loans diminishes at smaller banks.

On the other hand, the statistically significant negative coefficient on lending inefficiency, -0.6145 , in the specific specification reported in **Table 14** indicates that the capital market penalizes a lack of proficiency in loan making at all banks.

The decomposition of the nonperforming loan ratio into inherent credit risk and lending inefficiency shows that the credit market rewards inherent credit risk at the largest banks and penalizes lending inefficiency at all banks. A bank's ratio of nonperforming loans reflects both the inherent credit risk it has assumed and its proficiency at evaluating credit and monitoring loans; hence, the relationship of its q ratio to its nonperforming loan ratio reflects the net influence of these two components. The evidence obtained on this net effect from the specific regression in **Table 13** shows a statistically significant negative derivative with respect to the nonperforming loan ratio for 235 out of 244 banks in the publicly traded sample. From the evidence of the specific regression in **Table 14**, it would appear that the influence of lending inefficiency dominates and accounts for these negative net value effects. For the 9 large banks with positive values of the derivative, the influence on financial performance of inherent credit risk dominates. When the influence of these two effects is modeled separately in the regressions in **Table 14**, the negative value effect of lending inefficiency is obtained by all banks. The positive value effect of making riskier loans appears at 104 banks and is statistically significant at 37 banks – all large banks.

Hence, the decomposition uncovers evidence of a risk-taking incentive for lending at many more banks than the incentive revealed by the aggregate nonperforming loan ratio.

In sum, the net value effect of the nonperforming loan ratio suggests a dichotomous lending strategy to maximize value that differs between the largest banks and smaller banks. The nonperforming loan ratio is positively related to value at the largest banks and negatively related at smaller banks. However, the positive net effect at the largest banks is associated with making riskier loans while the negative net effect at smaller banks is related to reducing lending inefficiency. The evidence of a dichotomous lending strategy that differs between the largest financial institutions and smaller institutions is similar to evidence of dichotomous capital strategies found by Hughes, Mester, and Moon (2016), which also differs between large banks that at the margin improve value by reducing their capital ratio and smaller banks that at the margin improve value by increasing their capital ratio. Marcus (1984) demonstrates that pursuing a low-risk investment strategy to minimize the probability of financial distress maximizes value at banks with high-valued investment opportunities while adopting a high-risk investment strategy to exploit the option value of explicit and implicit deposit insurance maximizes value at banks with low valued investment opportunities. Hughes, Mester, and Moon (2016) show that smaller banks experience higher valued investment opportunities than larger banks. McConnell and Servaes (1995) find similar results for nonfinancial firms which they interpret as capital structure that addresses the overinvestment problem at firms with low valued investment opportunities and the underinvestment problem at firms with high valued investment opportunities.

5. Summary and Conclusions

We develop a novel technique to analyze nonperforming loans and apply it to data on top-tier bank holding companies at year-end 2013. The ratio of banks' nonperforming loans to their total loans is decomposed into two components: first, a minimum ratio that represents the **best-practice nonperforming loans ratio** given the volume and composition of a bank's loans, the average contractual interest rate charged on these loans, and market conditions such as the average

GDP growth rate and market concentration; and, second, a ratio, which is the difference between the bank's observed ratio of nonperforming loans and the best-practice minimum ratio, that represents the bank's **inefficiency at lending**. The best-practice ratio of nonperforming loans represents the **inherent credit risk** of the loan portfolio.

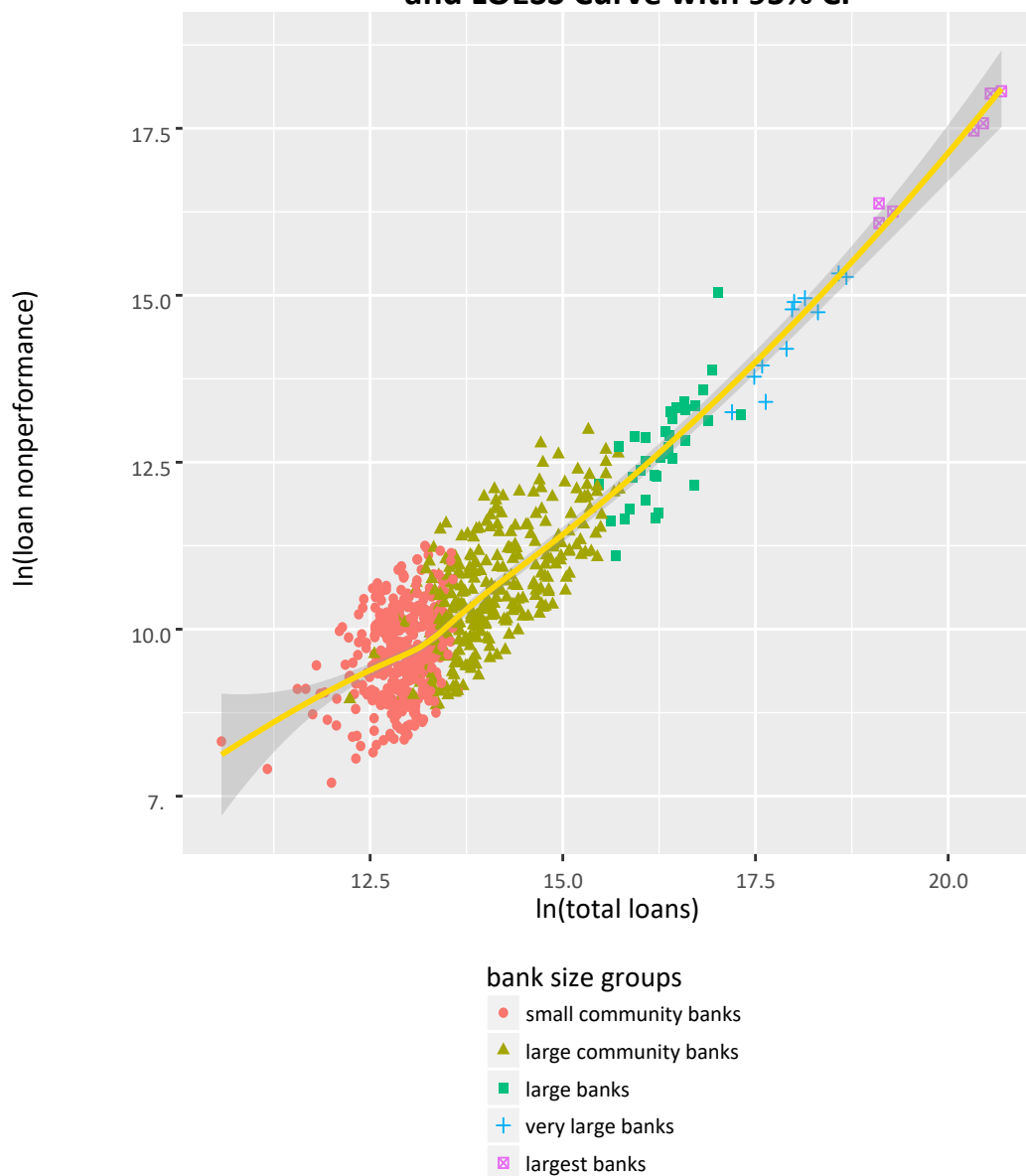
Bank holding companies are divided into five size groups. The largest banks with consolidated assets exceeding \$250 billion experience the highest ratio of nonperformance among the five groups. Moreover, the inherent credit risk of their lending is the highest among the five groups. On the other hand, their inefficiency at lending is one of the two lowest among the five. Thus, the high ratio of nonperformance of the largest financial institutions appears to result from lending to riskier borrowers, not from inefficiency at lending. Small community banks also exhibit higher inherent credit risk than all other size groups except the largest banks; however, their lending inefficiency is the highest among the five size groups.

When the sample is restricted to publicly traded bank holding companies, market values can be used to gauge how financial performance is related to nonperforming loans. In contrast to accounting measures of performance, market value reveals the market's expectation of future as well as current cash flows discounted by market-priced risk. The ratio of nonperforming loans to total loans is negatively related to financial performance except at the largest institutions, which suggests a dichotomous credit risk strategy for maximizing value that differs between the largest banks and smaller banks. The decomposition of this ratio into inherent credit risk and lending inefficiency shows that market discipline rewards riskier lending at large banks and discourages inefficient lending at all banks.

