AN EXAMINATION OF RATING AGENCIES' ACTIONS AROUND THE INVESTMENT-GRADE BOUNDARY

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Abstract

Data on credit ratings by the agencies with the legal status of Nationally-Recognized Statistical Rating Organizations (NRSROs) show some tendency for one-day downgrades that start from the lowest investment grade, BBB-, to travel more grades than those from neighboring grades. This would be consistent with the lower threshold of the NRSROs' grade BBB- being at a substantial default probability, but also could occur simply because downgrades to junk severely impair some firms' operations. A comparison of data from a non-NRSRO agency and an NRSRO shows that the latter's regrades from BBB- moved in the direction of the non-NRSRO's earlier ratings. This suggests the non-NRSRO defines its grade BBB- more narrowly than the NRSRO.

JEL Classification: G2; G28; G14

Key words: Credit rankings, default, *Egan-Jones Ratings*, prediction, Enron, California utilities

1. Introduction

This paper explores and compares credit-rating agencies' ratings of firms' debt around the boundary between investment grade and junk. Laws regulate holdings of debt with reference to its rating by firms the Securities and Exchange Commission (SEC) recognizes as Nationally-Recognized Statistical Rating Organizations (NRSROs). In recent years three firms held this status: Moody's, Standard and Poor's (S&P), and Fitch. This article refers to these three firms as 'the NRSROs'. The SEC also granted NRSRO status to Dominion Bond Rating Service (DBRS) in February 2003. Episodes in 2001-2 where the NRSROs maintained firms' investment-grade ratings until shortly before they defaulted have concerned policymakers. All three then NRSROs rated Enron Corporation at investment grade until four days before its bankruptcy filing in 2001, then the largest in U.S. history. All three also rated WorldCom at investment grade until forty-two days before its bankruptcy filing in 2002, which then became the largest in history.[1] An interesting question given these episodes is what level of perceived default risk the NRSROs accept within their definition of investment grade. The NRSROs may have rated weak firms at investment grade only because they were unaware of these firms' weakness, however.

The NRSROs describe their ratings as ordinally-ranked opinions on the likelihood that firms will default. They stress that their ratings do not imply particular, cardinal default probabilities. Historical evidence shows that only around 0.2 percent of firms the

[1] Bankruptcydata.com lists the 22 largest bankruptcies from 1980 to the present at http://www.bankruptcydata.com/Research/15_Largest.htm.

NRSROs rate at the three lowest investment grades at time *t* default within a year from *t*.[2] Default rates are even lower for firms the NRSROs rate more highly at time *t*. Thus substantial default risk at a firm rated investment grade by the NRSROs is clearly possible, but also highly unusual.

This paper presents two facts about credit ratings. First, data on S&P's long-term issuer ratings from 1985-2001 show a tendency for downgrades over the course of one day to travel more grades if they start from the lowest investment grade, BBB-, than if they start from higher or lower grades.[3] While the downgrades of California's utilities and Enron from BBB- in 2001 contribute heavily to this result, it remains in S&P data when these events are omitted. This pattern also exists in data on Moody's senior secured debt ratings, but is weaker in Moody's data overall. Fitch's downgrades from BBB- have traveled more grades than those from higher grades, but not than those from lower grades. S&P's upgrades from BBB- show no tendency to travel more grades than those from neighboring grades. Therefore S&P's ratings do not appear to be more volatile at BBB- than at other grades. Moody's upgrades from BBB- have traveled more grades than upgrades from higher, but not lower grades. Thus a greater volatility of ratings at BBB- than at higher grades could explain why Moody's downgrades from this grade are typically larger than those from higher grades. It could not explain why Moody's downgrades of senior secured debt are also larger than those from lower grades.

At least two interpretations of the tendency for large downgrades to start from BBB- are possible. One would be that, for a few firms, the NRSROs tolerate substantial

[2] Standard and Poor's (2002a) shows that from 1981 to 2001 the one-year default rate of firms rated BBB+, BBB or BBB- by S&P was 0.26%. Moody's (2002) shows that, from 1970 to 2001 the one-year default rate of firms rated Baa1, Baa2 or Baa3 by Moody's averaged 0.14%.

[3] For brevity BBB- is referred to throughout as the lowest investment-grade rating. In Moody's scale the lowest investment-grade rating is Baa3.

default risk within their definition of investment grade, so that conditional on falling below their grade BBB-, these firms are at considerable risk of default and merit a multiple-grade downgrade. By contrast S&P (2001) argues that multiple-notch downgrades from BBB- occur because private contracts and regulations impair some firms' operations if the NRSROs rate them at junk. Under this theory, the NRSROs' downgrades from BBB- would necessarily travel several grades even if they allowed minimal default risk within their definition of BBB-. Therefore a tendency for large downgrades from BBB- would not be informative about the level of default risk the NRSROs permit within their grade BBB-.

The second fact arises from a comparison of rating changes from BBB- by S&P with the same firms' ratings by Egan-Jones Ratings (EJR) 21 to 70 days beforehand. EJR is a non-NRSRO agency that has rated debt issues since 1995. Both S&P's and EJR's ratings use the same symbols and reflect qualitative assessments of firms' probability of defaulting.[4] OLS regressions show robustly that, when S&P's regraded a firm from BBB-, its new rating was correlated with EJR's earlier rating. Assuming S&P and EJR assigned the same probabilities of default to each firm, this result suggests that the boundaries of EJR's grade BBB- in terms of default probabilities lie strictly within those of S&P, so that EJR's grade BBB- is more narrowly defined.

This paper proceeds as follows. Section 2 describes the credit-rating industry. Section 3 reviews previous literature on this industry. Section 4 describes the data used in this paper. Section 5 examines S&P's and Moody's one-day rating changes. Section 6 compares S&P's and EJR's ratings. Section 7 concludes.

[4] Both firms issue separate analyses of the prospects that bondholders will recover the value of their bonds in the event of a bankruptcy.

2. The Credit-Rating Industry

This section describes practice in the credit-rating industry, drawing heavily on Cantor and Packer (1995), which provides additional detail. It also discusses ratings triggers in debt contracts, which have received particular attention since Enron's collapse, and proposed reforms of the credit-rating industry.

