The Credit Rating Industry

Richard Cantor and Frank Packer

As financial market complexity and borrower diversity have grown over time, investors and regulators have increased their reliance on the opinions of the credit rating agencies. At the same time, the number of rating agencies operating in the United States and abroad has risen sharply. Together, these trends have prompted market participants and policymakers to reassess the performance of the agencies and the adequacy of public oversight of the ratings industry. This article provides background for such a reassessment by investigating the evolution and economics of the industry, the growth of ratings-dependent regulations, and the reliability and comparability of the agencies' ratings. We examine the correspondence of ratings with default rates and report differences among major agencies in their ratings for junk bonds, international banks, and mortgage-backed securities.

Our findings raise several questions about the current uses of ratings. While the agencies provide accurate rank-orderings of default risk, the meanings of specific ratings vary over time and across agencies. Since these ratings are used as the basis of most investor guidelines and government regulations, the variations in meaning could have serious implications. Moreover, as the number of agencies increases, differences in ratings may encourage borrowers to "shop" for the most favorable ratings. In light of the possibilities for ratings misuse, the current reevaluation of ratings-dependent regulations and the adequacy of public oversight seems well justified.

The Evolution and Economics of the Ratings Industry

Rating Agency Origins, Owners, and Symbols

The precursors of bond rating agencies were the mercantile credit agencies, which rated merchants' ability to pay their financial obligations. In 1841, in the wake of the financial crisis of 1837, Louis Tappan established the first mercantile credit agency in New York. Robert Dun subsequently acquired the agency and published its first ratings guide in 1859. A similar mercantile rating agency was formed in 1849 by John Bradstreet, who published a ratings book in

Digitized for FRASER
http://fraser.stlouisfed.org/
Federal Reserve Bank of St. Louis

1857. In 1933, the two agencies were consolidated into Dun and Bradstreet, which became the owner of Moody's Investors Service in 1962.

The expansion of the ratings business to securities ratings began in 1909 when John Moody started to rate U.S. railroad bonds. A year later, Moody extended his ratings activity to utility and industrial bonds. Poor's Publishing Company issued its first ratings in 1916, Standard Statistics Company in 1922, and the Fitch Publishing Company in 1924. The number of bond rating agencies in the U.S. reverted to three when Standard Statistics and Poor's Publishing Company merged to form Standard and Poor's (S&P) in 1941. The most significant new entry in the United States since that time has been the Chicago-based Duff and Phelps, which began to provide bond ratings for a wide range of companies in 1982, although it had researched public utility companies since 1932. Another major ratings provider—McCarthy, Crisanti, and Maffei—was founded in 1975 and acquired by Xerox Financial Services before its fixed income rating and research service was merged into Duff and Phelps in 1991.

The four major rating agencies face additional competition from more specialized agencies. For example, Thomson Bankwatch and IBCA in the United States exclusively rate financial institutions, and A.M. Best rates insurance companies' claims-paying abilities. More generally, the analysts employed by many financial institutions regularly make recommendations to buy or sell that implicitly confirm or contradict the agencies' ratings. To the extent that the analyses underlying these recommendations are made public, they provide alternative perspectives to the judgments of the rating agencies.

As capital flows in international financial markets have shifted from the banking sector to capital markets, credit ratings have also begun to make a mark overseas. Credit ratings are in use in the financial markets of most developed economies and several emerging market countries as well (Dale and Thomas 1991). With demand rising in foreign countries, the number of foreign-based rating agencies has increased. Along with the four largest U.S. raters, one other U.S., one British, two Canadian, and three Japanese firms are listed among the world's "most influential" rating agencies by the *Financial Times* in its publication *Credit Ratings International.* The principal characteristics of all eleven agencies are reported in Table 1.

The ownership structures of the U.S. rating agencies do not generally present serious conflict of interest problems.[1] The major agencies are all either independent or owned by nonfinancial companies, though two had until recently been owned by financial companies. Moody's is a subsidiary of Dun and Bradstreet, which dominates the market for commercial credit ratings. Standard and Poor's is a subsidiary of McGraw-Hill, a major publishing company with a strong business information focus. Fitch, initially a publishing company, was bought by an independent investors group in 1989. Duff and Phelps Credit Ratings is a subsidiary of Duff and Phelps,

Table 1
SELECTED BOND RATING AGENCIES

Year Ratings First Published	Credit Rating Agency	Home Country	Year of SEC Designation	Employees	Ownership	Principal Ratings Areas
1909	Moody's Investors Service ("Moody's")	U.S.	1975	674	Dun and Bradstreet	Full service
1922	Fitch Investors Service ("Fitch")	U.S.	1975	200+	Independent	Full service
1923	Standard and Poor's Corporation ("S&P")	U.S.	1975	700+	McGraw-Hill	Full service
1972	Canadian Bond Rating Service ("CBRS")	Canada	N.A.	26	Independent	Full service (Canada)
1974	Thomson BankWatch ("Thom")	U.S.	1991	40	Thomson Company	Financial institutions
1975	Japanese Bond Rating Institute ("JBRI")	Japan	N.A.	91	Japan Economic Journal (Nikkei)	Full service (Japan)
1977	Dominion Bond Rating Service ("DBRS")	Canada	N.A.	20	Independent	Full service (Canada)
1978	IBCA, Ltd. ("IBCA")	U.K.	1990	50	Independent	Financial institutions
1980	Duff and Phelps Credit Rating Co. ("Duff")	U.S.	1982	160	Duff and Phelps Corp.	Full service
1985	Japanese Credit Rating Agency ("JCRA")	Japan	N.A.	61	Financial Institutions	Full service (Japan)
1985	Nippon Investor Service Inc. ("NIS")	Japan	N.A.	70	Financial Institutions	Full service (Japan)
1975	McCarthy, Crisanti, and Maffei ("MCM") (no longer in operation)	U.S.	1983	N.A.	Acquired by Duff and Phelps in 1991	Full service (U.S.)

Digitized for FRASER
http://fraser.stlouisfed.org/
Federal Reserve Bank of St. Louis

Inc., whose affiliates offer investment management, financial consulting, and investment research services. By late 1994, however, Duff and Phelps Credit Ratings is expected to become an independent company as its shares are spun off to the shareholders of Duff and Phelps, Inc., itself a closely held company. Thomson Bankwatch was a subsidiary of Keefe, Bruyette, and Woods, a brokerage firm, until March 1989, when it was sold to the Thomson Corporation, a large private international publishing conglomerate. Most of the non-U.S. firms are also independent. The London-based rating agency, IBCA, is independently owned, as are the two Canadian rating agencies. Two of the rating agencies from Japan, however, are owned by consortia of financial institutions, including some for which credit ratings are issued.

Over time, the agencies have expanded the depth and frequency of their coverage. The four leading U.S. credit rating agencies rate not only the long-term bonds issued by U.S. corporations, but also a wide variety of other debt instruments: municipal bonds, asset-backed securities, preferred stocks, medium-term note programs, shelf registrations, private placements, commercial paper programs, and bank certificates of deposit. More recently, ratings have been applied to other types of risks, including the counterparty risk posed by derivative products companies and other institutions, the claims-paying ability of insurance companies, the performance risk of mortgage servicers, and the price volatility of mutual funds and mortgage-backed securities.

Increased foreign demand has also led to a dramatic overseas expansion of the established U.S. rating agencies. Over the past ten years, Moody's has opened offices in Tokyo, London, Paris, Sydney, Frankfurt, and Madrid, and now rates the securities of approximately 1,200 non-U.S. issuers (out of more than 4,500 total). Standard and Poor's has set up offices in Tokyo, London, Paris, Melbourne, Toronto, Frankfurt, Stockholm, and Mexico City, and has established affiliations or acquired local rating agencies in Sweden, Australia, Spain, and Mexico. Duff and Phelps has formed joint ventures in Mexico and several other Latin American countries. The established U.S. agencies appear to have a competitive advantage over their foreign counterparts in the business of providing independent, credible securities ratings.

The bond ratings assigned by all the rating agencies are meant to indicate the likelihood of default or delayed payment of the security. Most of the rating agencies have long had their own system of symbols—some using letters, others using numbers, many both—for ranking the risk of default from extremely safe to highly speculative. Gradually, however, a rough correspondence among the major agencies' ratings has emerged (Table 2).[2] To provide finer rating gradations to help investors distinguish more carefully among issuers,

Table 2
LONG-TERM SENIOR DEBT RATING SYMBOLS

Investment Grade Ratings			Speculative Grade Ratings		
S&P and others	Moody's	Interpretation	S&P and others	Moody's	Interpretation
AAA	Aaa	Highest quality	BB+	Ba1	Likely to fulfill
			BB	Ba2	obligations; ongoing
			BB–	Ba3	uncertainty
AA+	Aa1	High quality	B+	B1	High risk
AA	Aa2		B	B2	obligations
AA–	Aa3		B–	B3	
A+	A1	Strong payment	CCC+		Current vulnerability
A	A2	capacity	CCC	Caa	to default, or in
A–	A3		CCC–		default (Moody's)
BBB+	Baa1	Adequate payment	C	Ca	In bankruptcy or
BBB	Baa2	capacity	D	D	default, or other
BBB–	Baa3				marked shortcoming

Notes: The other agencies listed in Table 1 use the rating symbols of the first column, with the exception of DBRS (H and L symbols in place of + and –) and CBRS (H and L symbols in place of + and –, and + symbols that correspond to second and third letters). The agencies follow a variety of policies with respect to the number of ratings symbols given below B–.

Digitized for FRASER
http://fraser.stlouisfed.org/
Federal Reserve Bank of St. Louis

Fitch in 1973, Standard and Poor's in 1974, and Moody's in 1982 started attaching plus and minus symbols to their ratings. Other modifications of the grading schemes — including the addition of a "credit watch" category to denote that a rating is under review — have also become standard. In the remainder of this article, the symbols currently employed by Standard and Poor's, Fitch, Duff and Phelps, and others are used to refer to the ratings of all agencies.

The Transition to Charging Issuers and the Role of Reputation

Agencies initially provided public ratings of an issuer free of charge, and financed their operations solely through the sale of publications and related materials. However, the publications, which were easily copied once published, did not yield sufficient returns to justify intensive coverage. As the demand on rating agencies for faster and more comprehensive service increased, the agencies began to charge issuers for ratings. They then used these revenues to expand services and products and to compete with private sector analysts at other financial institutions.

The default of Penn Central on $82 million of commercial paper in 1970 was a catalyst in the transition to charging issuers. The commercial paper market had grown very rapidly in the 1960s with little regard for credit quality. Investors tended to assume that any firm with a household name was an acceptable credit risk. When Penn Central defaulted during the 1970 recession, investors began to question the financial condition of many companies and refused to roll over their commercial paper. Facing a liquidity crisis, many of these companies also defaulted. To reassure nervous investors, issuers actively sought credit ratings, and it became established market practice that new debt issues coming to market have at least one credit rating. With the demand for rating services rising, the agencies found they were able to impose charges on issuers. Fitch and Moody's started to charge corporate issuers for ratings in 1970, and Standard and Poor's followed suit a few years later. (Standard and Poor's started to charge municipal bond issuers for ratings in 1968.) Now, according to one estimate, roughly four-fifths of Standard and Poor's revenue comes from issuer fees (Ederington and Yawitz 1987).

Agencies charge fees that vary with the size and type of issue, but a representative fee on a new long-term corporate bond issue ranges from 2 to 3 basis points of the principal for each year the rating is maintained. Normally, the charge for any one bond issue has both a floor and a ceiling, and negotiated rates are available for frequent issuers. For issuers of commercial paper, Moody's and Standard and Poor's maintain quarterly charges based on amounts outstanding (up to 7 basis points) plus an annual fee.

While the current payment structure may appear to encourage agencies to assign higher ratings to satisfy issuers, the agencies have an overriding incentive to maintain a reputation for high-quality, accurate ratings. If investors were to lose confidence in an agency's ratings, issuers would no longer believe they could lower their funding costs by obtaining its ratings. As one industry observer has put it, "every time a rating is assigned, the agency's name, integrity, and credibility are on the line and subject to inspection by the whole investment community" (Wilson 1994). Over the years, the discipline provided by reputational considerations appears to have been effective, with no major scandals in the ratings industry of which we are aware.[3]

While the current payment structure may appear to encourage agencies to assign higher ratings to satisfy issuers, the agencies have an overriding incentive to maintain a reputation for high-quality, accurate ratings.