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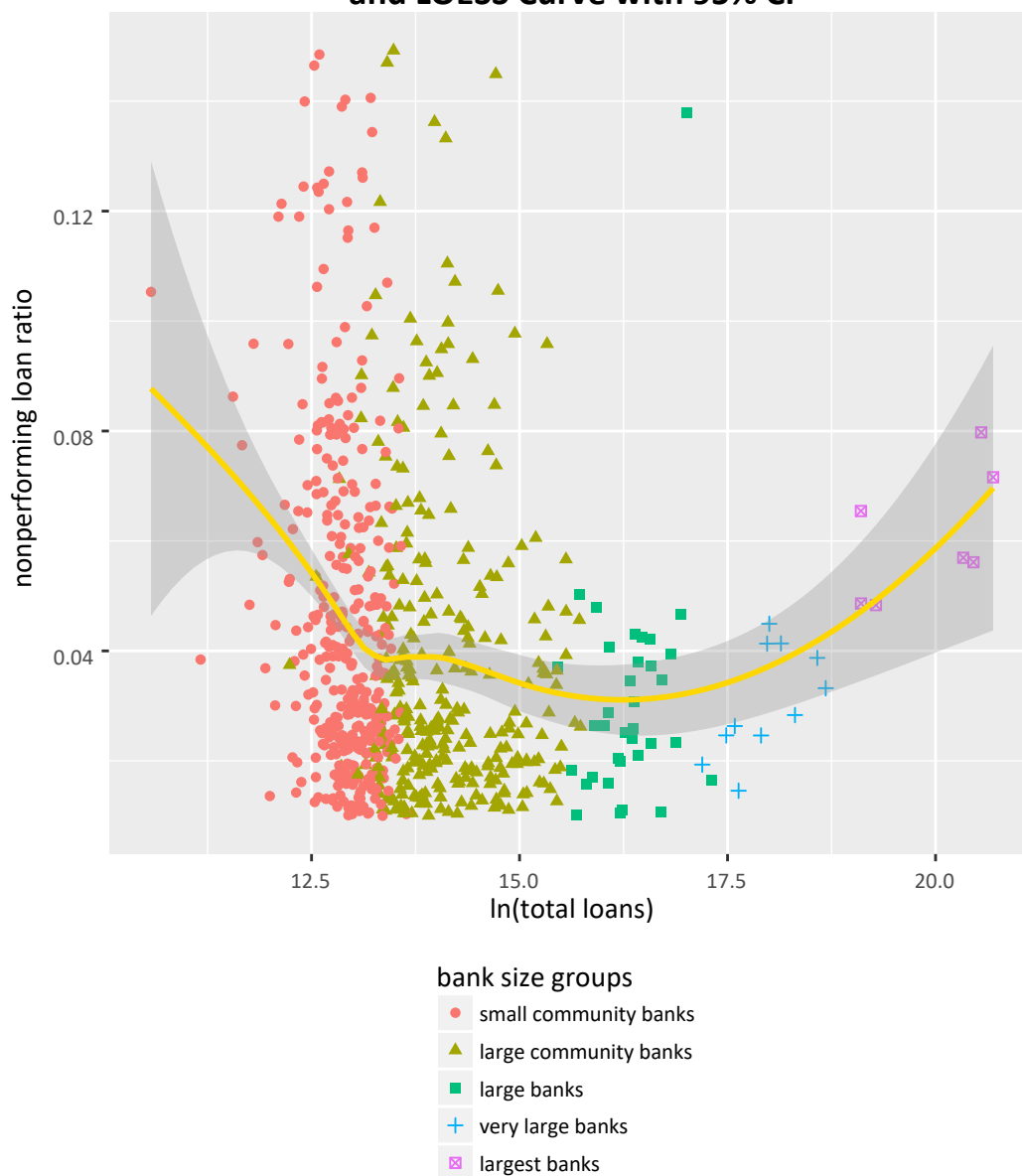
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Figure 1
Scatter Plot of $\ln(\text{loan nonperformance})$ against $\ln(\text{total loans})$
and LOESS Curve with 95% CI



The log transformation of nonperforming loans is plotted against the log transformation of total loan volume for 710 top-tier bank holding companies at year-end 2013. These 710 companies represent banks whose loan volume exceeds 15 percent of consolidated assets and whose nonperforming loans (including gross charge-offs and foreclosed real estate) amount at least to 1 percent and no more than 15 percent of total loans. While it appears that, for any given volume of loans, the degree of nonperformance is wide, it is important to remember that some of this wide variation in nonperformance is due to differences in the average contractual interest rate, the composition of the loan portfolio, the GDP growth rate, and market concentration. LOESS curve (the thick curve in the above figure) and its 95% confidence interval (the shaded band) are included. LOESS is short for locally estimated scatterplot smoothing, which fits local polynomial regression model to scatter points. LOESS is one of the most popular local smoothing methods and is robust to a long-tailed error distribution while it is highly efficient when the error distribution is normal.

Figure 2
Scatter Plot of nonperforming loan ratio against $\ln(\text{total loans})$
and LOESS Curve with 95% CI



The ratio of nonperforming loans as a proportion of total loans is plotted against the log transformation of total loan volume for 710 top-tier bank holding companies at year-end 2013. These 710 companies represent banks whose loan volume exceeds 15 percent of consolidated assets and whose nonperforming loans (including gross charge-offs and foreclosed real estate) amount at least to 1 percent and no more than 15 percent of total loans. While it appears that, for any given volume of loans, the degree of nonperformance is wide, it is important to remember that some of this wide variation in nonperformance is due to differences in the average contractual interest rate, the composition of the loan portfolio, the GDP growth rate, and market concentration.

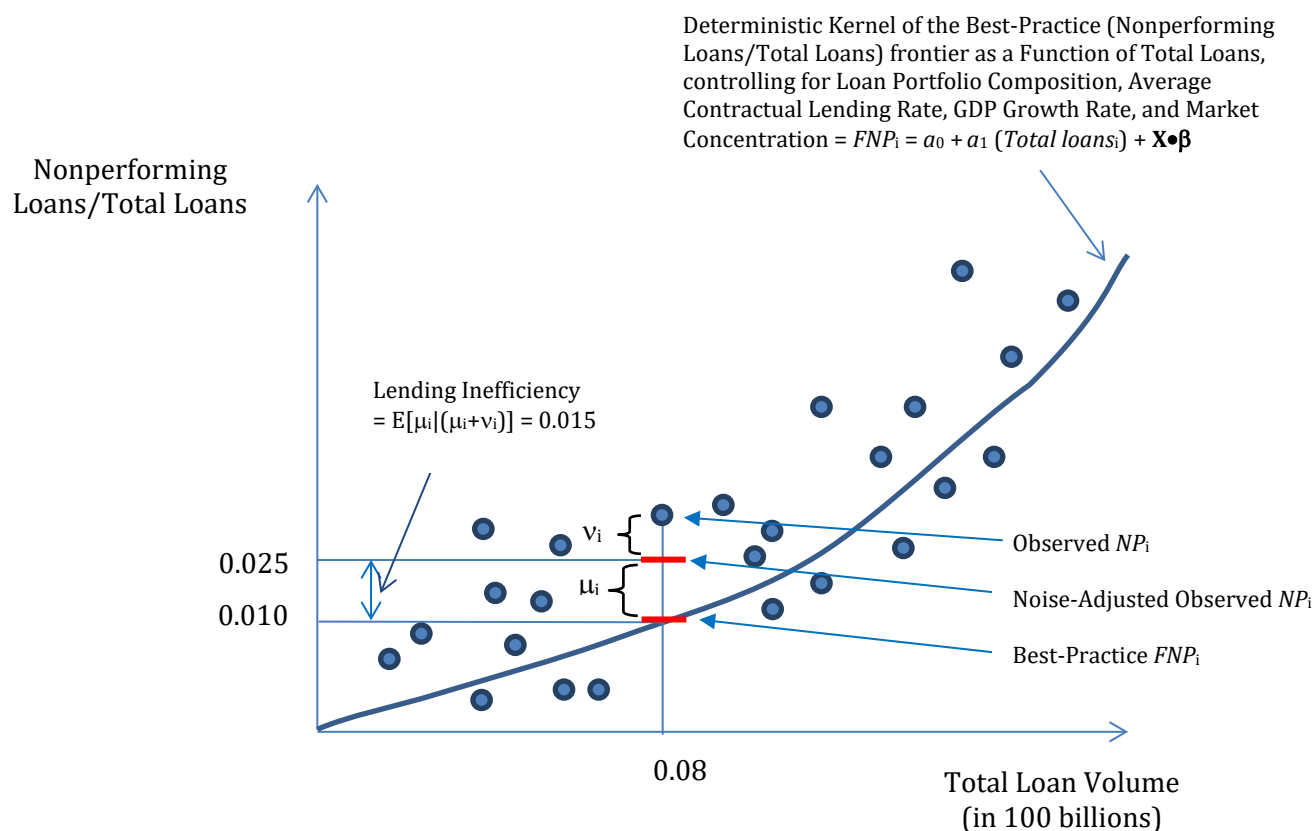
LOESS curve (the thick curve in the above figure) and its 95% confidence interval (the shaded band) are included. LOESS is short for locally estimated scatterplot smoothing, which fits local polynomial regression model to scatter points. LOESS is one of the most popular local smoothing methods and is robust to a long-tailed error distribution while it is highly efficient when the error distribution is normal.

Figure 3

Best-Practice Loan Nonperformance Frontier¹¹

This figure illustrates the best-practice minimum ratio of nonperforming loans to total loans that is obtained by stochastic frontier estimation of the relationship between the nonperforming loan ratio and total loans (expressed in 100 billions), controlling for the loan portfolio composition, the average contractual lending rate, and the GDP growth rate and market concentration in the bank's market. The error term, $\varepsilon_i = v_i + \mu_i$, is a composite term used to distinguish statistical noise, $v_i \sim \text{iid } N(0, \sigma_v^2)$, from the term, μ_i , which is a positive, half-normal error term, $\mu_i (\geq 0) \sim \text{iid } N(0, \sigma_\mu^2)$, that measures the systematic excess nonperformance from bank i 's best-practice minimum nonperforming loan ratio. The 'expected' best-practice minimum nonperforming loan ratio is given by the deterministic kernel of the estimated function, while the best-practice minimum nonperformance loan ratio is given by the stochastic frontier of the estimated function.

In this example, bank i has total loans of 0.08 (\$8 billions¹²) and experiences a nonperforming loan ratio adjusted for statistical noise, $NP_i - v_i$, of 0.025, which is an excess of 0.015 over the 'expected' best-practice minimum, FNP_i , of 0.010. Thus, its *lending inefficiency* is 0.015.



¹¹ Adapted from Hughes, Jagtiani, and Mester (2016)

¹² 0.08 (in 100 billions, here) = 8,000,000 (in thousands in the Y9-C data report) = 8 billions.

