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A Survey of Current and Potential Uses of Market Data by the FDIC *(page 1)*

by Steven Burton and Gary Seale

Is market information useful to regulators? This paper discusses how supervisors of banks and thrifts currently use market information. It then explores possible applications of market information for FDIC activities, such as deposit insurance pricing and management of the insurance funds.

Limited-Purpose Banks: Their Specialties, Performance, and Prospects *(page 19)*

by Chiwon Yom

Although credit card bank, subprime lenders, and internet primary banks make up only a small part of the financial services industry, their unique characteristics and distinctive business models have attracted considerable attention. This paper examines the special characteristics, performance, and future prospects of these limited-purpose banks.

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A Survey of Current and Potential Uses of Market Data by the FDIC

*Steven Burton and Gary A. Seale**

> *Our examiners are extremely good at what they do, but any good examiner recognizes that data should come from a variety of different sources, including the signals that come from the market. Therefore, market discipline can be an important adjunct to the supervisory process.*—Roger W. Ferguson, Jr., Vice Chairman, Board of Governors of the Federal Reserve System
>
> *I propose that a formal integration of selected market data into the regulatory agencies' analytical systems could substantially improve the quality of the oversight they can provide.*—Mark J. Flannery, Barnett Banks Professor of Finance, University of Florida

Market data play an increasingly important role in the ongoing monitoring of insured institutions' risks. In the eyes of the supervisory community, the essence of this role is captured by the two statements quoted above. First, supervisory processes benefit from consideration of a broad range of different sources of information, including objective signals offered by market participants. Second, the integration of market data into off-site monitoring tools and models can improve supervisors' responsiveness to emerging risks. The FDIC is also considering the possible benefits of integrating market data into insurance pricing and failure loss-prediction models.

This article illustrates various ways in which the supervisors of depository institutions currently use market information; the article also highlights some potential applications of market data that the FDIC is considering in its insurance functions. The first section reviews the literature on the application of market data to supervisory risk assessments. The second section briefly reviews the supervisory process, setting the context for the current use of market information within that process. The third section illustrates how market information is currently applied in assessments of both industry risk trends and institution-specific risk conditions. The fourth section discusses research and other activities being conducted at the FDIC with a view to using market information more broadly. The final section summarizes and discusses a few of the challenges for wider incorporation of market information into the supervisory process.

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Market Data and the Literature on Links between Market Signals and Supervisory Risk Assessments

The term "market discipline" assumes that the information provided by markets can signal that excessive risk levels are present in banks. From a public–policy standpoint, supervisors' use of such signals is highly desirable. Market discipline has the potential to reduce the extent and frequency of burdensome regulatory oversight; and—because market signals call immediate attention to potential excessive risk taking—it allows regulators to take more timely corrective action. The inclusion of market discipline as Pillar III of the new Basel Capital Accord (Basel II) proposal underscores the important role regulators foresee market forces playing in encouraging banks to have adequate levels of capital.

The market information presently available for publicly traded insured depositories is of three kinds:[1] equity information (prices and trading volumes), debt information (debt ratings and subordinated debt prices), and analysts' reports (see table 1).

Data on daily and even intraday equity prices and trading volumes are widely available for U.S. public companies. As table 2 shows, just over one-half of the 1,002 publicly held U.S. banking and thrift holding companies trade on the National Association of Securities Dealers Automated Quote System (NASDAQ). However, the largest banking organizations trade on the New York Stock Exchange (NYSE). Equity pricing information is also readily available for a number of large foreign banking organizations that own insured banking subsidiaries operating in the United States.

Debt information is less widely available than equity information. As of year-end 2003, debt ratings from one of the three major rating agencies[2] were available for 133 bank and thrift holding companies with roughly $6.4 trillion in insured assets. Subordinated debt prices, which have received a great deal of attention in recent academic research, are available for roughly 50 of the largest bank and thrift organizations with over $5 trillion in insured depository assets. Only about 30 of these companies have issues that are actively traded.

The third kind of market information that is available is provided by the analyst community,

[1] Publicly traded insured depositories make up a relatively small percentage of all insured entities, yet as of September 30, 2004, they held over 85 percent of all the assets held by insured institutions.
[2] Moody's, Standard & Poor's, and Fitch.

Table 1

Insured Subsidiaries of Publicly Traded U.S. and Foreign-based Companies by Primary Regulator

	Number of Insured Institutions[a]	Percentage of All Insured Depositories	Assets ($ B) 9/30/04	Percentage of All Insured Depository Assets
Comptroller of the Currency (OCC)	524	5.7	$4,580	46.3
Federal Reserve (FR)	274	3.0	1,792	18.1
Federal Deposit Insurance Corp. (FDIC)	828	9.1	1,109	11.2
Office of Thrift Supervision (OTS)	227	2.5	999	10.1
Total	1,853	20.3	$8,480	85.7

Source: FDIC.

[a] Includes stand-alone entities and subsidiaries of publicly traded bank and thrift companies. Excluded are insured institutions owned by industrial (nonfinancial) corporations (for example, Monogram Credit Card Bank, which is owned by General Electric).

which widely monitors the performance of the largest 50 or so U.S. banking companies. Equity and bond analysts make investment recommendations and often prepare comprehensive analytical reports on the companies they follow. These recommendations and reports can be useful as confirmation of supervisory assessments of an institution's risk profile. Table 3 shows the breadth of analysts' coverage for equities of the 10 largest U.S. banking and thrift organizations.

Some people within the supervisory community have expressed doubts about the usefulness of these three kinds of market information. Much of the reluctance about using market information more regularly seems to center on doubts about whether these sources of market information can provide consistent, timely, and reliable indications of risk. In particular, the question is whether financial markets provide regulators with any information they do not already possess. Another way of asking this question is, "Can market participants detect deteriorating conditions in an institution before the institution's supervisory rating deteriorates?"

A number of studies have examined the extent to which equity holders and creditors are able to anticipate changes in the supervisory profile of regulated financial institutions. These studies generally incorporate one or more market-based measures into statistical models, which then attempt to forecast supervisory ratings. For example, Gunther, Levonian, and Moore (2001) examined the ability of equity data to predict changes in the BOPEC ratings of bank holding companies.[3] Using Moody's KMV Corporation's estimated default frequencies (EDFs), Gunther et al. concluded that equity prices provide incremental information to bank supervisors in periods between inspections. Hall et al. (2001), using separate equity measures, found similar results. Elmer and Fissel (2001) as well as Curry , Elmer, and Fissel (2001) related equity market variables directly to models of both CAMELS downgrades and bank failures.[4] Their findings strengthen the argument that equity market variables add explanatory value to supervisory models.

Similar studies have been performed using data from holders of bank debt. Gilbert , Meyer, and

[3] *BOPEC* is the acronym for the bank holding-company rating, assigned by the Federal Reserve Board, and stands for *B*anking subsidiaries, *O*ther (nonbanking) subsidiaries, *P*arent company, consolidated *E*arnings, and *C*onsolidated capital. A rating from 1 to 5 is assigned for each component, with 1 being the best and 5 being the worst. A composite rating from 1 to 5 is also assigned, reflecting the overall condition of the organization.

[4] The *CAMELS* rating is assigned by a bank's primary regulator. The acronym stands for *C*apital, *A*ssets, *M*anagement, *E*arnings, *L*iquidity, and *S*ensitivity to market risk. A rating from 1 (the best) to 5 (the worst) is assigned for each of these component elements, and an overall composite rating based on the component ratings is then assigned to the bank.

Table 2

Publicly Traded U.S. Banking and Thrift Companies: Exchanges, Number of Organizations, and Insured Subsidiary Assets

Exchange	Number of Companies	Assets of Insured Subsidiaries ($ B) 9/30/04
New York Stock Exchange (NYSE)	107	$6,431
NASDAQ	507	1,095
Other Over the Counter (OTC)	307	143
American Stock Exchange (AMEX)	39	33
Total	1,002	$7,752

Source: SNL Datasource

Table 3

Analyst Coverage of Major U.S. Banking and Thrift Companies

Company	Number of Analysts[a]
J.P Morgan Chase	15
Bank of America	21
Citigroup	20
Wells Fargo	23
Wachovia	21
Washington Mutual	15
U.S. Bancorp	20
National City	15
SunTrust	16
BB&T	15

Source: Yahoo Finance.

[a] Number of major brokerage firms providing buy, sell, hold recommendations on companies' equity.

Vaughn (2001) found that risk premia on jumbo CDs do not predict CAMELS downgrades as well as early-warning models do. On the other hand, Evanoff and Wall (2001) examined the degree to which subordinated debt spreads provide supervisors with additional information. They found that subordinated debt spreads do at least as well as capital ratios in explaining changes in supervisory ratings.

With support mounting for supervisors to use market discipline, Feldman and Levonian (2001) examined supervisory uses of market information and the reasons such data are not used more often. They point to several factors inhibiting the use of market data, including difficulty measuring market signals and the lack of specific direction from senior supervisory staff for using market data. They urge that multiple sources of market data be incorporated into three areas of the supervisory process: as an additional measure to augment supervisory risk assessments, as an element of statistical models used to forecast the future condition of banks, and as a measure to help assess banks' loan quality and capital adequacy. Further, they advocated a combination of changes to supervisory policies and additional applied research as the next step toward putting market data to practical use.

More recently, studies by Krainer and Lopez (2003) and Curry, Elmer, and Fissel (2003) further strengthen the case that market variables improve predictions of changes in supervisory ratings. Krainer and Lopez examined whether both equity and debt variables are significant in explaining BOPEC rating assignments, even after a large number of supervisory variables have been included in statistical models. They concluded that supervisors could benefit from incorporating market variables into their off-site monitoring models. Curry, Fissel, and Hanweck (2003) investigated the direction of causality, from changes in equity variables to changes in BOPEC ratings and the reverse. They find that, while market variables add value in predicting BOPEC rating changes, the reverse is only moderately successful, indicating that market variables may be more predictive of BOPEC rating changes than vice versa. They conclude that the market is able to obtain independent information about bank holding company risk exposure beyond the information available from public reporting resources and that therefore the market ought to be able to provide some degree of independent oversight. However, it should be noted that although both of these studies include in-sample and out-of-sample tests, results tend to be much weaker for out-of-sample prediction.

The Context for Supervisory Use of Market Information

Ideally, financial markets would provide continuous monitoring of bank performance in the periods between on-site examinations. Although on-site examinations allow the most extensive review of a bank's financial position, the information obtained during the examination becomes outdated over time, especially for rapidly growing institutions. However, market investors evaluate bank performance continually, even if they do not have access to as much detailed information as on-site examiners. Consequently, market signals could be effective in alerting supervisory agencies to a change in a bank's risk profile, and the change might in turn prompt a supervisory response from the primary regulator.[5] A supervisory response necessarily involves the reallocation of supervisory resources since it entails a shift in the current supervisory strategy.

Market information and market signals rarely in and of themselves influence the priorities and strategies of supervisors of U.S. financial institutions. Rather, when supervisors are evaluating risk trends, they consider market data in the context of a number of different sources of information. In other words, market indicators are just one of many considerations that affect strategic decisions in response to perceived risk and emerg-

[5] The term "market signal" is used to indicate when a change in investor sentiment about a company's prospects and risk profile is significant enough to produce a substantive change in a given market indicator.

ing risk trends. Figure 1 is a stylized representation of the role that market indicators might play in influencing supervisory responses to risk.

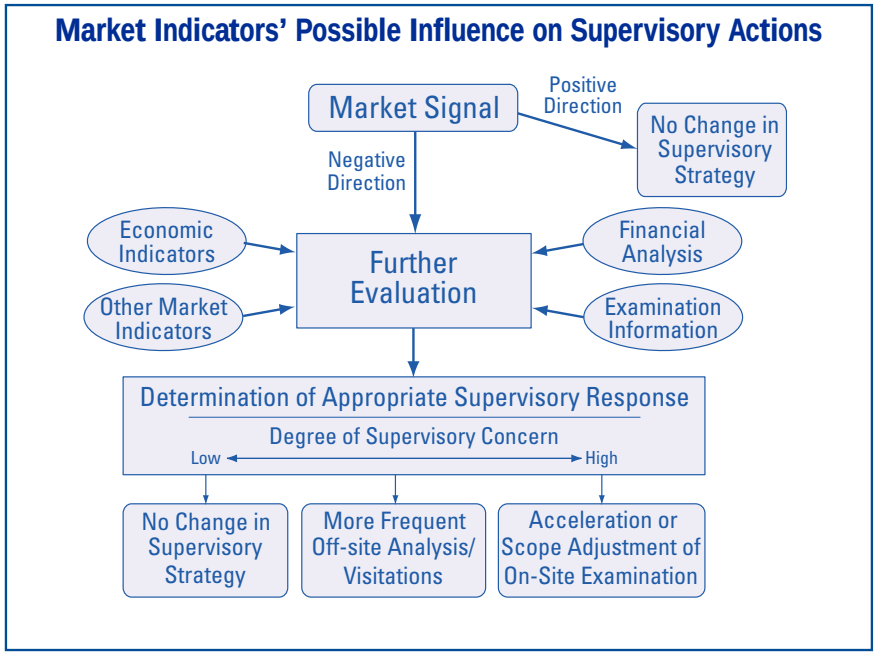
Aside from influencing supervisory responses (and therefore, possibly, the reallocation of supervisory resources), market data are also routinely considered in supervisory risk determinations. All examination activities and all the information and trends analyzed through these activities are used to support supervisory risk determinations, but these determinations do not directly involve a reallocation of resources. Rather, they involve the assignment of institutions to certain risk categories for monitoring purposes. Supervisory risk determinations are commonly summarized by the assignment of numeric or alphanumeric risk grades to individual institutions.[6] These determinations are critical for purposes of strategic and resource planning. For the FDIC, supervisory risk determinations are also one of the main factors influencing the level of deposit insurance premiums that insured institutions pay.[7] This subject is discussed below in the section "Potential Uses of Market Data."