In addition to putting an agency's reputation at risk, inaccurate ratings might expose the agency to costly legal damages. However, the threat of legal liability for rating agencies has not yet materialized. Class action suits have been brought against rating agencies following major failures — such as the Washington Public Power Supply System default in 1983 and the Executive Life bankruptcy in 1991—but the cases were dropped before verdicts were reached.

Digitized for FRASER
http://fraser.stlouisfed.org/
Federal Reserve Bank of St. Louis

The Ratings Process and Unsolicited Ratings

The process of obtaining a rating can be lengthy, requiring significant time and effort on the part of the debt-issuer and its underwriter as well as the agency. The agencies base their ratings on both quantitative and qualitative assessments of the borrowing company's condition and the special provisions of the particular security at hand. A staff committee at the agency usually votes on a recommendation by a senior analyst after presentation and debate. The rating assigned, often accompanied by explanatory analysis, is first communicated to the issuer and underwriter, and then to the public at large. The issuer frequently has the opportunity to appeal a rating if it is not satisfied, but in general the ratings process is structured to hear the best case the issuers have to present before the rating is assigned. (More discussion of the information-gathering and decision process can be found in Wilson 1994 and Ederington and Yawitz 1987.)

The agencies maintain very different policies about assigning ratings not requested by the issuer. Some agencies will issue ratings only upon request; other agencies will issue unsolicited ratings. Standard and Poor's rates all taxable securities in the U.S. domestic market registered by the Securities and Exchange Commission (SEC), regardless of whether the rating was requested and paid for by the issuer. Standard and Poor's will not, however, assign unsolicited ratings for structured securities and bonds issued by foreign companies because it views the nonpublic information provided by the issuer to be essential for analyzing these securities. Moody's shares Standard and Poor's policy of rating all SEC-registered, U.S. corporate securities, but Moody's frequently issues unsolicited ratings on structured securities and foreign bonds as well. In contrast, both Fitch and Duff and Phelps refrain from assigning unsolicited ratings to any security. Moreover, Duff and Phelps will only make a rating public upon the request of its client (Ederington and Yawitz 1987).

Moody's and Standard and Poor's usually receive fees for ratings they would have issued anyway because companies want the opportunity provided by the formal rating process to put their best case before the agencies. Moody's unsolicited ratings of issuers of structured securities and foreign bonds are more controversial because such assessments are not part of an overall policy to rate all such securities. Unsolicited ratings in these areas are often substantially lower than the solicited ratings and can affect the yield paid at issuance. Proponents claim that unsolicited ratings provide a powerful check against rating shopping, the practice of hiring only those agencies that offer favorable ratings. Critics complain that unsolicited ratings are based on incomplete information, because communication with the issuer is limited. Although an agency assigning unsolicited ratings may appear to have an incentive to be unduly conservative so as to reward those firms that do pay for its ratings, this incentive may be offset by the need to maintain a reputation for analytical credibility (Monro-Davis 1994).

The Use of Ratings in Regulations

Introduced as guides for unsophisticated investors, credit ratings have acquired several new uses. Many mutual funds and pension funds place limits on the amount of a portfolio that can be invested in non-investment-grade securities. Debt issuers and investors frequently introduce ratings explicitly into the covenants of their financial contracts and seek guidance from the agencies on the structuring of their financial transactions.

As ratings have gained greater acceptance in the marketplace, regulators of financial markets and institutions have increasingly used ratings to simplify the task of prudential oversight. The reliance on ratings extends to virtually all financial regulators, including the public authorities that oversee banks, thrifts, insurance companies, securities firms, capital markets, mutual funds, and private pensions. The early regulatory uses of ratings drew only on the agency distinctions between investment grade securities, or those rated BBB and above, and speculative securities, those rated BB and below. Regulations required that extra capital be held against speculative securities or prohibited such investments altogether. Although the distinction between investment grade and speculative securities remains an important one, over time, regulatory capital requirements, disclosure requirements, and investment prohibitions have increasingly been tied to other letter grades as well. The history of selected uses of ratings by regulators is summarized in Table 3.[4]

Since the regulators adopted ratings-dependent rules, they have had to specify which agencies would qualify

Digitized for FRASER
http://fraser.stlouisfed.org/
Federal Reserve Bank of St. Louis

for consideration under their regulations. The SEC currently designates six agencies as "nationally recognized statistical rating organizations" (NRSROs), and the other regulators generally rely on the SEC's designations. Given the large number of designated agencies (and at least as many agencies have applications pending), regulations must include methods for dealing with rating disagreements among the agencies. Most regulations simply accept either the highest rating or the second highest rating, but the insurance regulators conduct independent analyses to resolve disagreements among the agencies. The first approach is arbitrary and perhaps inflationary, while the second approach incurs the cost of establishing in-house analytical capacity.

Traditional Use of Ratings: Distinguishing Investment Grade From Speculative Securities

On the heels of a sharp decline in credit quality in 1931, the Office of the Comptroller of the Currency ruled that bank holdings of publicly rated bonds had to be rated BBB or better by at least one rating agency if they were to be carried at book value; otherwise the bonds were to be written down to market value and 50 percent of the resulting book losses were to be charged against capital. Similar rules were adopted by many state banking departments.

In 1936, the Office of the Comptroller and the Federal Reserve went further, prohibiting banks altogether from holding bonds not rated BBB or above by at least two agencies. The new rules had far-reaching consequences because 891 of 1,975 bonds listed on the New York Stock Exchange were rated below BBB in 1936. Still in force for banks today, these restrictions on investments were extended to thrifts in 1989.

As of the early 1930s, regulators of insurance companies were relying on ratings to help determine the capital to be put aside for securities held. In 1951, the National Association of Insurance Commissioners (NAIC) established a system of internal quality categories in which the top-quality classification corresponded to ratings of BBB and above, effectively establishing uniformity in the definition of "investment grade" across bank and insurance regulators (West 1973).[5]

Regulatory rules based on the distinction between investment grade and speculative securities have since expanded. The SEC has required dealers to hold extra capital against their inventories of speculative or "junk" bonds since

Table 3
Selected Uses of Ratings in Regulation

Year Adopted	Ratings-Dependent Regulation	Minimum Rating	How Many Ratings?	Regulator/Regulation
1931	Required banks to mark-to-market lower rated bonds	BBB	2	OCC and Federal Reserve examination rules
1936	Prohibited banks from purchasing "speculative securities"	BBB	Unspecified	OCC, FDIC, and Federal Reserve joint statement
1951	Imposed higher capital requirements on insurers' lower rated bonds	Various	N.A.	NAIC mandatory reserve requirements
1975	Imposed higher capital haircuts on broker/dealers' below-investment-grade bonds	BBB	2	SEC amendment to Rule 15c3-1: the uniform net capital rule
1982	Eased disclosure requirements for investment grade bonds	BBB	1	SEC adoption of Integrated Disclosure System (Release #6383)
1984	Eased issuance of nonagency mortgage-backed securities (MBSs)	AA	1	Congressional promulgation of the Secondary Mortgage Market Enhancement Act of 1984
1987	Permitted margin lending against MBSs and (later) foreign bonds	AA	1	Federal Reserve Regulation T
1989	Allowed pension funds to invest in high-rated asset-backed securities	A	1	Department of Labor relaxation of ERISA Restriction (PTE 89-88)
1989	Prohibited S&Ls from investing in below-investment-grade bonds	BBB	1	Congressional promulgation of the Financial Institutions Recovery and Reform Act of 1989
1991	Required money market mutual funds to limit holdings of low-rated paper	A1*	1†	SEC amendment to Rule 2a-7 under the Investment Company Act of 1940
1992	Exempted issuers of certain asset-backed securities from registration as a mutual fund	BBB	1	SEC adoption of Rule 3a-7 under the Investment Company Act of 1940
1994 Proposal	Would impose varying capital charges on banks' and S&Ls' holdings of different tranches of asset-backed securities	AAA & BBB	1	Federal Reserve, OCC, FDIC, OTS Proposed Rule on Recourse and Direct Credit Substitutes

* Highest ratings on short-term debt, generally implying an A– long-term debt rating or better.
† If issue is rated by only one NRSRO, its rating is adequate; otherwise, two ratings are required.

Digitized for FRASER
http://fraser.stlouisfed.org/
Federal Reserve Bank of St. Louis

1975. In 1989, Congress passed legislation prohibiting thrifts from investing in junk bonds. In 1993, the Basle Committee on Bank Supervision proposed in its market risk guidelines that internationally active commercial banks dealing in securities should hold extra capital against their non-investment-grade bond inventories as well. (This passage in the proposal mirrors a similar statement in the European Community's Capital Adequacy Directive governing the activities of security dealers domiciled in the Community.)

The achievement of an investment grade rating eases the burden of disclosure for the issuer of the securities. In 1982, the SEC started to require less detailed disclosure at issuance for investment grade securities. In 1993, the SEC adopted Rule 3a-7, which made the investment grade rating a criterion for easing the public issuance of certain asset-backed securities (Cantor and Demsetz 1993).

Embedding the investment grade distinction in regulations has simplified prudential oversight of financial institutions. Some of these regulations have, as a by-product, adversely affected the availability and cost of funds to below-investment-grade borrowers. West (1973) and Carey et al. (1993) show that spreads rose for borrowers rated BB following the adoption of regulations affecting bank and insurance company investments in below-investment-grade securities.

The Emergence of New Cutoff Ratings

Regulators are increasingly using ratings other than BBB as thresholds in their rules. Each new regulatory use appears to have encouraged other regulators to expand their reliance on ratings. Some of these new rules have greatly influenced the development of capital markets.

In 1984, to promote the development of a mortgage-backed securities market without the support of government-related agencies (Government National Mortgage Association, Federal National Mortgage Association, and Federal Home Loan Mortgage Corporation), Congress passed the Secondary Mortgage Market Enhancement Act (SMMEA). This act eased issuance and enhanced the marketability of mortgage-backed securities rated AAA or AA. In particular, it allowed these securities to be marketed up to six months in advance of the delivery of their underlying collateral and exempted them from most states' blue sky laws. In addition to essentially creating the nonagency mortgage-backed securities market, SMMEA established a new regulatory cutoff rating. The higher AA rating was chosen because mortgage-backed securities with full or partial government backing—the reference securities to which the new securities were compared—were virtually all rated AAA or AA at the time.

A few years later, the Federal Reserve Board, which had previously refrained from expanding its use of ratings beyond the basic investment grade requirement for bank portfolio investments, also began to incorporate an AA cutoff in certain of its prudential rules affecting bank supervision. In recognition of the expanded role given to ratings by the Congress, the Board began to use AA as a cutoff in rules for determining the eligibility of mortgage-related securities (1987) and foreign bonds (1989) as collateral for margin lending.[6]

The single A rating has also served as a cutoff. The Labor Department, in its role as overseer of the private pension industry, adopted a regulation in 1988 permitting pension fund investments in asset-backed securities rated single-A or better (Baron and Murch 1993). The A rating gained further regulatory importance in 1990 when the NAIC adopted new capital rules that applied the least burdensome capital charge to bonds with the NAIC quality designation corresponding to a public rating of A or above.

Short-term ratings too have been important tools of recent regulation. In 1991, the SEC adopted amendments to Rule 2a-7 of the Investment Company Act of 1940 that imposed ratings-based restrictions on money market mutual fund investments.[7] Following the adoption of these amendments, mutual fund holdings of lower quality paper fell to zero, and the total amount of lower quality paper outstanding declined sharply (Crabbe and Post 1992).

Some regulations have gone beyond specific cutoff levels by incorporating schedules of multiple rating levels and corresponding restrictions and charges. As part of its 1990 reform of rating procedures, the NAIC increased the number of its quality categories from four to six and applied different regulatory restrictions to each category. Four years later, the Federal Financial Institutions Examination Council (1994) joined bank and thrift regulators, including the Federal Reserve, in a proposal to adjust capital charges on deposi-

Digitized for FRASER
http://fraser.stlouisfed.org/
Federal Reserve Bank of St. Louis

tory institutions' holdings of structured securities on the basis of credit ratings.

The Designation of NRSROs

Under most current ratings-dependent regulations in the United States, ratings matter only if they are issued by an NRSRO. The SEC first applied the NRSRO designation to agencies in 1975 in referring to agencies whose credit ratings could be used to determine net capital requirements for broker-dealers. Subsequently, the term was taken up by regulators other than the SEC and even by the private investment community.

When the phrase NRSRO was first used, the SEC was referring to the three agencies that had a national presence at that time, Moody's, Standard and Poor's, and Fitch. But as the public bond market and rating industry grew over time, other agencies have sought NRSRO designation from the SEC. In 1982, Duff and Phelps received designation, followed by IBCA and Thomson BankWatch in 1991 and 1992, respectively. The designation of the latter two has been limited to their ratings for banks and financial institutions only. In 1983, the SEC granted NRSRO status to McCarthy, Crisanti, and Maffei; however, this company's credit rating franchise was acquired by Duff and Phelps in 1991. At least six foreign rating agencies currently have applications outstanding with the SEC for designation as NRSROs.

