THE IMPACT OF RATING CHANGES IN AUSTRALIAN FINANCIAL MARKETS

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Abstract

This paper tests the response of bond yield spreads and equity prices to credit rating changes in the Australian financial market. Unlike some earlier studies for foreign markets, we find evidence that both yield spreads and equity prices move in the 'expected' direction following rating changes. However, the impacts are relatively small. In addition, in the case of downgrades and equity returns, we find evidence of large movements in prices in the six months prior to the rating announcement, suggesting that rating changes are largely validating information that has already been factored into equity prices. We also find that announcement effects are larger for small firms, for re-ratings from investment to speculative grade, and for cases where agencies have not indicated that the rating is under review.

JEL Classification Numbers: G12, G14, G20
Keywords: credit rating agencies, rating changes, event study, Australia

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1. Introduction

Credit rating agencies have become an integral part of the international financial system. The two largest agencies now operate in over 100 countries and assign over 150 000 ratings (White 2001). In Australia, they rate over 500 issuers, which account for nearly all of the outstanding stock of bonds.

The main role of the agencies is to convey opinions to financial markets about the creditworthiness of debt instruments and issuers. To the extent that they are specialists in obtaining and processing information about default risk, the actions of rating agencies reduce lenders' information-gathering costs and thereby facilitate the operation of securities markets. Ratings are also used by regulators in many countries. For example, in the United States rating agencies feature in securities markets regulation and, at a global level, the new Basel Capital Accord is likely to give agencies a role in determining banks' regulatory capital.[1]

Over the past few years, however, the performance of rating agencies has been widely debated. Rating agencies have been periodically criticised for inaccurate ratings and slow reactions to new information. This criticism has intensified since the collapse of Enron, WorldCom and HIH Insurance, which carried investment grade ratings just a few months before their failure. Such events have also prompted the interest of market regulators. The US Securities and Exchange Commission and the International Organization of Securities Commissions have both issued reports that examine the role of rating agencies in securities markets and discuss areas where rating agencies could be subject to greater regulation.[2]

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1 Basel Committee on Banking Supervision (2003).

2 See US Securities and Exchange Commission (2003) and International Organization of Securities Commissions (2003).

The formal evidence on rating agency performance is mixed. At one level, agencies' ratings appear on average to be accurate measures of relative default risk: for example, bonds issued with higher ratings have lower subsequent default rates than lower-rated bonds (Standard & Poor's 2001). In addition, many studies find that security prices react predictably to rating changes, rising after upgrades and falling after downgrades. This implies that rating decisions do provide information for financial markets. But the size of the response is generally quite small and the vast majority of the adjustment in prices around ratings announcements actually appears to occur in the weeks or months prior to the announcement. On balance, this evidence suggests that the decisions of agencies convey little *new* information to the market.

This paper reports the results of an event study using Australian data, where we examine the extent to which the prices of corporate debt and equity respond to the announcement of changes in ratings. Most earlier studies have used data for the US market, where there is a substantial role for credit ratings in laws and regulations. For example, the *Investment Company Act of 1940* ensures money market funds invest only in securities rated in the two highest categories, and the investment grade distinction is important in the *Federal Deposit Insurance Act*, where corporate debt is only 'investment grade' if rated in one of the four highest categories. Given that the portfolio decisions of US investors are affected by the decisions of rating agencies, this raises the possibility that earlier results showing that US market prices respond to rating agency decisions may be partly the result of the regulatory framework. By contrast, there is a more limited regulatory role for credit ratings in the Australian regulatory framework, and the Australian Prudential Regulation Authority's use of credit ratings is restricted to quite technical matters.[3] Accordingly, the Australian financial market offers a fertile environment for research on the role of ratings where the impact of rating changes can be observed free from major regulatory effects.