It is hard to generalize about the importance of market indicators in relation to other sources of information when supervisory risk determinations are prepared. The difficulty stems partly from the fact that risk surveillance systems are fundamentally judgment-based processes. In evaluating market signals, for example, FDIC examiners and analysts do not apply a formulaic approach. Rather, they use their best judgment in determining what market data to consider and how to interpret and respond to the information. It is probably fair to say that the examiners and analysts responsible for preparing supervisory risk determinations do not view market information as a substitute for other sources of information. Rather, they tend to view market data as a supplemental source of information that helps confirm the risk perceptions they formed by looking first

[6] The CAMELS rating is one example of a supervisory risk determination.

[7] The current risk-related premium system is based on a nine-cell pricing matrix. Institutions are assigned to cells in this matrix depending on their capital levels (the capital subgroup) and their CAMELS ratings (the supervisory subgroup). Deposit insurance reform legislation currently pending before Congress would expand the ability of the FDIC to consider other factors, including market indicators, when setting insurance fund premiums.

Figure 1



at supervisory information and financial performance measures.

Before reviewing the current uses of market data, we briefly summarize the three broad types of U.S. supervisory programs—those for large, midsize, and small institutions—and the role of market data in each. The distinguishing characteristics are the depth and scope of on-site reviews, the degree of interaction between examiners and management, and the extent to which the emphasis is on risk-management information systems and controls as opposed to transaction testing and asset valuation. Table 4 gives the approximate number of institutions and insured depository assets covered by each of these three kinds of program. The table also distinguishes between institutions that are affiliated with a publicly traded entity and those that are not.

Large-Institution Supervisory Programs. Large-institution supervision programs are by far the most intensive of the three types, subjecting institutions to more frequent and more in-depth on-site reviews and providing supervisors with a vast amount of nonpublic risk information more or less continuously. The Office of the Comptroller of the Currency (OCC), for example, uses teams of resident examiners to supervise the 23 largest nationally chartered banks. The Federal Reserve System uses designated supervisory teams, supplemented by teams of specialists in areas such as credit risk modeling and capital market activities, to oversee the largest complex banking organizations.[8] The FDIC, like the OCC, uses dedicated staff in its Large-Bank Program, which encompasses the six largest state-chartered nonmember institutions that the FDIC directly supervises.[9]

Although the design and structure of large-institution programs vary by primary regulator, all have the same goal: to provide real-time and continuous evaluations of the risks posed by large institutions. These programs differ from the more traditional point-in-time examination process in that examiners interact with bank personnel continually throughout the year. Large-institution programs also place far greater emphasis on evaluating internal risk-management systems and controls as opposed to performing the transaction testing and asset valuations (e.g., loan reviews) that take place during more traditional examinations.

Continuous access to management and to risk-management information allows supervisors to respond more quickly to emerging problems than would be possible with an annual examination approach. Because of their ongoing interaction with the large institutions, supervisors generally learn the nature of negative announcements, shifts in risk profile, or shifts in strategic direction well in advance of market investors. Table 5 provides a more detailed breakdown of large-institution programs administered by the three federal banking agencies in terms of covered insured sub-

[8] These institutions are covered by the Federal Reserve System's Large Complex Banking Organization (LCBO) program.

[9] Commensurate with its role as insurer and back-up supervisor to nationally chartered banks and thrift institutions and state-chartered institutions that are members of the Federal Reserve System, the FDIC has established two additional surveillance programs for large banks and thrifts. In each of the two, staff coordinate their work with their primary-supervisor counterparts to monitor and independently assess risks in large organizations. One of the two programs is the Dedicated Examiner program, which assigns dedicated examiners to monitor the activities of the six largest bank and thrift organizations. The other is the Large Insured Depository Institution (LIDI) program, which covers all remaining insured organizations with $10 billion or more in assets.

Table 4

Distribution of Insured Institutions by Supervisory Program

	Large	Midsize[a]	Small
Public Data Are Available	172 institutions $5,656 billion in assets	288 institutions $2,077 billion in assets	1,393 institutions $747 billion in assets
Public Data Are Not Available	0 institutions	83 institutions $198 billion in assets	7,190 institutions $1,215 billion in assets

[a] Approximation uses asset size > $5 billion as the criterion, excluding institutions explicitly included in one of the agencies' large-bank programs.

sidiaries and insured subsidiary assets. As this table reveals, although large-institution programs cover a very small percentage of the number of FDIC-insured financial institutions (less than 2 percent), they cover the majority of insured-institution assets.

Large-bank examiners are instructed to review all available information relevant to the risk classification of the bank, including market information. Although market signals for these large institutions are unlikely to convey any new information to the supervisor, they are nevertheless useful in corroborating and validating perceptions and judgments about risk, particularly when disclosures and trends are hard to quantify independently. In the context of large-bank programs, market data are also useful as an alternative measure of relative risk. In other words, market data provide a measure of the market's perception of this company's risk relative to the risk of its peers.

Midsize-Institution Supervisory Programs. Thresholds and considerations for placing institutions in a midsize supervisory program vary from agency to agency. However, these programs typically include institutions with more than $5 billion in assets. Although less formalized and less intensive than large-bank programs, midsize-institution programs are designed to provide for reviews of greater depth and frequency than is the case with a point-in-time examination approach. Examination programs of midsize institutions are often tailored to the institutions' specific risk profiles. For example, institutions engaged in complex banking activities might be subjected to periodic targeted reviews throughout the year and be assigned dedicated staff with strong technical expertise related to the institution's particular activities. For institutions engaged in less complex activities, the supervisory approach might resemble the more traditional periodic-examination approach but generally with a much greater degree of oversight than is applied to smaller institutions. As a result, market investors typically do not learn of negative news about a midsize institution before supervisors do.

In midsize supervisory programs, market information is used in much the same way as in large-institution programs—that is, less as a signaling device or tool and more as corroboration of risk issues and trends and as an alternative measure of relative risk.

Small-Institution or Community-Bank Supervisory Programs. As shown in table 4, the vast majority of publicly held insured institutions fall within a small-institution supervisory program. These programs usually consist of periodic examinations whose scopes vary considerably, depending on the overall risk profile of the institution being examined. It is in this area that market signals, used in conjunction with off-site surveil-

Table 5

Banking Agencies' Large Institution Supervisory Programs

	Insured Institutions Covered[a]	Percentage of All Insured Depositories	Assets ($ B) 9/30/04	Percentage of Insured Institution Assets Covered
Comptroller of the Currency (OCC)	103	1.1	$4,767	48.2
Federal Reserve (FR)	144	1.6	4,984	50.4
Federal Deposit Insurance Corp. (FDIC)	11	0.1	247	2.5
Total	172	1.8	$5,656	57.2

[a] The OCC and FDIC large-bank supervision programs overlap in many instances with the FR's LCBO supervision programs. However, the number and assets of covered organizations are counted only once in the total.

lance systems, have the potential to provide the most significant benefit to supervisors, given the time lag between examinations.[10]

Examples of Regulatory Applications of Market Data

Although the FDIC does not apply a formulaic approach to evaluating market signals, it does incorporate market data into its analytical products, early-warning systems, and decision-making processes requiring an assessment of prospective risks. The examples presented here relate to off-site monitoring, both of individual banks and of industry trends; monitoring for potential liquidity pressures in banks; corroborating the importance of risk events; developing risk rankings; monitoring credit risk trends in banks' corporate loan portfolios; formulating supervisory outlooks and strategies; and influencing decisions about the appropriate level of contingent loss reserves for potential failures.

Contributing to the Off-site Monitoring of Individual Banks

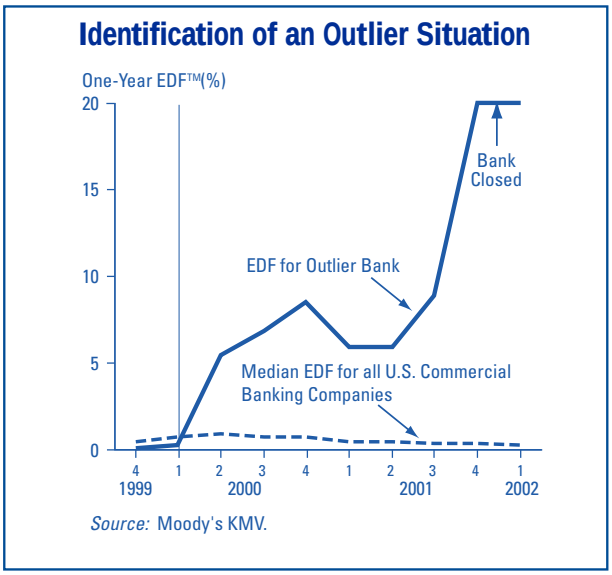
The FDIC, along with other U.S. banking supervisors, has developed various off-site monitoring programs to supplement on-site examination programs. A primary objective of off-site surveillance systems is to alert supervisors to potential emerging risk issues. Market indicators play a significant role in such systems. As an example, the FDIC's LIDI program (see note 9) instructs staff to consider all available data on the companies being reviewed, including more forward-looking information such as market indicators. Off-site reviews can influence supervisory strategies in variety of ways: for example, the scheduling of an on-site examination may be altered or accelerated, the resources allocated to an examination may be adjusted, or the planned scope of an on-site examination may be changed.

Another objective of off-site surveillance programs is to identify institutions whose risk profiles deviate from expectations. When such outliers are identified, examiners or analysts are typically required to perform follow-up analyses to determine the reason for the outlier condition and to recommend changes in supervisory strategies when appropriate. Figure 2 shows how Moody's KMV information might have been used to identify an outlier situation.[11] Here, market-based default expectations for an insured institution began to deviate from those for peer institutions beginning in June 2000. In this particular example, the market provided an unambiguous and quantifiable signal of financial weaknesses that led to the institution's failure some 21 months later. In mid-2000, an analyst would have responded to this information by reviewing financial data and supervisory information to try to determine the reasons for the negative market signal. Depending on the results of this review, the analyst would have either recommended a shift in supervisory strategy, such as an accelerated examination, or concluded that the strategy in place was sufficient.

[10] Institutions over $250 million are examined at least once a year. For institutions under $250 million, the intervals can be extended to 18 months.

[11] The Moody's KMV model uses stock prices and financial information to derive an expected default probability or expected default frequency (EDF™) for public firms. The model is based on a Merton contingent claims approach, where the probability of default is contingent on (1) a firm's asset market value, (2) the volatility of a firm's asset market values, and (3) the firm's capital structure or financial leverage.

Figure 2



Source: Moody's KMV.

Monitoring General Banking Conditions and Trends

Investor sentiment can be a good barometer of general risks and conditions in the banking sector. The FDIC and other supervisors evaluate this sentiment by monitoring banking stock indexes, debt spreads for bank debt, bond rating trends, debt and equity analyst research opinions, and various other market-based measures, such as Moody's Corporation KMV model of expected default. Figure 3, for example, uses Moody's KMV model to show the general trend in market default expectations for U.S. commercial banks since 1996.

Such broad measures are of particular interest to managers because they provide a barometer of the current health of and outlook for the industry. Used in conjunction with other information, such as trends in supervisory ratings and economic indicators, market indicators can convey a sense of the level of concern that should be factored into strategic decisions involving the allocation of supervisory resources and contingency planning.

Figure 4 shows another example of broad industry risk measures based on market information. This figure depicts a concept recently developed at the FDIC and referred to as a *dashboard* indicator. This particular indicator was designed to gauge general risk conditions in the universe of large insured depositories. Essentially an index compiled from a group of critical market-risk indicators, this indicator helps risk managers gauge the current health and outlook of large insured depositories relative to historical patterns. Indicators like this one are also important inputs into the strategic planning process at the FDIC.

Monitoring Potential Liquidity Situations

Sometimes supervisors must respond to changes in market indicators because of the liquidity pressures these changes can impose. For example, an organization that relies extensively on debt funding may face severe liquidity pressures if its debt ratings are downgraded. Many derivatives and securitization contracts also contain early termination or collateral clauses that are triggered by downgrades in the counterparty's or issuer's external debt rating. If a banking organization has a significant volume of such contracts, it may be unable to generate sufficient funding or collateral to meet the provisions of such contracts. As a

Figure 3

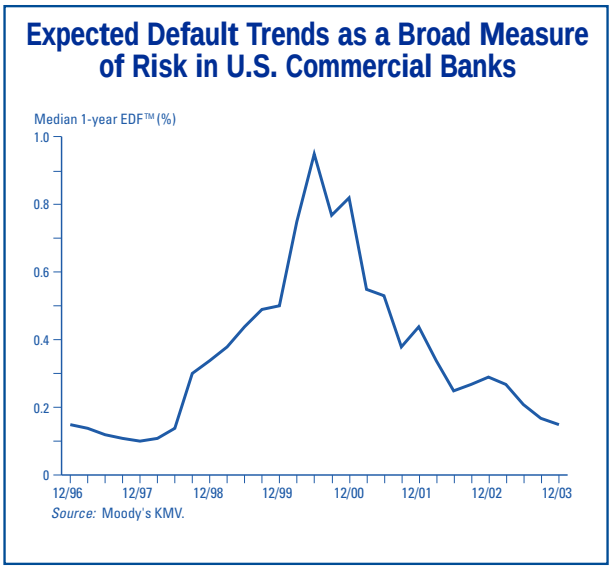
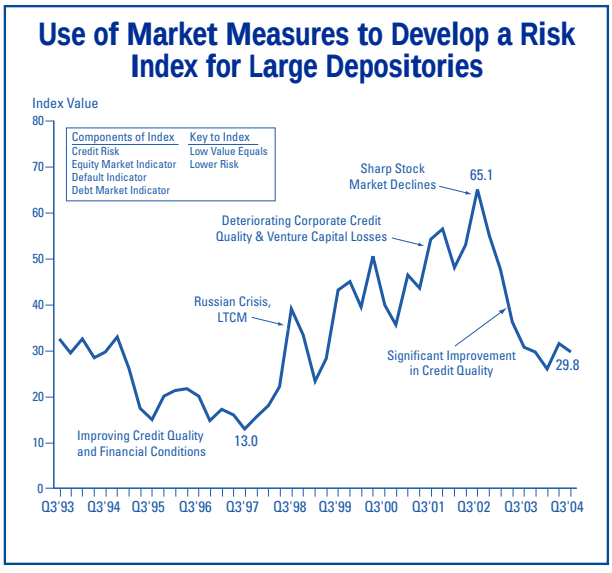


Figure 4



result, supervisors closely watch trends in external debt ratings as well as other indicators that might signal potential contractual performance problems for banking companies that have issued debt.