At present, the SEC's procedures and conditions for designating agencies as NRSROs are not very explicit. If a rating agency requests NRSRO status from the SEC, the SEC's staff will undertake an investigation, analyzing data supplied by the rating agency about its history, ownership, employees, financial resources, policies, and internal procedures. Nevertheless, the principal test applied by the SEC to any agency seeking NRSRO status is that the agency be "nationally recognized by the predominant users of ratings in the United States as an issuer of credible and reliable ratings" (SEC 1994a). In effect, the SEC requires that the market already place substantial weight on the judgment of a rating agency. Market acceptance is determined by polling on an informal basis. By giving the market a role in selecting NRSROs, the SEC intends to weed out agencies that have not already established a reputation for accurate ratings.

Nonetheless, the informality of the process and the opaqueness of the acceptance criteria raise serious problems. The requirement that an agency be widely used by major investors before it can be designated as an NRSRO clearly favors incumbents. Given the growing importance of NRSRO status, new entrants in the ratings business who lack this status may find it increasingly difficult to attract a wide following in the investment community. These concerns may become more acute as the SEC considers applications from foreign rating agencies.

Regulations generally refer directly to NRSRO rating levels without allowances for differences across agencies.

At present, the SEC does not require NRSROs to have uniform rating standards. In particular, the Commission has no explicit rule that "equivalent" letter grades must correspond to similar expected default rates. Nonetheless, regulations generally refer directly to NRSRO rating levels without allowances for differences across agencies.[8] Unless the way in which regulations use ratings is changed, all NRSRO ratings of a certain level ought to correspond to the same level of credit risk. To achieve such consistency, the SEC may have to develop additional acceptance criteria and ongoing monitoring capacity. In recognition of these concerns, the SEC has published a "concept release" that invites rating agencies, corporations, and investors to comment on "the role of ratings in federal securities laws and the need to establish formal procedures for designating and monitoring the activities of NRSROs" (SEC 1994a).

Resolving Disagreements among the Rating Agencies

Most ratings-dependent regulations only require that a bond issue carry a single NRSRO's rating. However, issuers in the United States commonly obtain at least two ratings on publicly issued securities. Since both Moody's and Standard and Poor's rate virtually all public corporate bond issues, a dual rating is fairly automatic. As a consequence, differences of

Digitized for FRASER
http://fraser.stlouisfed.org/
Federal Reserve Bank of St. Louis

opinion across the rating agencies inevitably arise. Regulators have had to find a way to resolve these differences because most of their rules key off specific letter grades. Their approaches to the problem take two forms—explicit rules and independent analysis.

The most common approach is to adopt an explicit rule, recognizing either the highest or the second highest rating, regardless of the number or level of the other ratings. The second-highest rating rule attempts to strike a balance between a conservative policy (eliminating the highest rating) and a liberal policy (not necessarily using the lowest rating). When the ratings industry was dominated by Moody's and Standard and Poor's, this rule was effectively conservative since the lower of two ratings was also the lowest rating. As the number of NRSROs has increased and issuers have begun to obtain three, four, or more ratings, the policy is potentially more liberal. Although regulators could conceivably adopt a more conservative rule (such as the lowest rating), in areas such as structured finance where Moody's and Standard and Poor's do not attempt to rate every issue, issuers could respond by dropping agencies that assigned the lower ratings.

Agency ratings have been a less reliable guide... to absolute credit risks: default probabilities associated with specific letter ratings have drifted over time.

The second approach, used by the NAIC, resolves differences of opinion among the rating agencies through independent analysis. The NAIC's Securities Valuation Office (SVO) assigns each bond held by an insurance company to one of six quality categories, and each category has a different implication for mandatory reserves. The six quality categories are meant to correspond to different NRSRO public ratings. (Category 1 corresponds to AAA,AA, and A; 2 to BBB; 3 to BB; 4 to B; and 5 or 6 to CCC,C, or D ratings, depending on the rating agency.) However, the SVO staff is free to assign a rating that differs from the bond's public credit rating as long as their judgment implies a downgrade from the corresponding public credit rating. In practice, the SVO concentrates its resources on (1) determining a quality category for unrated private placement securities and (2) resolving differences of opinion among the agencies, where the SVO may choose either the higher or lower rating (NAIC 1994). At the cost of establishing the capacity to undertake independent analysis, the NAIC has developed a discretionary use of ratings that calls for judgment in the interpretation of split ratings and permits certain ratings to be discounted if they are viewed as too high.

The Reliability of Ratings

In this section, we review the rating agencies' historical records in measuring *relative* and *absolute* risks of corporate bond defaults. Many of the current uses of ratings presume accuracy on both counts. To be meaningful, ratings must, at a minimum, provide a reasonable rank-ordering of relative credit risks. In addition, however, ratings ought to provide a reliable guide to absolute credit risk. In other words, the ratings levels corresponding to regulatory cutoffs should have a fairly stable relationship to default probabilities over time. Our review of the corporate bond defaults data assembled by Moody's and Standard and Poor's suggests that the agencies do a reasonable job of assessing relative credit risks: lower rated bonds do in fact tend to default more frequently than higher rated bonds. Agency ratings have been a less reliable guide, however, to absolute credit risks: default probabilities associated with specific letter ratings have drifted over time.

Our review is limited to Moody's and Standard and Poor's ratings because only these agencies have a long history of rating a large number of corporate issues. We present data primarily from Moody's because it has published more historical data than Standard and Poor's. By and large, however, we believe that the patterns observed in Moody's ratings are also present in Standard and Poor's ratings, and we provide some support for this view in the text. In addition, the analysis is limited to corporate bond ratings and excludes commercial paper ratings, municipal bond ratings, or asset-backed bonds. In these other markets, a study of rating reliability is not possible either because defaults have been too rare, the data are too hard to obtain, or the history of the market is too short.

Digitized for FRASER
http://fraser.stlouisfed.org/
Federal Reserve Bank of St. Louis

Measuring Relative Credit Risks

Some very simple tests suggest that the rating industry measures relative credit risks with reasonable accuracy. The capital markets seem to validate the agencies' judgments by pricing lower rated bonds at higher average yields. Moreover, both average short-term and long-term default rates are correlated in a sensible way with credit ratings. This evidence implies that ratings provide a useful rank ordering of credit risks.

For U.S. corporate bonds, market yields are generally closely related to their credit ratings. Table 4 reports the average yield spreads between corporate bonds and U.S. Treasuries by rating category for issues rated by Standard and Poor's between 1973 and 1987. Each letter grade decline corresponds to a distinct increase in average yield spreads. The pattern of increasing yields as the ratings category is lowered is extremely robust and holds without exception across all years of the sample (Altman 1989). While this correlation may seem unsurprising and perhaps a weak test of ratings reliability, Artus, Garrigues, and Sassenou (1993) put forth evidence that, for the French bond market, a direct relationship between yield and the ratings of the largest French bond rating agency is either weak or nonexistent.

This simple association of yields and ratings in the U.S. bond market need not indicate the presence of a causal relationship. Rather, it may simply mean that the capital markets and the rating agencies basically agree on the factors that measure credit risk. Although the literature is voluminous (see Ederington and Yawitz 1987), the evidence is mixed on whether credit ratings contain additional information not already embedded in market yields. Even if ratings do not contain independent information about credit risk, the use of ratings by investors and regulators may make sense if ratings offer an efficient summary of this information.

Table 4
Spreads between Corporate Bonds and U.S. Treasuries
1973–87 Averages

Rating	Basis Points
AAA	43
AA	73
A	99
BBB	166
BB	299
B	404
CCC	724

Source: Altman (1989).
Note: Based on equally weighted averages of monthly spreads per rating category. Spreads for BB and B represent data for 1979–87 only; spreads for CCC, data for 1982–87 only.

Measuring ratings performance by contemporaneous market yields, however, does not control for waves of market optimism or pessimism. The accumulation of ex post evidence on bond performance provides a more precise scorecard on ratings. Moody's and Standard and Poor's have made such evidence available in their corporate bond default studies, which calculate historical default rates among classes of rated issuers.

These studies indicate that lower corporate bond ratings have indeed been associated with a higher probability of default. The results of the Moody's study (Moody's Investors Service 1994) are summarized in Chart 1, which reviews the default rates among rated issuers between 1970 and 1993. The upper left panel in Chart 1 presents the one-year default rate for the entire sample of rated bonds. Measured to 1/10 of a percentage point, the one-year default rates are zero for all bonds rated A and above. The one-year default rate rises to 2/10 of a percentage point for BBB issuers, and 1.8 and 8.3 percent for BB and B rated issuers, respectively.

The other three panels of Chart 1 show how the default probabilities across Moody's rating categories change as the time horizon is lengthened to five, ten, and fifteen years.[9] While the default probability increases with the time horizon for each rating category, the negative relation between default probability and ratings remains intact. A similar historical default study (Brand, Kitto, and Bahar 1994) covering bonds rated by Standard and Poor's between 1981 and 1993 basically confirms the conclusions drawn from the longer term study by Moody's.

Consistent with the traditional importance of the investment grade/non-investment-grade distinction, the probability of default rises most dramatically once the investment grade barrier is breached. In the Moody's study, over a five-year time horizon, the default probability is six times higher for bonds rated BB than for those rated BBB. In contrast, the comparable ratio of default probabilities for B-rated versus BB-rated issues is much lower at 2.2, as is the ratio for BBB-rated versus A-rated issues at 3.2. The same ratios for

Digitized for FRASER
http://fraser.stlouisfed.org/
Federal Reserve Bank of St. Louis

the Standard and Poor's study were 4.8 (BB versus BBB), 3.0 (BBB versus A), and 1.9 (B versus BB), respectively.

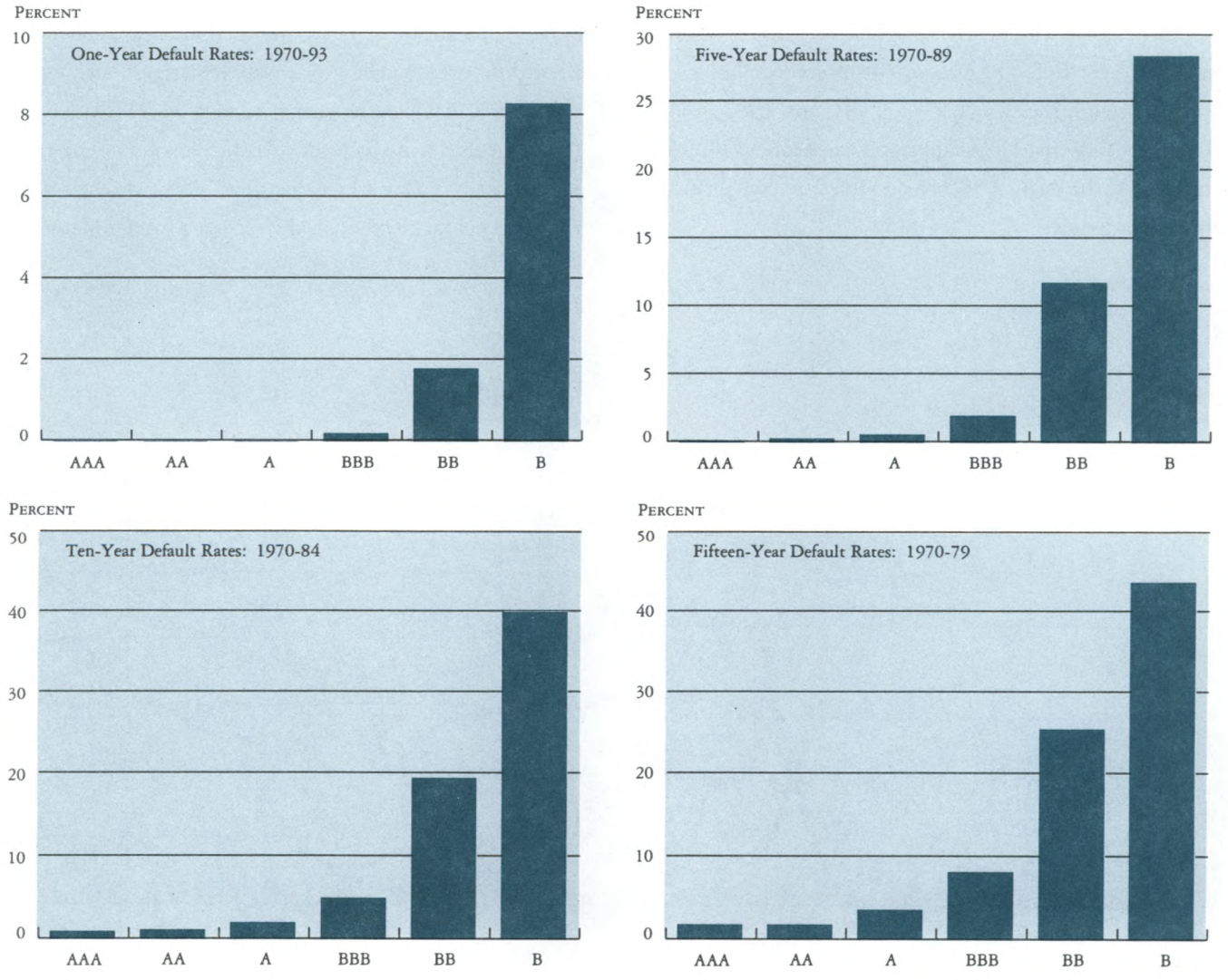
Measuring Absolute Credit Risks

The agencies do not intend their ratings to imply precisely the same default probabilities at every point in time. In particular, they are reluctant to make ratings changes based simply on cyclical considerations even though the frequency of defaults within rating categories clearly rises in recessions.[10] But even if cyclical variability in short-term default rates is an inevitable result of a longer term perspective, long-term default probabilities at the different ratings levels should exhibit relative stability over frequencies longer than the business cycle. In fact, legislators and financial regulators are presuming such a stability when they embed specific credit rating thresholds into law and regulation.

