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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.

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
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> *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.

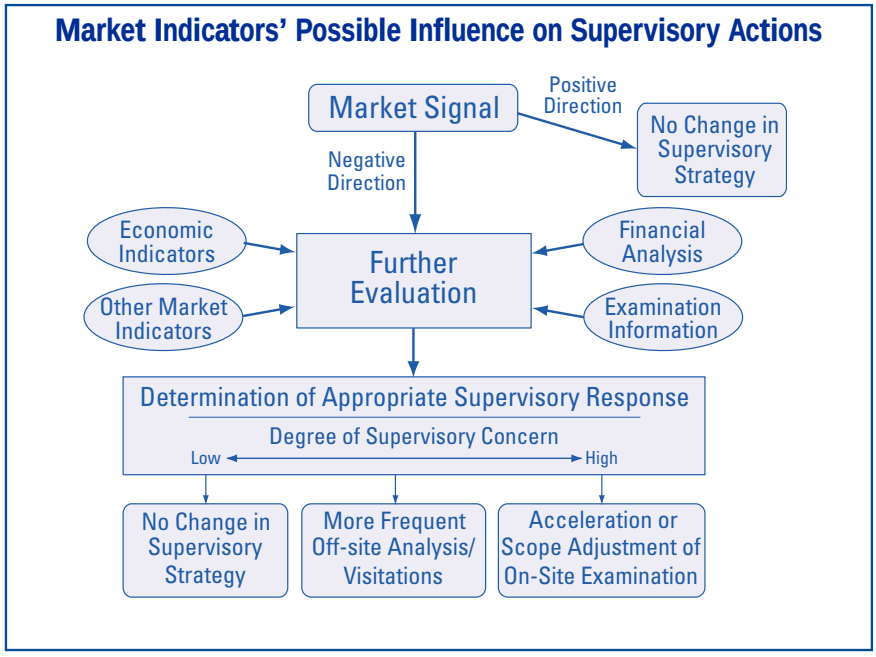
Aside from influencing supervisory responses (and therefore, possibly, the reallocation of supervisory resources), market data are also routinely considered in supervisory risk determinations. All examination activities and all the information and trends analyzed through these activities are used to 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

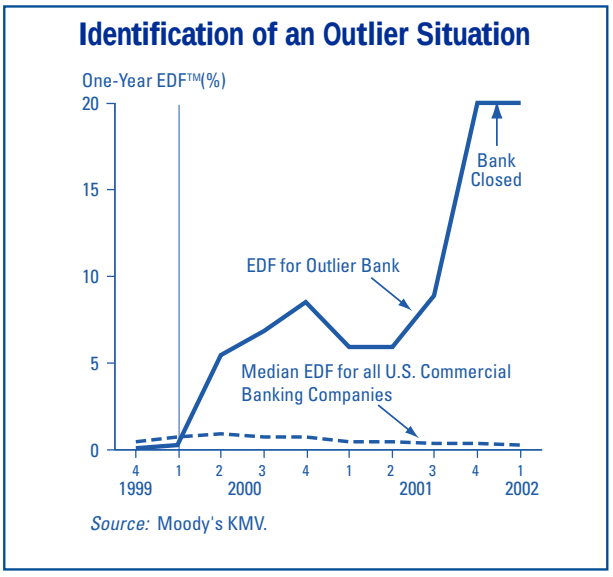
The FDIC, along with other U.S. banking supervisors, has developed various off-site monitoring programs to supplement on-site examination programs. A primary objective of off-site surveillance systems is to alert supervisors to potential emerging risk issues. Market indicators play a significant role 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

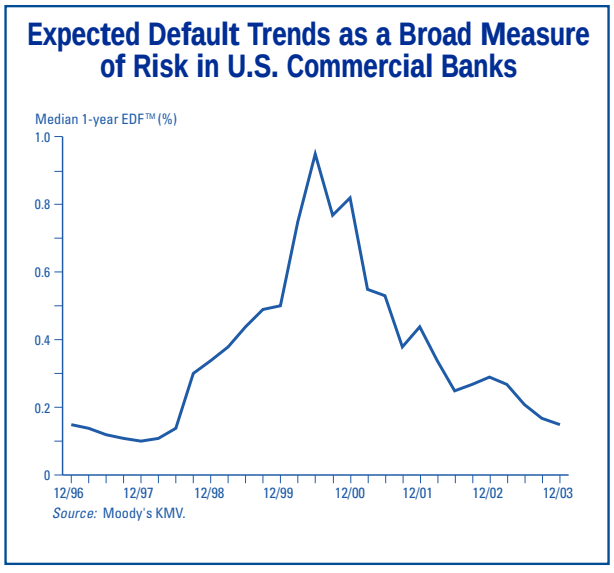
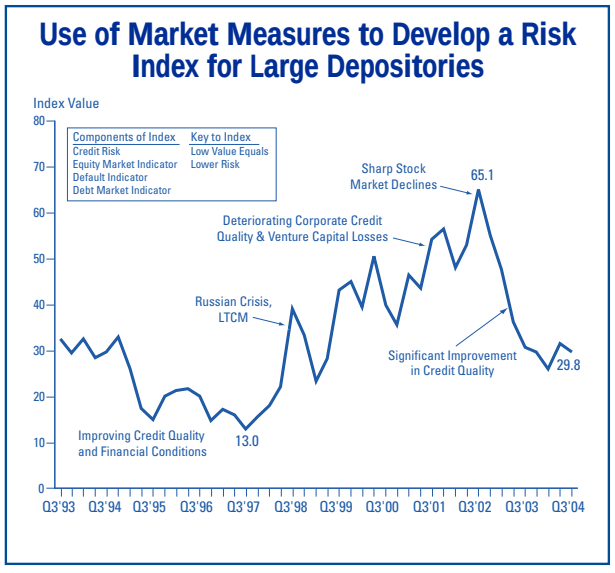