Corroborating Risks

Regulators often use market indicators to validate or corroborate risks they observe in supervised institutions. Market signals can be valuable in this respect because they not only provide directional signals but also serve as a quantitative benchmark for the significance of certain risk events. The stock price performance of large U.S. money-center banks in 2002 is perhaps an example of how market measures convey information about the magnitude of seemingly unquantifiable risks related to corporate governance and reputation risk. Figure 5 shows the stock market's reaction to a barrage of unfavorable publicity in late 2001 and early 2002 relating to certain investment banking practices and dealings with customers in connection with high-profile corporate failures, including Enron and WorldCom. Although the interpretation of such signals is not always straightforward,[12] the signals do convey a sense of the magnitude of events from the market's perspective. In this case, the market corroborated the seriousness with which the regulatory community viewed corporate governance issues surrounding larger banking organizations.

Developing Risk Rankings

Market data can be used to inform decisions having to do with the relative risks posed by institutions with similar supervisory ratings. Because supervisory-based ratings fall within a narrow range of possibilities (well-rated companies are assigned CAMELS or BOPEC composite ratings of 1 or 2), market indicators can help provide additional granularity to risk rankings. Such rankings can then be used to establish supervisory priorities. Figure 6 shows subordinated debt pricing spreads to Treasuries for three large institutions whose supervisory ratings are identical. The difference in spreads among the three institutions helps corroborate the relative risks posed by these companies, and the corroboration in turn supports decisions about the allocation of resources.

[12] In this illustration, declining credit quality probably contributed to the declining market valuations.

Figure 5

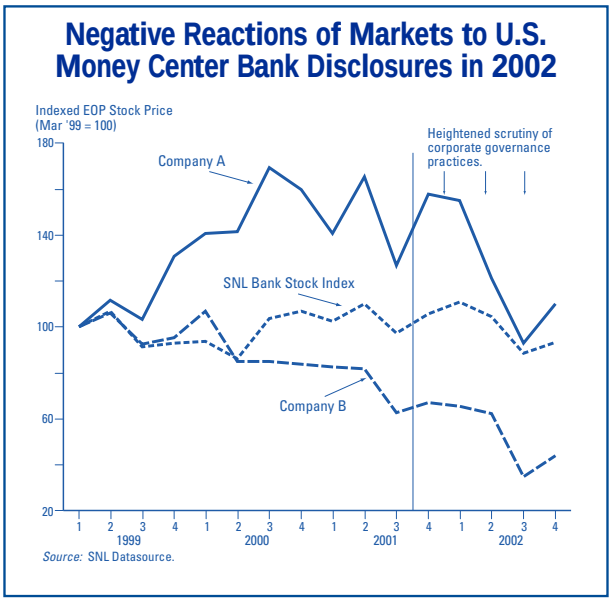
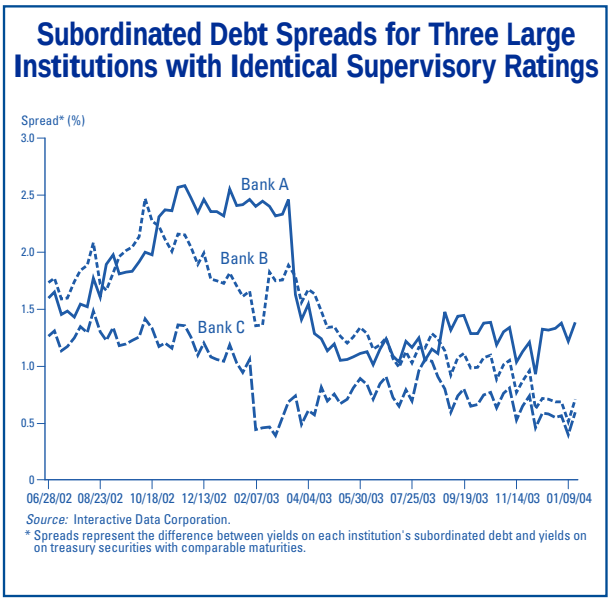


Figure 6



Monitoring Risk in Corporate Credit Portfolios

One of the more significant risks contained on the balance sheets of banks is corporate credit risk. Among larger banks, much of this exposure is related to publicly held companies. Hence, each of the supervisory agencies uses market data as an early-warning indicator of potential corporate loan performance problems. Figure 7 illustrates how Moody's KMV information in 1998, and even more so in 2000, indicated significant deterioration in market-based default measures for U.S. telecommunication firms. By associating such measures with actual loan exposure data, supervisors are able to produce quantitative rankings of industry credit risk exposures, and these rankings in turn support decisions about resource allocations related to on-site loan review work. For instance, in the years 1999–2001 the supervisory agencies used a similar kind of analysis to support resource allocation decisions relating to the Shared National Credit program—an interagency program that annually reviews large syndicated credits held by three or more supervised institutions.[13]

Influencing Changes in Supervisory Outlook

As mentioned above, market information can contribute to changes in supervisory outlook, and these changes, in turn, can cause shifts in priorities and supervisory strategies. Moreover, for the FDIC as the deposit insurer, the supervisory outlook for a given institution is often reflected both in the level of premiums assessed against insured deposits and in the amount of contingent loss reserves the Corporation sets aside for problem institutions.

To illustrate the market information the FDIC might consider when setting premium levels, figure 8 shows a banking organization that experienced a significant fall in its stock price relative to the prices of other large banking organizations during the latter half of 1998. Around the same time, the FDIC began to have concerns about this otherwise well-rated company and took steps to downgrade its supervisory subgroup rating for purposes of setting deposit insurance premiums (see note 7). In this case, market signals were one of many factors that contributed to a change in the

[13] See Burton (2001) for an example of industry risk rankings that use default expectations and industry loan exposure data.

Figure 7

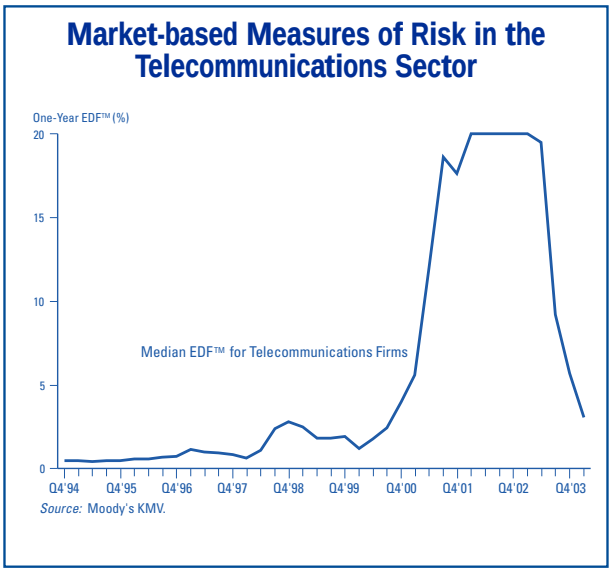
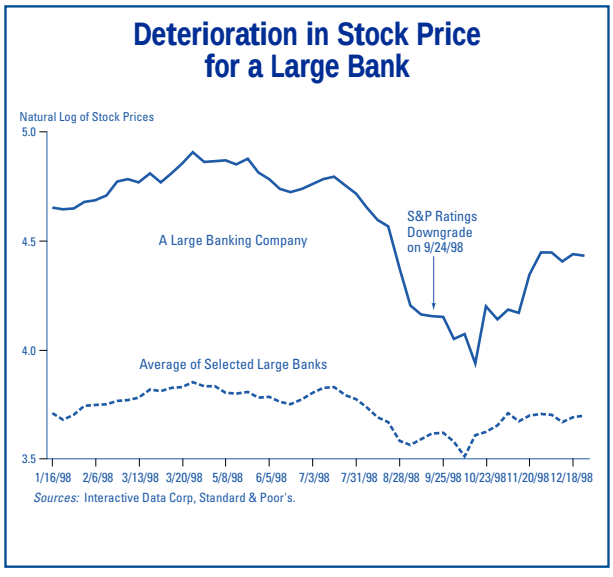


Figure 8



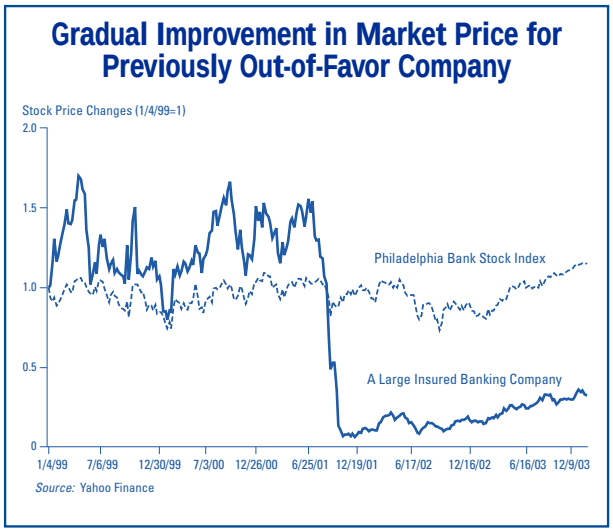
FDIC's overall risk evaluation of the institution. The signals reinforced the FDIC's supervisory outlook for the company, prompting the Corporation to act with one of the tools at its disposal—the imposition of higher deposit insurance premiums.

Figure 9 shows a reverse example. In figure 9, market signals reinforced the supervisory view that a problem institution's prospects were improving.

Influencing Macro-Level Contingent Loss-Reserve Decisions

The FDIC's accounting function requires the Corporation to establish loss reserves for potential bank and thrift failures. Key factors the Corporation considers when setting these reserves are the historical failure rates of problem institutions and factors that might suggest some deviation from recent failure-rate trends. When the Corporation evaluates whether contingent loss-reserve allocations should deviate from historical failure-rate patterns, among the factors it considers are market indicators as well as a variety of factors including the performance of the economy and the capital markets. For example, significant deterioration in market indicators related to the industry as a whole or to some group of institutions might provide support for increasing the reserve allocations for potential failures. Again, a shift in market indicators would probably not be the sole reason for such an action but could be one of several factors influencing the decision.

Figure 9



Potential Uses of Market Data

Beyond the applications discussed above, market measures have a number of potential applications. For the FDIC, some of these relate to the Corporation's unique role as the insurer of bank and thrift deposits. Specifically, market information could enhance the following applications or processes:

- Risk classifications for deposit insurance pricing purposes
- Evaluation of institution-level contingent loss reserves for potential bank and thrift failures
- Off-site surveillance models used to quantify the likelihood of downgrades in supervisory ratings
- Basel II benchmarking tools.

Using Market Data for Insurance Pricing

In April 2001, the FDIC outlined a number of recommendations for deposit insurance reform, one of which was to allow the FDIC greater flexibility in setting deposit insurance premiums.[14] In December 2003, the *FDIC Banking Review* contained an article that explored alternatives to the current risk-based pricing system, including the potential use of market indicators for setting deposit insurance premiums for large insured institutions.[15] As noted in that article, the evaluation and pricing of risk related to large complex operations may be more precise when market indicators complement supervisory ratings than when supervisory ratings are used alone. The article also noted that market data help overcome weaknesses in model-based approaches that rely on accounting data: when funding and liquidity

[14] See FDIC (2001).
[15] Bloecher, Seale, and Vilim (2003).

variables are included in such models they tend to unduly penalize larger institutions.

Market Variables under Consideration. For purposes of deposit insurance pricing, the FDIC is presently considering a variety of market variables that best differentiate risk in financial institutions. These variables include stock price volatility measures, external bond ratings, subordinated debt spreads, Moody's KMV measures of expected default, and stock price-to-book ratios. As shown in the article mentioned just above, these variables appear to be strongly correlated with subsequent downgrades.

Ways of Incorporating Market Data into a Deposit Insurance Pricing System. There are a variety of ways in which market information could be used in a risk-based premium framework. Three implementation possibilities, for illustrative purposes only, are described here (figures 10, 11, and 12). Figure 10, for example, shows a framework that considers market data in conjunction with supervisory ratings to determine an institution's risk premium category. In this case, market information results in a more granular set of risk rankings than would be feasible if only supervisory ratings were used.[16]

Figure 11 shows an alternative approach that uses market data as the basis for adjustments to initial risk assessments that are based on supervisory ratings, a continuous pricing model, or a scorecard.[17] In this example, an institution with favorable market indicators (e.g., a strong debt rating or relatively low stock price volatility) would receive an adjustment to a lower-premium subgroup.

In contrast to figure 11, in which market data are used to adjust initial assessments, figure 12 shows how market data could be used to trigger changes to an institution's risk-based premium subgroup. This trip-wire approach would result only in negative adjustments and might involve such occurrences as the lowering of a debt rating to subinvestment-grade status or the decline in a price-to-book ratio to below 1.0.

Implementation Issues. If the deposit insurance reform proposals pending before Congress are enacted (see note 7), incorporating market data

[16] In this example, the intent is to differentiate risk only for institutions that would be categorized as well-capitalized and highly rated (that is, 1A institutions) under the current nine-cell risk-based pricing matrix. The rest of the matrix, which is reserved for poorly rated and less than well-capitalized institutions, remains the same. As of year-end 2003, 92 percent of insured institutions were categorized as 1A institutions.

[17] Continuous pricing models might use the output from failure-prediction models as the basis for pricing deposit insurance premiums. (Failure-prediction models typically rely on accounting information.) The scorecard approach is also based on a failure-prediction model but applies expert-based subweightings to each variable in the model to produce discrete risk-based premium subgroups for pricing purposes.