Table 1
Banks with the Lowest Ratio of Total Loans to Consolidated Assets at Year-End 2013

The initial data set includes 807 top-tier bank holding companies at the end of 2013. They are sorted in ascending order by the ratio of total loans to total assets up to 0.40. To estimate the best-practice loan performance frontier, the sample is trimmed of companies with a ratio less than 0.15, which eliminates 4 companies that are not focused on the typical functions of commercial banking.

| | Name of Bank Holding Company | Book Value of Total Assets (1000s) | Total Loans/Total Assets |
|----|-------------------------------------|---|---------------------------------|
| 1 | State Street Corporation | 243,028,090 | 0.05549 |
| 2 | Goldman Sachs Group, Inc., The | 911,595,000 | 0.08951 |
| 3 | Morgan Stanley | 832,702,000 | 0.09235 |
| 4 | Bank Of New York Mellon Corporation | 374,310,000 | 0.13771 |
| 5 | BRISCOE RANCH | 1,246,790 | 0.16534 |
| 6 | VILLAGES BC | 1,579,895 | 0.17964 |
| 7 | INDUSTRY BSHRS | 2,480,503 | 0.18925 |
| 8 | Stifel Financial Corp. | 9,008,870 | 0.22830 |
| 9 | FIRST CMNTY BSHRS | 1,368,359 | 0.27399 |
| 10 | FIRST TX BC | 910,068 | 0.28382 |
| 11 | Northern Trust Corporation | 102,947,333 | 0.28544 |
| 12 | FIRST BC | 578,509 | 0.29945 |
| 13 | INDEPENDENT BKR FC | 2,188,247 | 0.30389 |
| 14 | FARMERS ENT | 694,668 | 0.30855 |
| 15 | SECURITY BC TN | 450,765 | 0.31137 |
| 16 | JPMorgan Chase & Co. | 2,415,689,000 | 0.31672 |
| 17 | MIDWEST INDEP BSHRS | 360,387 | 0.32309 |
| 18 | EAST TX BSHRS | 537,204 | 0.32400 |
| 19 | FIRST AMER BK CORP | 3,379,295 | 0.32498 |
| 20 | COCONUT GROVE BSHRS | 591,480 | 0.32878 |
| 21 | SNBNY HOLD | 6,672,456 | 0.33274 |
| 22 | DICKINSON FC II | 2,100,898 | 0.34222 |
| 23 | N W SVC CORP | 354,765 | 0.34324 |
| 24 | Citigroup Inc. | 1,880,382,000 | 0.36010 |
| 25 | FIRST NM FC | 427,134 | 0.36063 |
| 26 | MIDLAND FC | 653,403 | 0.36307 |
| 27 | CU BK SHARES | 568,135 | 0.36339 |
| 28 | OTTAWA BSHRS | 488,233 | 0.36534 |
| 29 | Century Bancorp, Inc. | 3,431,154 | 0.36861 |
| 30 | PACIFIC COAST BKR BSHRS | 545,753 | 0.37425 |
| 31 | Westamerica Bancorporation | 4,848,866 | 0.37694 |
| 32 | STURM FNCL GROUP INC | 2,059,318 | 0.37805 |
| 33 | National Bank Holdings Corpora | 4,914,115 | 0.37848 |
| 34 | BLACKHAWK BC | 1,101,428 | 0.38149 |
| 35 | AMERICAN BC | 1,000,668 | 0.38369 |
| 36 | Umb Financial Corporation | 16,911,852 | 0.38564 |
| 37 | Cullen/Frost Bankers, Inc. | 24,388,272 | 0.39021 |
| 38 | RED RIVER BC | 707,400 | 0.39058 |
| 39 | CBS BANC CORP | 1,482,676 | 0.39072 |
| 40 | Southside Bancshares, Incorpor | 3,445,663 | 0.39221 |
| 41 | ROCKHOLD BANCORP | 536,342 | 0.39785 |

Table 2**Banks with the Highest Proportion of Nonperforming Loans at Year-End 2013**

Nonperformance is measured by the following data from the Y9-C report at year-end 2013. Nonperforming Loans = past due loans less than and more than 90 days plus nonaccruing loans, lease financing receivables, placements, and other assets (BHCK525+BHCK524 +BHCK526); Nonperforming loans + Gross Charge-offs (BHCK4635); Nonperforming Loans + Gross Charge-offs + Other Real Estate Owned (BHCK2150); Total Loans (BHCK2122). Banks with a ratio (Nonperforming Loans + Gross Charge-offs + Other Real Estate Owned) / (Total Loans) > 0.15 are trimmed. The list below exhibits the 50 banks with the highest ratios.

| | Name of Bank Holding Company | Book Value of Total Assets (1000s) | (Nonperforming Loans) / (Total Loans) | (Nonperforming Loans + Gross Charge-offs) / (Total Loans) | (Nonperforming Loans + Gross Charge-offs + Other Real Estate Owned) / (Total Loans) |
|----|-------------------------------------|---|--|--|--|
| 1 | BEACH CMNTY BSHRS | 562,450 | 0.36595 | 0.37205 | 0.55477 |
| 2 | BUILDERS FC | 242,192 | 0.04101 | 0.04731 | 0.41082 |
| 3 | NORTHWEST BC OF IL | 280,762 | 0.02752 | 0.03207 | 0.40509 |
| 4 | GEORGIA BSHRS | 312,641 | 0.23661 | 0.24598 | 0.34973 |
| 5 | HOMEBANCORP | 706,902 | 0.30363 | 0.30389 | 0.30399 |
| 6 | METROPOLITAN BK GRP | 2,430,812 | 0.25052 | 0.25058 | 0.30245 |
| 7 | SEAWAY BSHRS | 556,584 | 0.24470 | 0.26986 | 0.29428 |
| 8 | CAPITOL CITY BSHRS | 286,974 | 0.15994 | 0.17402 | 0.27172 |
| 9 | PUTNAM-GREENE FC | 504,882 | 0.19133 | 0.20483 | 0.25619 |
| 10 | Porter Bancorp, Inc. | 1,076,121 | 0.15994 | 0.20590 | 0.24944 |
| 11 | NORTHERN ST FC | 392,412 | 0.11239 | 0.18098 | 0.24471 |
| 12 | PERSONS BKG CO | 361,270 | 0.12118 | 0.12901 | 0.22417 |
| 13 | UNITED NAT CORP | 2,344,689 | 0.04787 | 0.20891 | 0.20913 |
| 14 | Doral Financial Corporation | 8,493,455 | 0.17458 | 0.18714 | 0.20884 |
| 15 | CAPITOL BC | 915,264 | 0.11639 | 0.14365 | 0.20831 |
| 16 | FMB BSHRS | 556,134 | 0.07232 | 0.08801 | 0.20669 |
| 17 | N W SVC CORP | 354,765 | 0.10618 | 0.11956 | 0.20562 |
| 18 | DIAMOND BANCORP | 726,618 | 0.10409 | 0.12281 | 0.20537 |
| 19 | HAMILTON ST BSHR | 1,596,351 | 0.13725 | 0.14508 | 0.20074 |
| 20 | ALIKAT INV | 292,174 | 0.05005 | 0.10611 | 0.19372 |
| 21 | HCSB FC | 434,819 | 0.06310 | 0.09225 | 0.18964 |
| 22 | LIBERTY SHARES | 593,103 | 0.12969 | 0.14816 | 0.18950 |
| 23 | CERTUSHOLDINGS | 1,655,555 | 0.09777 | 0.11354 | 0.18216 |

| | Name of Bank Holding Company | Book Value of Total Assets (1000s) | (Nonperforming Loans) / (Total Loans) | (Nonperforming Loans + Gross Charge-offs) / (Total Loans) | (Nonperforming Loans + Gross Charge-offs + Other Real Estate Owned) / (Total Loans) |
|----|-------------------------------------|---|--|--|--|
| 24 | TENNESSEE ST BSHRS | 658,104 | 0.09991 | 0.11401 | 0.17705 |
| 25 | Peoples Financial Corporation | 762,264 | 0.11288 | 0.13985 | 0.16550 |
| 26 | First Bancorp | 12,656,925 | 0.09496 | 0.13891 | 0.15543 |
| 27 | COMMUNITY FIRST | 449,275 | 0.07813 | 0.08564 | 0.15255 |
| 28 | DICKINSON FC II | 2,100,898 | 0.02702 | 0.07734 | 0.14922 |
| 29 | Village Bank And Trust Financial | 444,091 | 0.07253 | 0.09172 | 0.14849 |
| 30 | BRIDGEVIEW BC | 1,008,007 | 0.05767 | 0.08269 | 0.14701 |
| 31 | OXFORD FC | 446,836 | 0.08085 | 0.08831 | 0.14648 |
| 32 | EDUCATIONAL SVC OF AMERICA | 2,665,828 | 0.14390 | 0.14466 | 0.14493 |
| 33 | FIRST NAT BSHRS | 671,885 | 0.11074 | 0.11899 | 0.14060 |
| 34 | LINCO BSHRS | 654,483 | 0.05586 | 0.07048 | 0.14026 |
| 35 | SAINT LOUIS BSHRS | 401,683 | 0.04763 | 0.05787 | 0.13994 |
| 36 | F&M FC | 495,791 | 0.10117 | 0.11801 | 0.13902 |
| 37 | Popular, Inc. | 35,749,000 | 0.09074 | 0.12530 | 0.13793 |
| 38 | SOUTHERN BSHRS | 2,269,581 | 0.10391 | 0.11409 | 0.13621 |
| 39 | CHAMBERS BSHRS | 751,058 | 0.03865 | 0.05735 | 0.13438 |
| 40 | AMBOY BC | 2,148,004 | 0.05589 | 0.05836 | 0.13324 |
| 41 | CITIZENS NBC | 504,803 | 0.08539 | 0.09090 | 0.12721 |
| 42 | NEW PEOPLES BSHRS | 684,711 | 0.08262 | 0.09488 | 0.12703 |
| 43 | MESABA BSHRS | 642,830 | 0.07810 | 0.08537 | 0.12608 |
| 44 | United Security Bancshares, Inc | 569,801 | 0.05266 | 0.09497 | 0.12498 |
| 45 | SECURITY CAPITAL | 500,191 | 0.04085 | 0.04499 | 0.12447 |
| 46 | FLORIDA CAP GRP | 410,618 | 0.06221 | 0.07526 | 0.12427 |
| 47 | SEQUATCHIE VALLEY BSHRS | 600,935 | 0.08466 | 0.09264 | 0.12352 |
| 48 | INLAND BC | 1,030,607 | 0.07774 | 0.10454 | 0.12168 |
| 49 | BARABOO BC | 632,567 | 0.06882 | 0.10252 | 0.12167 |
| 50 | American Founders | 276,706 | 0.05572 | 0.06602 | 0.12134 |