While anyone can issue credit ratings, as stated above at present the SEC grants NRSRO status to four firms. Since 1931, the Federal Reserve, the Comptroller of the Currency, the SEC and federal and state laws have regulated financial institutions' holdings of corporate debt according to its credit ratings. Since its introduction of the concept of NRSROs in 1975, the SEC has clarified that these laws refer only to ratings given by NRSROs. These laws prohibit banks, Savings and Loans and other institutions from holding debt that is not rated at 'investment grade' by at least one NRSRO. Debt rated below 'investment grade' is referred to as 'speculative grade' or 'junk' debt.[5]

Egan-Jones Ratings (EJR) is newer and smaller than the major rating agencies. It first issued ratings in December 1995, whereas Moody's has rated securities since 1909, Poor's since 1916, and Fitch since 1924.[6] EJR currently has ten employees, while S&P has 1,250, Moody's 800, Fitch 1,200, and DBRS 41.[7] EJR is not an NRSRO and thus its ratings have no regulatory implications.

The major rating agencies originally received revenue only from selling lists of their ratings. However, these were easily copied. Since the early 1970s the major

[5] 'Junk' bonds are also referred to as 'high-yield' or 'below-investment-grade' bonds.
[6] Poor's Publishing Company merged with Standard Statistics to form Standard and Poor's in 1941.
[7] Sources are Fitch: website as of December 11, 2002; S&P and Moody's: SEC testimony of November 2002, at www.sec.gov; EJR: conversation with Sean Egan, December 5, 2002; DBRS: *The New York Times* page C9, February 25th 2003. The S&P figure refers to U.S. staff only.

agencies have charged rating fees to bond issuers, while continuing to receive revenues from sales of their ratings. U.S. firms need not pay to be rated, since both Moody's and S&P have a policy of rating all taxable securities in the U.S. domestic market registered by the SEC. However, about 98 percent of U.S. bond issuers pay the major rating agencies' fees.[8] EJR does not charge firms fees, but instead receives all its revenues from sales of its ratings and analysis to investors. EJR also makes its ratings and opinions freely available to callers to its ratings desk.

Moody's and Fitch define their debt ratings as opinions both about the likelihood of default on a bond issue and how much of bonds' face value holders would recover in the event of a default. S&P defines its issuer ratings, and EJR its senior debt ratings, as opinions only on the likelihood of a default. Table 1 shows S&P's and Moody's long-term issuer and debt-rating symbols. Fitch and EJR use S&P's symbols. Ferri et. al. (1999) term the scale in column 3 a linear conversion of ratings, and also experiment with non-linear conversions. For simplicity, this paper uses only the linear conversion in column 3. In a few cases S&P awards ratings of SD (Selective Default) and R (a firm under regulatory supervision due to its financial condition), which are coded here as being as being equivalent to D (Default).

Rating agencies communicate their opinions through their ratings, their watch lists, and in news releases and conversations with investors. By announcing that a firm is on their watch list, agencies signal that they are reviewing its rating. Watch listings may have positive, negative or neutral outlooks, indicating the likely direction of any future rating change. Rating agencies do not guarantee that a watch listing will be followed by a regrade or that regrades will be preceded by watch listings.

[8] This figure is from Kliger and Sarig (2000).

Ratings triggers are agreements between a firm and individual creditors that make the schedule of that firm's debt repayments contingent on a rating agency's ratings. Often these triggers make debt payable immediately if either S&P or Moody's downgrade the firm's senior unsecured debt below investment grade, though they could refer to any grade. Some triggers have referred only to these agencies' ratings and not those of Fitch. To date no ratings triggers have been written referring to EJR's ratings. Creditors have expressed concern that they have been ignorant of rating triggers attached to other creditors' claims.[9] Since Enron's default S&P has investigated and reported on rating triggers in other firms' debt contracts and has encouraged firms to remove them.[10]

The Supreme Court has ruled that credit ratings are opinions protected by the First Amendment's free speech clause.[11] This would appear to preclude investors and issuers from suing agencies for issuing particular ratings and to preclude governments from compelling private agencies to award particular ratings. Thus governments may only regulate the credit-rating industry in an indirect manner. The Senate Government Affairs Committee's recent report (2002) proposes that greater oversight by the SEC be made a precondition of that body granting agencies NRSRO status. The major agencies have consistently argued against regulation of their industry on the grounds that their independence is crucial to the credibility of their analysis in markets.[12]

[9] Indeed, both the rating agencies and Enron's management at the time were unaware of one trigger relating to Enron's debt until the creditor exercised it. See Senate Government Affairs Committee (2002) p.114.
[10] Standard and Poor's (2002b).
[11] See the court cases described in the Senate Government Affairs Committee's (2002) report, p. 123-4.
[12] See Standard and Poor's and Moody's statements to the SEC's hearings of November 15 and 21, 2002, at www.sec.gov.

3. Literature Review

This section discusses literature on ratings transitions and on whether rating changes are predictable. Altman (1998) compares studies of ratings transition matrices. These matrices compare the ratings of firms at two points in time, for example days one year apart. Lando and Skødeberg (2002) show how continuous-time rating data can be used to estimate longer-run transition behavior. Overall, however, transition matrices seem poorly suited to studying ratings changes over short horizons since in this case their diagonal terms (representing the proportion of firms whose rating has not changed) become very close to unity while all the other terms become very close to zero. Most studies of ratings transitions examine changes between coarse grades, ignoring the '+' and '-' distinctions, since analyzing ratings according to these fine distinctions may lead to small sample sizes and low statistical power.[13]

Previous work has found that Moody's (Carty and Fons 1993) and S&P's (Bangia, Diebold and Schuermann 2002, and Lando and Skødeberg 2002) credit ratings exhibit downward momentum. That is, of all firms rated, say, A, those that were previously downgraded to A are more likely to be downgraded from A than those that were previously upgraded to A. Downward momentum is evident at all grades, and there is some, though less, evidence of upwards momentum.[14] The existence of momentum to rating changes implies that the history of agencies' past rating actions would help observers predict their future actions. Löffler (2002) shows that, if changes in credit

[13] For example Nickell et. al. (2000) comment that "one may doubt whether it is really useful to employ the finer categorization in credit risk modeling."
[14] Ratings momentum defined in this manner cannot exist at grades AAA or D since firms cannot be downgraded to AAA or upgraded to D.

quality follow a random walk, rating-grade boundaries that overlap in terms of default probabilities would generate momentum in rating changes. Overlaps between rating-grade boundaries would reduce the information content of credit ratings for investors, since they would enlarge the range of default probabilities that would be assigned any particular grade.