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[3] General insurers can use credit ratings to determine counterparty risk weightings (General Insurance Guidance Note 110.4); mortgage insurers must be rated at least 'A' for Authorised Deposit-taking Institutions (ADIs) to receive a concessional risk weighting for insured mortgages (ADI Guidance Note 112.1); and, ratings are one of the criteria for determining whether certificates of deposit and bank bills can be categorised as 'high quality liquid assets' (ADI Prudential Standard 210.0).

Overall, our results are quite encouraging in the sense that – unlike some earlier work – we find that upgrades and downgrades have immediate effects on both debt and equity prices, and that these responses are in the expected direction. However, the impacts are economically small, and there is strong evidence in the case of downgrades and equity returns that rating agencies 'lag the market' in the sense that their changes appear to reflect information which has already been factored into prices. We find some evidence – mainly in the bond market – that ratings downgrades have larger impacts on market prices than upgrades. Further, there is some evidence that rating changes have larger effects on equity prices when they relate to smaller firms, when they are relatively unexpected, and when they carry a firm from investment to sub-investment grade.

The plan of the paper is as follows. Section 2 reviews some related literature. Sections 3 and 4 outline the method and data employed. Section 5 presents the results for the analysis of debt and equity prices around rating announcements, while Section 6 concludes with an overall discussion of the results.

2. Previous Literature

The existing empirical literature on rating agencies addresses a number of questions. For example, there is evidence that ratings are highly correlated with subsequent default rates (see Standard and Poor's (2001)), although there appears to be little evidence as to whether ratings are better predictors of default rates than other information or variables. There are also studies as to whether agencies' ratings contain information that is different from the ratings of equity analysts (see Ederington and Goh (1998)). In the case of banks, there are studies about the relative information content of agencies' ratings and supervisory ratings (e.g., Berger, Davies and Flannery (2000)). And, given the debate over the potential role of rating agencies in the new Basel Capital Accord and concern that tying capital requirements to credit ratings may be destabilising, recent studies have also examined whether ratings are procyclical (e.g., Cantor, Mahoney and Mann (2003); Amato and Furfine (2003)). Finally, there is a substantial literature looking at the market pricing of debt and equity around the time of announcements

of changes in ratings. This paper focuses on this last topic, using data from the Australian bond and equity markets.

The early literature on the behaviour of debt and equity prices around rating announcements invariably used data from the US markets, although there are now also a number of studies using European data. Of those studies that look at bond returns or yields, a substantial number have failed to find significant effects from ratings, perhaps due to data problems (e.g., Gropp and Richards (2001)). Nonetheless, some studies have found evidence that bond prices or spreads do change in the expected direction around rating announcements (e.g., Hand, Holthausen and Leftwich (1992); Cantor and Packer (1996); Hite and Warga (1997); Kliger and Sarig (2000)). Although there is some variation in results across studies, there is evidence that downgrades are associated with larger market movements than upgrades, that lower-rated bonds respond more than higher-rated ones, and that the market movements around rating announcements are substantially smaller than the movements seen in the weeks or months prior to the announcements.

Each of these findings accords with expectations. If firms have incentives to release positive information about their prospects but to downplay negative information, then markets will look to third-parties such as rating agencies for objective analysis, and downgrades will be more newsworthy. And given the historical mapping between ratings and default probabilities, whereby default probabilities increase more sharply towards the lower end of the rating spectrum, it is to be expected that market prices respond more to rating changes in the latter range. Finally, if markets are reasonably efficient and rating agencies have little access to non-public information and change their ratings relatively infrequently, then it is not surprising that much of the price adjustment around rating changes occurs prior to the announcement of the change.