Table 3**Banks with the Lowest Proportion of Nonperforming Loans at Year-End 2013**

Nonperformance is measured by the following data from the Y9-C report. Nonperforming Loans = past due loans less than and more than 90 days plus nonaccruing loans, lease financing receivables, placements, and other assets (BHCK525+BHCK524 +BHCK5526); Nonperforming loans + Gross Charge-offs (BHCK4635); Nonperforming Loans + Gross Charge-offs + Other Real Estate Owned (BHCK2150); Total Loans (BHCK2122). Banks with a ratio (Nonperforming Loans + Gross Charge-offs + Other Real Estate Owned) / (Total Loans) < 0.01 are trimmed. The list below exhibits the 70 banks with the lowest ratios.

| | Name of Bank Holding Company | Book Value of Total Assets (1000s) | (Nonperforming Loans) / (Total Loans) | (Nonperforming Loans + Gross Charge-offs) / (Total Loans) | (Nonperforming Loans + Gross Charge-offs + Other Real Estate Owned) / (Total Loans) |
|----|-------------------------------------|---|--|--|--|
| 1 | TOLLESON WEALTH MGMT | 429,133 | 0.000510 | 0.000510 | 0.000510 |
| 2 | FIDELITY HC | 403,660 | 0.000000 | 0.000134 | 0.000596 |
| 3 | AMERICAN BK INC | 528,961 | 0.000724 | 0.000730 | 0.000730 |
| 4 | MERCHANTS BC | 1,179,418 | 0.000517 | 0.000869 | 0.001177 |
| 5 | Cardinal Financial Corporation | 2,894,230 | 0.001169 | 0.001260 | 0.001260 |
| 6 | Merchants Bancshares, Inc. | 1,730,936 | 0.000945 | 0.001297 | 0.001389 |
| 7 | LEADER BC | 658,722 | 0.002205 | 0.002571 | 0.002571 |
| 8 | SNBNY HOLD | 6,672,456 | 0.002503 | 0.002813 | 0.002813 |
| 9 | CBX CORP | 1,159,027 | 0.001387 | 0.003037 | 0.003037 |
| 10 | FIRSTPERRYTON BC | 963,592 | 0.002691 | 0.003063 | 0.003063 |
| 11 | FINANCIAL CORP OF LA | 631,803 | 0.002865 | 0.003328 | 0.003328 |
| 12 | First Of Long Island Corp | 2,399,892 | 0.003165 | 0.003795 | 0.003795 |
| 13 | SIGNATURE BC | 646,087 | 0.002682 | 0.004044 | 0.004044 |
| 14 | CAMBRIDGE BC | 1,533,711 | 0.004045 | 0.004110 | 0.004110 |
| 15 | HOMETOWN BC | 1,153,654 | 0.004148 | 0.004263 | 0.004263 |
| 16 | FIRST TX BHC | 1,299,111 | 0.003216 | 0.004281 | 0.004281 |
| 17 | Access National Corporation | 847,181 | 0.003563 | 0.004324 | 0.004324 |
| 18 | INWOOD BSHRS | 1,569,067 | 0.002431 | 0.002482 | 0.004384 |
| 19 | State Street Corp | 243,028,090 | 0.000062 | 0.000062 | 0.004439 |
| 20 | POST OAK BSHRS | 772,461 | 0.004011 | 0.004747 | 0.004747 |
| 21 | LEACKCO BHC | 581,422 | 0.002289 | 0.002801 | 0.004772 |
| 22 | Pacific Premier Bancorp, Inc. | 1,714,187 | 0.002338 | 0.003972 | 0.004926 |
| 23 | CUMMINS-AMER CORP | 1,200,777 | 0.004812 | 0.005275 | 0.005275 |
| 24 | MIDLAND BSHRS | 1,076,128 | 0.004980 | 0.005294 | 0.005294 |
| 25 | Center Bancorp, Inc. | 1,673,082 | 0.004812 | 0.005154 | 0.005383 |
| 26 | FIRST BSHRS OF TX | 826,012 | 0.004845 | 0.005601 | 0.005601 |
| 27 | PLANTERS FNCL GRP | 784,115 | 0.003947 | 0.005336 | 0.005840 |
| 28 | INDEPENDENCE BSHRS | 1,393,217 | 0.004581 | 0.005768 | 0.005847 |
| 29 | HERITAGE GROUP | 624,052 | 0.005856 | 0.005863 | 0.005863 |
| 30 | GNB BC | 495,827 | 0.005474 | 0.005563 | 0.005916 |

| | Name of Bank Holding Company | Book Value of Total Assets (1000s) | (Nonperforming Loans) / (Total Loans) | (Nonperforming Loans + Gross Charge-offs) / (Total Loans) | (Nonperforming Loans + Gross Charge-offs + Other Real Estate Owned) / (Total Loans) |
|----|-------------------------------------|---|--|--|--|
| 31 | MBT BSHRS | 562,965 | 0.000000 | 0.003311 | 0.005993 |
| 32 | SECURITY NAT CORP | 1,218,571 | 0.003863 | 0.004625 | 0.006190 |
| 33 | Independent Bk Grp Inc | 2,163,984 | 0.003535 | 0.004369 | 0.006293 |
| 34 | MIDWEST BANC HC | 614,586 | 0.003964 | 0.004108 | 0.006437 |
| 35 | CITIZENS NAT BSHRS OF BOSSIER | 745,840 | 0.004719 | 0.005762 | 0.006458 |
| 36 | MVB FC | 991,730 | 0.003913 | 0.006055 | 0.006580 |
| 37 | RBB BC | 723,410 | 0.002074 | 0.004106 | 0.006673 |
| 38 | RED RIVER BSHRS | 1,301,336 | 0.005064 | 0.005679 | 0.006726 |
| 39 | FARMERS & MRCH BC | 2,076,722 | 0.002915 | 0.003557 | 0.006879 |
| 40 | DAKOTA CMNTY BSHRS | 705,560 | 0.006696 | 0.007112 | 0.007112 |
| 41 | LAURITZEN CORP | 1,832,705 | 0.006729 | 0.007248 | 0.007302 |
| 42 | Bank Of New York Mellon Corpor | 374,310,000 | 0.006732 | 0.007062 | 0.007469 |
| 43 | BOU BC | 834,970 | 0.006925 | 0.007587 | 0.007587 |
| 44 | MANHATTAN BC | 1,099,989 | 0.007041 | 0.007790 | 0.007808 |
| 45 | Century Bancorp, Inc. | 3,431,154 | 0.006412 | 0.007846 | 0.007846 |
| 46 | NORTHERN BC | 1,096,296 | 0.007499 | 0.007916 | 0.007916 |
| 47 | AMERICAN BC | 1,192,869 | 0.006221 | 0.007910 | 0.007963 |
| 48 | SECURITY NAT CORP | 744,886 | 0.005745 | 0.006530 | 0.007970 |
| 49 | Peapack-Gladstone Financial Co | 1,966,948 | 0.006080 | 0.006740 | 0.007971 |
| 50 | BPC CORP | 662,640 | 0.001452 | 0.005943 | 0.008005 |
| 51 | Northrim Bancorp, Inc. | 1,215,006 | 0.003601 | 0.005288 | 0.008300 |
| 52 | STATE BSHRS | 2,946,169 | 0.006175 | 0.007173 | 0.008397 |
| 53 | Bridge Bancorp, Inc. | 1,896,640 | 0.005302 | 0.006206 | 0.008418 |
| 54 | BANK OF HIGHLAND PK FNCL CORP | 1,143,494 | 0.001941 | 0.004944 | 0.008699 |
| 55 | Stifel Financial Corp. | 9,008,870 | 0.006522 | 0.008648 | 0.008712 |
| 56 | AMERICAN CENTRAL BANCORP | 708,060 | 0.007100 | 0.007964 | 0.008730 |
| 57 | AMERICAN BK HOLDING CORP | 1,205,154 | 0.004398 | 0.006899 | 0.008782 |
| 58 | FIRST MANITOWOC BC | 1,060,887 | 0.003963 | 0.005174 | 0.008788 |
| 59 | FARMERS ST CORP | 562,783 | 0.008540 | 0.008726 | 0.008891 |
| 60 | AVENUE FNCL HOLD | 889,577 | 0.001020 | 0.003005 | 0.008971 |

| | Name of Bank Holding Company | Book Value of Total Assets (1000s) | (Nonperforming Loans) / (Total Loans) | (Nonperforming Loans + Gross Charge-offs) / (Total Loans) | (Nonperforming Loans + Gross Charge-offs + Other Real Estate Owned) / (Total Loans) |
|-----------|-------------------------------------|---|--|--|--|
| 61 | Prosperity Bancshares, Inc. | 18,651,693 | 0.007357 | 0.008063 | 0.009002 |
| 62 | FIRST-WEST TX BSHRS | 916,226 | 0.007154 | 0.008521 | 0.009006 |
| 63 | METROPOLITAN BANCGROUP | 800,678 | 0.003242 | 0.004446 | 0.009185 |
| 64 | CITIZENS BSHRS | 665,350 | 0.007725 | 0.008268 | 0.009511 |
| 65 | IDA GROVE BSHRS | 1,245,520 | 0.008319 | 0.009363 | 0.009531 |
| 66 | Southern Missouri Bancorp, Inc | 950,266 | 0.005302 | 0.005724 | 0.009688 |
| 67 | OTTAWA BSHRS | 488,233 | 0.006072 | 0.008381 | 0.009889 |
| 68 | CENTRAL BC | 162,259 | 0.007789 | 0.007985 | 0.009941 |
| 69 | BANKWELL FNCL GRP | 779,618 | 0.008426 | 0.008696 | 0.010013 |
| 70 | RCB HC | 2,117,679 | 0.006255 | 0.007095 | 0.010044 |

Table 4**Summary Statistics of Top-Tier Bank Holding Companies at Year-End 2013**

The data set includes 710 top-tier bank holding companies at the end of 2013. Nonperforming loans include past due loans less than and more than 90 days plus nonaccruing loans, lease financing receivables, placements, and other assets (BHCK525+BHCK5524 +BHCK5526); gross charge-offs (BHCK4635); and other real estate owned (BHCK2150). Banks whose nonperforming loans exceed 15 percent of total loans as well as those whose nonperforming loans are less than 1 percent of total loans are dropped. And banks with total loans less than 15 percent of consolidated assets are dropped. These restrictions reduce the initial sample of 807 banks to 710.