The KMV Corporation has developed a default predictor, Estimated Default Frequency (EDF^{TM}), which is heavily based on equity prices.[15] Kealhofer (2003) shows that EDF^{TM} was superior to Moody's or S&P's ratings as a predictor of defaults by U.S. companies from 1990 to 1999, in the following sense. KMV's, Moody's and S&P's rating scales can each be interpreted as binary 'no-default' and 'default' predicators by interpreting all ratings below an arbitrary cutoff a 'default' prediction. The predictions generated by any such cutoffs suffer from both Type I and Type II errors. Kealhofer (2003) shows that for any common level of Type II errors, predictions based on KMV's EDF^{TM} measure produced fewer Type I errors than predictions based on Moody's or S&P's ratings. Jarrow and Turnbull (2000) make various criticisms of KMV's method of modeling default risk.

4. Data

This paper takes Moody's, S&P's, Fitch's and EJR's rating actions from the Bloomberg system. Bloomberg takes these data directly from the rating agencies. The

[15] Stephen Kealhofer, John McQuown and Oldrich Vasicek founded KMV in 1989. Moody's acquired KMV in April 2002.

NRSROs' actions are examined from an arbitrary starting date of 1985. EJR first issued ratings in December 1995.

Moody's awards different types of long-term ratings. Below, several types of Moody's ratings are analyzed separately. Of the changes to Moody's long-term ratings Bloomberg lists from 1985 to 2001, the most common types are ratings of senior unsecured debt (37 percent of all changes), subordinated debt (16 percent), issuers (11), bank loan debt (7), senior implied issuers (6) and senior secured debt (6 percent). For a small number of firms, Bloomberg lists multiple ratings of the same type on the same day, which in most cases are identical ratings. All duplicate ratings are dropped from the data used here, which thus include at most one rating of each type for any firm on any one day. However, a firm and its subsidiaries may have ratings of the same type, which may move similarly. Thus not all observations in these data are independent, though the regressions below treat them as being so. Without information on subsidiary relationships it does not appear possible to control for them. These comments on duplicated ratings and subsidiaries apply also to the data on S&P and Fitch.

Of Bloomberg data on S&P's changes to firms' long-term ratings, 51 percent are changes to long-term local-currency issuer ratings and 46 percent are changes to long-term foreign-currency issuer ratings. Firms' local and foreign-currency ratings are typically identical. Changes to local-currency issuer ratings are analyzed below. Results using foreign-currency issuer ratings are very similar. The small number of changes from or to ratings based on public information only, which S&P suffixes 'pi', were omitted. S&P typically does not modify these ratings with '+' or '-' signs. Consequently it is difficult to state how many grades separate 'BBBpi', for example, from other grades.

Bloomberg carries fewer changes to long-term ratings by Fitch than by S&P or Moody's. Of these, 59 percent of those from 1985-2001 were changes to senior unsecured debt ratings. Below only this type of rating is analyzed due to the small sample sizes of ratings of other types.

The Bloomberg system lists EJR's senior unsecured debt ratings and written comments by EJR that accompanied them.[16] This paper omits a few firms for which these announcements are chronologically inconsistent, probably due to omissions.[17] EJR's ratings are matched to those of S&P by (precise) firm name, omitting cases where takeovers create ambiguity as to whether the rated entities are the same. EJR rates fewer firms than S&P, both because it rates only parent companies, not subsidiaries, and because it rates fewer parent companies than S&P.

5. The Number of Grades Traveled by Single-Day Downgrades

This section examines the average number of grades traveled by downgrades from each grade over the course of one day. Thus for example a downgrade from BBB- to B- travels six grades. This measure rather than a standard transition matrix is examined as all elements of the latter over short periods would be very close to either zero or one.

Table 2 constructs this average for downgrades by S&P in Bloomberg data from 1985 through 2001. The entries show the average number of grades traveled by

[16] These ratings are available through the Bloomberg system only to subscribers to Egan-Jones Ratings.
[17] For example, in some cases Bloomberg lists an announcement by EJR downgrading a firm from BB+ to BB and a following announcement downgrading it from BB- to B+. Thus the rating's path from BB to BB- is omitted.

downgrades (henceforth 'the average size of downgrades') that started from each grade. The bottom two rows present p-values from tests of whether downgrades from BBB- differed in size on average from those from grades A, A-, BBB+ and BBB (Test 1) and from those from grades BB+, BB, BB- and B+ (Test 2).

These tests are constructed as follows. Letting *Y* be the size of a downgrade, *Y-1* has an approximately Poisson distribution, but with a larger variance. The negative binomial distribution is a generalization of the Poisson distribution that allows for larger-than-Poisson variance. If *Y*-1 has a negative binomial distribution, then

$$(1) \qquad \Pr\left[Y-1=y\middle|x_i\right]=\frac{e^{-\mu_i}\mu_i{}^{y}}{y!}, \qquad \mu_i=\exp\left(x_i'\beta+v_i\right), \quad v_i\sim Gamma\left(1/\alpha,\,1/\alpha\right) \quad ,$$

where α can be estimated from data. This distribution reduces to the Poisson if α=0. Negative binomial regressions of Y_i*-1* are estimated using maximum likelihood, letting

$$(2) \qquad x_i'\beta=\beta_1+\beta_2.Z_i+\beta_3.Upper_i+\beta_4.Lower_i\,,$$

where Z =1 if the starting grade was BBB- and zero otherwise, *Upper* = 1 if the starting grade was A, A-, BBB+ or BBB and zero otherwise, and *Lower* =1 if the starting grade was BB+, BB, BB- or B+ and zero otherwise. Test 1 is the likelihood-ratio test that β_2=β_3 and Test 2 that β_2=β_4. These are one-tailed tests, so a rejection of the null implies that the downgrade sizes differ significantly, but does not imply that downgrades from BBB- were larger than others.

Column 1 of Table 2 shows the average sizes of S&P's downgrades of all world corporations from 1985 to 2001. Downgrades that started from BBB- were larger on average than those from all higher grades and the four lower grades, but were smaller than those from grades B through CC. Tests 1 and 2, reported in the bottom two rows, show that downgrades from BBB- differed in size on average from those from both the higher and lower four grades at a high level of significance. Column 2 shows the number of downgrades from each grade. S&P's heavy downgrades from BBB- of California's utilities and their subsidiaries in January 2001 and of Enron and its subsidiaries in November 2001 contribute heavily to the pattern in column 1. To remove these episodes, column 3 repeats column 1 but omits downgrades during January and November 2001. Again downgrades from BBB- were larger than those from all higher grades and from some lower grades, and differed significantly in size from those from the upper and lower four grades. Thus the pattern of S&P's large downgrades particularly starting from grade BBB- does not only reflect its large downgrades from this grade of California's utilities and of Enron.