The reliability of ratings as predictors of absolute credit risks can be evaluated by examining the default rates associated with different ratings over time, particularly if the time horizon is long enough to incorporate both ends of the business cycle. Using Moody's data between 1970 and 1994, Chart 2 reviews the progress of five-year cumulative default

Chart 1

Average Default Rates by Credit Rating



Source: Moody's Investors Service 1994.

Digitized for FRASER
http://fraser.stlouisfed.org/
Federal Reserve Bank of St. Louis

rates for investment grade and non-investment-grade bonds. The initial spike in 1970 for non-investment-grade bonds stems from the default that year of Penn Central and twenty-six other railroad companies; default rates decreased dramatically the next year. For cohorts established since January 1971, however, the cumulative default rate within all rating classes BBB and below has increased roughly threefold. The 1971 to 1989 increase is from 0.4 percent to 0.8 percent for A-rated bonds, 1.1 percent to 3.2 percent for BBB-rated bonds, 5.1 percent to 19.7 percent for BB-rated bonds, and 11.1 percent to 34.3 percent for B-rated bonds. Five-year default rates now lie well above the highs of 1970.

Though five-year default rates rose during the growth of the junk bond market in the 1980s, deterioration in performance was common to both investment grade and non-investment-grade samples. The increase in default rates actually began with the 1976, 1977, and 1978 cohorts, whose five-year defaults rates incorporated defaults that occurred through the end of 1980, 1981, and 1982, respectively. The rising trend in default rates, therefore, was initially related to the early 1980s recession but continued on through the decade.

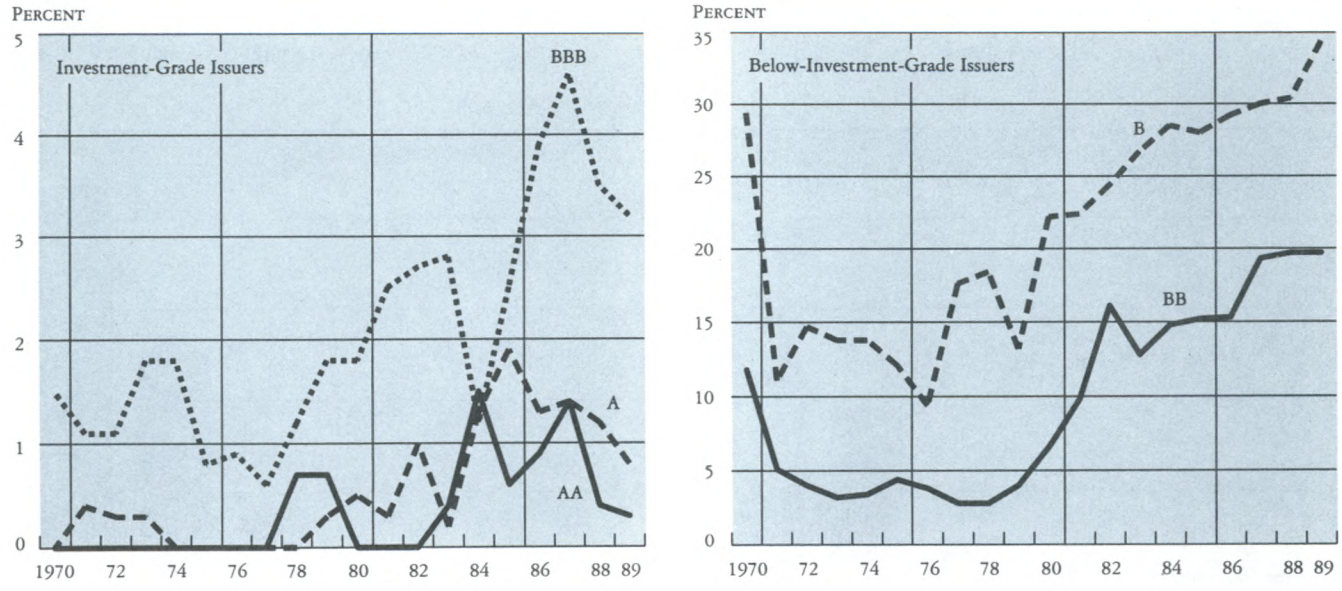
In retrospect, the rise in default rates is unsurprising given the general deterioration in credit ratios within rating classes that began in the mid-1980s. Chart 3 shows that the median fixed-charge coverage and leverage ratios of industrial firms with BBB, BB, and B credit ratings from Standard and Poor's generally worsened between 1985 and 1991. These data suggest that a relaxation of credit standards may have occurred,[11] perhaps as a result of the view commonly held in the late 1980s that even healthy corporations should increase leverage. In sum, the experience since 1970 indicates that the correspondence of ratings to default probabilities is subject to substantial change over time.

Ratings Differences across Agencies

Differences among the agencies over specific ratings are common, unavoidable, and even desirable to the extent that disagreements promote better understanding. Nonetheless, these differences can be highly problematic for ratings-based regulations in which the ratings of any two NRSROs are substitutable. Some of the observed differences can be attributed to alternative rating methodologies; others are the results of the judgmental element in the ratings process. Many of the

Chart 2

Trends in Five-Year Default Rates by Credit Rating



Source: Moody's Investors Service 1994.

Note: The five-year default rate indicates the share of issuers with a given rating at the beginning of the year that defaulted within the following five years.

Digitized for FRASER
http://fraser.stlouisfed.org/
Federal Reserve Bank of St. Louis

differences, however, may reflect systematic differences among agencies in the acceptable level of risk in any ratings category. In this section, we review some of the basic differences in agency methodologies, average ratings, and rank orderings of credit risks. We examine some of these differences in the context of three important areas of competition within the industry—ratings for new-issue junk bonds, banks, and asset-backed securities.

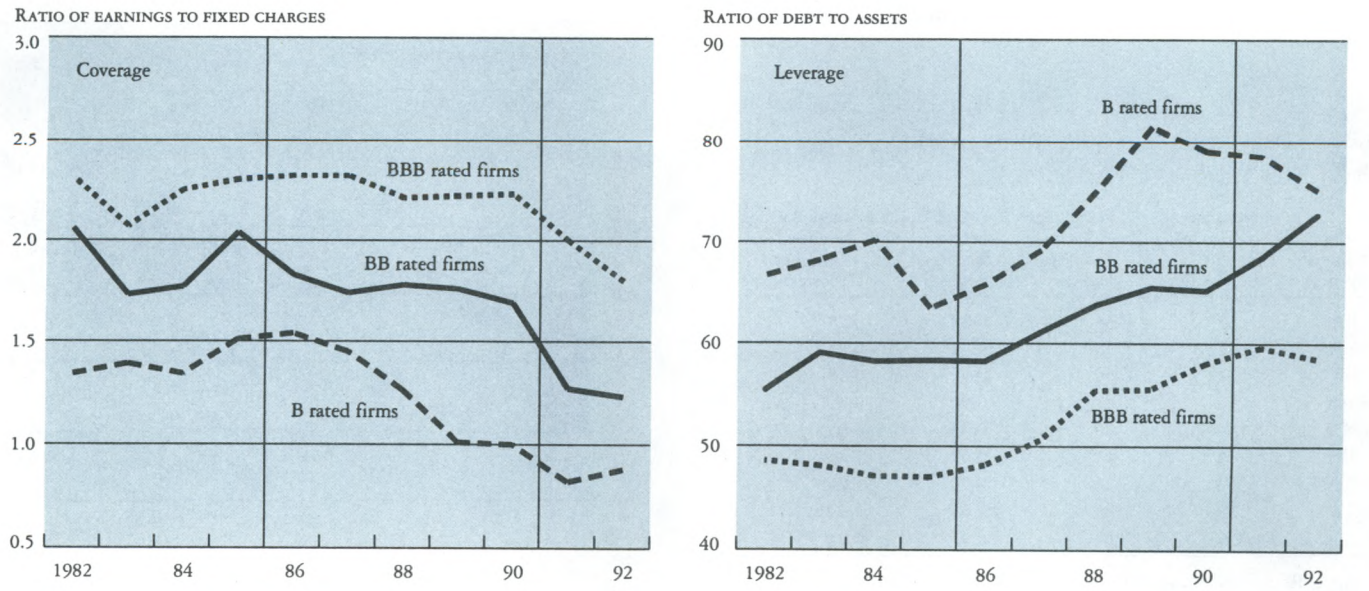
Rating Disagreements Stemming From Alternative Methodologies

Although each agency publishes formal definitions of its various letter ratings, these definitions provide very little insight into the source of agency rating differences. The definitions imply that a different likelihood of default is associated with each letter grade, but do not quantify these differences.[12] In addition, rating agencies do not explicitly compare their ratings with those of other agencies. As a practical matter, however, it appears that market participants have historically viewed the Moody's and Standard and Poor's scales as roughly equivalent and that the other agencies have attempted to align their scales against those two. But while the relationships among the scales are imprecise, the implicit presumption of the ratings-dependent regulations is that the corresponding ratings levels of the different NRSROs represent equivalent levels of credit risk and are interchangeable.

Periodically, the rating agencies articulate unique ratings philosophies. For example, although Moody's and Standard and Poor's are primarily concerned with the likelihood of default on interest or principal, Moody's is prepared to give a higher rating to an asset-backed security that is likely to recover most of its principal in the event of default.[13] In addition, in the area of rating sovereign credit risks, Moody's is more reluctant to assign a higher rating to a country's domestic currency obligations relative to its foreign currency obligations than is Standard and Poor's (Purcell, Brown, Chang, and Damrau 1993). The other agencies also differ from their counterparts in certain particulars. For example, unlike other agencies, Duff and Phelps sometimes gives higher ratings for the medium-term notes than for the longer term securities of the same issuers. And IBCA assigns higher ratings to certain non-U.S. banks than do the U.S. agencies because it attaches more weight to a foreign government's implicit support of the banking system. Individual agencies

Chart 3

Median Coverage and Leverage Ratios of Industrial Firms by Credit Rating



Source: Standard and Poor's.

Note: Data are three-year moving averages.

Digitized for FRASER
http://fraser.stlouisfed.org/
Federal Reserve Bank of St. Louis

often describe the bases for their positions in their documents, but how their methodologies differ from other agencies' generally must be inferred.

Broad Differences Observed in Ratings

Beattie and Searle (1992a) summarize the ratings differences observed in a large sample of long-term credit ratings assigned in 1990 by twelve of the leading international rating agencies and recorded by the *Financial Times* in its quarterly publication *Credit Ratings International.* Among the 5,284 rating pairs examined for 1,853 rated borrowers, 44 percent agreed precisely, 35 percent differed by one rating notch, 14 percent differed by two notches, and 6 percent differed by three or more notches. (A "rating notch" is, for example, the gap between an A and A+ rating.) The differences across agencies as measured by the frequency of agreement compound two potential sources of disagreement—mean rating scales and rank orderings.