Figure 10

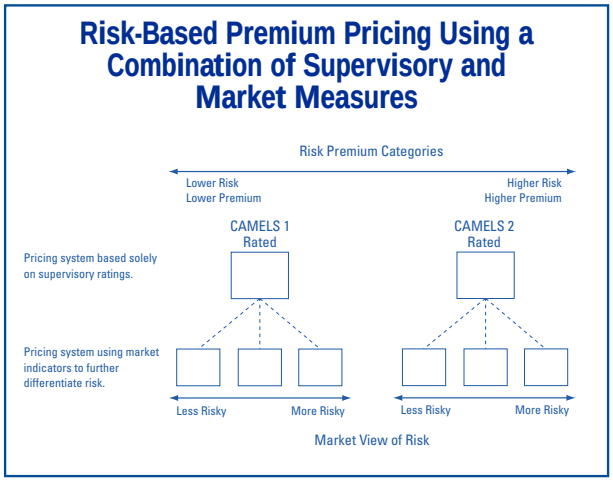
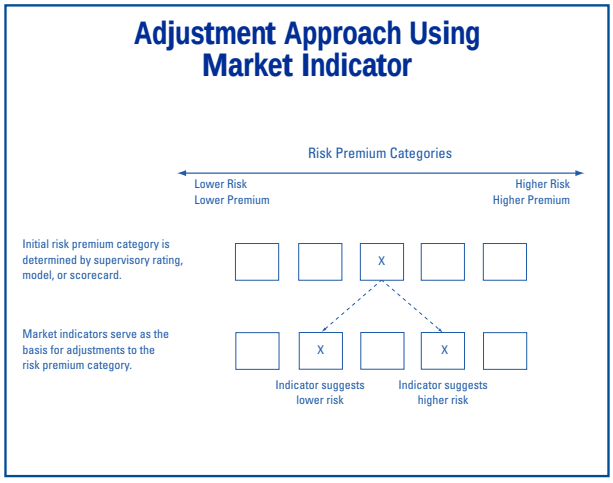


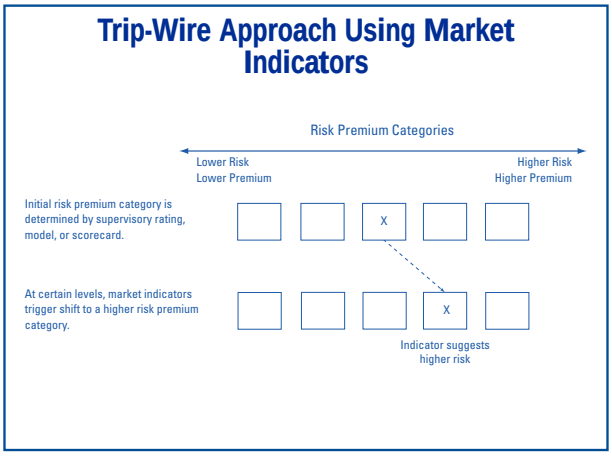
Figure 11



into a new risk-based pricing framework will require the resolution of two practical issues. First, market data are typically available only for consolidated companies, whereas insurance premiums are currently assessed at the insured-subsidiary level. This issue could be overcome if an organization-wide view were adopted, at least for "significant" subsidiaries—those for which there is likely to be a close correspondence among a subsidiary's performance, its risk indicators, and the company's market signals. For "nonsignificant" subsidiaries—those for which performance and risk are not linked to market signals—it may be more appropriate to apply a general framework that does not include market information.

A second practical issue is the determination of what constitutes a large institution. As shown in table 4 above, numerous subsidiaries of companies fall into the category of midsize institutions.[18] Where to draw the line between large and all other institutions could depend on a variety of factors relating to an institution's complexity and the availability of certain kinds of market information. Continuously available subordinated debt pricing, for instance, is generally available only for the largest banking and thrift organizations (perhaps as many as the top 50 in terms of asset size). Thus, the availability of certain types of market data could be used to determine which banks would be priced under one system compared with another.

Figure 12



Using Market Data in the Evaluation of Contingent Loss Reserves

The FDIC is required to establish adequate reserves to cover potential insurance fund losses from failures. The process of establishing such reserves essentially entails considering three prospective factors: (1) the likelihood of failure of an individual institution, (2) the loss that will be incurred if that institution fails, and (3) the level of insured deposits at the institution when it fails. For publicly held banking and thrift organizations, market indicators can be useful in assessing the first two of these factors.

As shown by Moody's KMV model and others, market information such as equity prices and subordinated debt spreads can be used to provide quantifiable measures of market failure expectations. When supervisors are evaluating the failure prospects of troubled institutions, they can compare these measures with judgment-based assessments that rely on supervisory and financial data. In addition, equity prices are a direct measure of the value assigned by shareholders to a firm's assets and liabilities. Thus, market valuations may be useful when supervisors evaluate the liquidation-value scenarios related to probable failures.

Incorporating Market Data into Off-site Surveillance Models

Merton-based models such as those used by Moody's KMV are just one of many approaches that incorporate market information in the measurement of default probabilities. Arguably, supervisors have the means to improve on these models by incorporating both public and nonpublic data into failure estimations. For example, logit models that incorporate market, supervisory, and financial variables could result in more accurate failure predictions than models that rely solely on market data.

[18] As of year-end 2003, approximately 80 insured banking organizations had between $5 billion and $20 billion in assets.

Research at the FDIC has shown that incorporating market signals into early-warning systems improves the ability of supervisors to predict supervisory ratings of holding companies.[19] Such early-warning systems are relevant for failure models as well, since it is reasonable to expect the factors associated with supervisory downgrades to be predictive also of financial-institution failures.

Using Market Information as Benchmarks for the Outputs of Internal Ratings-Based Capital Models

Market information could be useful for evaluating the consistency and integrity of the advanced internal ratings-based (A-IRB) models used for Basel II capital calculation purposes.[20] Given not only the variations among institutions in the characteristics of loan portfolios but also the flexibility that exists in the Basel II implementation requirements, it is not feasible to use market measures to definitively validate or invalidate the outputs of A-IRB models. Rather, such measures would provide approximations or rough benchmarks, which might highlight potential biases or inconsistencies in A-IRB measures applied to corporate loan exposures.

In terms of market measures, the most obvious candidate for producing A-IRB benchmarks is the Moody's KMV model of estimated default frequencies (EDFs). Although not necessarily synonymous with the Basel II definition of the probability of default (PD), EDFs are expressed in the same basic unit of measurement: one-year default expectations related to an obligor.[21] The most straightforward PD benchmarks would involve comparisons between firm-specific EDFs and the PDs assigned by the bank for that same firm. Less straightforward, but relatively easy to construct, would be industry-specific PD benchmarks that were developed from EDFs and could be compared with the weighted average portfolio PDs for similar industry credit exposures held by institutions. Such industry benchmarks hold the possibility of extending the use of market indicators beyond the exposures of publicly held companies.

External loan and bond ratings (debt ratings) can also be used to develop proxy benchmarks for PDs. Unlike EDFs, debt ratings are not an explicit measure of PDs. Rather, they are long-run estimates of *relative* likelihood of default through an entire business cycle. Nevertheless, default studies produced by the rating agencies give long-run averages of default by debt grade. Hence, ratings can be associated with PDs if one uses the long-run average historical default rates for a particular debt rating. Again, the most straightforward PD benchmarks would involve credit exposures to firms with rated debt. PD benchmarks for industry credit exposures could also be developed if one used average industry debt ratings.

Conclusion

Market signals play an important role in supervisory processes. Incorporated into surveillance programs, market signals supplement supervisory and financial information for purposes of corroborating supervisory risk determinations and evaluations. Market signals also provide quantitative rankings of risk that can help in the evaluation of supervisory priorities. Although market signals in isolation rarely influence supervisory priorities and strategies, they are nevertheless a critical factor for supervisors to consider when formulating their outlooks for U.S. financial institutions. Market signals are important inputs into off-site surveillance systems, since they provide supervisors with an objective early-warning indicator. Such signals are especially important during the period between examinations.

Beyond their use in surveillance programs, market indicators can play a role in the insurance pricing

[19] See Curry, Fissel, and Hanweck (2003).

[20] Under the A-IRB approach of Basel II, certain institutions will be allowed to use internal estimates of credit risk for individual loan exposures as inputs into regulatory formulas (risk-weight functions), and the regulatory formulas in turn determine minimum regulatory capital requirements. The principal internal risk measures provided by A-IRB banks include estimates of probabilities of default, losses given default, and facility exposures at default.

[21] EDFs are point-in-time estimates of the likelihood of default (usually expressed over a one-year time horizon). In contrast, PDs are intended to represent a conservative, long-run average view of the likelihood of borrower default.

and funds management processes, where the deposit insurer requires estimates of both the likelihood of failure and the liquidation values of failing-institution assets. Market signals can also add explanatory power to failure- and supervisory downgrade-prediction models. Finally, applied to credit exposures, market data can be used to construct rough benchmarks for the outputs of A-IRB models, which serve as critical inputs into regulatory capital requirements under Basel II.

Broader use of market data largely depends on the development of a reliable source of market prices that are linked directly with other supervisory and regulatory financial data. For example, off-site surveillance models could be significantly enhanced if they could be automatically linked to multiple sources of information on debt and equity prices. To apply this information to insured subsidiaries, it will also be necessary to identify explicit linkages between market data, which relate to the consolidated operations of a company, and financial performance information that is related to insured subsidiaries. Finally, analysts and examiners will have to be able to clearly define the notions of significance and permanence as they relate to changes in market valuations. For all these reasons, the FDIC is pursuing the creation of a market data warehouse. Such a warehouse of information will achieve several objectives, including those of collecting multiple sources of debt and equity information under one database, linking this information to financial information on insured institutions, and developing algorithms that alert analysts and examiners to significant, long-term shifts in debt and equity prices.

REFERENCES

Bloecher, Eric P., Gary A. Seale, and Robert D. Vilim. 2003. Options for Pricing Federal Deposit Insurance. *FDIC Banking Review* 15, no. 4:1–15. Available at www.fdic.gov/bank/analytical/banking/2003dec/1_15n4.pdf.

Burton, Steven. 2001. Credit Problems for U.S. Businesses Continue to Increase. National Regional Outlook. Available at http://www.fdic.gov/bank/analytical/regional/ro20011q/na/Infocus1.html.

Curry, Timothy J., Peter J. Elmer, and Gary S. Fissel. 2001. Regulator Use of Market Data to Improve the Identification of Bank Financial Distress. Working Paper No. 2001-01. Federal Deposit Insurance Corporation.

———. 2003. Market Information, Bank Holding Company Risk, and Market Discipline. Working Paper No. 2003-04. Federal Deposit Insurance Corporation. Available at http://www.fdic.gov/bank/analytical/working/wp2003_04/wp2003_04.pdf.

Curry, Timothy, Gary S. Fissel, and Gerald Hanweck. 2003. Market Information, Bank Holding Company Risk, and Market Discipline. Working Paper No. 2003-04. Federal Deposit Insurance Corporation. Available at http://www.fdic.gov/bank/analytical/working/wp2003_04/wp2003_04.pdf.

Elmer, Peter J., and Gary S. Fissel. 2001. Forecasting Bank Failure from Momentum Patterns in Stock Returns. Unpublished Paper. FDIC.

Evanoff, D., and L. Wall. 2001. Sub-Debt Yield Spreads as Bank Risk Measures. *Journal of Financial Services Research* 20:121–45.

Federal Deposit Insurance Corporation (FDIC). 2001. Keeping the Promise: Recommendations for Deposit Insurance Reform. Available at www.fdic.gov/deposit/insurance/initiative/direcommendations.pdf.

Feldman, R., and M. Levonian. 2001. Market Data and Bank Supervision: The Transition to Practical Use. Federal Reserve Bank of Minneapolis, *The Region* 15, no. 3:11–13, 46–54.

Gilbert, A., A. Meyer, and M. Vaughn. 2001. Can Feedback from the Jumbo CD Market Improve Off-Site Surveillance of Small Banks? Working Paper No. 2002-08. Federal Reserve Bank of St. Louis.

Gunther, J. W., M. E. Levonian, and R. R. Moore. 2001. Can the Stock Market Tell Bank Supervisors Anything They Don't Already Know? Federal Reserve Bank of Dallas *Economic and Financial Review* (Q2): 2–9.

Hall, J. R., T. B. King, A. P. Meyer, and M. D. Vaughn. 2001. What Can Bank Supervisors Learn from Equity Markets? A Comparison of the Factors Affecting Market-Based Risk Measures and BOPEC Scores. Working Paper No. 2002-06. Federal Reserve Bank of St. Louis.

Krainer, J., and J. Lopez. 2003. How Might Financial Market Information Be Used for Supervisory Purposes? Federal Reserve Bank of San Francisco *Economic Review*: 29–45.

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Limited-Purpose Banks: Their Specialties, Performance, and Prospects

*Chiwon Yom**

Limited-purpose banks are institutions that specialize in relatively narrow business lines. Some limited-purpose banks concentrate on making a certain type of loan, some serve a subset of consumers, and some offer an innovative product. As niche players focusing on a limited set of activities, these institutions can quickly develop expertise in their particular business lines and can become efficient producers. Specialization may have been promoted by technological innovations, which generally lead to gains in productivity and economies of scale.

This study examines credit card banks, subprime lenders, and Internet primary banks. Although numerically these institutions make up a small share of the financial services industry, their unique products and technologies have attracted considerable attention. Insured institutions such as MBNA, Providian, and ETrade Bank are examples of limited-purpose banks specializing, respectively, in credit card services, subprime lending, and Internet banking.

Credit card banks offer their customers both convenience and liquidity by providing a financial product that can be used as a means of payment and a source of instant credit. These banks are very profitable, earning higher income than the industry. Their use of technology and the benefits of economies of scale have probably contributed to their superior financial performance.

Subprime lenders are insured institutions that specialize in lending to people with poor credit histories. By focusing on a customer base that was formerly shunned by the banking industry, these banks can boost their profit margins. Although some subprime lenders have outperformed the industry, others have either failed, experienced large losses, or remained in business but exited the subprime market altogether.

Internet primary banks use the Internet as their sole means of delivering banking services. It was once widely believed that Internet banks could earn higher profits by eliminating physical branches and reducing overhead expenses. However, cost reductions and higher profitability have not been realized, and Internet banks continue to underper-

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form relative to the industry. Their underperformance may reflect limited consumer demand for Internet banking services. And relative to branching banks, Internet banks are at a competitive disadvantage in lending to small businesses because they lack the means of building long-term relationships with borrowers.