Panel A: Consolidated Assets < \$1 Billion

| | <i>N</i> | Mean | Median | Std. Dev. | Minimum | Maximum |
|-------------------------------|----------|---------|---------|-----------|---------|---------|
| Book Value Assets (1,000s) | 364 | 662,973 | 654,468 | 167,443 | 92,694 | 998,762 |
| Loans/Assets | 364 | 0.6400 | 0.6558 | 0.1267 | 0.2838 | 0.9142 |
| (Nonperforming Loans) / Loans | 364 | 0.0461 | 0.0370 | 0.0310 | 0.0100 | 0.1485 |

Panel B: \$1 Billion < Consolidated Assets < \$10 Billion

| | | | | | | |
|-------------------------------|-----|-----------|-----------|-----------|-----------|-----------|
| Book Value Assets (1,000s) | 293 | 2,600,335 | 1,853,823 | 1,918,892 | 1,000,668 | 9,641,427 |
| Loans/Assets | 293 | 0.6414 | 0.6537 | 0.1229 | 0.1653 | 0.9216 |
| (Nonperforming Loans) / Loans | 293 | 0.0383 | 0.0280 | 0.0277 | 0.0100 | 0.1492 |

Panel C: \$10 Billion < Consolidated Assets < \$50 Billion

| | | | | | | |
|-------------------------------|----|------------|------------|-----------|------------|------------|
| Book Value Assets (1,000s) | 35 | 21,161,256 | 18,473,488 | 9,330,543 | 10,989,286 | 47,138,960 |
| Loans/Assets | 35 | 0.6322 | 0.6588 | 0.1366 | 0.3856 | 0.9621 |
| (Nonperforming Loans) / Loans | 35 | 0.0312 | 0.0264 | 0.0219 | 0.0102 | 0.1379 |

Panel D: \$50 Billion < Consolidated Assets < \$250 Billion

| | | | | | | |
|-------------------------------|----|-------------|------------|------------|------------|-------------|
| Book Value Assets (1,000s) | 11 | 104,276,621 | 92,991,716 | 43,640,904 | 56,031,127 | 183,009,992 |
| Loans/Assets | 11 | 0.6678 | 0.6958 | 0.1388 | 0.2854 | 0.8290 |
| (Nonperforming Loans) / Loans | 11 | 0.0307 | 0.0283 | 0.0099 | 0.0146 | 0.0449 |

Panel E: Consolidated Assets > \$250 Billion

| | | | | | | |
|-------------------------------|---|---------------|---------------|-------------|-------------|---------------|
| Book Value Assets (1,000s) | 7 | 1,272,854,333 | 1,527,015,000 | 923,465,518 | 297,282,098 | 2,415,689,000 |
| Loans/Assets | 7 | 0.5174 | 0.5501 | 0.1409 | 0.3167 | 0.6656 |
| (Nonperforming Loans) / Loans | 7 | 0.0610 | 0.0569 | 0.0118 | 0.0483 | 0.0798 |

Table 5**The Largest Banks and Their Loan Performance at Year-End 2013**

Holding companies whose consolidated assets exceed \$50 billion are listed below. Nonperformance is measured by the following data from the Y9-C report at year-end 2013 divided by Total Loans (BHCK2122). Nonperforming = past due loans less than and more than 90 days plus nonaccruing loans, lease financing receivables, placements, and other assets (BHCK525+BHCK5524 +BHCK5526); Nonperforming loans + Gross Charge-offs (BHCK4635); Nonperforming Loans + Gross Charge-offs + Other Real Estate Owned (BHCK2150).

| | Name of Bank Holding Company | Book Value of Total Assets (1000s) | (Nonperforming Loans) / (Total Loans) | (Nonperforming Loans + Gross Charge-offs) / (Total Loans) | (Nonperforming Loans + Gross Charge-offs + Other Real Estate Owned) / (Total Loans) |
|----|-------------------------------------|---|--|--|--|
| 1 | JPMorgan Chase & Co. | 2,415,689,000 | 0.042777 | 0.052537 | 0.056131 |
| 2 | Bank Of America Corporation | 2,104,995,000 | 0.058744 | 0.069468 | 0.071591 |
| 3 | Citigroup Inc. | 1,880,382,000 | 0.033841 | 0.056329 | 0.056944 |
| 4 | Wells Fargo & Company | 1,527,015,000 | 0.067471 | 0.075102 | 0.079751 |
| 5 | U.S. Bancorp | 364,021,000 | 0.036162 | 0.044326 | 0.048340 |
| 6 | PNC Financial Services Group, | 320,596,232 | 0.037558 | 0.045575 | 0.048626 |
| 7 | Capital One Financial Corp | 297,282,098 | 0.037057 | 0.064881 | 0.065447 |
| 8 | BB&T Corp | 183,009,992 | 0.028152 | 0.036616 | 0.038728 |
| 9 | Suntrust Banks | 175,380,779 | 0.024413 | 0.031124 | 0.033224 |
| 10 | Fifth Third Bancorp | 129,685,180 | 0.017885 | 0.024993 | 0.028333 |
| 11 | Regions Financial Corp | 117,661,732 | 0.027746 | 0.039622 | 0.041359 |
| 12 | Northern Trust Corporation | 102,947,333 | 0.016903 | 0.018918 | 0.019324 |
| 13 | Keycorp | 92,991,716 | 0.018109 | 0.024203 | 0.024622 |
| 14 | M&T Bank Corp | 85,162,391 | 0.036329 | 0.040286 | 0.041329 |
| 15 | Discover Financial Services | 79,339,664 | 0.018484 | 0.044931 | 0.044931 |
| 16 | Comerica Inc | 65,356,580 | 0.010943 | 0.014293 | 0.014566 |
| 17 | Huntington Bancshares Inc | 59,476,344 | 0.018639 | 0.025698 | 0.026335 |
| 18 | Zions Bancorporation | 56,031,127 | 0.020123 | 0.023459 | 0.024635 |

Table 6**Estimation of Stochastic Best-Practice Loan Nonperformance Frontier**

The data set includes 710 top-tier bank holding companies at the end of 2013. Nonperforming loans include past due loans less than and more than 90 days plus nonaccruing loans, lease financing receivables, placements, and other assets (BHCK525+BHCK5524 +BHCK5526); gross charge-offs (BHCK4635); and other real estate owned (BHCK2150). Banks whose nonperforming loans exceed 15 percent or are less than 1 percent of total loans are dropped from the initial sample. Stochastic frontier techniques are used to estimate the best-practice minimum ratio of nonperforming loans to total loans for any given amount of total loans, expressed in 100 billions, controlling for the composition of the bank's loan portfolio, the average contractual interest rate charged on its loans, the ten-year average GDP growth rate and market concentration in the states in which the bank operates, where each state's datum is weighted by the proportion of the bank's total deposits located in the state. Parameters significantly different from zero at the 10 percent or stricter are given in **bold**.

| Parameter | Variable | Coefficient Estimate | Robust Standard Error |
|--------------|--|----------------------|-----------------------|
| α_0 | Intercept | -0.011187 | 0.032787 |
| α_1 | total loans _i (100 billons) | 0.005420 | 0.000000 |
| β_1 | Contractual lending rate _i | 0.434162 | 0.000000 |
| β_2 | Herfindahl index of market concentration _i | -0.006387 | 0.394509 |
| β_3 | GDP growth rate _i | -0.000745 | 0.007770 |
| β_4 | (Small business loan volume _i) / (Total loan volume _i) | -0.026611 | 0.004986 |
| β_5 | (Total business loan volume _i) / (Total loan volume _i) | 0.000923 | 0.587099 |
| β_6 | (Consumer loan volume _i) / (Total loan volume _i) | 0.008051 | 0.052753 |
| β_7 | (Residential real estate volume _i) / (Total loan volume _i) | 0.006539 | 0.046151 |
| β_8 | (Commercial real estate volume _i) / (Total loan volume _i) | 0.007822 | 0.121623 |
| σ_v | Two-sided, normally distributed error term, $v_i \sim \text{iid } N(0, \sigma_v^2)$ | 0.002120 | 0.000836 |
| σ_μ | Positive, half-normally distributed error term, $\mu_i (\geq 0) \sim \text{iid } N(0, \sigma_\mu^2)$, that gauges excess nonperformance | 0.040618 | 0.000000 |

Table 7**Best Practice Nonperformance and Lending Inefficiency**

The data set includes 710 top-tier bank holding companies at the end of 2013. Nonperforming loans include past due loans, gross charge-offs, and other real estate owned. Banks whose nonperforming loans exceed 15 percent or are less than 1 percent of total loans are dropped from the initial sample. Stochastic frontier techniques are used to estimate the best-practice minimum ratio of nonperforming loans to total loans for any given amount of total loans, controlling for the composition of the bank's loan portfolio, the average contractual interest rate charged on its loans, the ten-year average GDP growth rate and market concentration in the states in which the bank operates, where each state's datum is weighted by the proportion of the bank's total deposits located in the state. Lending Inefficiency is measured as the difference between the actual ratio and the best-practice minimum ratio of nonperforming loans to total loans.