Due to data availability problems with bonds (which we discuss in Section 4), a larger number of studies of announcement effects have actually used equity returns rather than bond market data. The assumption implicit in most of these studies is that information that is good (bad) news for bondholders will also be good (bad) news for equityholders, so equity prices should respond in the same way as bond

prices, rising following upgrades and falling following downgrades. However, as is discussed by Goh and Ederington (1993), this assumption may not always be correct. In particular, it is possible to think of circumstances where a change in a bond rating may not reflect any view about the overall profitability of a company (where rating changes have similar implications for both bondholders and equityholders), but instead may reflect decisions that are being taken by management that benefit one class of claimants at the expense of the other. While such differential impacts on the different claimants are theoretically possible, it seems unlikely that such cases constitute a particularly large subset of all rating changes, and indeed most studies proceed on the assumption that if rating announcements are relevant for equity pricing, downgrades (upgrades) will be associated with negative (positive) returns.

Indeed, the empirical literature suggests that equity prices generally respond in the 'expected' direction around the time of rating changes (e.g., Holthausen and Leftwich (1986); Hand *et al* (1992); Schweitzer, Szewcyzk and Varma (1992); Goh and Ederington (1993); Billett, Garfinkel and O'Neal (1998)). However, while many studies find significantly negative returns around downgrades, some studies find that returns around upgrades are statistically insignificant. In addition, the magnitude of announcement effects is often quite small, especially when compared with the movements in stock prices that occur prior to the rating announcements. For example, Holthausen and Leftwich (1986) find cumulative average abnormal returns in the US equity market of around –20 per cent in the 300 trading days prior to downgrades, but an announcement effect of only about –1 per cent.

To sum up, most previous evidence from foreign markets suggests that rating changes have relatively little impact on market prices of both bonds and equities and that rating decisions tend to lag earlier movements in market prices. The finding that announcement effects are relatively small suggests that market participants generally perceive that there is only limited new information in the decisions of agencies. Furthermore, the evidence that announcement effects are typically far smaller than pre-announcement market movements implies that much of the information that prompts rating changes is already reflected in market prices prior to the announcement of the change. Indeed, supporting evidence for this proposition can be found in the work of Ederington and Goh (1998) who show that

most bond downgrades are preceded by declines in actual corporate earnings and in stock analysts' forecasts of earnings.

The only earlier Australian evidence on the impact of rating announcements on financial market prices appears to be the study by Matolcsy and Lianto (1995) who examine the impact of changes in ratings of Australian Ratings (acquired by S&P in 1990) over 1982–1991. The study excludes rating changes if they are accompanied by corporate announcements such as mergers, but includes rating changes that coincide with earnings announcements. The analysis of weekly stock market returns around rating announcements shows that returns in either 11-week or 25-week windows are significantly negative around downgrades and significantly positive around upgrades. However, after controlling for the information in earnings announcements in these windows, the authors suggest that returns are significantly different to zero only for ratings downgrades.

This earlier study is complementary to ours in that there is almost no overlap in the sample periods of the two studies. However, our study makes three important innovations relative to the earlier one. In particular, it examines movements in bond yields as well as equity prices; it uses daily rather than weekly data and therefore focuses on the precise day of each announcement; and, due to the growth of the Australian corporate bond market, it has a substantially larger sample size (even after excluding all events that were accompanied by value-relevant announcements).

3. Methodology

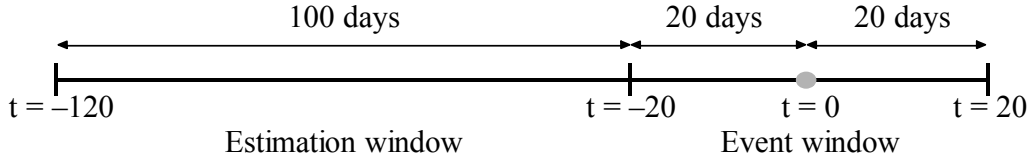
We examine the impact of the announcement of rating changes on debt and equity prices using relatively standard event study techniques.[4] Given the depth of information available about companies from a variety of sources, our null hypothesis is that announcements by rating agencies should not be associated with impacts on market prices. We depart from a number of earlier studies by excluding rating changes that coincide with other major corporate news such as

[4] See MacKinlay (1997) for a general discussion of event studies.

announcements concerning earnings, mergers and divestments. The reason for excluding these events, which Hand *et al* (1992) refer to as 'contaminated' events, is to ensure that we are capturing the impact (if any) of rating changes *per se* on market prices and not simply the effect of other value-relevant news.[5] In our case, this rules out more than half of all rating changes, and the announcement effects that we document in Section 5 would be substantially larger had we kept all the 'contaminated' events in the sample.