The next section reviews some of the important technological innovations that promoted the growth of limited-purpose banks. The subsequent section describes the data used in this study. Then come three sections analyzing, respectively, credit card banks, subprime lenders, and Internet banks. Each of those three sections describes the unique characteristics of the particular type of limited-purpose bank, along with the distinctive business model used; compares that type of limited-purpose bank with the rest of the industry in terms of financial performance and risk characteristics; and assesses those banks' viability and prospects. A final section concludes.

Technological Innovations in the Financial Services Industry

Technological improvements have played an important role in the growth of limited-purpose banks as well as in the broader financial services industry. Some people even argue that improvements in technology led financial institutions to specialize. Jim Marks, a director at Credit Suisse First Boston, states, "The lessons over the past 20 to 30 years have taught us that technological improvements lead to specialization."[1] Technologically intensive production processes generally exhibit large economies of scale which means that larger operations have lower costs. By producing a large quantity of a single product, these banks can benefit from scale economies. In addition, specialization may reduce the risky investments in technology that banks need to make.

A number of innovations were vital to implementing the business models adopted by limited-purpose banks. Among these innovations are data-mining techniques, electronic payment systems, securitization, and the Internet.

Data-mining techniques are increasingly used for various purposes in the financial services industry. The most significant example of their use is in credit scoring. Credit scoring uses historical data and statistical techniques to produce a score that summarizes a loan applicant's credit risk. Credit scoring is used to speed up credit decisions, to price loans, to constitute input in automated underwriting processes, to screen prospective customers, to price the default risk of asset-backed securities in secondary markets, and to monitor accounts.

Data-mining techniques are also used by financial institutions to target potential customers for solicitations and to manage existing accounts. To attract new customers, institutions use data-mining techniques to identify potential customers. Institutions can target potential customers of a certain credit quality or can identify the potential customers most likely to respond to specific offers (such as free airline miles or low-cost balance transfers). Once the institutions obtain new customers, they can use the data to manage the accounts on an ongoing basis. They may use customer-specific information to assess which accounts are most profitable for them or to predict which customers are likely to defect to a competitor. The limited-purpose banks examined in this study, especially credit card banks and Internet banks, rely heavily on data-mining techniques. These banks operate in a national market and have little direct contact with borrowers, so data mining is the only feasible way for them to solicit potential customers, underwrite loans, and manage customers' accounts.

Electronic payment systems, which are methods of transferring funds electronically, are another important innovation in the financial services industry. Studies have found results that are consistent with electronic payments technologies displaying economies of scale (Berger [2003]). Moreover, improvements in technology have dramatically reduced the costs of processing electronic payments and increased the availability of such

[1] See Wenninger (2000).

processing. Such improvements benefited credit card banks as lower cost and increased availability of electronic payments technology has led more retail businesses to accept payments by credit card. Internet banks, too, rely heavily on electronic payments technology. Lacking physical branches, they rely both on ATMs to give their customers access to cash and on the Automated Clearing House (ACH) for fund transfers.

Securitization, which is a process of pooling financial assets into commodity-like securities, has also played a vital role in the growth of limited-purpose banks. Securitized financial assets typically include credit card balances, automobile receivable paper, commercial and residential first mortgages, commercial loans, home equity loans, and student loans.[2] The pool of assets is transferred to a special-purpose entity, which issues securities that are rated, underwritten, and then sold to investors. During the period 1984–2001, asset-backed securities grew at an average annual rate of 13.7 percent (Berger [2003]). According to Furletti (2002), $6.6 trillion of tradable securities made up the asset-backed securities market as of June 2002.

Since its introduction in 1987, credit card securitization has become a primary source of funding (Furletti [2002]) and is integral to the growth of the credit card industry (Calomiris and Mason [2003]). More generally, securitization helped the consumer finance sector reach double-digit growth in the early 1990s (Calomiris and Mason [2003]). As of June 2002, credit card asset-backed securities amounted to $400 billion (Furletti [2002]).

Securitization also contributed to the growth in subprime lending (Laderman [2001]). Mahalik and Robinson (1998) note that the production of subprime mortgage securities more than tripled between 1995 and 1997, going from $18 billion to $66 billion. In addition, the percentage of subprime mortgages being financed by securitizations is rising: approximately 53 percent of all subprime mortgage loans originated in 1997 were sold in the securities market, compared with 28 percent in 1995.

The Internet and Internet security and protection technologies are important for on-line banking. As part of information technology, the Internet brings together different parties and allows them to share information. Because banking is an exchange of information between a bank and its customers, the Internet has become an important innovation for financial institutions. Using the Internet distribution channel, banks can offer increased convenience to customers by allowing them to perform their banking activities on-line at any time and in any place. Moreover, improvements in Internet security and protection technologies help prevent hackers from breaking into the computer systems. These technologies provide consumers with some confidence that their Internet bank accounts will remain secure.

Data

The sample of limited-purpose banks used in this study is taken from various sources. Credit card banks are those defined as such by the FDIC's Research Information System (RIS). The list of subprime lenders is from the FDIC's Quarterly Lending Alert (QLA). The sample of Internet banks is from the FDIC's informal database of Internet primary banks.[3]

Credit card banks are institutions (1) the sum of whose total loans, asset-backed securities on credit card receivables, and bank securitization activities of credit card loans sold and securitized (with servicing retained or with recourse or other seller-provided credit enhancements) is greater than 50 percent of the sum of total assets and bank securitization activities of credit card loans sold and securitized, and (2) the sum of whose credit card loans, asset-backed securities on credit card receivables, and bank securitization activities of credit card loans sold and securitized is greater than 50 percent of the sum of total loans, asset-backed

[2] See OCC, et al. (1999).
[3] This is an informal database and may not be comprehensive.

securities on credit card receivables, and bank securitization activities of credit card loans sold and securitized.

The FDIC's QLA is a database of insured institutions that engage in risky lending activities such as high loan-to-value loans, subprime lending, and payday lending. Insured banks with an aggregate credit exposure related to subprime loans that are equal to or greater than 25 percent of Tier 1 capital are referred to as subprime lenders. According to this FDIC definition, aggregate exposure includes principal outstanding and committed, accrued and unpaid interest, and any retained residual assets relating to securitized subprime loans. The QLA database includes information on types of subprime loans (e.g., automobile, credit card, mortgage, and other).

As of October 22, 2002, there were 18 banks that used the Internet as their primary method of contacting customers. One institution has been removed from the sample because it has 17 full-service brick-and-mortar branches, and it is hard to argue that an institution with 17 branches is an Internet bank. In addition, two institutions were involved in voluntary liquidation and closing prior to December 2003. As a result, 15 Internet primary banks remain in the sample.

All balance-sheet and income-statement variables are from the quarterly Report of Income and Condition (Call Report). The Federal Reserve System's Surveys of Consumer Finances data are also used.

Credit Card Banks

Credit cards date from the Diners Club, the first "universal" card, which was introduced in 1949 and used for purchases at restaurants and in department stores. Recognizing the potential profitability of providing open-end financing to consumers who were willing to pay high rates of interest to obtain unsecured credit, commercial banks began offering general-purpose credit cards to individual consumers; the cards came into broad use in the middle-to-late 1960s (Canner and Luckett [1992]). Bank-type credit cards offer both convenience and liquidity to their customers: they can be used as a payment device or as open-end revolving credit. Today, the bank-type card is the most widely held among different types of credit cards.

Table 1, which reports the percentage of households with bank-type cards, shows the rise in ownership of bank-type cards over the past three decades. In 1970, 16 percent of households surveyed had bank-type credit cards. In 2001, the comparable figure was 72 percent. Moreover, the increase in the shares of households with credit cards over time is evident at all income levels (Durkin [2000]). Clearly, credit cards have become a consumer financial product important to households regardless of income.

Credit card banks are affiliated with national credit systems, such as VISA and MasterCard, to be part of a network. The national credit systems allow the cardholder to use a credit card for purchasing goods and services in areas served by other banks. Thus, sales drafts can be transferred from the merchant's bank to the cardholder's bank for collection. The national systems effectively transform local cards into national cards.

Business decisions, however, are made at the level of the card-issuing bank. Individual banks own their cardholders' accounts and determine the interest rate, annual fee, grace period, credit limit, and other terms of the accounts. Thus, this study examines the credit card business at the individual-bank level.

Table 1

Usage of Credit Cards among U.S. Households

	1970	1977	1983	1989	1995	1998	2001
Households with bank-type credit cards (%)	16	38	43	56	66	68	72
Households with outstanding balances on bank-type card after the most recent payment (%)	37	44	51	52	56	55	54

Source: Federal Reserve Board's Survey of Consumer Finances.

Consolidation

Figure 1 shows that in recent years, trends in the size and number of credit card banks have gone in opposing directions. Since 1995, the average asset size of credit card banks has been growing at the rate of roughly 20.5 percent annually. In contrast, the number of credit card banks has been declining at an annual rate of 6.8 percent. Similarly, figure 2 shows that trends for the number of credit card banks and for the mean value of credit card loans have moved in opposing directions in recent years. The average credit card loan has been steadily increasing.

Consolidation in the bank credit card industry can be attributed to a number of factors (Mandell [1990]). First, consolidation may be necessary to exploit economies of scale. There is some evidence that credit card bank operations exhibit increasing returns to scale. Pavel and Binkley (1987) find evidence of increasing returns to scale at small-to medium-size card banks. Canner and Luckett (1992) find that operating expenses account for a smaller portion of the total cost for the large issuers; thus, large card issuers would enjoy some benefits of economies of scale in their operations.

Second, by consolidating, banks can achieve the size necessary to conduct certain activities. For instance, the marketing tools used by credit card banks, such as television commercials, Internet advertisements, and mail solicitations, are expensive and can be used only by a few large institutions. Through consolidation, credit card banks may reach the size that will enable them to allocate funds for such costly marketing activities.

Third, because most cardholders lack a sense of identification with the banks that issued their credit cards, their loyalty to specific card banks is likely to be low; accordingly, little (in terms of customer loyalty) is lost through consolidation.

Financial Performance

Credit card banks enjoy consistently higher earnings than the banking industry as a whole. Table 2 presents interest and noninterest income for the three kinds of limited-purpose banks we are studying and for all banks. As of December 2003, the average return on assets (ROA) of credit card banks was 4.6 percent—more than four times the 1.0 percent of the industry average. Possibly the card banks' ROAs are being inflated by their securitization income.

A closer examination of credit card bank operations will help us understand the revenue and cost structures of these banks. As mentioned above, consumers use credit cards mainly as a means of payment and a source of open-end revolving cred-

Figure 1

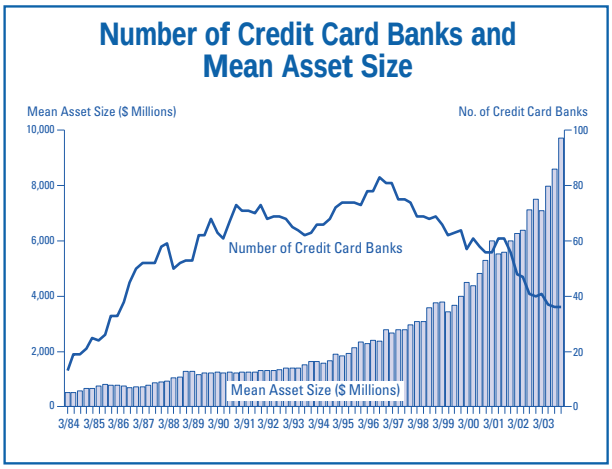
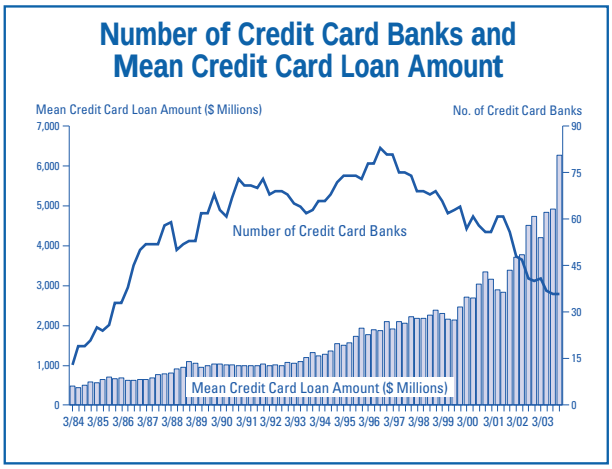


Figure 2



it. In transactions where consumers use credit cards as a payment device and pay back the loans within the grace period, banks forgo interest income, although they still earn noninterest income from fees. Only when the card is used as a source of credit do banks earn interest income as well as noninterest income.

Column 1 of table 2 shows that credit card banks earn high interest income. On average, the card banks' interest income is 10.8 percent of assets—more than twice the 5.3 percent earned by the industry during the year ending December 31, 2003. Historically, credit card rates have been higher than competitive rates and more stable than the cost of funds. Moreover, credit card loan rates are more stable than the rates of other types of loans, such as mortgage and auto loans (Canner and Luckett [1992]).

Table 2

Summary Measures of Profitability[a]
(as of December 31, 2003)

	(1) Credit Card Banks	(2) Internet Banks	(3) Subprime Lenders	(4) All Banks and Thrifts
Mean				
Interest income	10.8	4.6	8.0	5.3
Interest expense	1.6	2.1	2.3	1.6
Net interest income	**9.2**	**2.5**	**5.8**	**3.7**
Noninterest income	18.5	1.1	3.4	1.6
Other noninterest income	0.0	0.1	0.1	0.0
Noninterest expense	16.8	3.4	5.6	3.6
Other noninterest expense	13.8	1.2	2.9	1.3
Net noninterest income	**1.7**	**-2.3**	**-2.3**	**-2.0**
ROA	**4.6**	**0.7**	**1.2**	**1.0**
ROE	**24.3**	**8.8**	**11.1**	**10.0**
Median				
Interest income	8.7	4.5	6.2	5.2
Interest expense	1.6	2.0	2.1	1.6
Net interest income	**7.0**	**2.3**	**4.1**	**3.6**
Noninterest income	10.2	0.2	0.8	0.7
Other noninterest income	0.0	0.0	0.0	0.0
Noninterest expense	9.3	2.6	3.6	2.8
Other noninterest expense	6.2	0.8	1.2	0.8
Net noninterest income	**1.5**	**-1.6**	**-2.4**	**-2.0**
ROA	**3.6**	**0.8**	**1.1**	**1.0**
ROE	**22.4**	**9.9**	**11.1**	**9.9**
No. of observations	36	15	116	9181

[a] Income and expense ratios are expressed as a percentage of assets. ROA is expressed as a percentage of assets and ROE is expressed as a percentage of equity. The variables are merger-adjusted four-quarter totals.