Columns 4 to 7 of Table 1 test for this pattern in subsamples of the S&P data. Column 4 examines downgrades from 1985-94. In this period downgrades from BBB- were larger than those from all higher and some lower grades, but did not differ significantly in size from those from the higher or lower four grades. The smaller number of rating changes in this period reduces the power of tests 1 and 2 somewhat. Column 5 shows similar results for 1995-2000. Downgrades from BBB- were larger on average than those from all higher and some lower grades. Tests 1 and 2 show that downgrades from BBB- differed significantly in size from downgrades from the higher

four grades but not from the four lower grades. Columns 6 and 7 split data from 1985-2000 into U.S. and foreign subsamples. Downgrades from BBB- did not differ significantly in size from those from other grades in this U.S. subsample. In the foreign subsample downgrades from BBB- were again larger than those from all higher and some lower grades. They differed significantly in size from those from the four higher grades though not from those from the four lower grades.

Overall there is something of a pattern for S&P's large single-day downgrades to start from BBB- rather than the higher or lower four grades. This pattern remains when the Californian utility and Enron cases are dropped from the data. It also exists in some subsamples of the 1985-2001 data, though it is not always statistically significant. Results using S&P's long-term foreign-currency issuer ratings are not shown but were highly similar.[18]

Table 3 repeats this exercise using Moody's data. Columns 1 and 2 examine Moody's rating of world corporations' senior unsecured debt. Column 1 shows that from 1985-2001, downgrades from the lowest investment grade, Baa3, on average traveled more grades than those from the higher but not lower grades. The difference in size with downgrades from the higher four grades is statistically significant. Column 2 shows that the same results hold if downgrades from January and November 2001, and thus those of California's utilities and Enron, are omitted from the data.

Columns 3-9 examine other types of Moody's long-term ratings. Column 3 shows that from 1985-2001 Moody's downgrades of issuer ratings from Baa3 traveled

[18] Subjecting S&P's downgrades of foreign-currency issuer ratings to the tests shown in Table 2, those from BBB- differed in average size from those starting from the higher and lower four grades at the 5-percent significance level in the world sample from 1985-2001 including or excluding January and November 2001 and in the world sample from 1995-2000, but not in the other subsamples.

more grades on average than those from all higher and most lower grades. Column 4 shows that this result disappears when January and November 2001 are excluded from the sample. Columns 5 and 6 examine subordinated debt ratings. Downgrades from Baa3 differed significantly in size from those from the four higher but not lower grades from 1985-2001 including or excluding January and November 2001. Column 7 shows no such pattern exists among Moody's ratings of bank loan debt. Columns 8 and 9 show that Moody's downgrades of senior secured debt from Baa3 were larger than those from all higher and most lower grades and that they differed significantly in size from those from the four higher and lower grades whether or not the sample includes January and November 2001.[19]

Overall Moody's long-term debt ratings show a fairly consistent tendency for downgrades from Baa3 to be larger than those from higher grades. Only among downgrades of senior secured debt have downgrades from Baa3 been robustly larger than those from lower grades also. Thus there is less of a tendency for large downgrades to start from Baa3 rather than other grades than is evident in S&P's ratings.

Table 4 examines changes to Fitch's ratings. Fitch rates fewer firms than the other NRSROs. Column 1 shows that among world firms from 1985-2001 Fitch's downgrades from grade BBB- were substantially larger on average than those from most higher grades, but not than those from lower grades. The difference in downgrade sizes between those from BBB- and those from the four higher grades is highly significant. Column 3 shows the same is true in Fitch data from 1985-2000. Columns 4 and 5 show that no significant differences are apparent if the 1985-2000 data are divided into U.S.

[19] Downgrades of Moody's senior implied issuer ratings are not shown since few of these started from investment grades and thus comparisons of average downgrade sizes are difficult.

and foreign samples, though here the small sample sizes reduce the power of tests 1 and 2 drastically. Overall the Fitch data show a tendency for downgrades from BBB- to travel more grades than those from higher but not lower grades.

One might infer from Tables 2-4 that the credit quality of firms rated BBB- is more volatile than that of firms rated at the neighboring grades. In this case upgrades from grade BBB- would be expected to travel more grades than those from neighboring grades. Table 5 compares the size of S&P's and Moody's upgrades from each grade of all world firms from 1985 through 2001. No tendency for S&P's upgrades from BBB- to be larger than those from neighboring grades is apparent. Thus in S&P data firms rated BBB- do not appear to have particularly volatile default probabilities. Moody's upgrades from Baa3 have traveled more grades than those from higher but not lower grades at the 5-percent significance level. Thus Moody's data give some support to the view that the firms rated Baa3 have more volatile default risks than higher-graded firms. This would not explain why Moody's downgrades of senior secured debt ratings from Baa3 were larger than those from both higher and lower grades, however.

Alternatively, one might infer from Tables 2-4 that credit ratings tend to stick at grade BBB- for some time and in some cases fall sharply later. To explore this possibility, Table 6 calculates the number of firm-days spent at each grade from 1985-2001 using Bloomberg data. Bloomberg data on S&P's ratings begin in 1960, and all these data were used to identify firms whose ratings remained constant and thus for whom S&P took no rating actions between 1985 and 2001.[20] It is possible that some firms' ratings have remained constant since before 1960 and thus are omitted from this

[20] For example, Bloomberg quotes S&P as rating General Electric Co at AAA on 11/23/1981. S&P did not change this rating after 1981, so data from 1985-2001 show no S&P ratings of GE. Thus it is necessary to examine Bloomberg data from before 1985 to know how S&P rated GE between 1985 and 2001.

calculation of firm-days at each grade during 1985-2001. Columns 1 and 2 of Table 6 show the average number of U.S. and foreign firms respectively rated at each grade from 1985 to 2001, calculated by dividing the firm-day total at each grade by 6208, the number of days from 1985-2001. No tendency for firms to bunch at grade BBB- is apparent. Columns 3 and 4 show the average length of firm spells at each grade in U.S. and foreign samples respectively. This is the number of firm-days at each grade divided by the number of regrades away from that grade.[21] Spells at BBB- were longer than those at BB+, but shorter than those at BBB and higher grades. Thus there is no general tendency for spells at BBB- to be longer than those at neighboring grades.