Panel A: Consolidated Assets < \$1 Billion

| | <i>N</i> | Mean | Median | Std. Dev. | Minimum | Maximum |
|---------------------------------------|----------|--------|--------|-----------|---------|---------|
| Avg. Contractual Loan Interest Rate | 364 | 0.0525 | 0.0511 | 0.0089 | 0.0352 | 0.1404 |
| (Nonperforming Loans) / (Total Loans) | 364 | 0.0461 | 0.0370 | 0.0310 | 0.0100 | 0.1485 |
| Best-Practice Nonperformance | 364 | 0.0123 | 0.0120 | 0.0045 | 0.0009 | 0.0529 |
| Lending Inefficiency | 364 | 0.0338 | 0.0237 | 0.0290 | 0.0007 | 0.1308 |

Panel B: \$1 Billion < Consolidated Assets < \$10 Billion

| | | | | | | |
|---------------------------------------|-----|--------|--------|--------|--------|--------|
| Avg. Contractual Loan Interest Rate | 293 | 0.0494 | 0.0483 | 0.0086 | 0.0278 | 0.1329 |
| (Nonperforming Loans) / (Total Loans) | 293 | 0.0383 | 0.0280 | 0.0277 | 0.0100 | 0.1492 |
| Best-Practice Nonperformance | 293 | 0.0109 | 0.0104 | 0.0044 | 0.0017 | 0.0504 |
| Lending Inefficiency | 293 | 0.0274 | 0.0190 | 0.0256 | 0.0011 | 0.1390 |

Panel C: \$10 Billion < Consolidated Assets < \$50 Billion

| | | | | | | |
|---------------------------------------|----|--------|--------|--------|--------|--------|
| Avg. Contractual Loan Interest Rate | 35 | 0.0458 | 0.0445 | 0.0067 | 0.0352 | 0.0643 |
| (Nonperforming Loans) / (Total Loans) | 35 | 0.0312 | 0.0264 | 0.0219 | 0.0102 | 0.1379 |
| Best-Practice Nonperformance | 35 | 0.0096 | 0.0096 | 0.0035 | 0.0020 | 0.0206 |
| Lending Inefficiency | 35 | 0.0217 | 0.0168 | 0.0196 | 0.0031 | 0.1174 |

Panel D: \$50 Billion < Consolidated Assets < \$250 Billion

| | | | | | | |
|---------------------------------------|----|--------|--------|--------|--------|--------|
| Avg. Contractual Loan Interest Rate | 11 | 0.0453 | 0.0401 | 0.0223 | 0.0253 | 0.1100 |
| (Nonperforming Loans) / (Total Loans) | 11 | 0.0307 | 0.0283 | 0.0099 | 0.0146 | 0.0449 |
| Best-Practice Nonperformance | 11 | 0.0128 | 0.0110 | 0.0108 | 0.0017 | 0.0431 |
| Lending Inefficiency | 11 | 0.0179 | 0.0172 | 0.0082 | 0.0019 | 0.0304 |

Panel E: Consolidated Assets > \$250 Billion

| | | | | | | |
|---------------------------------------|---|--------|--------|--------|--------|--------|
| Avg. Contractual Loan Interest Rate | 7 | 0.0538 | 0.0444 | 0.0196 | 0.0401 | 0.0921 |
| (Nonperforming Loans) / (Total Loans) | 7 | 0.0610 | 0.0569 | 0.0118 | 0.0483 | 0.0798 |
| Best-Practice Nonperformance | 7 | 0.0424 | 0.0496 | 0.0162 | 0.0179 | 0.0589 |
| Lending Inefficiency | 7 | 0.0186 | 0.0240 | 0.0107 | 0.0040 | 0.0307 |

Table 8
Best Practice Nonperformance and Lending Inefficiency
for Banks with Consolidated Assets Greater Than \$50 Billion

The values of lending inefficiency, the best-practice ratio of nonperforming loans measuring inherent credit risk, and the observed ratio of nonperforming loans are shown for large banks with consolidated assets greater than \$50 billion. Nonperforming loans include past due loans, gross charge-offs, and other real estate owned. Stochastic frontier techniques are used to estimate the best-practice minimum ratio of nonperforming loans to total loans for any given amount of total loans, controlling for the composition of the bank's loan portfolio, the average contractual interest rate charged on its loans, the ten-year average GDP growth rate and market concentration in the states in which the bank operates, where each state's datum is weighted by the proportion of the bank's total deposits located in the state.

| | Name of Bank Holding Company | Book Value of Total Assets (1000s) | Lending Inefficiency | Best-Practice Nonperformance | (Nonperforming Loans) / (Total Loans) |
|----|-------------------------------------|---|-----------------------------|-------------------------------------|--|
| 1 | JPMorgan Chase & Co. | 2,415,689,000 | 0.0065 | 0.0496 | 0.0561 |
| 2 | Bank Of America Corporation | 2,104,995,000 | 0.0127 | 0.0589 | 0.0716 |
| 3 | Citigroup Inc. | 1,880,382,000 | 0.0040 | 0.0530 | 0.0569 |
| 4 | Wells Fargo & Company | 1,527,015,000 | 0.0259 | 0.0538 | 0.0798 |
| 5 | U.S. Bancorp | 364,021,000 | 0.0262 | 0.0222 | 0.0483 |
| 6 | PNC Financial Services Group, | 320,596,232 | 0.0307 | 0.0179 | 0.0486 |
| 7 | Capital One Financial Corp | 297,282,098 | 0.0240 | 0.0414 | 0.0654 |
| 8 | BB&T Corporation | 183,009,992 | 0.0220 | 0.0167 | 0.0387 |
| 9 | Suntrust Banks, Inc. | 175,380,779 | 0.0206 | 0.0127 | 0.0332 |
| 10 | Fifth Third Bancorp | 129,685,180 | 0.0161 | 0.0122 | 0.0283 |
| 11 | Regions Financial Corporation | 117,661,732 | 0.0304 | 0.0110 | 0.0414 |
| 12 | Northern Trust Corporation | 102,947,333 | 0.0176 | 0.0017 | 0.0193 |
| 13 | Keycorp | 92,991,716 | 0.0172 | 0.0074 | 0.0246 |
| 14 | M&T Bank Corporation | 85,162,391 | 0.0300 | 0.0114 | 0.0413 |
| 15 | Discover Financial Services | 79,339,664 | 0.0019 | 0.0431 | 0.0449 |
| 16 | Comerica Incorporated | 65,356,580 | 0.0093 | 0.0053 | 0.0146 |
| 17 | Huntington Bancshares Inc | 59,476,344 | 0.0169 | 0.0094 | 0.0263 |
| 18 | Zions Bancorporation | 56,031,127 | 0.0144 | 0.0102 | 0.0246 |

Table 9
Factors Affecting Lending Inefficiency

The data set includes 710 top-tier bank holding companies at the end of 2013. Stochastic frontier techniques are used to estimate the best-practice minimum ratio of nonperforming loans to total loans specified in (1).

Lending Inefficiency, defined by (4), is measured as the difference between the actual ratio and the best-practice minimum ratio of nonperforming loans to total loans.

The regression is estimated with OLS, and standard errors are heteroscedasticity consistent. Parameter estimates in **bold** are significantly different from zero at stricter than 10%.

We apply the general-to-specific modeling strategy to identify the best specification for the lending inefficiency equation. The regressors of the general specification are given in the first column. The specific specification is obtained through a full AIC-based search over all possible specifications with all combinations of regressors derived from the general specification.

| Variable | General Specification | | Specific Specification | |
|---|-----------------------|---------|------------------------|---------|
| | Parameter Estimate | Pr > t | Parameter Estimate | Pr > t |
| Intercept | -1.14127 | 0.2358 | -0.06965 | 0.0003 |
| log (Book Value Assets (1,000s)) | 0.13899 | 0.2577 | | |
| [log (Book Value Assets (1,000s))]² | -0.00442 | 0.2558 | | |
| Total Loans/Assets | -0.02389 | 0.0024 | -0.02468 | 0.0012 |
| Equity Capital/Assets | -0.13971 | 0.0036 | -0.14365 | 0.0023 |
| Contractual Interest Rate on Loans | 41.97631 | 0.1661 | 2.73758 | <.0001 |
| (Contractual Interest Rate on Loans)² | -330.04581 | 0.1610 | | |
| [Contractual Interest Rate on Loans] x [log (Book Value Assets (1,000s))] | -5.07195 | 0.1917 | | |
| [Contractual Interest Rate on Loans]² x [log (Book Value Assets (1,000s))] | 0.16053 | 0.1942 | -1.02265 | <.0001 |
| [Contractual Interest Rate on Loans] x [log (Book Value Assets (1,000s))]² | 41.64547 | 0.1700 | | |
| [Contractual Interest Rate on Loans]² x [log (Book Value Assets (1,000s))]² | -1.35212 | 0.1652 | | |
| Consumer Loans/Total Loans | 0.06263 | 0.0146 | 0.05884 | 0.0163 |
| Total Business Loans/ Total Loans | 0.04302 | 0.0124 | 0.04096 | 0.0109 |
| Small Business Loans/ Total Loans | -0.10344 | 0.0002 | -0.09910 | 0.0001 |
| Commercial RE Loans/ Total Loans | 0.06081 | <.0001 | 0.06109 | <.0001 |
| Residential RE Loans/ Total Loans | 0.03825 | 0.0039 | 0.03818 | 0.0042 |
| GDP Growth Rate | -0.00395 | <.0001 | -0.00405 | <.0001 |
| Number of States | 0.00258 | 0.0203 | 0.00230 | 0.0013 |
| [Number of States] x [Number of Branches] | -3.53221E-7 | 0.0057 | -3.31649E-7 | 0.0105 |
| Market Concentration | -0.01267 | 0.3103 | | |

Table 10**Best Practice Nonperformance, Lending Inefficiency, and Financial Performance**

The data set consists of 710 top-tier bank holding companies, of which 244 are publicly traded, at year-end 2013. The sample is partitioned into the halves with the lower and higher ratios of observed nonperforming loans to total loans. Mean values in **bold** print are significantly different at stricter than 10 percent.