The two largest NRSROs, Moody's and Standard and Poor's, assign very similar average ratings and rank orderings of credit risks. Of the 1,398 cases in 1990 in which senior debt ratings were assigned by both companies, 64 percent were assigned the same rating, 16 percent were rated higher by Moody's, and 20 percent were rated higher by Standard and Poor's. The average (mean) difference in their ratings (including all those cases where their ratings were the same) was only five-one-hundredths of a notch.[14] Not surprisingly, Moody's and Standard and Poor's ratings were very highly correlated at 0.97, revealing a general consensus regarding rank ordering of relative risks.[15]

This rough equivalence in the rating standards of Moody's and Standard and Poor's does not seem to extend to other rating agencies. Table 5 compares the ratings given by nine agencies with those given by Moody's to the same borrowers. (Moody's ratings are used as the basis of comparison simply because this agency has the most ratings in the data set.) Three measures of ratings differences are presented: the frequency of agreement, the correlation coefficients, and the average ratings differences. Standard and Poor's agrees most closely with Moody's (64 percent), while the percentage agreement varies among the rest to a low of 11 percent for the Japan Credit Rating Agency. Compared with Standard and Poor's ratings, the ratings of the other agencies exhibit larger average absolute ratings differences and less correlation with Moody's ratings.

These differences in ratings reflect not only differences in rank orderings of credit risks, but, to a large extent, differences in rating scales. Chart 4 shows that most of the

Table 5

Senior Debt Ratings of Nine Rating Agencies Compared with Moody's Ratings in 1990

Name of Agency	Number of Jointly Rated Companies	Percentage of Ratings That Are Equal	Correlation between Ratings Scales*	Average Ratings Differences† ("+"=higher; "–"=lower)
CBRS	37	38	0.83	0.78
DBRS	51	28	0.72	–0.25
Duff	524	50	0.92	0.38
Fitch	295	47	0.90	0.29
IBCA	134	28	0.83	0.05
JBRI	65	11	0.67	1.75
MCM	343	26	0.90	–1.04
NIS	33	33	0.63	1.09
S&P	1398	64	0.97	0.05

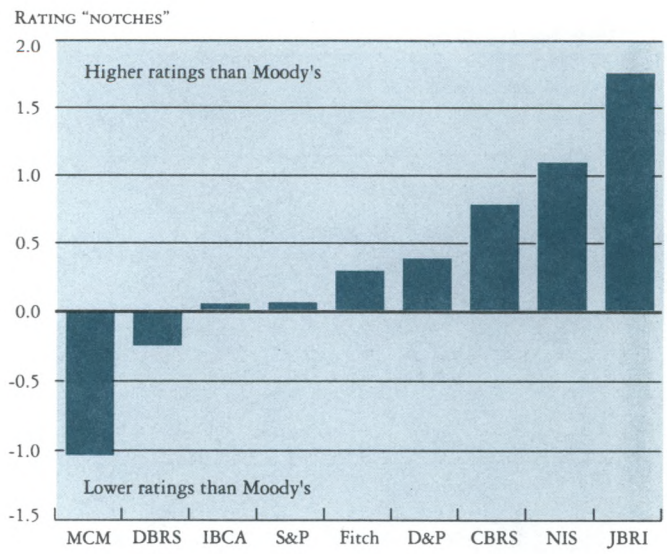
Source: Beattie and Searle 1992a.

* The Pearson product-moment correlation.

† Differences are measured in rating "notches." For example, the gap between A+ and A– is two ratings notches.

Chart 4

Average Difference in Ratings between Moody's and Other Agencies in 1990



Source: Beattie and Searle 1992.

Note: Rating notches are the gaps between ratings. For example, the gap between A+ and A- is two notches. Average differences are calculated using only the ratings of issuers that were rated by both Moody's and the other agency.

Digitized for FRASER
http://fraser.stlouisfed.org/
Federal Reserve Bank of St. Louis

agencies rate higher than Moody's, although McCarthy, Crisanti, and Maffei (since merged with Duff and Phelps) rates on average a whole rating notch lower. The two largest American agencies after Moody's and Standard and Poor's, Fitch and Duff and Phelps, each rate about a third of a notch higher than Moody's.[16] The Canadian Bond Rating Service, Nippon Investors Service, and the Japan Credit Rating Agency rated on average 0.78, 1.09, and 1.75 notches higher than Moody's, respectively.

Ratings for New-Issue Junk Bonds

From the point of view of regulatory practice, a rise in the number of rating agencies increases the likelihood that marginal borrowers will meet minimum ratings thresholds because (1) natural variation in opinion increases the probability of receiving at least one satisfactory rating, and (2) some rating agencies may have higher average rating scales enabling more borrowers to meet regulatory cutoffs. We can observe the impact of multiple rating agencies on regulatory definitions of investment grade securities by documenting agency disagreements in the junk bond market.

A rise in the number of rating agencies increases the likelihood that marginal borrowers will meet minimum ratings thresholds.

As generally defined, any issue is considered "junk" that has at least one rating below the BBB- level from either Moody's or Standard and Poor's. After falling off in the early 1990s, junk bond issues reached a new high of $57 billion (18.2 percent) in 1993 (Fridson 1994). Of the nearly 700 new U.S. junk issues between 1989 and 1993 listed in First Boston's annual High-Yield Handbook, 96 percent are rated by both Moody's and Standard and Poor's. Junk bond issuers, however, are increasingly seeking third and fourth ratings as well. Duff and Phelps and Fitch, which respectively rated 16 and 4 percent of all issues in the 1989-93 period, have significantly increased their rating activity in the past few years (see Table 6).

The junk bond sample reveals more striking differences in agency measurements of absolute and relative credit risks than does the broad sample. Standard and Poor's and Moody's are much more often at odds in the ratings they assign junk bond issuers: if we compare the junk bond ratings in Table 7 with the ratings for the broad sample in Table 5, we find smaller frequencies of agreement and smaller correlation coefficients. The providers of third (and fourth) opinions in this sector, Duff and Phelps and Fitch, also appear to disagree with Moody's with greater regularity and on a greater scale in the junk bond sample.

Table 7
Credit Ratings Assigned to Junk Bond Issuers in 1989–93: Comparing the Ratings of S&P, Duff & Phelps, and Fitch with Moody's Ratings

Name of Agency	Number of Jointly Rated Companies	Percentage of Ratings That Are Equal	Correlation between Ratings Scales*	Average Ratings Differences† ("+"=higher; "–"=lower)
S&P	672	41	0.83	–0.003
Duff	113	33	0.79	0.965
Fitch	28	14	0.69	1.393

Sources: First Boston 1990–94; Federal Reserve Bank of New York staff estimates.
* The Pearson product-moment correlation.
† Differences are measured in rating "notches." For example, the gap between A+ and A– is two ratings notches.

Table 6
Market Shares of New-Issue U.S. Junk Bond Ratings: 1989–93

Year	Percent of New Issues: Moody's	S&P	Duff	Fitch	Memo: Total Number of Issues	Year	Percent of Dollar Volume: Moody's	S&P	Duff	Fitch	Memo: Total Volume (Billions of Dollars)
1989	100	99	7	0	116	1989	100	100	21	0	2.9
1990	80	80	40	0	5	1990	99	99	72	0	0.5
1991	100	100	24	12	42	1991	100	100	21	24	9.9
1992	94	97	24	5	233	1992	99	99	28	5	38.9
1993	97	98	13	4	301	1993	99	99	19	7	54.1

Sources: First Boston 1990–94; Federal Reserve Bank of New York staff estimates.

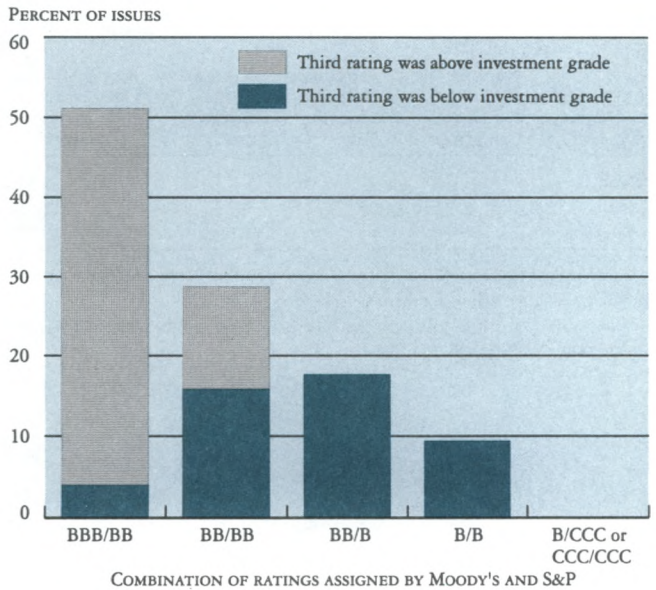
Digitized for FRASER
http://fraser.stlouisfed.org/
Federal Reserve Bank of St. Louis

For the newer rating agencies, many of the observed differences may be related to a difference in their absolute scales in rating credit risks. While Moody's and Standard and Poor's rate about the same on average for jointly rated issues, Duff and Phelps and Fitch ratings are between 1 and 1.5 rating notches higher than Moody's or Standard and Poor's. These differences greatly exceed those reported in Table 5 for the aggregate sample of bond issues. Thus, differences of opinion between the two largest agencies and the smaller agencies appear to be greater for junk bonds than for investment grade securities.

Given the possibilities for split ratings, the decision to employ a third rating agency is not random. Chart 5 relates the frequency with which issuers seek a third rating to the ratings received from Moody's and Standard and Poor's. Issuers are more likely to obtain a third rating if they receive near-investment-grade or mixed (speculative grade/investment grade) ratings from Moody's and Standard and Poor's. In particular, 46 percent of the firms with one investment grade rating from the major two agencies obtained a third opinion. Of these thirty-four firms, twenty-nine obtained a second investment grade rating. Among issuers that received marginally below-investment-grade ratings (BB-ratings) from both Moody's and Standard and Poor's, 26 percent obtained a third rating. Of these thirty-four firms, sixteen obtained an investment grade rating. In sum, the demand for third ratings increases with the issuer's proximity to investment grade, and the opportunity to seek third and fourth ratings has enabled a number of firms to achieve investment grade status under certain regulations.

Chart 5

The Decision to Obtain a Third Rating



Source: First Boston 1990-94.

Notes: The sample consists of 671 junk bond issues brought to market between 1989 and 1993. The issues received the following combinations of ratings from Moody's and Standard and Poor's: 74 rated BBB/BB, 132 rated BB/BB, 79 rated BB/B, 359 rated B/B, and 27 rated B/CCC or CCC/CCC. Each bar in the chart indicates the fraction of issues that were given a third rating from another agency.

International Bank Ratings

As capital markets have become increasingly global, international considerations have taken on greater importance in the ratings industry. U.S. rating agencies have been expanding their presence overseas, and non-U.S. rating agencies have been proliferating. In this section, we review international ratings differences in the senior debt ratings of banks.

Credit ratings are particularly important to banks (through counterparty exposure limits, letters of credit, and nondeposit sources of funds),[17] and a large number of ratings in the industry are cross-border ratings. In addition, the potential designation of certain foreign agencies as NRSROs may have considerable impact on the activities of foreign banks in the United States.

Dominant in many other industry sectors, Moody's and Standard and Poor's are the leading agencies in the rating of banks. Of the 1018 banks worldwide for which long-term bond ratings were available in January 1994, Moody's and Standard and Poor's rated 64 and 55 percent, respectively (*Financial Times* 1994).[18] When the sample is limited to just those 580 rated banks domiciled outside the United States, Moody's and Standard and Poor's still rated 57 and 46 percent, while IBCA was in third position at 31 percent. While these three leading agencies rate many banks outside their home countries, most of the other agencies tend to specialize in the ratings of banks of their own nationality (see Table 8).

Agencies appear to disagree more in their measurement of credit risks for banks than in their risk measurement for other industries. In Table 9, the bank ratings of nine lead-

Digitized for FRASER
http://fraser.stlouisfed.org/
Federal Reserve Bank of St. Louis

ing rating agencies generally show lower frequencies of agreement and higher absolute ratings differences relative to Moody's than does the broader ratings sample described in Table 5.[19] The differences are greater for the agencies of some countries than for the agencies of others: in particular, the ratings of Japanese agencies differ much more from those of Moody's than do the ratings of other agencies. What accounts for the wide disagreement? For the U.S. and Canadian agencies, agreement concerning relative risk declines as we move from the broad ratings sample to the bank sample, as evidenced by lower correlation coefficients. By contrast, for the Japanese agencies, the wider disagreement reflects higher average rating differentials.