As stated above, (at least) two rival interpretations are possible of the apparent tendency for downgrades from BBB- to be larger than those from higher and in some cases lower grades. One is that the NRSROs set the lower boundary of grade BBB- at a sufficiently high default risk that firms they rate BBB- would need only a small deterioration in credit quality to have a default risk consistent with a considerably lower rating. Another is that negative shocks to firms rated BBB- necessitate large downgrades no matter how much default risk the NRSROs tolerate within their grade BBB-. Further evidence that may help choose between these interpretations is available from examination of contemporary ratings by Egan-Jones Ratings.

[21] Regrades to 'Not Rated' are treated as censored observations and are thus not included in the denominator.

6. A Comparison Between Standard and Poor's and Egan-Jones' Ratings

This section compares the grades to which Standard and Poor's regraded firms from BBB- with Egan-Jones' ratings of the same firms in the 3-10 weeks before S&P's regrades. These agencies are compared because they both use the same rating symbols and define their ratings as opinions on the probability that firms will default on their debts.[22]

Using Bloomberg data, a dataset was constructed of all S&P's upgrades and downgrades of world firms from BBB- that had concurrent ratings by EJR, from December 1995, when EJR first issued ratings, through October 2002. Of the 587 firms S&P regraded from BBB- during this period, the Bloomberg system quotes EJR's ratings of 126 firms up to 35 days before S&P's regrades from BBB-, and of 119 firms 70 days before S&P's regrades. Many of S&P's regrades lack EJR coverage because they are subsidiaries of firms EJR rated.[23] The sample of 126 firms includes Edison International, PG&E Corp. and Enron Corp., but not these firms' subsidiaries.

Figure 1 shows these 126 firms. Its y-axis shows S&P's rating of these firms at the end of the day it changed each firm's rating from BBB-, and its x-axis shows EJR's rating at the end of the day 21 days earlier. Letter grades are converted to numbers using the scale in Table 1, so BBB- corresponds to 13, and lower numbers represent lower, junk ratings. The horizontal and vertical lines denote S&P's and EJR's grade BBB- respectively. Since many firms had the same (x,y) values, each data-point is randomly

[22] This is true of S&P's issuer ratings, used here; their issue ratings reflect prospects for recovery in the event of bankruptcy.

[23] If EJR chose only to rate those firms where it felt it could predict S&P's subsequent rating action, these regression results would overestimate EJR's predictive ability for a firm selected at random. Egan-Jones state that their decisions on which firms to rate are entirely driven by the demands of their investor clients.

disturbed slightly to show how many observations lie at each point. This shows that most of S&P's up- and downgrades traveled only one grade, and that many of these regrades moved to EJR's rating of 21 days earlier. The two firms in the bottom left-hand corner are California's utilities PG&E Corp. and Edison International. A positive correlation between S&P's rating after regrading from BBB- and EJR's rating 21 days earlier is apparent. Table 7 explores this correlation in more detail.

The regressions in Table 7 are based on the specification

$$(3) \qquad S_i = \alpha + \beta.E_{i,j} + \varepsilon_i$$

where S_i is S&P's rating of firm i at the end of the day it regraded it from BBB- and $E_{i,j}$ is EJR's rating of the same firm at the end of the day j days earlier. If EJR's ratings had no predictive content for S&P's regrades, β=0. Therefore β>0 would indicate that EJR's ratings had predictive content. β could overstate this predictive content because the data used here would exclude episodes in which EJR's rating of a firm differed from BBB- but S&P's rating remained at that grade. However, β>0 would reliably show that S&P's regrades from BBB- moved in the direction of EJR's earlier ratings. If so, then assuming both agencies assigned the same default probability p to each firm, this would imply that the boundaries of EJR's grade BBB- in terms of p lay strictly within those of S&P. Alternatively, one could assume that both firms had the same grade boundaries but that Egan-Jones systematically had superior information that allowed it to detect when firms default risks had crossed a grade boundary sooner. This latter explanation seems

implausible, however, since the NRSROs employ large staffs and have extensive access to firms' management.

Columns 1-3 of Table 7 estimate equation (3) using Ordinary Least Squares for j=21, 35 and 70. The upper panel uses all the available firm-episodes while the lower panel omits PG&E and Edison International. As noted above the regressions using j=70 have a smaller available sample size. In the upper panel a positive and significant $\hat{\beta}$ is estimated whether EJR's ratings are recorded 21, 35 or 70 days prior to S&P's regrades. The estimated $\hat{\beta}$ falls as j increases, consistent with firms' default risks having started in or close to EJR's grade BBB- but having migrated away from it over time. To test whether these results are sensitive to whether regrades are measured in grades traveled, arguably a poor metric for their economic importance, in column 4 S_i and $E_{i,j}$ are coded as 1 = above BBB-, 0 = BBB- and -1 = below BBB-. The significant coefficients on EJR's rating 21 days before S&P's regrade in column 4 in the upper and lower panel indicate that the results of columns 1 are not sensitive to the metric used to measure the 'size' of each regrade. Regressions such as (3) were also run controlling for S&P's watch-list ratings j days prior to S&P's regrades from BBB-. In these regressions also the coefficients on EJR's earlier ratings were positive and statistically significant. They are not reported here, since controlling for S&P's watch-list ratings does not seem necessary to test whether EJR's implicit boundaries of grade BBB- lie inside those of S&P.

In this sample, S&P's regrades of California's utilities PG&E Corp. and Edison International traveled furthest from BBB-. Therefore these downgrades might be expected to affect the estimated $\hat{\beta}$ substantially. The bottom panel of Table 7 omits these two firms, and shows that $\hat{\beta}$ is still significantly positive at j=21, 35 and 70.

Therefore the result that S&P's regrades moved towards EJR's earlier ratings does not depend on the inclusion of these cases. Table 7 could overstate the ability of outside observers to predict changes in S&P's ratings because there are many rating agencies and EJR could merely be one which guessed luckily in this sample. The p-values associated with EJR's prior ratings in Table 7 show, however, that the odds of EJR's producing this correlation through random guessing would have been low. As argued above, the existence of momentum in the NRSROs' ratings would also have helped EJR predict the direction of S&P's regrades from BBB-.