We define the date of the announcement (the 'event') as $t = 0$, and a window of 20 days on either side of the event as the 'event window' (Figure 1). We attempt to isolate the movement of financial prices in the event window that is not due to factors influencing the overall market. In the case of equities, this is the 'abnormal return', and in the case of bonds, this is the change in spreads, which we define below. We assess the statistical significance of these abnormal movements based on the movements in financial prices in the 'estimation window', the 100-day period prior to the event window.

Figure 1: Outline of Time-line for Event Study



In the case of equities, we estimate a standard market model using daily returns in the estimation window. For each event (i), the daily (log-differenced) equity price return for the relevant company (R_{it}) is regressed upon the corresponding broad market return (the All Ordinaries Index, R_{mt}) using ordinary least squares:

$$R_{it} = \hat{\alpha}_i + \hat{\beta}_i R_{mt} + \varepsilon_{it} \qquad (1)$$

[5] Of course, reports about major companies occur quite frequently. In cases where there were simultaneous news reports unrelated to the rating announcement, we omitted events if this other news appeared substantially more important than the rating announcement.

Abnormal returns for the event windows (AR_{it}) are then defined as the difference between actual returns and the returns predicted by the market model using the parameters from the estimation window:[6]

$$AR_{it} = R_{it} - (\hat{\alpha}_i + \hat{\beta}_i R_{mt}) \tag{2}$$

The daily average abnormal return (AAR_t) for any n events (either upgrades or downgrades) is then calculated by summing (in event-time) across the n events. The cumulative average abnormal return ($CAAR(\tau_1, \tau_2)$) between any two days τ_1 and τ_2 within the event window is defined as the sum of the average abnormal returns over that period. The statistical significance of average abnormal returns in the event window can be assessed using the estimate of the standard deviation of average abnormal returns in the estimation window which is denoted $s(AAR_t)$. Under the assumption of i.i.d. normally distributed abnormal returns, the ratio of AAR_t to $s(AAR_t)$ is distributed as a Student's t with n degrees of freedom. In addition, under these assumptions the standard deviation of any cumulative average abnormal return is given by $s(AAR_t)$, multiplied by the square root of the number of days in the period.

In the case of debt securities, we analyse the impact on bond yields, or more specifically the impact on bond *spreads*, relative to the Commonwealth Government bond of comparable maturity. The movement in each bond's yield spread (measured in basis points, or hundredths of one percentage point) provides a ready-made proxy for its abnormal performance relative to the overall market.[7]

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6 An alternative approach would be to recognise – based on earlier US studies cited in Section 2 (and our data) – that decisions to change ratings may not be completely exogenous with respect to recent return outcomes. In particular, estimates of α_i in the estimation window are unlikely to be reliable – downgrades are likely to be associated with negative estimates of α_i and upgrades with positive estimates. On the other hand, estimates of β_i should not be problematic. This would suggest estimating the market model including a constant term in the estimation window, but then defining the abnormal return in the event window to be given by $R_{it} - \beta_i R_{mt}$; i.e., removing the impact of the problematic constant term in the abnormal return. The result of this change is to make the pre-announcement and announcement effects in Figure 4 and Table 2 somewhat larger, but overall the results are little changed.

7 Because corporate spreads tend to vary over time (i.e., corporate yields do not always move one-for-one with government yields), in principle one could measure spreads relative to other similarly rated bonds. However, this is difficult given the relatively small number of bonds within any single rating and maturity category in existing Australian indices.

