

Point and Click, or Mortar and Brick?

A Look at Internet Banking in the Eighth District

By Rubén Hernández-Murillo and Deborah Roisman



Internet banking has been on the rise since its inception in 1995. Services today include delivery of account statements, online credit card and loan applications, transfer of funds between accounts and online bill payment. These services have the potential to alter many aspects of the banking industry—in particular, the degree of market competitiveness and financial performance—as banks use the Internet as a tool to attract and retain customers.

But there is very little information so far on Internet banking to analyze these issues. In 1999, banks and other depository institutions in the United States were first asked to report their web site address, and not until 2003 were they also asked to report whether their web site provided online services. The adoption of Internet technologies, as indicated by the reports of a web site address, has shown a steady increase in this period. Economist Rick Sullivan of the Federal Reserve Bank of Kansas City indicates that 35 percent of depository institutions reported a web site address in 1999, compared with 70 percent in 2003.¹

This article looks at a sample of commercial banks in the Eighth Federal Reserve District and asks the following questions:

- Is there a relationship between the adoption of Internet technologies and a bank's size, location and demographic characteristics of its customer base?
- Is there a relationship between the adoption of Internet technologies and a bank's competitive position, as measured by its deposit market share?
- Finally, is there a relationship between the adoption of Internet banking and measures of credit risk and profitability?

A Look at Eighth District Banks

The data used for this analysis are from the Consolidated Reports of Condition and Income (Call Reports) for the first quarter of 2004. The data consist of a sample of 808 commercial banks located in the Eighth District. Internet banks are defined here as banks that offer banking services through a transactional web site—a site that allows online transactions, such as fund transfers between accounts.

Overall, 48.5 percent of Eighth District banks have a transactional web site. This rate is slightly lower than the 54 percent rate for the entire U.S. banking industry.

We categorize banks into four size groups based on their total assets because previous studies on Internet banking have shown that bank performance varies significantly across bank sizes.² Group 1 includes banks with assets of \$100 million or less. Group 2 includes banks with assets between \$100 million and \$350 million. Group 3 includes banks with assets between \$350 million and \$500 million. Group 4 includes banks with assets greater than \$500 million. Nearly 90 percent of District banks in the sample have assets of \$350 million or less—48.6 percent of all banks are in Group 1 and 40.6 percent are in Group 2.

Demographics and Competition

A bank's decision to adopt Internet technologies depends, at least in part, on the characteristics of the market it serves. Past research has shown that demographic characteristics of a bank's potential customers, such as income and education, as well as whether the bank is located in a metropolitan area, are important factors that a bank should consider when deciding whether to offer Internet banking.³ Competitive factors, such as the bank's deposit market share, presumably influence the adoption decision as well. We will show through a tabular analysis whether this is the case for Eighth District banks.

The adoption rates of Internet banking indicate that larger banks as a group have been more likely to adopt Internet technologies, as seen in Table 1. In the three largest groups, 68 percent of the District banks in Group 2, 95 percent in Group 3 and 93.6 percent in Group 4 have adopted Internet banking. In contrast, only 22.1 percent of banks in Group 1 have adopted Internet banking.

Census data reveal that markets of Internet banks have slightly higher median income, on average, than markets of non-Internet banks. A market is defined here by the corresponding county or metropolitan area in which a bank is located. On average, median household income (in constant 1999 dollars) in Internet bank markets is larger than in non-Internet bank markets. Markets of Internet banks also appear to have a larger share of persons with higher education (a bachelor's degree or higher) compared with markets of

non-Internet banks. Markets of banks in Group 3 are an exception in both cases.

The percent of Internet banks in an urban area increases with bank size. The share of Internet banks located in urban areas is 34.1 percent for Group 2, 42.1 percent for Group 3 and 61.4 percent for Group 4, compared with only 18.4 percent for Group 1. In addition, within each group Internet banks are more likely to be in urban areas, except for Group 3 banks.

What is the relationship between the adoption of Internet banking and market conditions such as average market share and the degree of market competitiveness? We compute a bank's market share as the ratio of deposits held by the bank to the market's total deposits. We compute the market's concentration index as the sum of the squares of the market shares multiplied by 10,000. A higher concentration index indicates the market is less competitive.⁴ We find that the average market share increases with bank size, but there appears to be no consistent pattern of differences in average market shares between Internet and non-Internet banks across size groups. Compared with non-Internet banks, however, markets in which Internet banks operate appear to be more competitive, as suggested by the lower concentration indexes for markets of Internet banks across size groups, except for markets of banks in Group 3.