Panel A: Half of the Sample with a Lower Ratio of Nonperforming Loans to Total Loans

| | <i>N</i> | Mean | Median | Std. Dev. | Minimum | Maximum |
|--|----------|------------------|-----------|------------|---------|-------------|
| Book Value Assets (1,000s) | 355 | 4,152,644 | 1,098,991 | 12,251,316 | 280,370 | 129,685,180 |
| (Nonperforming Loans) / Loans | 355 | 0.0208 | 0.0206 | 0.0061 | 0.0100 | 0.0325 |
| Best-Practice Nonperformance | 355 | 0.0095 | 0.0093 | 0.0029 | 0.0009 | 0.0223 |
| Lending Inefficiency | 355 | 0.0112 | 0.0110 | 0.0060 | 0.0007 | 0.0262 |
| Average Contractual Loan Interest Rate | 355 | 0.0476 | 0.0475 | 0.0059 | 0.0253 | 0.0750 |
| Loans / Assets | 355 | 0.6543 | 0.6735 | 0.1211 | 0.1892 | 0.9621 |
| Tobin's <i>q</i> Ratio | 129 | 1.0564 | 1.0554 | 0.0475 | 0.9580 | 1.3129 |

Panel B: Half of the Sample a Higher Ratio of Nonperforming Loans to Total Loans

| | | | | | | |
|--|-----|-------------------|---------|-------------|--------|---------------|
| Book Value Assets (1,000s) | 355 | 29,089,290 | 864,288 | 214,309,437 | 92,694 | 2,415,689,000 |
| (Nonperforming Loans) / Loans | 355 | 0.0634 | 0.0549 | 0.0278 | 0.0325 | 0.1492 |
| Best-Practice Nonperformance | 355 | 0.0143 | 0.0132 | 0.0067 | 0.0023 | 0.0589 |
| Lending Inefficiency | 355 | 0.0491 | 0.0398 | 0.0269 | 0.0019 | 0.1390 |
| Average Contractual Loan Interest Rate | 355 | 0.0540 | 0.0525 | 0.0110 | 0.0366 | 0.1404 |
| Loans / Assets | 355 | 0.6246 | 0.6431 | 0.1297 | 0.1653 | 0.9216 |
| Tobin's <i>q</i> Ratio | 116 | 1.0360 | 1.0258 | 0.0621 | 0.9506 | 1.3058 |

Table 11
Comparison of Means between Groups Partitioned
by Nonperforming Loans Ratio and Lending Inefficiency

The data set consists of 710 top-tier bank holding companies, of which 244 are publicly traded, at year-end 2013. The sample is partitioned into the halves with the lower and higher ratios of observed nonperforming loans to total loans. Each of these halves is then partitioned into the more and less efficient halves by lending efficiency. The p -value represents the statistical significance of the comparison of means in the pairing. Pairs of means in **bold** are statistically different at stricter than $p = 0.10$.

| | Panel A | | | Panel B | | | Panel C | | |
|--|---|-----------------------------------|----------|--|-----------------------------------|----------|---------------------------------------|-----------------------------------|----------|
| | Banks with Lower Ratios of Nonperforming Loans to Total Loans | | | Banks with Higher Ratios of Nonperforming Loans to Total Loans | | | (Nonperforming Loans) / (Total Loans) | | |
| | More Efficient at Lending | Less Efficient at Lending | | More Efficient at Lending | Less Efficient at Lending | | Lower Ratio | Higher Ratio | |
| | <i>n</i> = 178 <i>n</i> * = 62 | <i>n</i> = 177 <i>n</i> * = 67 | | <i>n</i> = 178 <i>n</i> * = 76 | <i>n</i> = 177 <i>n</i> * = 40 | | <i>n</i> = 178 <i>n</i> * = 62 | <i>n</i> = 178 <i>n</i> * = 76 | |
| | Mean | Mean | <i>p</i> | Mean | Mean | <i>p</i> | Mean | Mean | <i>p</i> |
| Book Value Assets (1,000s) | 3,153,030 | 5,157,905 | 0.12 | 56,597,667 | 1,425,498 | 0.02 | 3,153,030 | 56,597,667 | 0.02 |
| (Nonperforming Loans) / Loans | 0.0160 | 0.0256 | <0.01 | 0.0432 | 0.0837 | <0.01 | 0.0160 | 0.0432 | <0.00 |
| Best-Practice Nonperformance | 0.0098 | 0.0092 | 0.05 | 0.0143 | 0.0143 | 0.98 | 0.0098 | 0.0143 | <0.00 |
| Lending Inefficiency | 0.0062 | 0.0163 | <0.01 | 0.0289 | 0.0693 | <0.01 | 0.0062 | 0.0289 | <0.00 |
| Average Contractual Loan Interest Rate | 0.0484 | 0.0467 | <0.01 | 0.0533 | 0.0548 | 0.19 | 0.0484 | 0.0533 | <0.00 |
| Loans / Assets | 0.6575 | 0.6511 | 0.62 | 0.6367 | 0.6124 | 0.08 | 0.6575 | 0.6367 | 0.12 |
| Tobin's <i>q</i> Ratio* | 1.0643 | 1.0490 | 0.07 | 1.0468 | 1.0155 | 0.01 | 1.0643 | 1.0468 | 0.05 |

Table 12
**Regression Analysis of Tobin's q Ratio with the Nonperforming Loans Ratio
as One of the Main Factors for the Construction of Regressors**

The data set includes 244 publicly traded top-tier bank holding companies at the end of 2013. The dependent variable is Tobin's q ratio. Regressions are estimated with OLS, and standard errors are heteroscedasticity consistent. Probability values are reported in parentheses under the parameter estimates. Parameter estimates in **bold** are significantly different from zero at stricter than 10%.

We apply the general-to-specific modeling strategy to identify the best specification for the q ratio equation. The regressors of the general specification are given in the first column. The specific specification is obtained through a full AIC-based search over all possible specifications with all combinations of regressors derived from the general specification.

| Variable | Dependent Variable: Tobin's q Ratio | | | |
|--|---------------------------------------|---------|------------------------|---------|
| | General Specification | | Specific Specification | |
| | Parameter Estimate | Pr > t | Parameter Estimate | Pr > t |
| Intercept | -0.4160 | 0.049 | -0.4616 | 0.027 |
| \ln (Book Value Assets (1,000s)) | 0.1972 | <.0001 | 0.1933 | <.0001 |
| $[\ln$ (Book Value Assets (1,000s))] ² | -0.0060 | <.0001 | -0.0059 | <.0001 |
| Loans/ Assets | -0.2794 | 0.196 | -0.0587 | 0.045 |
| (Loans/ Assets) ² | 0.1756 | 0.288 | | |
| Nonperforming Loans/ Loans | -3.1918 | 0.125 | -2.8247 | 0.088 |
| (Nonperforming Loans/ Loans) ² | 1.3889 | 0.775 | | |
| (Nonperforming Loans/ Loans) \times $[\ln$ (Book Value Assets (1,000s))] | 0.1705 | 0.180 | 0.1553 | 0.177 |
| | Adj. R Sq = 0.339 | F=18.8 | Adj. R Sq = 0.354 | F=26.1 |

Table 13

Regression Analysis of Tobin's q Ratio with the Nonperforming Loans Ratio and the Mega Bank Dummy as Two of the Main Factors for the Construction of Regressors

The data set includes 244 publicly traded top-tier bank holding companies at the end of 2013. The dependent variable is Tobin's q ratio. Regressions are estimated with OLS, and standard errors are heteroscedasticity consistent. Probability values are reported in parentheses under the parameter estimates. Parameter estimates in **bold** are significantly different from zero at stricter than 10%.

The regressors of the general specification are given in the first column. The specific specification is obtained through a full AIC-based search over all possible specifications with all combinations of regressors derived from the general specification.

Mega Bank is the indicator variable of banks with assets greater than \$170 billion.

| | Dependent Variable: Tobin's q Ratio | | | |
|---|---------------------------------------|---------|------------------------|---------|
| | General Specification | | Specific Specification | |
| Variable | Parameter Estimate | Pr > t | Parameter Estimate | Pr > t |
| Intercept | -1.5560 | 0.0002 | -1.5617 | <.0001 |
| \ln (Book Value Assets (1,000s)) | 0.3425 | <.0001 | 0.3327 | <.0001 |
| $[\ln$ (Book Value Assets (1,000s))] ² | -0.0106 | <.0001 | -0.0102 | <.0001 |
| Loans / Assets | -0.2678 | 0.2000 | -0.0556 | 0.0502 |
| (Loans / Assets) ² | 0.1685 | 0.2888 | | |
| Nonperforming Loans / Loans | -0.6926 | 0.6281 | | |
| (Nonperforming Loans / Loans) ² | 1.3889 | 0.5556 | | |
| (Nonperforming Loans / Loans) \times [\ln (Book Value Assets (1,000s))] | -0.0064 | 0.9447 | -0.0391 | <.0001 |
| Mega Bank (=1 when book value assets > \$170 billion) | -0.0725 | 0.5551 | | |
| (Mega Bank) \times (Nonperforming Loans / Loans) | -11.1061 | 0.1622 | -14.3103 | 0.0018 |
| (Mega Bank) \times [(Nonperforming Loans / Loans) ²] | -33.1282 | 0.4794 | | |
| (Mega Bank) \times (Nonperforming Loans / Loans) \times [\ln (Book Value Assets (1,000s))] | 0.8417 | 0.0108 | 0.8325 | 0.0004 |
| | Adj. R Sq = 0.369 | F=13.9 | Adj. R Sq = 0.377 | F=25.5 |

Table 14**Regression Analysis of Tobin's q Ratio with the Two Components of the Nonperforming Loans Ratio as Two of the Main Factors for the Construction of Regressors**

The data set includes 244 publicly traded top-tier bank holding companies at the end of 2013. The dependent variable is Tobin's q ratio. Regressions are estimated with OLS, and standard errors are heteroscedasticity consistent. Parameter estimates in **bold** are significantly different from zero at stricter than 10%.