The reason for considering spreads rather than bond returns is that the bonds in our sample have a range of maturities, so we would expect that a given impact on required bond yields or spreads would have different effects on the prices of different bonds, depending on the maturity of the bond. Hence, it may make little sense to examine abnormal returns of bond prices.

For our statistical tests, we calculate the average basis point changes for each day of the event and estimation windows, for upgrades and downgrades separately. These average changes can be summed over time to compute cumulative average basis point changes. The statistical significance of the average and cumulative spread changes in the event window can then be determined by comparing them to the standard deviation of spread changes in the estimation window. The expectation is that if announcements of upgrades (downgrades) convey information to market participants, spreads on average will fall (rise) immediately following news of the rating change.

In addition to the statistical tests for average abnormal returns or average spread changes, we also present tests based on the proportion of positive or negative changes in market prices. This type of test may be useful if abnormal returns or spread changes are not normally distributed. For this test, we compare the actual proportion of events that are positive and compare this with the theoretical distribution (a binomial test) under the null hypothesis that this proportion is equal to 0.5. Here the expectation is that if rating announcements convey information, the proportion of abnormal returns that are positive will be greater than (less than) 0.5 following upgrades (downgrades), and the proportion of spread changes that are positive will be less than (greater than) 0.5 for upgrades (downgrades).

4. Data

We analyse the impact of credit rating changes on Australian issuers by Moody's and Standard and Poor's, the two largest agencies in the Australian market.[8] The

[8] All data on ratings are taken from Bloomberg. In the case of bonds we look at the specific rating that applies to the particular bond for which we have data. In the case of equities, we look at a general issuer rating, either the long-term local currency rating for S&P, or the issuer rating or senior unsubordinated debt rating for Moody's.

sample covers changes in credit ratings between January 1990 and July 2003, with the sample limited to those ratings announcements that were not accompanied by other value-relevant announcements.[9] These ratings are all 'solicited', being requested by the issuer, rather than being assigned by the agencies based only on public information. We treat simultaneous rating changes by both agencies as one event.[10] To increase the size of our sample, our ratings events include both announcements of actual changes in ratings and announcements that an agency is actively considering a near-term rating change.[11] We refer to the latter as 'watch' events, and treat them as either upgrades or downgrades based on the direction of the likely change indicated by the agency.[12] We refer to actual changes as either 'anticipated' if they are preceded by a watch, and 'unanticipated' if the rating was changed with no prior warning.

The sample of events for our analysis of bond spreads is substantially constrained by data problems. One problem is that many listed companies do not issue bonds. More importantly, since corporate bonds are traded much less actively than equities and are not traded in a centralised exchange, it is difficult to get good daily data for bond prices and spreads. Indeed, the investment banks that calculate corporate bond indices are essentially the only source for daily bond data, and these banks tend to focus only on a subset of bonds which meet certain criteria regarding size and liquidity. Accordingly, for the event study using bond yields, our sample of rating changes is limited to those companies for which we could obtain daily data for at least one bond from either UBS Australia or Merrill Lynch, two providers of corporate bond indices. In principle, it would have been possible to get price data for a wider sample of bonds from Bloomberg, but many of these

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9 We use Bloomberg to check for other news about companies, which includes announcements concerning earnings, mergers and divestments.

10 Cases of multiple announcements that occur within 10 days of each other are treated as only a single event.

11 In cases where companies are removed from credit watch without a subsequent rating change, the removal of the watch was not considered an event in our sample. These cases are relatively rare and we were more uncomfortable about classifying them as being equivalent to the other upgrades or downgrades.

12 Information from the rating agencies suggests that 'watch' announcements are followed more than two-thirds of the time by actual rating changes within a few months. Accordingly, they are a much stronger expression of an agency's views than an 'outlook' which is simply an indication of the possible direction of movement in the rating over a much longer horizon.

prices appear to be matrix-based, rather than actual indicative price quotes as are used in the bond indices.