Risk and Profitability

Are measures of profitability and financial performance for Internet banks and non-Internet banks different?

Standard measures of profitability, such as the return on average assets (net income divided by the quarterly average of total assets) and the return on equity (net income divided by equity), indicate that profitability in all four size groups appears to be lower for Internet banks compared with non-Internet banks in the Eighth District, as seen in Table 2.⁵ Although not shown in the table, this pattern is more common in rural markets for banks in Groups 1 and 2. Profitability of Internet banks in urban markets of banks in these two size groups seems to be higher than for non-Internet banks.

Standard measures of credit risk include the loan-to-asset ratio (total loans divided by total assets) and the nonperforming loan ratio (loans that are 90 days past due plus nonaccrual loans divided by total loans). The loan-to-asset ratio is higher for Internet banks in Groups 1 and 2, but it is smaller for banks in Groups 3 and 4. In contrast, the nonperforming loan ratio is higher for non-Internet banks in Groups 1, 2 and 3, and it is smaller for non-Internet banks in Group 4.

Thus, although Internet banks with assets less than \$350 million exhibit higher loan-to-asset ratios, indicating that they may be more exposed to bad loans, the actual fraction of nonperforming loans is lower for all Internet banks except those with assets greater than \$500 million.

Rubén Hernández-Murillo is an economist and Deborah Roisman is a research associate, both at the Federal Reserve Bank of St. Louis.

ENDNOTES

- ¹ See Sullivan (2004).
- ² See Sullivan (2000, 2001) and Furst, Lang and Nolle (2002), among others.
- ³ See Sullivan (2000).
- ⁴ This concentration measure is known as the Herfindahl Index. A higher index indicates that the market is less competitive because it is concentrated among fewer firms. A market with only one firm will exhibit a Herfindahl Index of 10,000, the maximum possible. In general, a market with N firms and equal market shares will exhibit a Herfindahl Index of 10,000/N.
- ⁵ The profitability ratios are annualized by multiplying by 4.

REFERENCES

Furst, Karen; Lang, William W.; and Nolle, Daniel E. "Internet Banking: Developments and Prospects." Center for Information Policy Research, Harvard University, Program on Information Resources Policy, April 2002.

Sullivan, Richard. "Payment Services and the Evolution of Internet Banking." Federal Reserve Bank of Kansas City Payments System Research Briefing, August 2004.

Sullivan, Richard. "How Has the Adoption of Internet Banking Affected Performance and Risk in Banks? A Look at Internet Banking in the Tenth Federal Reserve District." Federal Reserve Bank of Kansas City *Financial Industry Perspectives* 2000, pp. 1-16.

Sullivan, Richard. "Performance and Operation of Commercial Bank Web Sites." Federal Reserve Bank of Kansas City *Financial Industry Perspectives* 2001, pp. 23-33.

		TABLE 1 Market Demographic Characteristics and Competition								TABLE 2 Credit Risk and Profitability					
Size group by banks' assets		Internet bank?	Number of banks	Internet adoption (percent)	Banks in urban markets (percent)	Average market median income (1999 dollars)	Average market percentage of people with higher education	Average deposits market share (percent)	Average market concentration index	Internet bank?	Number of banks	Loan-to-asset ratio (percent)	Nonperforming loan ratio (percent)	Return on average assets (percent annualized)	Return on equity (percent annualized)
Group 1	Less than \$100 million	No	306		13.4	31,016	12.2	25.9	5,606	No	306	57.53	1.18	1.08	9.57
		Yes	87	22.1	18.4	31,847	12.4	28.6	5,031	Yes	87	64.31	1.17	0.96	9.09
Group 2	\$100-\$350 million	No	105		21.9	30,534	12.3	44.0	5,601	No	105	60.30	1.22	1.27	10.97
		Yes	223	68.0	34.1	31,462	13.5	36.1	5,597	Yes	223	64.45	0.91	1.08	10.81
Group 3	\$350-\$500 million	No	2		50.0	36,677	18.1	37.7	3,513	No	2	75.52	1.69	1.73	17.73
		Yes	38	95.0	42.1	34,202	16.9	46.2	5,605	Yes	38	68.20	0.63	1.05	11.23
Group 4	\$500 million or more	No	3		33.3	33,626	16.2	60.3	7,333	No	3	71.63	0.71	1.54	17.62
		Yes	44	93.6	61.4	33,936	19.4	43.3	5,338	Yes	44	67.84	1.07	1.17	11.82

NOTE: Data are from the Call Reports for the first quarter of 2004.