National differences in methodology and approach may also help explain the variation in international bank ratings. For example, the accounting for nonperforming loans and reserves is not standardized by country, and opinions vary widely regarding the extent to which particular governments lend implicit support to specific banks in the banking system. Indeed, judgments regarding controversial issues are related to some degree to the nationality of rating agencies. When raters are from the same country, agreement about the relative ranking of issuers, as measured by the coefficient of correlation, tends to be higher than when they are not.[20]

Are observed bank ratings consistent with earlier research concluding that agencies judge issuers from their own country more leniently (Beattie and Searle, 1992b)? When the ratings of all banks evaluated by both home-country and foreign agencies are aggregated, the average home rating exceeds the average foreign rating by one-half of a rat-

Table 8
PERCENTAGE MARKET SHARES OF INTERNATIONAL BANK RATINGS IN 1994

Agency	Home Country	All Banks	U.S. Banks	Non-U.S. Banks	Memo: Home Country Ratings as a Percentage of Total Ratings of Each Agency
CBRS	Canada	2.1	0.2	4.0	95.2
DBRS	Canada	5.5	0.4	10.0	96.1
JCRA	Japan	4.0	0.0	7.6	78.9
JBRI	Japan	3.1	0.0	5.8	79.3
NIS	Japan	5.0	0.0	9.4	70.0
Fitch	U.S.	8.4	17.1	0.8	94.9
Duff	U.S.	17.6	36.8	0.8	97.6
Moody's	U.S.	69.6	75.8	64.3	50.8
S&P	U.S.	50.3	66.3	35.9	61.9
Thom	U.S.	9.7	16.9	3.4	81.3
IBCA	U.K.	30.0	23.5	35.7	9.2

Sources: *Financial Times* 1994; Federal Reserve Bank of New York staff estimates.

Table 9
INTERNATIONAL BANK RATINGS OF NINE RATING AGENCIES COMPARED WITH MOODY'S RATINGS IN 1994

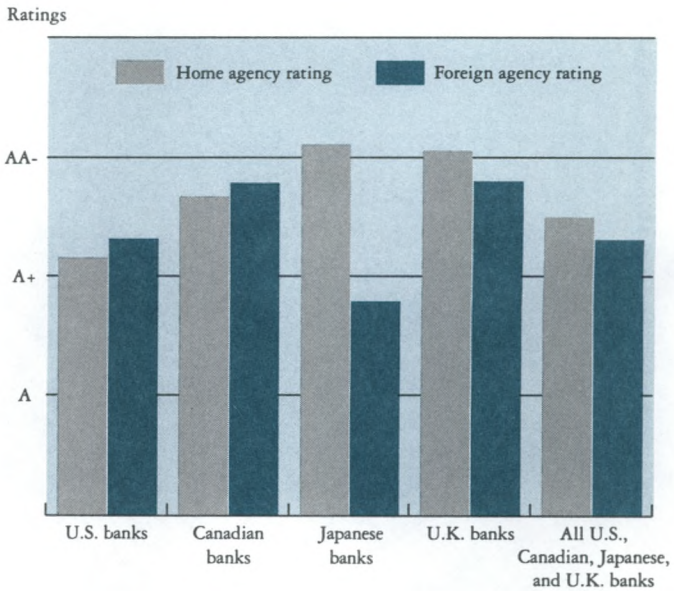
Name of Agency	Number of Jointly Rated Companies	Percentage of Ratings That Are Equal	Correlation between Ratings Scales*	Average Ratings Differences† ("+"=higher; "–"=lower)
CBRS	11	9	0.52	0.36
DBRS	17	29	0.61	–0.53
Duff	139	42	0.84	0.17
Fitch	68	44	0.77	0.38
IBCA	206	38	0.88	0.51
JCRA	19	11	0.82	2.63
JBRI	19	0	0.73	2.42
NIS	35	6	0.81	2.40
S&P	351	37	0.77	–0.15

Sources: *Financial Times* 1994; Federal Reserve Bank of New York staff estimates.

* The Pearson product-moment correlation.

† Differences are measured in rating "notches." For example, the gap between A+ and A– is two ratings notches.

Chart 6
AVERAGE SENIOR DEBT RATINGS ASSIGNED TO BANKS BY HOME AND FOREIGN AGENCIES



Sources: *Financial Times* 1994; Federal Reserve Bank of New York staff estimates.

Notes: Observations are limited to banks with both home country and foreign country senior debt ratings. Sample sizes for the five bank groups (from left to right) are 100, 17, 35, 18, and 170.

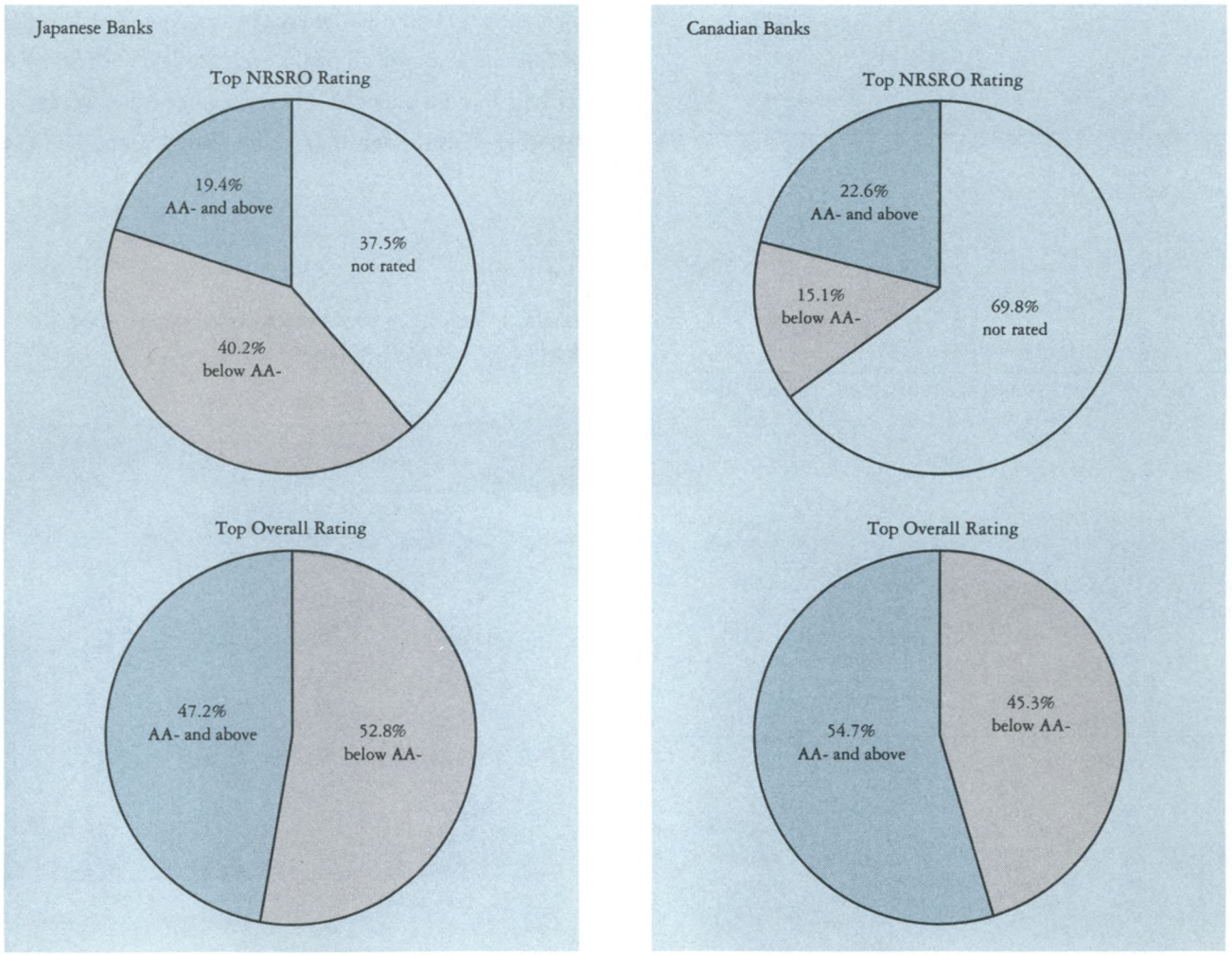
Digitized for FRASER
http://fraser.stlouisfed.org/
Federal Reserve Bank of St. Louis

ing notch. However, the results differ greatly depending on the nationality of the bank (Chart 6). While U.S. and Canadian banks receive lower home ratings than foreign ratings, Japanese and U.K. banks receive higher home ratings. At least in this sample, observed differences between home and foreign ratings reflect the relative toughness of each country's agencies rather than a more general home-country bias. Whether the rated bank was from the same country or not bore little relationship to the differences between the ratings of non-U.S. agencies and Moody's.

International ratings differences are of particular importance at the present time because the SEC is reviewing numerous applications for NRSRO designation from agencies of foreign countries. Differences among the agencies of different countries and the tendency of many agencies to focus on the rating of banks from their home countries imply that if NRSRO status were to be granted to the two Canadian and three Japanese rating agencies, the number of Canadian and Japanese banks reaching regulatory cutoff ratings would increase considerably. As Chart 7 shows, of the fifty-three

Chart 7

IMPLICATIONS OF EXPANDING THE NUMBER OF NATIONALLY RECOGNIZED STATISTICAL RATING ORGANIZATIONS (NRSROs)



Source: *Financial Times* 1994.

Notes: The Japanese sample and the Canadian sample consist of seventy-two and fifty-three banks, respectively. Top NRSRO rating is the highest long-term rating of those assigned by Duff, Fitch, IBCA, Moody's, S&P, and Thomson. Top overall rating is the highest long-term rating of those assigned by the NRSROs and the following non-NRSROs: CBRS, DBRS, JBRI, JCRA, and NIS.

Digitized for FRASER
http://fraser.stlouisfed.org/
Federal Reserve Bank of St. Louis

Canadian banks with senior debt ratings listed in the *Financial Times Credit Ratings International* (1994), the share receiving an NRSRO credit rating of at least AA- would rise from 23 percent to 55 percent. Similarly, of the seventy-four Japanese banks with senior debt ratings listed in the same publication, the share receiving an NRSRO rating of at least AA- would rise from 20 percent to 48 percent.

Ratings for Mortgage- and Asset-Backed Securities

Competition among the rating agencies is particularly marked in the rating of mortgage-backed and asset-backed securities (MBSs and ABSs).[21] Issuers often seek ratings from just one or two companies, and as we see below, Fitch and Duff and Phelps have increased market share. Banks and securities firms generally consult directly with the rating agencies to find out how MBSs and ABSs can be structured to obtain high credit ratings. The agencies analyze the asset pools to be securitized to determine the adequacy of the credit support underlying each tranche of structured transactions. Agency disagreements normally center on the criteria that establish the amount of credit enhancement required for a specific rating. These differences of opinion are not normally evident in the ratings per se because issuers structure their securities to obtain the desired ratings from the agencies they hire. (Moody's occasionally assigns unsolicited ratings that indicate its disagreement with the higher ratings assigned by other agencies.) Market observers have expressed concern that competitive pressures have led agencies to compete on ratings criteria, potentially undermining the reliability of the ratings.[22]

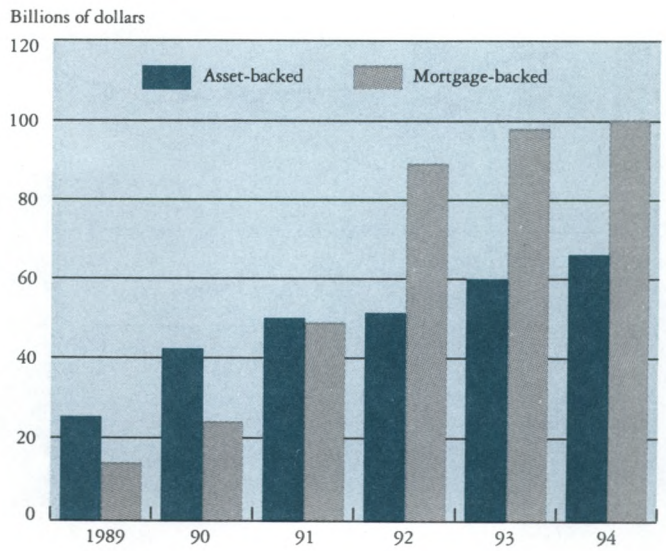
Industry analysts normally distinguish between two broad categories of MBSs, those backed by government agencies such as the Federal National Mortgage Association and private label issues that securitize jumbo mortgages, commercial mortgages, and various other so-called nonconforming first mortgages that the government agencies do not securitize. The ABS market securitizes shorter duration asset pools such as credit card receivables, auto loans, and home equity loans. The MBS and ABS markets have grown very rapidly since 1989 (Chart 8).