Our sample of events for which we have both rating changes and yield spread data includes 33 announcements consisting of 21 downgrades and 12 upgrades. The bonds in question are all issued in Australia and denominated in Australian dollars. Most have maturities between two and three years, and spreads are calculated relative to a Commonwealth Government security of similar maturity. Our upgraded bonds have a median initial rating of A-/A3, and the day before the rating announcement have a median spread of 67 basis points. Downgraded bonds have a slightly higher median initial rating of A/A2, but a higher median initial spread of 87 basis points.

In the case of equities, the number of events is much larger because shares are more actively traded and price information is readily available.[13] The sample includes 141 rating announcements for which we have accompanying equity returns and which are not ruled out because they occur at the same time as a corporate announcement. Of these 141 events, 33 are rating watches and 108 are announcements of actual rating changes, 23 of which are more than one 'notch' in magnitude.[14] Of the 108 rating changes, 48 were preceded by a watch and so are 'anticipated' according to our definition, and the other 93 events (including watches) are therefore 'unanticipated'.[15] Downgrades (including negative watches) account for 95 of the events and upgrades (including positive watches) account for 46 events. The 141 events involve 62 different firms from 15 industry groups, and their industry concentration is broadly representative of the composition of the All Ordinaries Index. Reflecting the recent growth in the corporate bond market and the wider use of bond ratings, our sample is dominated by more recent events, and the second half of the sample period contains about three-quarters of all the events. Finally, rating changes by S&P account for 100 of the equity events, broadly

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13 Equity returns are based on the indices for total returns (prices plus dividends) constructed by Thomson Financial.

14 Broad ratings categories are typically divided into three subcategories or 'notches' (the exception is AAA/Aaa).

15 The reason why we have fewer (33) rating watches than rating changes that were preceded by a watch (48) is that many announcements that the rating is on watch occur at the same time as other corporate announcements and are excluded for that reason.

reflecting that agency's greater presence in the Australian market. Appendix A gives more detail for both bond and equity events.

5. Results

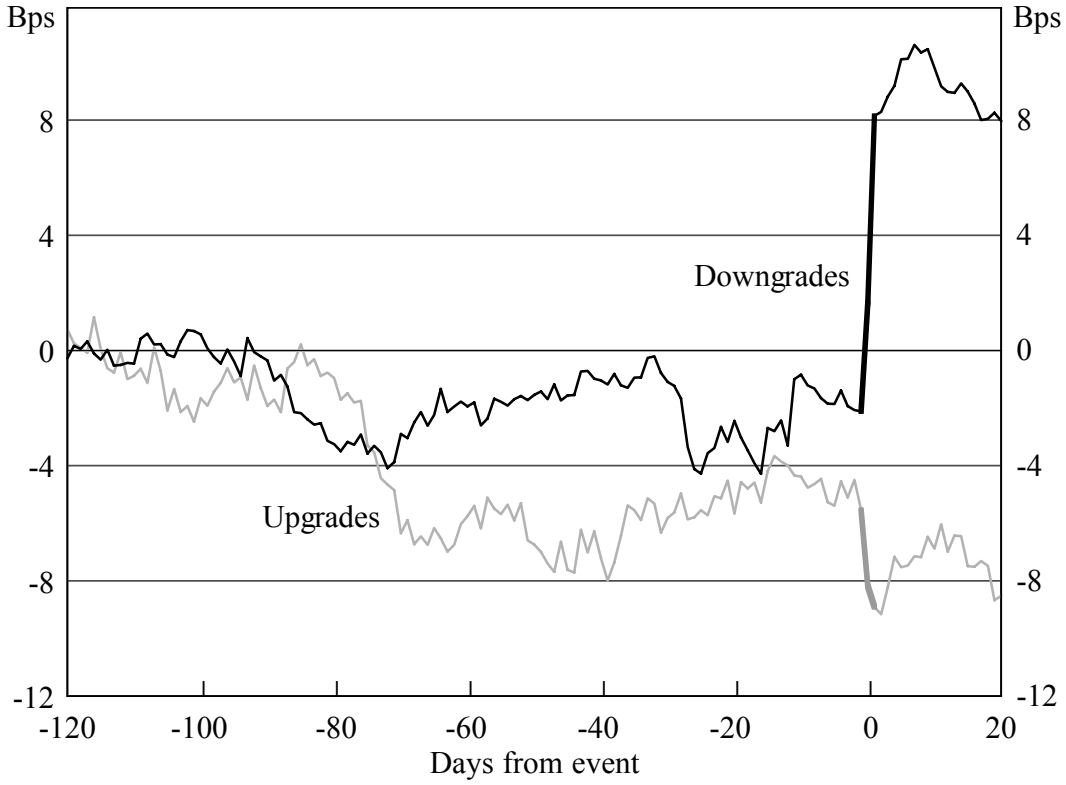
Given that ratings relate specifically to bonds rather than equities, we present the results for bond yields first. In each case, we present results for average abnormal returns on the announcement day and for the two days prior to and following announcements. In addition, we present cumulative average spread changes or abnormal returns for three windows: pre-announcement (day –20 to –1); announcement (day 0 and 1, allowing for some lagged response of prices); and post-announcement (day 2 to 20). Most of the discussion of our results focuses on the market movements over these three broader windows.