The regressors of the general specification are given in the first column. The specific specification is obtained through a full AIC-based search over all possible specifications with all combinations of regressors derived from the general specification.

| Variable | General Specification | | Specific Specification | |
|---|-----------------------|---------|------------------------|---------|
| | Parameter Estimate | Pr > t | Parameter Estimate | Pr > t |
| Intercept | -1.046 | 0.0019 | -1.0806 | 0.0004 |
| \ln (Book Value Assets (1,000s)) | 0.2778 | <.0001 | 0.2734 | <.0001 |
| $[\ln$ (Book Value Assets (1,000s))]² | -0.0087 | <.0001 | -0.0085 | <.0001 |
| Loans / Assets | -0.2430 | 0.2638 | -0.0526 | 0.0646 |
| (Loans / Assets)² | 0.1504 | 0.3682 | | |
| Best-Practice Nonperformance | -8.5872 | 0.0209 | -6.9464 | 0.0038 |
| (Best-Practice Nonperformance)² | -17.7697 | 0.6429 | | |
| (Best-Practice Nonperformance) × $[\ln$ (Book Value Assets (1,000s))] | 0.5838 | 0.0175 | 0.4625 | 0.0016 |
| Lending Inefficiency | -0.6120 | 0.7498 | -0.6145 | <.0001 |
| (Lending Inefficiency)² | 0.6405 | 0.9013 | | |
| (Lending Inefficiency) × $[\ln$ (Book Value Assets (1,000s))] | -0.0195 | 0.8735 | | |
| (Lending Inefficiency) × (Best-Practice Nonperformance) | 15.9534 | 0.5756 | | |
| | Adj. R Sq = 0.352 | F=13.0 | Adj. R Sq = 0.362 | F=24.0 |

Table 15: Panel A**Significance Tests of Derivatives of Tobin's q Ratio with Respect to Each of the Two Components of the Nonperforming Loans Ratio**

In specific specification of **Table 14**, the derivatives of Tobin's q ratio with respect to the stochastic frontier nonperforming loans ratio and the lending inefficiency are given by

$$\partial(\text{Tobin's } q \text{ ratio})/\partial(\text{stochastic frontier nonperforming loans ratio}) = -6.94641 + (0.46254) \times [\ln(\text{Book Value Assets (1,000s)})].$$

$$\partial(\text{Tobin's } q \text{ ratio})/\partial(\text{lending inefficiency}) = -0.61452.$$

| Derivative of Tobin's q ratio with respect to ... | > 0 | > 0 and statistically significant | < 0 | < 0 and statistically significant |
|---|-----|-----------------------------------|-----|-----------------------------------|
| stochastic frontier nonperforming loans ratio | 104 | 37 | 140 | 0 |
| lending inefficiency | 0 | 0 | 244 | 244 |

Table 15: Panel B**Estimates of Derivatives of Tobin's q Ratio with Respect to Inherent Credit Risk, Individually for the Largest 50 Banks**

The derivative of Tobin's q ratio with respect to the stochastic frontier nonperforming loans ratio is derived from the specific specification of **Table 14**:

$$\partial(\text{Tobin's } q \text{ ratio})/\partial(\text{stochastic frontier nonperforming loans ratio}) = -6.94641 + (0.46254) \times [\ln(\text{Book Value Assets (1,000s)})].$$

Estimates of derivatives in **bold** are significantly different from zero at stricter than 10%.

| | Name | Book-Value Assets (1000s) | $\partial(\text{Tobin's } q \text{ Ratio})/\partial(\text{stochastic frontier nonperforming loans ratio})$ | p-value |
|----|-------------------------------|---------------------------|--|---------|
| 1 | Jpmorgan Chase & Co. | 2,415,689,000 | 3.047 | 0.0011 |
| 2 | Bank Of America Corporation | 2,104,995,000 | 2.983 | 0.0011 |
| 3 | Citigroup Inc. | 1,880,382,000 | 2.931 | 0.0012 |
| 4 | Wells Fargo & Company | 1,527,015,000 | 2.835 | 0.0012 |
| 5 | U.S. Bancorp | 364,021,000 | 2.172 | 0.0022 |
| 6 | Pnc Financial Services Group | 320,596,232 | 2.113 | 0.0023 |
| 7 | Capital One Financial Corp | 297,282,098 | 2.078 | 0.0024 |
| 8 | Bb&T Corporation | 183,009,992 | 1.854 | 0.0035 |
| 9 | Suntrust Banks, Inc. | 175,380,779 | 1.834 | 0.0037 |
| 10 | Fifth Third Bancorp | 129,685,180 | 1.694 | 0.0049 |
| 11 | Regions Financial Corp | 117,661,732 | 1.649 | 0.0055 |
| 12 | Northern Trust Corporation | 102,947,333 | 1.587 | 0.0063 |
| 13 | Keycorp | 92,991,716 | 1.540 | 0.0071 |
| 14 | M&T Bank Corporation | 85,162,391 | 1.500 | 0.0080 |
| 15 | Comerica Incorporated | 65,356,580 | 1.377 | 0.0114 |
| 16 | Huntington Bancshares Inc | 59,476,344 | 1.334 | 0.0130 |
| 17 | Zions Bancorporation | 56,031,127 | 1.306 | 0.0142 |
| 18 | Cit Group Inc. | 47,138,960 | 1.226 | 0.0185 |
| 19 | N Y Community Bancorp | 46,688,287 | 1.222 | 0.0188 |
| 20 | First Niagara Financial Group | 37,643,867 | 1.122 | 0.0267 |
| 21 | Popular, Inc. | 35,749,000 | 1.098 | 0.0291 |
| 22 | City National Corporation | 29,717,951 | 1.013 | 0.0401 |
| 23 | Bok Financial Corporation | 27,021,529 | 0.969 | 0.0475 |
| 24 | Svb Financial Group | 26,417,306 | 0.958 | 0.0494 |
| 25 | Synovus Financial Corp. | 26,201,604 | 0.954 | 0.0502 |

| Table 15: Panel B (Continued) | | | | |
|---|--------------------------------|------------------------------|--|------------|
| Estimates of Derivatives of Tobin's q Ratio with Respect to Inherent Credit Risk, Individually for the Largest 50 Banks | | | | |
| | Name | Book-Value Assets (1000s) | $\partial(\text{Tobin's } q \text{ Ratio}) / \partial(\text{stochastic frontier nonperforming loans ratio})$ | p -value |
| 26 | East West Bancorp, Inc. | 24,730,609 | 0.928 | 0.0557 |
| 27 | Cullen/Frost Bankers, Inc. | 24,388,272 | 0.921 | 0.0571 |
| 28 | Associated Banc-Corp | 24,226,920 | 0.918 | 0.0578 |
| 29 | Firstmerit Corporation | 23,912,451 | 0.912 | 0.0591 |
| 30 | First Horizon National Corp | 23,791,187 | 0.910 | 0.0597 |
| 31 | Commerce Bancshares, Inc. | 23,081,892 | 0.896 | 0.0630 |
| 32 | First Citizens Bancshares, Inc | 21,199,091 | 0.856 | 0.0735 |
| 33 | Webster Financial Corp | 20,856,659 | 0.849 | 0.0757 |
| 34 | Hancock Holding Company | 19,025,806 | 0.806 | 0.0894 |
| 35 | Susquehanna Bancshares | 18,473,488 | 0.793 | 0.0943 |
| 36 | Tcf Financial Corporation | 18,402,494 | 0.791 | 0.0949 |
| 37 | Wintrust Financial Corp | 18,097,783 | 0.783 | 0.0978 |
| 38 | Umb Financial Corporation | 16,911,852 | 0.752 | 0.1105 |
| 39 | Fulton Financial Corporation | 16,908,633 | 0.752 | 0.1106 |
| 40 | Valley National Bancorp | 16,156,541 | 0.731 | 0.1199 |
| 41 | Bank Of Hawaii Corporation | 14,127,598 | 0.669 | 0.1521 |
| 42 | Privatebancorp, Inc. | 14,085,746 | 0.667 | 0.1528 |
| 43 | F.N.B. Corporation | 13,563,405 | 0.650 | 0.1632 |
| 44 | Iberiabank Corporation | 13,365,550 | 0.643 | 0.1675 |
| 45 | Bancorpsouth, Inc. | 13,045,442 | 0.632 | 0.1746 |
| 46 | International Bancshares | 12,079,477 | 0.596 | 0.1991 |
| 47 | Trustmark Corporation | 11,790,383 | 0.585 | 0.2073 |
| 48 | Texas Capital Bancshares, Inc | 11,714,698 | 0.582 | 0.2096 |
| 49 | Umpqua Holdings Corp | 11,641,151 | 0.579 | 0.2118 |
| 50 | Cathay General Bancorp | 10,989,286 | 0.553 | 0.2330 |