Figure 4



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

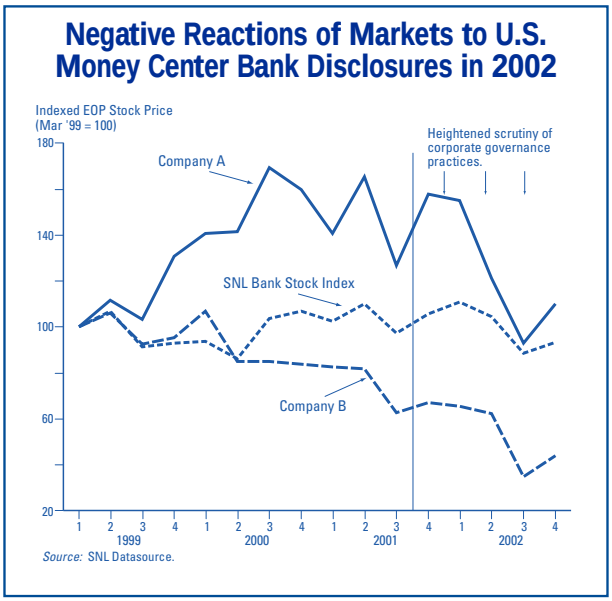
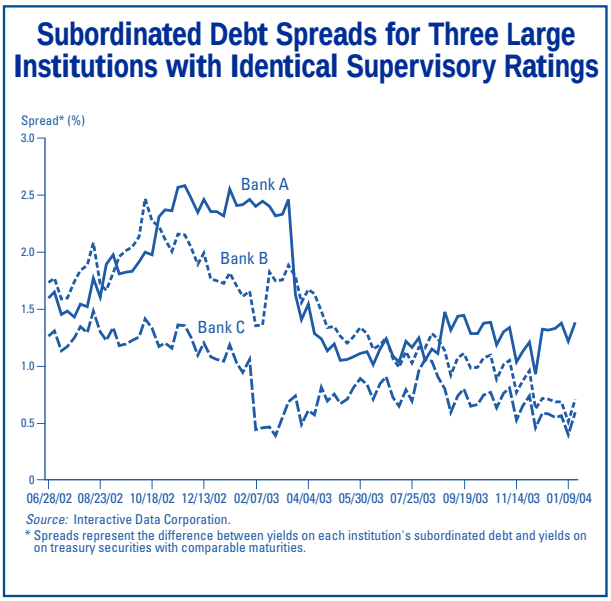


Figure 6



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

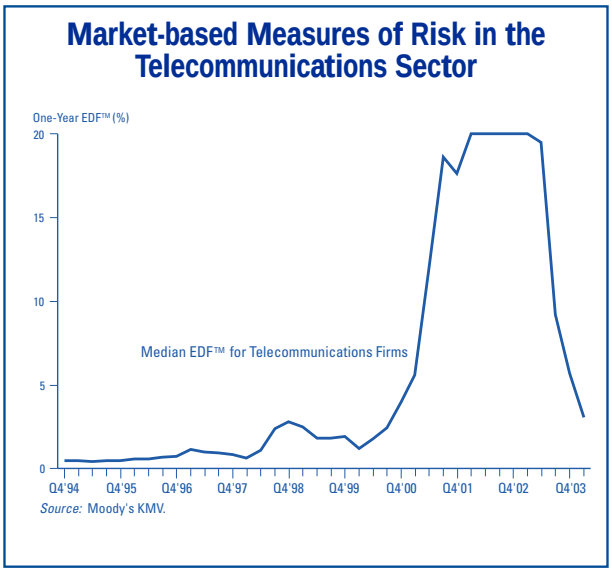
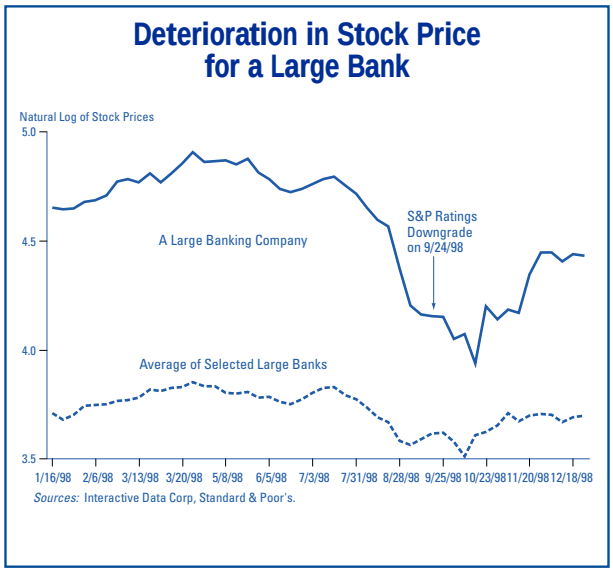