Rating agency market shares for MBS and ABS ratings have shifted considerably over time. In the mid-1980s, Standard and Poor's was the undisputed leader in MBS and ABS ratings. In the late 1980s, Moody's caught up considerably and Duff and Phelps made significant inroads in the ABS market. Since then, Fitch has made great strides in market share, actually leading the market for MBSs in 1994, while the other agencies' shares have fluctuated. Charts 9 and 10 summarize the available data on these two markets since 1989. (Since more than one agency can rate each security, the sum of the shares exceeds 100 percent.)

Unlike the corporate bond market, the MBS and ABS markets are limited almost entirely to highly rated issues, typically either AA or AAA for MBSs, and A or AAA for ABSs. The need for high ratings appears to arise from the advantages regulations confer on highly rated (particularly MBS) issues and from investors' concerns about the quality of the collateral as well as their unfamiliarity with the complicated structures of the securities. The relatively small share of MBSs and ABSs that are rated less than A consist largely of "B" tranches that are subordinate to much larger, highly rated senior tranches. The subordinated tranches tend to be

Chart 8

Issuance of Asset-Backed and Nonagency Mortgage-Backed Securities



Sources: *Asset Sales Report*; *Inside Mortgage Finance*; Federal Reserve Bank of New York staff estimates.

Note: Mortgage-backed and asset-backed volumes for 1994 are annualized using data through April and June, respectively.

Digitized for FRASER
http://fraser.stlouisfed.org/
Federal Reserve Bank of St. Louis

privately placed and are often rated by just a single agency or carry no rating at all.

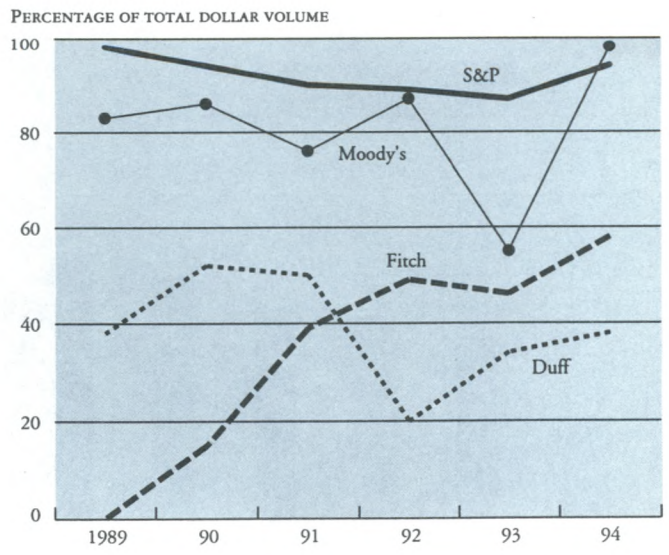
MBS and ABS structures typically contain credit protection so that the securities are less risky than the underlying asset pools. The forms of the credit enhancements vary widely and include bank letters of credit, bond insurance company guarantees, subordinated interests, cash collateral accounts, and reinvestment of the excess cash flows generated by the asset pools themselves. Since all enhancements are costly, issuers prefer structures that achieve a given rating with the smallest enhancements and choose rating agencies with the most lenient credit enhancement requirements, provided the agencies' ratings carry sufficient weight in the capital market. In principle, securities with lower credit enhancements can be discounted by the market. However, in practice, the market has trusted agencies to be prudent in the determination of credit support requirements and has not required higher yields from issuers that have switched to agencies with lower enhancement requirements (Bruskin 1994).

The evolution of credit rating standards and the emergence of market competition have been particularly dramatic in the case of private-label mortgage-backed securities. Until the mid-1980s, Standard and Poor's was the only agency rating these securities, and its required credit enhancements for reaching target ratings represented the industry standard. In 1986, Moody's entered the market with criteria that were slightly different. While its standards were stricter than those of Standard and Poor's in some areas, Moody's set lower enhancement requirements for certain types of mortgage pools (shorter term, negative amortization, and convertible adjustable rate mortgages) and subsequently gained market share in those areas. In 1987 and 1988, Moody's issued some unsolicited ratings (in areas where its standards were stricter than those of Standard and Poor's) and caused yields to rise on these securities. In response, some issuers changed their MBS structures and hired Moody's. By 1989, Moody's share of the MBS business exceeded that of Standard and Poor's.

In 1990, Fitch began rating mortgage-backed securities using a model of required credit enhancement that

Chart 9

Rating Agency Market Shares of Asset-backed Securities Issuance

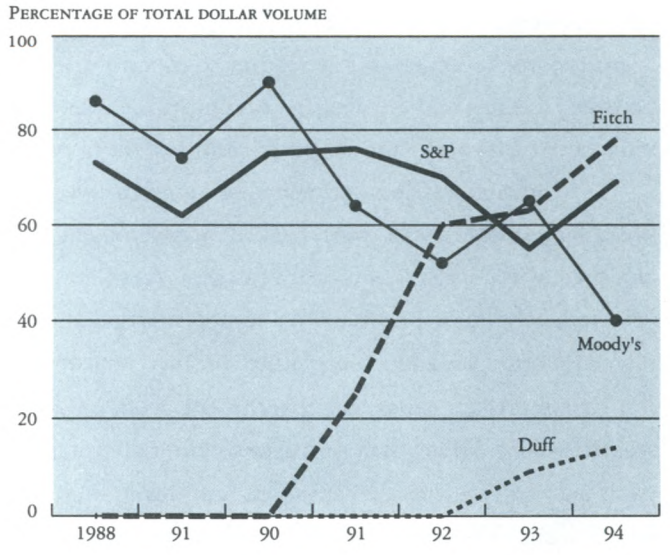


Sources: Internal agency data; *Asset Sales Report*; Federal Reserve Bank of New York staff estimates.

Notes: Market shares for 1994 are based on data through June. The sum of the market shares exceeds 100 percent because many issues receive multiple ratings.

Chart 10

Rating Agency Market Shares of Mortgage-backed Securities Issuance



Sources: Internal agency data; *Asset Sales Report*; Federal Reserve Bank of New York staff estimates.

Notes: Market shares for 1994 are based on data through April. The sum of the market shares exceeds 100 percent because many issues receive multiple ratings.

Digitized for FRASER
http://fraser.stlouisfed.org/
Federal Reserve Bank of St. Louis

based its worst-case scenarios on the Texas recession of the 1980s. This approach resulted in required enhancements below those of Standard and Poor's (lower by as much as 50 percent for certain balloon payment mortgages), whose model extrapolated from the mortgage default experience of the Great Depression. Duff and Phelps followed suit with a framework similar to Fitch's in 1992. Standard and Poor's, which once had a monopoly, saw its market share slide to 55 percent in 1993 as many issuers who had at one time employed only Standard and Poor's, then later used Standard and Poor's together with Moody's, had switched to a pairing of Fitch and Moody's.

Most recently, in December 1993, Standard and Poor's came out with revised criteria for credit enhancements that implied a 30 percent reduction on average across a variety of mortgage pool types. Explanations for the changes followed the next month (Standard and Poor's 1994). Some of the revisions were in those areas in which the agency had been losing market share, including shorter term mortgages. Rival rating agencies claimed that the move represented a competitive attempt to win back market share. In the first four months of 1994, Standard and Poor's has regained market share largely at Moody's expense. It is difficult to tell at this point whether the shift reflects issuers moving from one agency to another or merely a growth in issuance by firms that use Standard and Poor's ratings (see Schultz 1994 and *Inside Mortgage Securities* 1994a, 1994b).

Clearly, MBS credit enhancement levels have declined over the history of the market. Analysts and agencies note that this in part reflects a progression along the learning curve: more information has become available over time about the performance of such securities, reducing the degree of uncertainty. Skeptics remark that competitive pressures can lead to increased pressures to review standards. Whether or not agencies compete on criteria, it does appear that the incentive to innovate in structured finance ratings tends to favor lower enhancement levels.

Conclusion

Regulators, like investors, value the cost savings achieved through the use of ratings in the credit evaluation process. As a result, they have have come to employ a variety of specific letter ratings as thresholds for determining capital charges and defining investment prohibitions. Although the agencies make no such assurances, the current use of ratings in regulation assumes a stable relationship between ratings and default probabilities. The historical record suggests otherwise: although ratings usefully order credit risks at any point in time, specific letter ratings corresponded to higher default risks in the 1980s than in the 1970s.

The increasing number of agencies also poses problems for the existing structure of ratings-based regulations. Some agencies appear to have different absolute scales, rating bonds higher or lower on average than other agencies. However, even normal variations in opinion across agencies with the same basic scales confounds the application of existing regulations. These problems multiply as the number of agencies and the differences of opinion among them increase.

The impact of multiple rating agencies and ratings differences is apparent in the case studies of junk bond, bank debt, and mortgage-backed securities ratings. For junk bonds, the availability of third opinions enables many borrowers to climb out of the speculative grade zone into investment grade territory. In the area of bank debt ratings, differences of opinion are particularly great between agencies of different countries and imply that the designation of more foreign agencies as NRSROs will allow more foreign banks to achieve higher ratings. Regarding private-label mortgage-backed securities, intensifying competition among the four major agencies has been associated with downward revisions of required enhancement levels.

The Securities and Exchange Commission (1994a, 1994b) is currently reconsidering its procedures for designating nationally recognized agencies (NRSROs), the role of ratings in regulations, and the degree of public oversight and mandatory ratings disclosure. Questions for which comments have been solicited include:

- What are the proper objective criteria to consider when determining NRSRO status?
- Is it appropriate for NRSROs to charge issuers for ratings, and in particular, to vary the charge with the size of the transaction?
- Would further regulatory oversight of NRSROs

Digitized for FRASER
http://fraser.stlouisfed.org/
Federal Reserve Bank of St. Louis

be appropriate and what type of oversight would that be?

- Should issuers be required to disclose activities such as rating shopping—soliciting preliminary indications from numerous rating agencies in order to identify the agency that will provide the highest rating?

The SEC's questions all raise the possibility of additional oversight or disclosure of NRSRO activity and the ratings process. Such measures could conceivably address some of the issues raised in this paper by improving the intertemporal stability of default rates within ratings category and reducing differences among the officially designated agencies. Of course, any changes in policy would entail complex tradeoffs; specific proposals and their implications will surely be explored in future research.

The SEC has also invited comment on whether it should continue to employ an NRSRO concept. Although dropping the designation of NRSROs would be a radical measure, it might encourage regulators to revise their current use of ratings and to adjust for ratings differences across time and agency. Ratings can and do play an important and valuable role in the functioning and oversight of financial markets. But at a minimum, regulators and investors alike should be critical users and should regularly review their application of ratings to the decisions they make.

Digitized for FRASER
http://fraser.stlouisfed.org/
Federal Reserve Bank of St. Louis

ENDNOTES

1. Government policy has helped to avert conflicts of interest. The Federal Reserve Board discouraged a proposed acquisition of Duff and Phelps by Security Pacific Bank in 1984. The Board ruled that if the merger were to take place, Duff and Phelps would be prohibited from issuing public ratings because Security Pacific would effectively be rating its own borrowers (Ederington and Yawitz 1987).

2. See the description of the agencies' ratings methodologies in the *Financial Times* 1994, pp. 25-79. Comparisons across the agencies' rating scales are more difficult in the lowest part of the range near default, where the agencies carry different numbers of ratings (Dale and Thomas 1991).

3. For a more critical view, see Stein 1992.

4. Dale and Thomas (1991) and Baron and Murch (1993) provide comprehensive discussions of the current use of ratings by regulators in the United States and abroad. Harold (1938) provides a detailed account of the earliest uses of ratings in the United States.

5. Under this system, insurance companies were allowed to request that specific BB rated bonds be treated the same as those more highly rated bonds in the top quality category. This practice, which became common over time, was halted by reforms adopted by the NAIC in 1990.

6. In analyzing the margin rules for mortgage-related securities, Federal Reserve Board staff reasoned thus: "The question of using bond ratings by a recognized service as a criterion for margin eligibility was discussed when the initial definition of 'OTC margin bond' was under consideration. The National Association of Securities Dealers proposed a rating standard at that time and most securities dealers endorsed its use for non-listed bonds in comment letters, but the Board declined to adopt such a requirement. Since that time, however, the SEC has used these evaluations of third parties as a means of categorizing some debt securities; regulatory examiners use them to determine investment grade; and the United States Congress has mandated their use in the statutory definition under consideration. Staff believes that developments subsequent to the 1978 decision warrant a departure from the Board's earlier decision" (Board of Governors 1987).