Some economists argue that cardholders are insensitive to interest rates because the cardholders persistently underestimate the extent to which they will carry over unpaid balances and thereby incur interest costs (Ausubel [1991]). Moreover, high-and-sticky card rates are attributed to the high search-and-switching costs. Cargill and Wendel (1996) claim that compared with small average balances, the cost of cardholders searching for lower rates is too high. Calem and Mester (1995) maintain that the inconvenience of switching accounts is another reason for cardholders to be insensitive to interest rates.

While credit card banks' interest income is substantially higher, their interest expense is similar to the industry average: during the year ending December 31, 2003, interest expense on average amounted to 1.6 percent of total assets at credit card banks, same as for the industry. By earning substantially higher interest income without having to incur higher interest expense, credit card banks earn a high net interest income. During the year ending December 31, 2003, the mean value of net interest income to total assets ratio for credit card banks was more than double the industry average.

Credit card banks earn noninterest income by charging annual fees, finance charges, late-payment fees, over-limit fees, and other servicing fees. Feldman and Schmidt (2000) find that noninterest income makes up a greater share of net revenue at credit card banks than at non-credit card banks. Moreover, credit card banks earn noninterest income by servicing accounts that are taken off their balance sheets through securitization. By providing services to securitized asset trusts—for example, by mailing monthly statements to customers, answering phone calls, and collecting past-due balances—credit card banks earn servicing fees from the trusts (Furletti [2002]). Earning servicing fees from securitized assets has the effect of inflating the credit card banks' ROAs: in most cases, credit card securitization is structured as a sale, and by earning noninterest income on securi-

tized assets that are taken off their balance sheets, the credit card banks have an ROA that is elevated compared with the ROAs of institutions that keep their receivables in their asset portfolios. This situation suggests that simply examining the financial ratios, such as ROA, can be misleading, since these ratios mask the risks that banks are exposed to if they have recourse interest on their securitized assets.

At the same time, credit card banks incur high noninterest expenses. On December 31, 2003, for instance, the average noninterest expense of credit card banks amounted to roughly 17 percent of total assets. Processing credit card transactions is a costly operation. Pavel and Binkley (1987) detail the mechanics of bank card transactions. When a cardholder uses his or her credit card, a sales slip is created and sent to a merchant's bank for processing. The merchant's bank credits the merchant's account for the amount of the sale and sends the sales information to the interchange facilities (such as MasterCard or Visa). The interchange facilities transfer the sales information to the issuing bank and send the amount of the transaction less an interchange fee and a per-item fee to the merchant's bank. Then the issuing bank bills the cardholder. Having to process a large volume of transactions and service a large number of accounts, credit card banks incur large processing expenses. Although advances in technology have substantially improved operating efficiency at credit card banks, operating expenses remain high. Other noninterest expenses include advertising and marketing expenses, fraud losses, and network access fees.

Like other limited-purpose banks, credit card banks are likely to suffer from high income volatility because of a lack of diversification in their loan portfolios. There are, however, a number of factors that can dampen these income fluctuations. First, credit card banks' greater dependence on noninterest income can partially offset and reduce the income volatility. Second, credit card banks' cost of funds tends to go down when charge-off costs are high, and the lower cost of funds can offset the adverse effects of high default rates on the banks' profitability.

Empirical evidence however, shows that these factors fail to offset the credit card banks' income volatility; these banks suffer from higher income fluctuations. At the same time, their earnings are consistently higher than those of a typical bank. Even during periods of low profitability, credit card banks continue to outperform other banks.

Prospects

Credit card banks are highly profitable and are an example of institutions that successfully implemented the business model of specialization. The successful use of technology and the benefits of scale economies are likely to have contributed to their superior financial performance. Given their profitability, it is reasonable to expect that these banks will continue to supply credit card services.

On the demand side, the share of households with bank-type cards has been steadily rising, and these households maintain positive attitudes toward credit cards. According to the Survey of Consumer Finances in 2001, the holders of bank-type credit cards consider the cards useful and believe that they are better off with them. It is reasonable to expect that the demand for credit card services will remain high and that credit card banks will continue to provide the service. It remains to be seen whether these banks have exhausted the benefits of scale economies or will continue to consolidate.

Subprime Lenders

Subprime borrowers are those with weakened-or-poor credit histories, and traditionally banks have stayed away from extending credit to them.[4] Banks' practices have locked subprime borrowers out of the mainstream credit system.

[4] The bank regulatory agencies have recently suggested that any of the following may indicate a subprime borrower: (1) a FICO credit score of 660 or below; (2) two or more 30-day delinquencies during the past year; (3) bankruptcy within the last five years; (4) judgement, foreclosure, repossession, or charge-offs in the prior 24 months; or (5) debt service-to-income ratio of 50 percent or greater (OCC et al. [2001]).

In the early-1900s, the credit market neglected lower-income households. At the time, usury laws set a maximum rate that could be charged on loans. Such laws reflected a sentiment shared by many at the time that regarded debt for the purposes of personal consumption with great disfavor. Because of high transaction costs per account, such usury laws effectively made small loans infeasible. In contrast, businessmen were easily able to obtain bank loans for both business and personal needs. Hence, usury laws had the effect of locking lower-income households out of the credit market. Consequently, many of these households had to rely on loan sharks for credit and had to pay high (illegal) rates.

Similarly today, subprime borrowers who cannot obtain credit from banks or other financial institutions are left to rely on pawnshops, payday lenders, and rent-to-own stores to meet their credit needs. Carr and Shuetz (2001) note that as many as 12 million households either have no relationship with traditional financial institutions or depend on fringe lenders for financial services. The fringe lenders remain largely unregulated, and they frequently charge excessively high fees. Relying heavily on such lenders for credit needs can marginalize borrowers and expose them to predatory practices. Carr and Kolluri (2001) note that predatory lending thrives in an environment where competition for financial services is limited or nonexistent.

In recent years, however, insured institutions have begun to participate in the subprime market. Their entry has been motivated by high prospective profits and the possibility of using existing capacity. Banks generally participate in the subprime market by, "Lending directly to subprime borrowers, purchasing subprime dealer paper or loans acquired through brokers, lending directly to financing companies involved in subprime lending, participating in loan syndications providing credit to such financing companies, and acquiring asset-backed securities issued by these financing companies."[5]

Table 3 summarizes the subprime loan portfolio of subprime lenders over time. The FDIC's QLA database includes banks identified as subprime lenders starting with September 1999. For each quarter, one column reports the total amount of subprime loans in these lenders' asset portfolios and a second column reports the ratio (as a percentage) of total subprime loans to total assets.

Table 3 also breaks down subprime loans into different types, such as automobile, credit card, mortgage, and other. For September 1999 and September 2000, automobile, credit card, mortgage, and other subprime loan information are missing because these loans are not documented in the QLA database. For all periods, mortgage and credit card loans make up the largest volume of subprime loans.

On average, subprime lenders are larger than a typical bank. As of December 31, 2003, the average total assets of subprime lenders were $4.0 billion, compared with $1.0 billion for the industry. It may well be that subprime lending requires a certain set of skills or resources that are more likely to be available to larger banks. These lenders may need staff with expertise in subprime lending activities, or larger staff to handle the collection efforts on delinquent loans. Moreover, accessing capital markets to fund these loans may be easier for large banks.

In September 1999, subprime loans totaled $23 billion, which made up 7.2 percent of these institutions' assets. For the next two years the volume of lending by insured institutions to subprime borrowers steadily rose (except for June 2000), reaching $81 billion in September 2001. Since September 2001, however, the volume of subprime loans has been gradually decreasing. By December 2003, total subprime loans had fallen to $52 billion, making up 11.21 percent of assets at these institutions.

The number of institutions actively participating in the subprime market shows a similar trend. The number increased to 156 institutions in December 2000 and fell thereafter, dropping to 116 by December 2003.

[5] See FDIC (1997).

Table 3

Aggregate Subprime Loan Amounts: in Level and as a Percentage of Total Assets[a]

	Level ($ millions)	Ratio (percent)	Level ($ millions)	Ratio (percent)	Level ($ millions)	Ratio (percent)
Date	**9/99**		**12/99**		**3/00**	
Subprime total	23,143	7.19	28,840	5.97	66,770	7.12
Automobile			69	0.01	2,924	0.31
Credit card			22	0.00	10,076	1.07
Mortgage			74	0.02	25,838	2.75
Other			37	0.01	7,723	0.82
Payday			—		—	
No. of observations	121		131		145	
Date	**6/00**		**9/00**		**12/00**	
Subprime total	70,914	7.29	67,408	6.77	67,860	6.68
Automobile	2,872	0.30			3,611	0.36
Credit card	14,479	1.49			18,505	1.82
Mortgage	40,372	4.15			42,485	4.18
Other	7,743	0.80			3,290	0.32
Payday	—				—	
No. of observations	148		145		156	
Date	**3/01**		**6/01**		**9/01**	
Subprime total	71,503	7.20	73,149	7.36	80,717	7.97
Automobile	2,860	0.29	4,806	0.48	5,245	0.52
Credit card	24,393	2.46	24,936	2.51	25,105	2.48
Mortgage	41,809	4.21	41,169	4.14	46,872	4.63
Other	2,031	0.20	1,984	0.20	3,341	0.33
Payday	79	0.01	64	0.01	38	0.00
No. of observations	144		133		127	
Date	**12/01**		**3/02**		**6/02**	
Subprime total	71,157	14.56	69,203	13.21	65,145	12.43
Automobile	4,410	0.90	4,282	0.82	4,898	0.93
Credit card	26,256	5.37	27,962	5.34	25,371	4.84
Mortgage	34,246	7.01	31,434	6.00	29,283	5.59
Other	6,044	1.24	5,426	1.04	5,428	1.04
Payday	52	0.01	42	0.01	49	0.01
No. of observations	130		129		129	
Date	**9/02**		**12/02**		**3/03**	
Subprime total	65,800	12.21	53,879	9.86	53,775	9.67
Automobile	4,602	0.85	4,504	0.82	21,156	3.81
Credit card	20,504	3.81	18,667	3.42	17,319	3.11
Mortgage	33,259	6.17	27,687	5.07	28,723	5.17
Other	5,032	0.93	2,939	0.54	2,818	0.51
Payday	46	0.01	39	0.01	18	0.00
No. of observations	129		127		119	
Date	**6/03**		**9/03**		**12/03**	
Subprime total	55,417	10.67	51,382	10.85	52,119	11.21
Automobile	23,954	4.61	6,516	1.38	6,470	1.39
Credit card	16,104	3.10	15,916	3.36	15,675	3.37
Mortgage	35,684	6.87	24,682	5.21	27,666	5.95
Other	2,687	0.52	2,347	0.50	2,387	0.51
Payday	8	0.00	0	0.00	0	0.00
No. of observations	120		119		116	

Source: FDIC, Quarterly Lending Alert.

[a] Level refers to the aggregate amount of the subprime loans. Ratio refers to the ratio (in percent) of aggregate subprime loan amounts to the aggregate assets of the subprime lenders.

At the same time, the ratio of subprime loans to total assets at these institutions has been increasing. Figure 3 shows that the ratio of total subprime loans to total assets at subprime lenders rose sharply from December 2001. Although the concentration in subprime loans has fallen in recent periods, the ratio of subprime loans to total assets at subprime lenders remains above those prior to December 2001. This rise suggests that the insured institutions that continue to participate in the subprime market are the ones whose loan portfolios have higher concentrations of subprime loans. It may well be that the insured institutions that are successful in lending to the subprime market are staying in the market and increasing their concentrations in these loans.

Financial Performance

On average, subprime lenders earn higher net interest income compared with the industry. Figure 4 graphs the ratio of interest income, interest expense, and net interest income to total assets across time for subprime lenders and for all banks.

Subprime lenders earn higher interest income. During the period September 1999 to December 2003, the ratio of subprime lenders' annual average interest income to assets was 9.3 percent. In comparison, the industry earned 6.8 percent on average. Subprime lenders charge higher interest rates to compensate for the greater risk posed by subprime borrowers. Some people argue that the higher interest rates charged also reflect a lack of standardization in underwriting that makes it more costly to originate and service loans to borrowers with blemished credit histories and limited income.

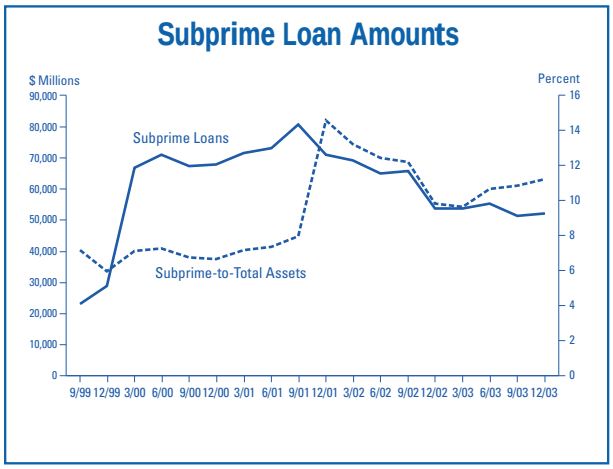
The high interest income earned by subprime lenders more than offsets their higher interest expense and allows them to earn higher net interest income than the industry

average. For instance, during the period September 1999 to December 2003, subprime lenders had the average annual net interest income-to-assets ratio of 5.8 percent, compared with 3.9 percent for the industry.