Since the episode of California's utilities represents an extreme episode of large downgrades from BBB- that EJR anticipated beforehand, further information on this episode may help explain how the two main results of this paper may arise. Figure 2 shows S&P's, Moody's, Fitch's and EJR's ratings of Edison International in 2000-1, again using the numerical scale of Table 2. The four agencies' ratings of PG&E Corp. were almost identical.[24] It was known at the time that downgrades to junk by S&P or Moody's would trigger clauses in the utilities' debt contracts that would likely force the utilities into default, but that no triggers were attached to Fitch's or EJR's ratings.[25] Of the four agencies shown in Figure 2, it is striking that the two whose ratings had no legal consequences reduced their ratings to low junk before those of the two agencies whose junk ratings would have had such consequences. Indeed, S&P and Moody's maintained their ratings of BBB- until Edison's subsidiary Southern California Edison missed a payment to bondholders on January 16th 2001. The ratings in Figure 2 would be

[24] Fitch does not rate PG&E Corp. but does rate its subsidiary Pacific Gas & Electricity Corporation.
[25] *The Wall Street Journal*, p.A3, Jan 5th 2001.

consistent with S&P and Moody's having tolerated a considerable degree of default risk within their definitions of grade BBB- in this episode.

Overall, it is robustly the case that S&P's regrades from BBB- moved in the direction of EJR's earlier ratings. It appears more likely that this result reflects systematic differences between the two firms' rating policies than a small number of lucky guesses by EJR.

7. Conclusion

This paper finds some tendency for Standard and Poor's and Moody's multiple-notch downgrades to start from their lowest investment grade rather than from neighboring grades. This pattern exists in some though not all sub-samples of the data which omit these agencies' heavy downgrades of California's utilities, Enron and their subsidiaries from BBB- in 2001.

Conflicting interpretations of this regularity are possible. One would be that the NRSROs set the lower threshold of their grade BBB- at a fairly high default probability. Alternatively, large downgrades from BBB- could result from the fact that regulations and contracts imply junk ratings impede firms' operations. In this case the size of downgrades from BBB- would not be informative about the lower threshold agencies set for this grade.

A comparison between S&P's and EJR's ratings shows that, conditional on S&P's upgrading or downgrading a firm from BBB-, its new grade was correlated with the grade

EJR had awarded at least ten weeks earlier. This suggests that S&P defines its grade BBB- more widely in terms of default probabilities than EJR. It also suggests that S&P's large downgrades from BBB- did not occur immediately after negative surprises to firms, but rather after a steady accumulation of bad news which EJR's ratings reflected.

In the absence of a prescriptive model, it is not possible to judge that any firm's ratings boundaries are too high or low, or too wide or narrow. Any such a judgment would need to take account of credit ratings' effects on all market participants, which are many and complex and differ across agencies.

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Table 1: Standard and Poor's Long-Term Issuer Ratings and Egan-Jones', Fitch's and Moody's Long-Term Senior Debt Ratings

	S&P/EJR/Fitch	Moody's	Numeric Scale
Investment Grade	AAA	Aaa	22
	AA+	Aa1	21
	AA	Aa2	20
	AA-	Aa3	19
	A+	A1	18
	A	A2	17
	A-	A3	16
	BBB+	Baa1	15
	BBB	Baa2	14
	BBB-	Baa3	13
Speculative Grade	BB+	Ba1	12
	BB	Ba2	11
	BB-	Ba3	10
	B+	B1	9
	B	B2	8
	B-	B3	7
	CCC+	Caa1	6
	CCC	Caa2	5
	CCC-	Caa3	4
	CC	Ca	3
	C	C	2
	D		1

Note: Standard and Poor's defines D as its default grade, while Moody's states that bonds rated Caa1 through C may be in default.

Table 2: Size in Grades of S&P's Downgrades of Corporations' Long-Term Local-Currency Issuer Ratings, 1985-2001

	1	2	3	4	5	6	7
Country	World					U.S.	Foreign
Period	1985-2001		1985-2001*	1985-1994	1995-2000	1985-2000	
	Size	N	Size	Size	Size	Size	Size
Starting Grade							
AAA	1.54	144	1.55	1.55	1.61	1.67	1.51
AA+	1.49	179	1.52	1.64	1.52	1.56	1.56
AA	1.55	342	1.55	1.77	1.42	1.63	1.44
AA-	1.49	404	1.49	1.77	1.38	1.65	1.28
A+	1.53	467	1.52	1.73	1.43	1.61	1.39
A	1.69	539	1.7	2.09	1.51	1.89	1.43
A-	1.49	460	1.49	1.74	1.43	1.52	1.53
BBB+	1.46	366	1.48	1.82	1.35	1.51	1.48
BBB	1.46	303	1.48	1.67	1.47	1.55	1.43
BBB-	1.97	299	1.79	2.24	1.71	1.76	1.93
BB+	1.74	235	1.65	2.24	1.65	1.79	1.74
BB	1.59	274	1.62	1.78	1.61	1.58	1.8
BB-	1.55	385	1.54	1.95	1.56	1.59	1.64
B+	1.68	594	1.69	1.75	1.68	1.63	1.95
B	2.27	413	2.27	2.21	2.35	2.42	1.93
B-	2.37	315	2.34	2.33	2.45	2.51	2.28
CCC+	3.14	208	3.11	2.4	3.04	2.97	2.94
CCC	2.99	141	3.06	1	3.11	3.25	2.09
CCC-	2.23	64	2.24	2	2.42	2.48	2.14
CC	1.99	143	1.99	1	2	1.98	2
Test 1 p-value	0.00		0.00	0.17	0.01	0.24	0.00
Test 2 p-value	0.00		0.04	0.33	0.12	0.22	0.47

* Omitting January and November 2001.
Note: Test 1 has H_0: Downgrades from BBB- are of the same size on average as downgrades from grades BBB, BBB+, A- and A.
Test 2 has H_0: Downgrades from BBB- are of the same size on average as downgrades from grades BB+, BB, BB- and B+.
H_1 for each test: Downgrades from BBB- are of a different size on average than those from the specified grades.
Tests use negative binomial regressions as described in section 5.