Figure 8



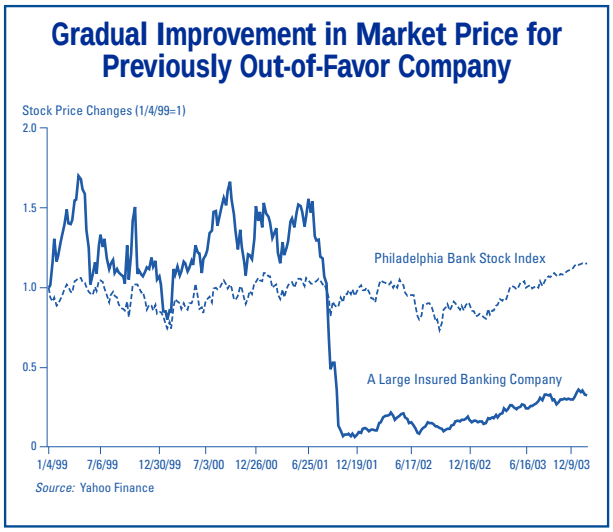
FDIC's overall risk evaluation of the institution. The signals reinforced the FDIC's supervisory outlook for the company, prompting the Corporation to act with one of the tools at its disposal—the imposition of higher deposit insurance premiums.

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

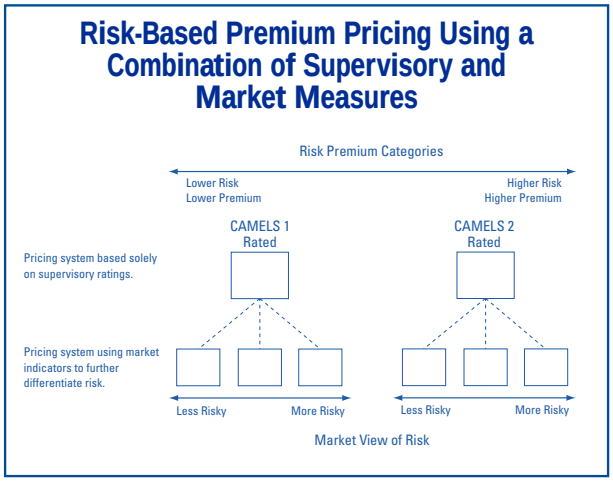
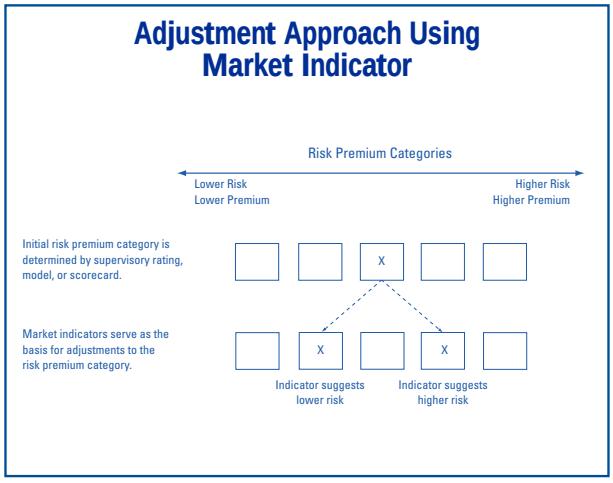


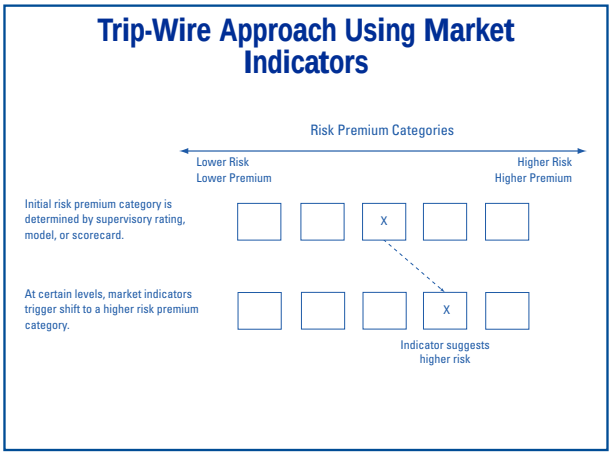
Figure 11



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.

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