7. These rules key off the agencies' short-term ratings, limiting money funds from holding more than 5 percent of their assets in paper rated A2 by Standard and Poor's (P2 by Moody's) or more than 1 percent in any paper of a single A2/P2 issuer. Issuers with these weaker short-term ratings typically have long-term bond ratings that are still rated well above the investment grade cutoff.

8. When voicing its concerns over the 1991 amendments to Rule 2a-7, the Securities Industry Association noted that "rating categories were not designed as regulatory tools and NRSROs may change their criteria from

Note 8 continued
time to time as they deem appropriate. Further, when determining ratings, rating agencies neither use uniform criteria nor weigh the same criteria equally" (Grafton 1992).

9. The Moody's study calculates the default rate formally as a *weighted-average cumulative default rate,* which is the complement of the product of weighted-average marginal survival rates. For details concerning rate calculations, see the Appendix in Moody's Investors Service 1994.

10. As reported by Fons (1991), most of the cyclical variation in the aggregate default rate on corporate bonds cannot be explained by cyclical variations in Moody's ratings on bond outstandings. Moreover, since yield spreads between high- and low-rated bonds tend to rise during recessions, market pricing is consistent with a perceived rise in the default probabilities of lower rated issues relative to those of higher rated issues during recessions. Alternatively, the rise in spreads in recessions may merely reflect a concurrent rise in the market's aversion to default risk or other supply and demand factors.

11. Wigmore (1990) documents a much more severe difference between the 1986-88 average credit ratios and the 1983-85 ratios than is suggested by the Standard and Poor's data presented in Charts 7 and 8 for bonds rated BB or B. According to Wigmore, the Standard and Poor's data understate the decline in credit quality because a greater proportion of the junk bonds issued in the later period were issued by companies in conjunction with leveraging events (mergers, acquisitions, and leveraged buyouts); therefore, their current credit ratios were much weaker than the historical credit ratios included in the Standard and Poor's data. In contrast, Fridson (1991) argues that much of the apparent deterioration in credit ratios and increases in default rates for B-rated issues in the late 1980s can be explained by an increase in the proportion of issuers rated "B-" as opposed to "B" or "B+".

12. Moody's and Standard and Poor's now provide ex post analyses of corporate bond defaults by rating categories. Variations in default probabilities for Moody's and Standard and Poor's can, therefore, be inferred from these studies.

13. Standard and Poor's is generally less willing to base ratings on expected recoveries even though it has always made such distinctions, as have all the other agencies, for different classes of debt issued by the same firm. Whenever a firm defaults on its subordinated debts, its senior debt is almost always drawn into default as well. Nevertheless, agencies regularly award higher ratings to the senior debt because its expected recovery rate is higher.

14. Other authors with other data sets also note a rough equivalence between Moody's and Standard and Poor's ratings (Perry 1985, Ederington

Digitized for FRASER
http://fraser.stlouisfed.org/
Federal Reserve Bank of St. Louis

ENDNOTES *(Continued)*

Note 14 continued
1986, Ederington and Yawitz 1987). Moreover, Billingsley, Lamy, Marr, and Thompson (1985) show that the market views Moody's and Standard and Poor's ratings as equivalent because the yields on bond issues with split ratings do not depend on which agency assigned the higher rating.

15. The Pearson product-moment correlation coefficient, which can range from -1.00 to a maximum value of 1.00, measures the extent to which rank orderings agree while removing any confounding effects of differences in average rating scores and differences in units of measurement.

16. These agencies acknowledge that their ratings are higher than Moody's and Standard and Poor's on average; however, they attribute some of the ratings difference to sample selection bias. They argue that ratings from Fitch or Duff and Phelps are only sought when there is a strong expectation of improving upon Moody's and Standard and Poor's ratings. When Fitch or Duff and Phelps might, in fact, rate lower, their ratings are not purchased.

17. For example, U.S. issuers of commercial paper and long-term securities often obtain bank letters of credit in order to achieve targeted credit ratings, but the attractiveness of such backing depends greatly on the credit rating of the bank issuing the letter of credit. When Standard and Poor's put three Japanese banks on its CreditWatch list (with negative implications) in March 1994, the bond issues of 144 U.S. bond issuers and 46 U.S. commercial paper issues that were backed by letters of credit from these

Note 17 continued
banks were also put on CreditWatch.

18. The ratings of the French rating agency S&P-ADEF, a joint venture founded in 1990 by Standard and Poor's and Agence d'Evaluation Financière, are counted as Standard and Poor's ratings for the purposes of calculating global market share.

19. The one consistent exception is IBCA, which shows more agreement with Moody's on these measures for banks than does the wider sample. This finding may reflect IBCA's initial specialization in the rating of financial institutions and the limitation of its NRSRO designation to that area.

20. The mean of the Pearson product-moment correlation for ratings of agencies from the same country is 0.858, compared with a mean of 0.775 for the correlation coefficients for the ratings of agencies from different countries. The standard errors of measurement for the two coefficients are 0.018 and 0.054, respectively.

21. In this article, we follow industry practice in using "asset-backed securities" (ABSs) in the more narrow sense that excludes mortgage-backed securities (MBSs).

22. See Bruskin (1988, 1994), Schultz (1994), and *Inside Mortgage Securities* (1994a, 1994b). This section's discussion of the evolution of ratings criteria for MBSs draws heavily from these sources.

REFERENCES

Altman, Edward I. 1989. "Measuring Corporate Bond Mortality and Performance." JOURNAL OF FINANCE (September): 909-22.

Ang, J., and K. Patel. 1975. "Bond Rating Methods: Comparison and Validation." JOURNAL OF FINANCE (May): 631-40.

Artus, Patrick, Jean Garrigues, and Mohamed Sassenou. 1993. "Interest Rate Costs and Issuer Ratings: The Case of French CP and Bonds." JOURNAL OF INTERNATIONAL SECURITIES MARKETS (Autumn): 211-18.

Baron, Neil, and Leah Murch. 1993. "Statutory and Regulatory Uses of Ratings in the United States and Other Jurisdictions." Fitch Investors Services, January 14.

Beattie, Vivien, and Susan Searle. 1992a. "Bond Ratings and Inter-Rater Agreement." JOURNAL OF INTERNATIONAL SECURITIES MARKETS (Summer): 167-72.

Digitized for FRASER
http://fraser.stlouisfed.org/
Federal Reserve Bank of St. Louis

REFERENCES *(Continued)*

_____. 1992b. "Credit-Rating Agencies: The Relationship between Rater Agreement and Issuer/Rater Characteristics." JOURNAL OF INTERNATIONAL SECURITIES MARKETS (Winter): 371-5.

Billingsley, Randall, Robert Lamy, M. Wayne Marr, and G. Rodney Thompson. 1985. "Split Ratings and Bond Reoffering Yields." FINANCIAL MANAGEMENT (Spring): 59-65.

Board of Governors of the Federal Reserve System. 1987. "Marginability of Mortgage-Related Securities." Office Correspondence from Division of Banking Supervision and Regulation to the Board of Governors, April 15.

Brand, Leo, Thomas C. Kitto, and Reza Bahar. 1994. "1993 Corporate Default, Rating Transition Study Results." STANDARD AND POOR'S CREDIT WEEK INTERNATIONAL, June 6.

Bruskin, Eric. 1988. "The Role of the Rating Agencies." CONVENTIONAL PASS-THROUGH QUARTERLY. Mortgage Securities Research, Goldman Sachs, July.

_____. 1994. "The Rating Game: You Pays Your Money and You Take Your Choice." MORTGAGE MARKET COMMENT, Mortgage Securities Research, Goldman Sachs, January 7.

Cantor, Richard, and R. Demsetz. 1993. "Securitization, Loan Sales, and the Credit Slowdown." FEDERAL RESERVE BANK OF NEW YORK QUARTERLY REVIEW (Summer): 27-38.

Carey, Mark, Stephen Prowse, John Rea, and Gregory Udell. 1993. FEDERAL RESERVE BULLETIN (February): 77-92.

Crabbe, Leland, and Mitchell Post. 1992. "The Effect of SEC Amendments to Rule 2a-7 on the Commercial Paper Market." Board of Governors of the Federal Reserve System Working Paper no. 199.

Dale, Richard S., and Stephen H. Thomas. 1991. "The Regulatory Use of Credit Ratings in International Financial Markets." JOURNAL OF INTERNATIONAL SECURITIES MARKETS (Spring): 9-18.

Ederington, Louis. 1986. "Why Split Ratings Occur." FINANCIAL MANAGEMENT (Spring): 37-47.

Ederington, Louis, and Jess Yawitz. 1987. "The Bond Rating Process." In Edward Altman, ed., HANDBOOK OF FINANCIAL MARKETS. New York: John Wiley and Sons.

Federal Financial Institutions Examination Council. 1994. "Risk Based Capital Requirements—Recourse and Direct Credit Substitutes; Proposed Rule." FEDERAL REGISTER, vol. 59, no. 100, pp. 27116-41.

Financial Times. 1994. FINANCIAL TIMES CREDIT RATINGS INTERNATIONAL (First Quarter).

First Boston. 1990-94. HIGH-YIELD HANDBOOK, annual issues.

Fons, Jerome S. 1991. "An Approach to Forecasting Default Rates." MOODY'S SPECIAL REPORT.

Fridson, Martin S. 1991. "Are Bond Ratings Consistent Over Time?" JUNK BOND REPORTER, February 25.

_____. 1994. "The State of the High Yield Bond Market." JOURNAL OF APPLIED CORPORATE FINANCE (Spring):85-97.

Grafton, K. Susan. 1992. "The Role of Ratings in the Federal Securities Laws." INSIGHTS (August): 22-27.

Harold, Gilbert. 1938. BOND RATINGS AS AN INVESTMENT GUIDE.

INSIDE MORTGAGE SECURITIES. 1994a. "In MBS Rating Service Battle, Historical Leader S&P Quietly Drops into Third Place during 1993." March 18.

_____ 1994b. "Four-Way Battle for Private-Label Rating Business Heats Up As Moody's Loses Market Share." June 17.

Lore, Kenneth. 1991. MORTGAGE-BACKED SECURITIES, 1990-91 Edition. New York: Clark, Boardman Company.

Moody's Investors Service. 1994. "Corporate Bond Defaults and Default Rates: 1970-1993." January.

Monro-Davis, Robin. 1994. "Unsolicited Ratings Are for Investors." THE TREASURER (February): 30-33.

National Association of Insurance Commissioners, Securities Valuation Office. 1994. VALUATION OF SECURITIES MANUAL, vols. 1-2.

O'Neill, Leo C. 1993. Speech before the IOSCO Annual Conference, Mexico City, October 24-26.

Perry, Larry G. 1985. "The Effect of Bond Rating Agencies on Bond Rating Models." JOURNAL OF FINANCIAL RESEARCH (Winter): 307-15.

Digitized for FRASER
http://fraser.stlouisfed.org/
Federal Reserve Bank of St. Louis

REFERENCES *(Continued)*

Purcell, John, Ernest Brown, Joyce Chang, and Dirk Damrau. 1993. "Ferment over Developing Country Ratings: The Case of Mexico." EMERGING MARKETS RESEARCH, Salomon Brothers, February 2.

Schultz, Abby. 1994. "S&P Faces Criticism in Mortgage Area." WALL STREET JOURNAL, January 4.

Securities and Exchange Commission. 1994a. "Nationally Recognized Statistical Rating Organizations." Release Nos. 33-7085, August 31.

Securities and Exchange Commission. 1994b. "Disclosure of Security Ratings." Release No. 33-7086, August 31.

Standard and Poor's. 1994. "Improving Outlook Spurs MBS Revisions." STANDARD AND POOR'S CREDITWEEK, January 10.

Stein, Benjamin. 1992. A LICENSE TO STEAL: THE UNTOLD STORY OF MICHAEL MILKEN AND THE CONSPIRACY TO BILK THE NATION. New York: Simon and Schuster.

West, Richard R. 1973. "Bond Ratings, Bond Yields, and Financial Regulation: Some Findings." JOURNAL OF LAW AND ECONOMICS (April): 159-68.

Wigmore, Barrie. 1990. "The Decline in Credit Quality of New-Issue Junk Bonds." FINANCIAL ANALYSTS JOURNAL (September-October): 53-62.

Digitized for FRASER
http://fraser.stlouisfed.org/
Federal Reserve Bank of St. Louis