Table 3: Average Size in Grades of Moody's Downgrades of World Corporations' Ratings, 1985-2001, by Starting Grade and Rating Type

	1	2	3	4	5	6	7	8	9
Rating Type	Senior Unsecured Debt		Issuer Rating		Subordinated Debt		Bank Loan Debt	Senior Secured Debt	
Period	1985-2001	1985-2001*	1985-2001	1985-2001*	1985-2001	1985-2001*	1985-2001	1985-2001	1985-2001*
Starting Grade									
Aaa	1.46	1.46	1.56	1.56	1.33	1.33	..	2	2
Aa1	1.7	1.7	1.65	1.65	1.16	1.16	2	1.35	1.35
Aa2	1.53	1.51	1.22	1.23	1.51	1.48	2	1.48	1.48
Aa3	1.41	1.41	1.32	1.33	1.36	1.37	..	1.37	1.37
A1	1.5	1.5	1.31	1.3	1.19	1.18	1.29	1.27	1.11
A2	1.43	1.41	1.55	1.47	1.35	1.35	1.8	1.54	1.57
A3	1.57	1.58	1.51	1.52	1.68	1.68	1.33	1.48	1.48
Baa1	1.5	1.5	1.89	1.94	1.58	1.59	1.6	1.67	1.66
Baa2	1.41	1.42	1.19	1.19	1.76	1.76	1.26	1.74	1.51
Baa3	1.77	1.63	2.23	1.58	1.98	1.98	1.56	2.32	1.94
Ba1	1.84	1.79	1.75	1.75	2.16	2.09	1.62	1.59	1.58
Ba2	1.95	1.94	1.91	1.91	1.74	1.75	1.53	1.65	1.5
Ba3	1.58	1.58	1.6	1.64	1.83	1.84	1.55	1.42	1.43
B1	1.52	1.51	1.65	1.67	1.62	1.63	1.63	1.45	1.41
B2	1.73	1.7	1.92	1.92	1.34	1.33	1.66	1.69	1.67
B3	2.1	2.1	1.99	2.01	2.42	2.41	1.69	2.19	2.16
Caa1	2.2	2.2	2.01	1.97	2.22	2.23	1.6	2.15	2.19
Caa2	1.96	1.96	2.03	2.05	2	2	1.25	1.86	1.86
Caa3	1.24	1.25	1.29	1.27	1.24	1.21	2	1.28	1.4
Test 1 p-value	0.00	0.00	0.00	0.81	0.00	0.00	0.14	0.00	0.02
Test 2 p-value	0.43	0.33	0.02	0.46	0.23	0.2	0.8	0.00	0.00

* Omitting January and November 2001.
Note: All downgrades from Moody's grade Ca travel one notch by definition.
Tests 1 and 2 are as described in Table 2.

Table 4: Size in Grades of Fitch's Downgrades of Corporations' Senior Unsecured Debt Ratings, 1985-2001					
	1	**2**	**3**	**4**	**5**
Country	World			U.S.	Non-U.S.
Period	1985-2001		1985-2000	1985-2000	
	Size	N	Size	Size	Size
Starting Grade					
AAA	2.36	28	2.33	3.73	1.38
AA+	1.32	38	1.19	1.23	1.17
AA	1.44	93	1.38	1.45	1.33
AA-	1.28	144	1.28	1.43	1.08
A+	1.32	138	1.22	1.34	1.12
A	1.43	136	1.45	1.52	1.38
A-	1.65	112	1.42	1.38	1.47
BBB+	1.32	84	1.34	1.46	1.07
BBB	1.43	58	1.42	1.5	1.18
BBB-	2.25	48	1.89	1.79	2.5
BB+	2	24	2.13	2.17	2
BB	2.27	30	2.09	2.25	1
BB-	2.46	26	2.63	2.55	2.8
B+	2.29	21	2.36	2.63	2
B	2.63	16	2.56	2	3.25
B-	2.29	17	2.2	2.25	2
CCC+	1.25	4	1	1	..
CCC	1	13	1	1	1
CCC-	..	0	..	..	..
CC	..	0	..	..	..
Test 1 p-value	0.00		0.03	0.13	0.16
Test 2 p-value	0.98		0.34	0.15	0.75

Note: All downgrades from Fitch's grade C travel one notch by definition. Tests 1 and 2 are as described in Table 2.

Table 5: Average Size in Grades of Upgrades of World Corporations Long-Term Local-Currency Issuer Ratings (S&P) and Senior Unsecured Debt Ratings (Moody's) by Starting Grade, 1985-2001

	1	2	3	4
Agency	S&P		Moody's	
Starting Grade	Size	N	Size	N
AA	1.4	40	1.26	74
AA-	1.17	84	1.23	144
A+	1.18	164	1.12	225
A	1.29	256	1.24	245
A-	1.39	279	1.28	270
BBB+	1.42	250	1.35	231
BBB	1.52	315	1.62	269
BBB-	1.53	283	1.51	283
BB+	1.48	237	1.53	233
BB	1.49	222	1.54	171
BB-	1.55	244	1.76	148
B+	1.65	254	1.65	150
B	1.74	152	1.85	127
B-	1.97	75	2.54	100
CCC+	2.24	41	1.12	33
CCC	2.89	28	2.39	77
CCC-	2.71	14	1.33	3
CC	3.85	20	6.2	20
C	4.5	2	5.33	3
Test 1 p-value	0.9		0.05	
Test 2 p-value	0.19		0.28	

Note: Test 1 has H_0: Upgrades from BBB- are of the same size on average as upgrades from grades BBB, BBB+, A- and A.
Test 2 has H_0: Upgrades from BBB- are of the same size on average as upgrades from grades BB+, BB, BB- and B+.
H_1 for each test: 'Upgrades from BBB- are of a different size on average than those from the specified grades.'
Tests use negative binomial regressions as described in section 5.
All upgrades from S&P's grade AA+ and Moody's grade Aa1 travel one notch by definition.