In many cases, the loan rate is not the entire source of income for subprime lenders. Subprime lenders generally charge up-front fees and prepayment penalties, both of which increase their noninterest income. At the same time, loans to subprime borrowers usually require intensive levels of servicing and collection efforts to ensure timely payment, with the result that noninterest expense is higher. Thus, subprime lenders earn lower net noninterest income (see figure 5). During the same period (September 1999 to December 2003), subprime lenders earned net noninterest income of –2.4 percent, compared with –2.1 percent for the industry. Moreover, high charge-offs and loan-loss provisions deplete the earnings of these institutions.

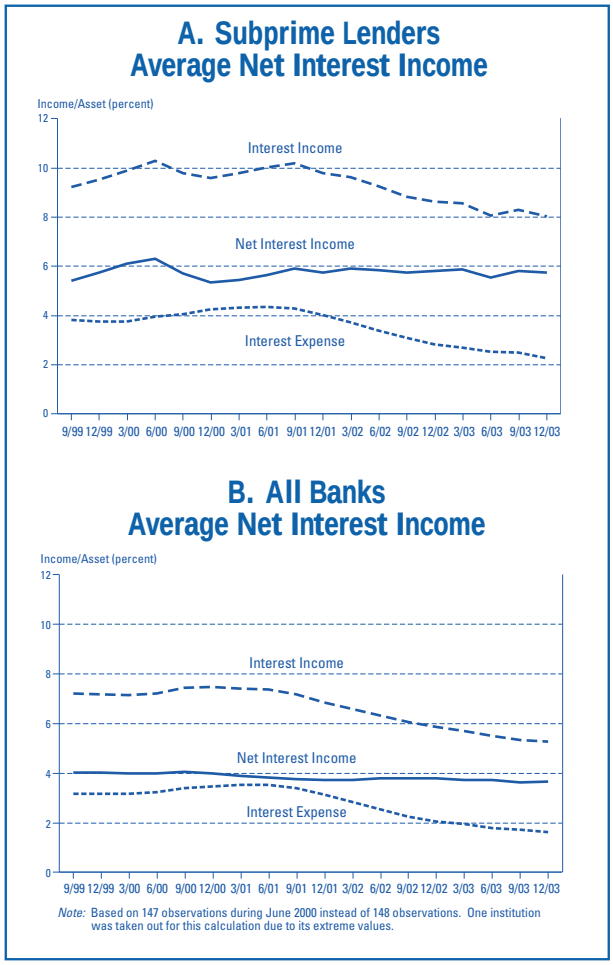
Net of these factors, subprime lenders' profitability is comparable to that of other insured institutions. During the period September 1999 to December 2003, subprime lenders earned an average ROA of 1.2 percent, compared with 1.1 percent for the industry average. Similarly, the average return on equity (ROE) of subprime lenders was 10.9 percent, compared with 10.8 percent for the industry.

Figure 3



It is important to note that the above-average rate of return masks the large fluctuations in earnings experienced by subprime lenders. Figure 6, which graphs the rate of return over time, shows these fluctuations. In some periods, subprime lenders performed worse than the industry. For instance, in December 2001 subprime lenders had an average ROA and ROE of 0.77 percent and 7.23 percent, respectively. In comparison, the industry average ROA and ROE for the same period were 0.94 percent and 9.58 percent, respectively. In more recent periods, however, the subprime lenders have been outperforming the industry. Possibly there is a survivorship bias in the sample: only the successful participants are left, while poorly performing lenders have exited the subprime market.

Figure 4



Prospects

As stated above, the number of insured institutions participating in the subprime market and the dollar amount of subprime loans have fallen in recent quarters. Several factors may have led to this decreasing trend. First, some participants may have exited the market because they were performing poorly. This hypothesis is consistent with the result discussed above—that while some lenders were exiting the subprime market, the ones remaining have been outperforming the industry in recent periods. It may be that success in subprime lending requires an institution to have certain expertise and resources.

Second, increased capital requirements may have effectively eliminated the advantage that insured banks enjoyed by participating in the subprime market. Typically, insured banks hold lower capital than their nonbank counterparts (consumer finance companies and mortgage lenders). Thus, insured banks enjoyed an advantage in competing against the nonbank financial institutions in the subprime market. By holding lower capital, the insured institutions incurred a lower cost than their nonbank counterparts in making subprime loans. However, recent regulatory and supervisory changes may have effectively eliminated this advantage.

Greater supervisory scrutiny of subprime lenders' capital adequacy is well justified. Concern has been rising that subprime lending activities are accompanied by significant risks. A number of institutions have failed, while others have experienced large losses in recent years as a result of their participation in the subprime market. Among the

Figure 5

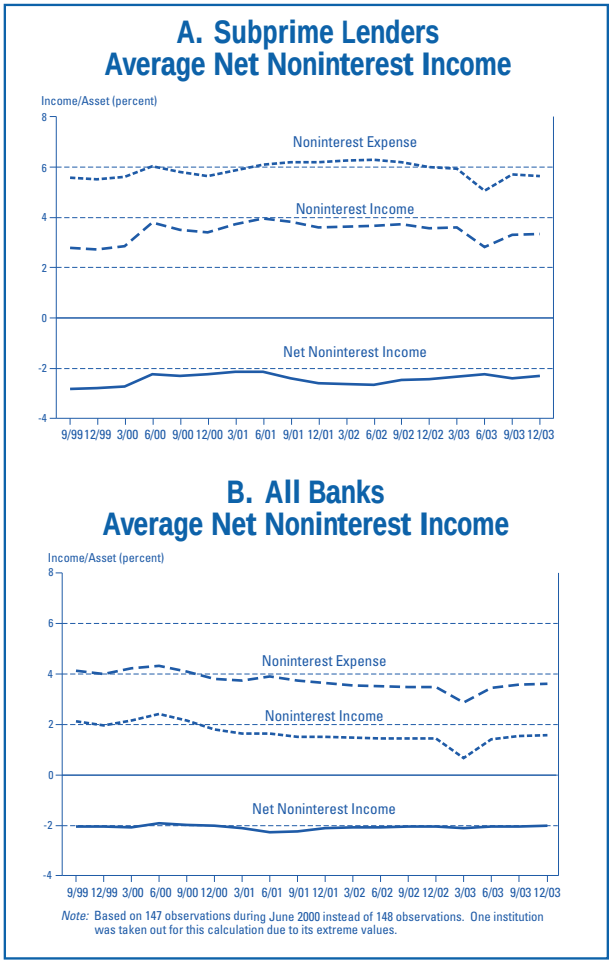
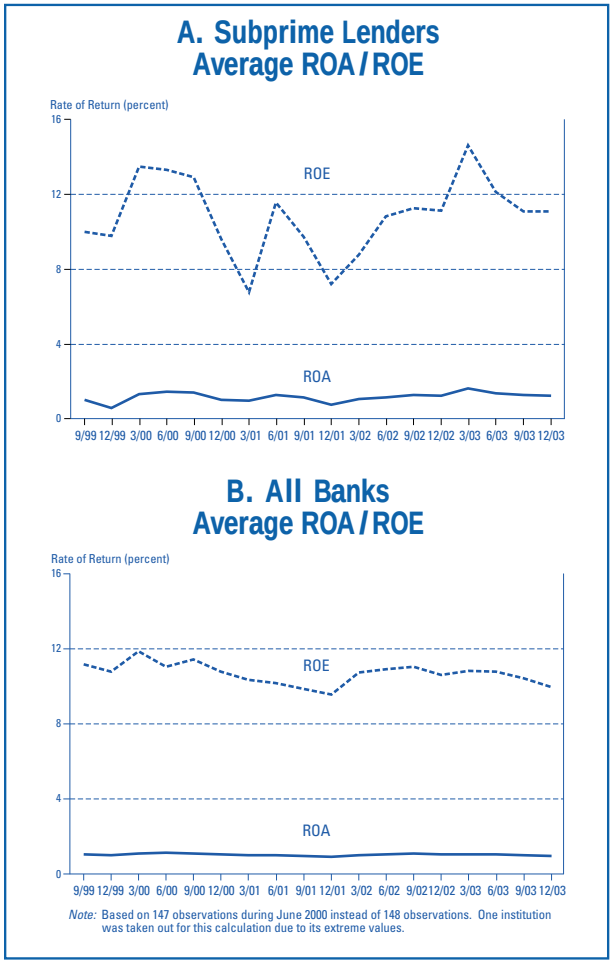


Figure 6



failed subprime lenders have been Superior Bank of Chicago, First National Bank of Keystone, NextBank, and Pacific Thrift and Loan Company. Alexander, Grimshaw, McQueen, and Slade (2002) give examples of banking institutions that have experienced large losses in recent years. First Union National Bank closed its acquired subprime lender, The Money Store, and took a $2.8 billion restructuring charge in 2000. In 2001, Bank of America announced its exit from the subprime lending market and sold its $22 billion subprime loan portfolio and took a large restructuring charge.

In general, subprime lenders have poor asset quality. As Table 4 shows, non-performing and non-accrual loans are substantially higher at subprime lenders than at a typical bank. Similarly, the average gross charge-offs were nine times those of a typical bank. In response, the bank regulators have begun to require more capital for subprime loans. This is both to ensure that banks' capital matches the risks they carry and to help ensure the survival of these institutions.

Table 4

Mean Values of Size, Balance-Sheet Ratios, Asset Quality Ratios, and Growth Measures[a]
(as of December 31, 2003)

	(1) Credit Card Banks	(2) Internet Banks	(3) Subprime Lenders	(4) All Banks and Thrifts
Assets (in $1,000s)	9,677,284	3,490,314	4,008,279	988,648
Balance Sheet Ratios				
Equity	20.6	9.3	11.8	11.5
Noncore funding	54.6	44.5	27.7	19.5
Liquid assets	17.1	27.8	26.1	34.3
Loans & long-term securities	74.3	71.9	74.6	69.7
Asset Quality Ratios				
Non-performing & non-accruals	4.9	1.1	4.0	1.4
Gross charge-offs[b]	6.3	0.3	2.7	0.3
Provision for loan losses[b]	4.6	0.2	1.8	0.3
Growth Measures (in percent)				
Asset growth	47.7	20.3	13.6	9.8
Equity growth	18.9	2.5	10.5	0.5
Loan growth	42.3	30.5	16.0	15.4
No. of observations	36	15	116	9181

[a] The variable Assets is expressed in $1000s. The growth measures are one-year change (in percent) in assets, equity, and loans. The remaining variables are expressed as a percentage of assets.

[b] Gross charge-offs and provision for loan losses are merger-adjusted four-quarter totals.

The bank regulators note that minimum capital requirements apply to loan portfolios that are less risky than the subprime loans. Therefore, the subprime lenders are expected to hold higher capital ratios and to quantify the additional capital needed for subprime lending activities. In 2001, the banking regulators noted that "…[g]iven the higher risk inherent in subprime lending programs, examiners should reasonably expect, as a starting point, that an institution would hold capital against such portfolios in an amount that is one and one half to three times greater than what is appropriate for non-subprime assets of a similar type."[6]

Moreover, because subprime lenders are active participants in securitizations, the recently established risk-based capital requirements on recourse obligations, residual interests, and direct credit substitutes for banks indirectly affect subprime lenders.

There is some evidence that these supervisory and regulatory measures have led to an increase in the amount of capital held by subprime lenders. For instance, these lenders' average capital-to-assets ratio was 11.8 percent in December 2003, compared with 9.3 percent in September 1999.

The measures undertaken by bank regulatory agencies may have effectively leveled the playing field for different lenders in the subprime market. Consequently, the advantage banking institutions used to enjoy in the subprime market may have largely disappeared. The fall in the number of subprime lenders and in the dollar amount of subprime loans held by these lenders may reflect their response to the new regulatory regime.

Both market forces and regulatory changes appear to be reducing insured institutions' participation in the subprime market. Institutions that can effectively manage the elevated risks associated with subprime lending and also be

[6] See OCC et al. (2001).

profitable will continue extending credit to the subprime market. It is not clear whether insured banks' participation in this market has already begun to stabilize or will decrease further.

As a public-policy goal, the active participation of insured institutions in the subprime market may be important for promoting the availability of credit to all households. At the same time, it is important for these institutions to recognize the risks associated with subprime lending and to enhance risk-management practices accordingly.

Internet Banks

A small number of banks deliver banking services primarily on-line. In theory, Internet banking offers attractive features. By eliminating the physical branches and employing fewer workers, Internet banks can reduce overhead expenses (DeYoung [2001, 2002]) and salary expenses. Orr (2001) refers to a study by Booz, Allen & Hamilton that reports that a typical transaction over the Internet costs about a penny, compared with $1.07 at a full-service teller window and $0.27 at an ATM. Furthermore, with an Internet-based distribution channel, Internet banks can easily enter new geographic markets without starting new branches. Thus, Internet banks can grow more rapidly.

Table 5

Internet Primary Banks (as of May 20, 2002)

Name	Date Chartered[a]	Type of Bank Offices
Nexity Bank	1968	1 full-service brick-and-mortar office
National American Bank	1983	1 full-service brick-and-mortar office
Etrade Bank	1933	1 full-service brick-and-mortar office
Netbank	1988	1 full-service cyber office
Principal Bank	1998	1 full-service cyber office
First Internet Bank of Indiana	1998	1 full-service cyber office
Ebank	1998	1 full-service brick-and-mortar office
GMac Bank	2001	1 full-service brick-and-mortar office, 2 limited-service administrative offices
BMW Bank of North America	1999	1 full-service brick-and-mortar office
Deepgreen Bank	1999	1 full-service brick-and-mortar office
Lydian Private Bank	2000	1 full-service brick-and-mortar office
The Bancorp Bank	2000	1 full-service brick-and-mortar office
ING Bank FSB	2000	2 full-service brick-and-mortar offices
Bank of Internet USA	2000	1 full-service brick-and-mortar office
Earthstar Bank	2001	1 full-service brick-and-mortar office

[a] The chartered date is not necessarily the date these institutions entered the Internet banking business. Some institutions switched from offering banking services via branches, telephone, fax, and mail to Internet banking services at a later date.