Table 6: Average Number of Firms at Each Grade and Average Spell Length, Days, S&P's Long-Term Local-Currency Issuer Ratings, 1985-2001

	1	2	3	4
	No. of Firms		Spell Length	
Country	U.S.	Non-U.S.	U.S.	Non-U.S.
AAA	55.4	45	5,207	4,165
AA+	32.2	25.8	2,249	1,841
AA	89.5	48	2,231	2,205
AA-	108.6	55.6	2,195	2,067
A+	160.5	55.7	2,425	1,694
A	180.1	69	2,113	1,488
A-	127.9	52.8	1,647	1,395
BBB+	129.8	44.3	1,759	1,796
BBB	135.6	68.8	1,776	1,599
BBB-	102.9	34.4	1,511	1,396
BB+	60.3	15.8	1,019	950
BB	77.7	42.1	1,287	1,152
BB-	100.1	22.7	1,295	926
B+	157.4	20.1	1,435	788
B	64.9	22.2	898	821
B-	27.7	6.5	607	391
CCC+	12.3	2.2	394	263
CCC	5.8	3.2	277	368
CCC-	1.84	0.8	208	226
CC	2.93	1.4	149	198
C	0.1	0	176	0

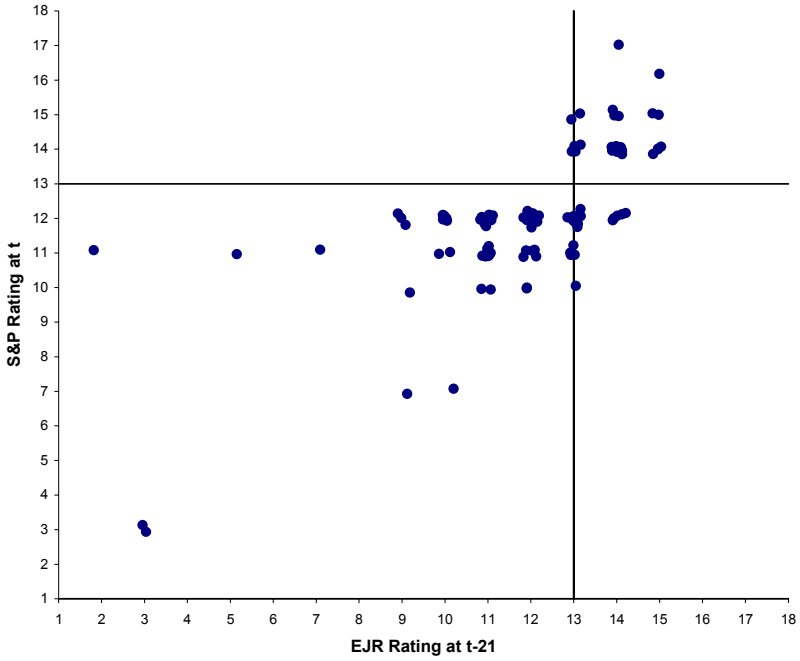
Note: Average firms at grade i = $(\text{Firm Days})_i/6208$; Average spell length at grade i= $(\text{Firm Days})_i/(\text{Regrades from } i)$. Regrades to 'No Rating' are treated as censored spells and thus are not in the denominator of spell length. Average spell length is rounded to the nearest day.

Table 7: OLS Regressions of S&P's Long-Term Local-Currency Issuer Ratings after changes from BBB- on earlier Egan-Jones Senior Unsecured Debt Ratings, 1996-October 2002.
Column 4: Is rating greater, equal to or less than BBB-? (1,0,-1).

	1	**2**	**3**	**4**
	Days Before S&P's Downgrade From BBB-			
	21	35	70	21
Egan-Jones' Rating	0.63 (0.05)	0.42 (0.1)	0.34 (0.11)	0.84 (0.06)
[p-value]	[0.00]	[0.00]	[0.00]	[0.00]
R^2	0.53	0.13	0.07	0.61
N	126	126	119	126
	Omitting PG&E Corp. and Edison International			
Egan-Jones' Rating	0.49 (0.06)	0.55 (0.07)	0.49 (0.09)	0.84 (0.06)
[p-value]	[0.00]	[0.00]	[0.00]	[0.00]
R^2	0.37	0.34	0.22	0.61
N	124	124	117	124

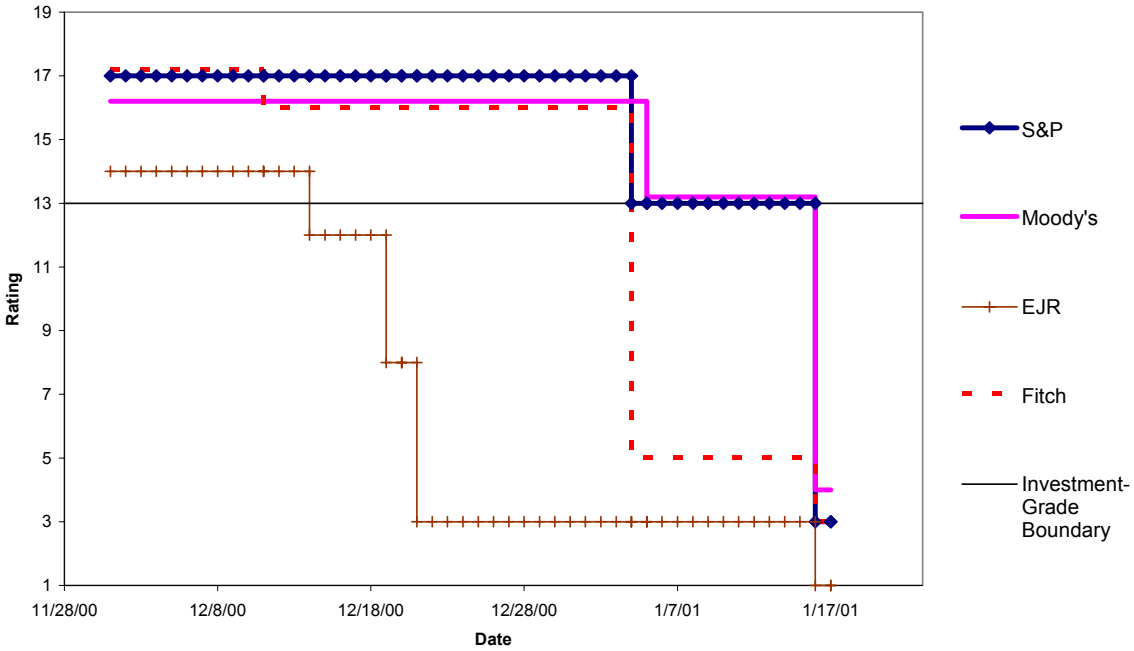
Note: All regressions include constants. Standard errors are in round brackets.

Figure 1: S&P's Grade at End of Regrades from BBB- and EJR's Rating 21 Days Earlier, December 1995-October 2002. Data are from Bloomberg.



Note: These are firms' Long-Term Local-Currency Issuer Ratings (S&P) and Senior Unsecured Debt Ratings (EJR).

Figure 2: S&P's, Moody's, Fitch's and Egan-Jones' Ratings of Edison International, 2000-1. Data are from Bloomberg.



Note: These are Edison's Long-Term Local-Currency Issuer Rating (S&P) and its Senior Unsecured Debt Ratings (others).