Likewise, Internet banking benefits customers by offering services at a low cost. The banks' savings in overhead and salary expenses can be transferred to their customers. The banks can offer higher rates to depositors while charging lower rates to borrowers. According to one Internet banker, savings in fixed capital can make a difference of 50–70 basis points of interest on savings accounts.[7] Moreover, Internet banking offers convenience to customers, for they can perform many types of banking transactions—for example, checking their account balances, paying bills, and applying for loans—on-line at any time without having to travel.

To reap such benefits, some people have started Internet primary banks while some existing banks have entered the Internet banking business. Table 5 lists the Internet primary banks included in this study. The first column reports the dates these banks were chartered: the dates range from 1933 to 2001, although most were chartered in or after 1998. The chartered date is not necessarily the date these institutions entered the Internet banking business—some institutions switched from offering banking services via branches, telephone, fax, and mail to Internet banking services. The second column describes the service facilities of these institutions. It is noteworthy that only three banks have exclusively cyber offices. Others maintain one or two full-service brick-and-mortar offices. It may well be that physical branches are made available for types of transactions that are impossible to perform via the Internet, such as withdrawing cash or depositing checks.

Internet banks are bigger than the industry average. For instance, in December 2003, average total assets of Internet banks were $3.5 billion, compared with $1 billion for all banks and thrifts.

[7] See Orr (1999).

To achieve such size, Internet banks have been growing rapidly. Table 4 shows that their average asset growth is 20.3 percent, and loan growth is 30.5 percent. To achieve such rapid growth, Internet banks are relying on expensive and volatile funds (average noncore funds amount to 44.5 percent of their assets).

The large size and rapid growth of Internet banks may be associated with these institutions' heavy reliance on technology. They may have to pass a certain size threshold in order to earn enough revenues to cover the high fixed costs associated with technology-intensive production processes. Earlier studies found that technology-intensive production processes exhibit economies of scale. Thus, these institutions are growing rapidly to take advantage of the benefits of scale economies associated with technologically intensive production processes.

Financial Performance

Contrary to prediction, Internet banks have not proven to be very profitable. In fact, their performance is inferior to that of the industry. As of December 2003, for instance, Internet banks had an average ROA of 0.7 percent, compared with 1.0 percent for the industry. Moreover, the average ROE of Internet banks was 8.8 percent, compared with the industry average of 10.0 percent.

These banks' low profitability is attributed to both low net interest and low noninterest income. Internet banks earn lower interest income than the industry. Some Internet banks buy loans on the wholesale market instead of originating them, and thus earn lower interest income. Internet banks also incur higher interest expense by offering higher rates on deposits and relying more heavily on expensive sources of funds. As table 4 shows, in December 2003 noncore funds amounted to 44.5 percent of total assets at Internet banks, compared with 19.5 percent at a typical bank. Such heavy reliance on "hot" money may have resulted from the failure to attract a core client base (Hine and Phillips [2003]) and from the attempt to achieve a certain size through rapid growth.

Compared with the industry, Internet banks also earn lower net noninterest income. The reason is that although they earn higher noninterest income, they also incur higher noninterest expense; the technology-intensive production process used by Internet banks is likely to have high fixed costs. (Banks must generate a large enough volume to offset the high fixed costs.) Moreover, Internet banks spend more on salary expenses. It may well be that Internet delivery systems require fewer but better-skilled employees resulting in higher salary expenses (DeYoung [2001]).

Internet banks are also likely to spend more on marketing and advertising to attract customers to their Web sites. Unlike a branching bank, an Internet bank does not benefit from free advertising whenever a potential customer walks or drives past it. Instead, Internet banks have to purchase advertising to attract new customers to their Web sites. DeYoung (2001) refers to a study by Rosen and Howard (2000) that finds that compared with the average brick-and-mortar retailer, the average on-line retailer spends more than ten times as much per purchase on marketing and advertising. Other expenses include contracts with vendors to service and maintain the Web site, and payments to ATM networks.

In addition, Internet banks incur unanticipated costs by offering physical delivery channels. As noted above, the majority of Internet banks have one or two physical branches, probably because customers need to perform certain transactions at physical locations.

Prospects

Internet banks underperform brick-and-mortar banks, with little evidence of improvement over time. This situation may be attributed to a number of factors. For one thing, Internet banks suffer from low consumer demand. The low volume of business is partly explained by the fact that most Internet banks were established only recently. Like branching de novo banks, newly established

Internet banks need time to attract depositors, find borrowers who are good credit risks, and find other profitable opportunities. Low business volume is also attributed to limited consumer demand for Internet services (Orr [2001]). For many consumers, a technology-driven Internet delivery channel can be both intimidating and frustrating. In addition, transactions such as making deposits or withdrawing cash are impossible to perform via the Internet. Moreover, automated banking services lack person-to-person contact and do not create customer loyalty.

Relative to branching banks, Internet banks are also at a competitive disadvantage in lending to small businesses because they lack the means of building long-term relationships with borrowers. Small businesses tend to be informationally opaque, with little public information available. Banks can alleviate information asymmetries and agency costs by building a relationship with the borrower. Through repeated interactions, banks can gain private information on borrowers and can better monitor the borrower to prevent unanticipated risk-taking activities.

In contrast, Internet banks use automated underwriting procedures for generating loans and manage risk by diversifying large pools of these loans. Through such transaction-lending practices, Internet banks fail to build relationships with borrowers. Consequently, Internet banks are less likely to gain proprietary information about their borrowers and less likely to monitor them effectively. Hence, Internet banks are at a disadvantage compared with branching banks.

For these reasons, Internet banks can be expected to have only a modest chance of success.

Conclusion

Limited-purpose banks challenge the traditional notion of banking. Although relatively few in number, they have unique business models and product mixes that have attracted considerable attention. This study has described their business models, evaluated their performance and risk characteristics, and discussed their prospects.

Some business strategies adopted by limited-purpose banks lead to superior financial performance. For instance, credit card banks are highly profitable compared with both other limited-purpose banks and the industry benchmark. Because of the inherent riskiness of unsecured credit, credit card banks have poor asset quality and high default rates. However, their interest and noninterest income is sufficiently high, leading to high profits. Given their volatile yet robust profitability, credit card banks are likely to have found a permanent place in the banking sector. Moreover, the increasing trend of consolidation suggests that a few large institutions will remain and dominate the sector.

In contrast, other business models show lackluster performance. Subprime lenders earn higher interest income than the industry average, yet poor asset quality diminishes those earnings. Moreover, recent initiatives by the banking regulators impose higher capital requirements on subprime loans and may have eliminated the advantage the insured banks enjoyed in the subprime market. Consequently, the number of subprime lenders has been falling in recent years. It is reasonable to expect that bank participation in subprime lending will remain at reduced levels, if it does not decline further.

Similarly, Internet banks have not proven to be profitable. They incur high costs in acquiring and keeping customers and in using technology-intensive production processes. Moreover, Internet banks fail to build relationships with borrowers and thus forgo an informational advantage with respect to their borrowers. The evidence to date appears to suggest that Internet banks have only a modest chance of success.

The evidence presented in this paper suggests that some limited-purpose banks may have little success in the long run. But although some of these business lines may be less successful as free-standing operations, they may be suitable as part of a larger

bank. Citibank, for example, offers all such services.

Integrating such disparate business lines and offering various financial products and services may lead to economies of both scope and scale; and institutions with diversified asset portfolios may then achieve more stable streams of income. Moreover, institutions offer convenience to their customers by providing different financial products and services in one place.

The trend of institutions offering multiple services and products is already evident. For instance, increasing numbers of banks are using the "click-and-mortar" strategy of adding an Internet site to their physical branches. Through the Internet site, customers can perform banking transactions such as accessing accounts and transferring funds online. In addition, customers can make deposits, apply for a loan, or withdraw cash from their accounts in physical branches or at ATM networks. Gup (2003) refers to studies that document the preference by customers of large banks (such as Morgan Online and Bank of America) for a combination of Internet-based tools and a close relationship with a personal banker. Thus, diversified banks offering multiple services may well be the wave of the future.

BIBLIOGRAPHY

Aizcorbe, Ana M., Arthur B. Kennickell, and Kevin B. Moore. 2003. Recent Changes in U.S. Family Finances: Evidence from the 1998 and 2001 Survey of Consumer Finances. *Federal Reserve Bulletin* 89, no.1:1–32.

Alexander, William P., Scott D. Grimshaw, Grant R. McQueen, and Barrett A. Slade. 2002. Some Loans Are More Equal than Others: Third-Party Originations and Defaults in the Subprime Mortgage Industry. *Real Estate Economics* 30, no. 4:667-–97.

Ausubel, Lawrence M. 1991. The Failure of Competition in the Credit Card Market. *American Economic Review* 81, no. 1:50–81.

Berger, Allen. 2003. The Economic Effects of Technological Progress: Evidence from the Banking Industry. *Journal of Money, Credit, and Banking* 35, no. 2:141–76.

Berlin, Mitchell. 1996. For Better and for Worse: Three Lending Relationships. Federal Reserve Bank of Philadelphia *Business Review*. (November):3–12.

Calem, Paul S., and Loretta J. Mester. 1995. Consumer Behavior and the Stickiness of Credit Card Interest Rates. *American Economic Review* 85, no. 5:1327–36.

Calomiris, Charles W., and Joseph R. Mason. 2003. Credit Card Securitization and Regulatory Arbitrage. Working Paper, no. 03–7. Federal Reserve Bank of Philadelphia.

Canner, Glenn B., and Charles A. Luckett. 1992. Developments in the Pricing of Credit Card Services. *Federal Reserve Bulletin* 78, no. 9:652–66.

Cargill, Thomas F., and Jeanne Wendel. 1996. Bank Credit Cards: Consumer Irrationality versus Market Forces. *Journal of Consumer Affairs* 30, no. 2:373–89.

Carr, James H., and Lopa Kolluri. 2001. Predatory Lending: An Overview. Fannie Mae Foundation Report.

Carr, James H., and Jenny Schuetz. 2001. Financial Services in Distressed Communities: Framing the Issue, Finding Solutions. Fannie Mae Foundation Report.

DeYoung, Robert. 2001. Learning-by-Doing, Scale Efficiencies, and Financial Performance at Internet-Only Banks. Working Paper, no.6. Federal Reserve Bank of Chicago.

———. 2001. The Financial Performance of Pure Play Internet Banks. Federal Reserve Bank of Chicago *Economic Perspectives* 25, no. 1:60–75.

Durkin, Thomas A. 2000. Credit Cards: Use and Consumer Attitudes, 1970-2000. *Federal Reserve Bulletin* 86, no. 9:623–34.

Ergungor, O. Emre. 2003. Securitization. Federal Reserve Bank of Cleveland, *Economic Commentary*, August 15.

Federal Deposit Insurance Corporation (FDIC). 1997. Risks Associated with Subprime Lending. *Financial Institution Letters* 44–97. FDIC.

Federal Register. 2000. Risk-Based Capital Standards; Recourse and Direct Credit Substitutes. *Federal Register* 65, no. 46:12320–52.

Feldman, Ron, and Jason Schmidt. 2000. Noninterest Income in the Ninth District: The Roles of Community and Credit Card Banks. *Fedgazette*. (January):18–19.

Fortowsky, Elaine, and Michael LaCour-Little. 2002. Are Subprime Mortgages Fairly Priced? An Analytic Approach. Wells Fargo Home Mortgage.

Furletti, Mark. 2002. An Overview of Credit Card Asset-Backed Securities. *Payment Cards Center Discussion Paper* 02–14. Federal Reserve Bank of Philadelphia.

Gup, Benton E. 2003. Electronic Banking. In *The Future of Banking*, edited by Benton E. Gup, 131–51. Quorum Books.

Hine, Susan, and Ronnie J. Phillips. 2003. The New Institutional Structure of Banking: A Framework for Survival in the Digital Age. In *The Future of Banking*, edited by Benton E. Gup 153–72. Quorum Books.

Kuykendall, Lavonne. 2001. Providian Ordered Out Of Subprime. *American Banker*, November 29.

Laderman, Elizabeth. 2001. Subprime Mortgage Lending and the Capital Markets. *FRBSF Economic Letter*, no. 38 (2001):1–3.

Mahalik, Robert F., and Kenneth J. Robinson. 1998. Credit is Overdue for Subprime Mortgage Lending. Federal Reserve Bank of Dallas *Financial Industry Issues*. (2nd Quarter):1–8.

Mandell, Lewis. 1990. *The Credit Card Industry: A History*. Twayne Publishers.

Office of the Comptroller of the Currency (OCC), Federal Deposit Insurance Corporation, Board of Governors of the Federal Reserve System, and Office of Thrift Supervision. 1999. Interagency Guidelines on Asset Securitization Activities, December 13. http://www.fdic.gov/news/news/financial/1999/FIL99109.pdf [February 2005].

Office of the Comptroller of the Currency (OCC), Board of Governors of the Federal Reserve System, Federal Deposit Insurance Corporation, and Office of Thrift Supervision. 2001. Expanded Guidance for Subprime Lending Programs, January 31. http://www.fdic.gov/news/news/press/2001/pr0901a.html [February 2005].

Orr, Bill. 1999. E-banks or E-branches? *ABA Banking Journal* XCI, no. 7:32–34.

———. 2001. E-banking 2001: Where are we headed? *ABA Banking Journal* XCIII, no. 1:52–4.

Pavel, Christine, and Paula Binkley. 1987. Costs and Competition in Bank Credit Cards. Federal Reserve Bank of Chicago *Economic Perspectives* XI, no. 2:3–13.

Rosen, Kenneth T., and Amanda L. Howard. 2002. E-retail: Gold Rush or Fool's Gold? *California Management Review* 42, no. 3:72-100.

The Economist. 2003. Fighting the Worms of Mass Destruction. November 29, 65-7.

Wenninger, John. 2000. Summary of "Technology: Driving Specialization or Enabling Diversification (or Both)?," Proceedings of a Conference Sponsored by the Federal Reserve Bank of New York. Federal Reserve Bank of New York *Economic Policy Review* 6, no. 4:69-72.