5.1 Bonds

While the small sample of events must remain a caveat, the overall picture from the event study for bond yields is that there is essentially no movement in yield spreads prior to ratings announcements, and then a small but statistically significant change immediately following the announcements (Figure 2 and Table 1). Looking first at the estimation window (days –120 to –21), the data for cumulative average spread changes in the estimation window suggest that bonds subject to upgrades and downgrades both exhibit some very modest tendency to narrow in the period leading up to the announcement. At first glance, this common narrowing of spreads – although it is not statistically significant – appears puzzling, but it appears to be due to the natural tendency for credit spreads to narrow gradually as maturities shorten. In particular, the analysis in Appendix B suggests that for bonds of around 2 to 3 years outstanding maturity, the passage of 100 days should normally be associated with a narrowing in spreads of around 4 basis points (bps), which is approximately what is observed in Figure 2.

Looking next to the event window, the cumulative spread change in the pre-announcement (days –20 to –1) and post-announcement (days 2 to 20) windows are statistically insignificant. There is, however, a statistically significant movement in spreads on the day of both downgrades and upgrades. The cumulative average changes on the day of the announcement and the day following the announcement (days 0 and 1) are a fall in spreads of 3.4 bps for upgrades and a rise of 10.3 bps for downgrades. In addition, around 80 per cent of the events show changes in spreads of the expected sign during this two-day window, with the observed proportions for downgrades being statistically significantly different from 0.5.

Figure 2: Cumulative Change in Bond Spreads



Note: The cumulative two-day changes to day 1 are shown in bold.

Table 1: Changes in Bond Spreads around Rating Announcements

Days relative to event	Average spread change – bps		Proportion of negative changes	
	Upgrades	Downgrades	Upgrades	Downgrades
–2	0.6	–0.1	0.25	0.67
–1	–1.0	0.0	0.58	0.57
0	–2.6***	3.7***	0.75	0.19***
1	–0.7	6.5***	0.42	0.38
2	–0.3	0.1	0.42	0.62
	Cumulative average spread change – bps		**Proportion of negative changes**	
	Upgrades	Downgrades	Upgrades	Downgrades
–20 to –1	–1.0	1.1	0.42	0.57
0 to 1	–3.4***	10.3***	0.75	0.19***
2 to 20	0.4	–0.2	0.50	0.48
Sample size	12	21		
Standard deviation of daily spread change – bps	0.6	0.5		

Note: ***, **, * indicate significance at the 1, 5 and 10 per cent level; two-tailed t-test.

Given the average levels of spreads prior to announcements (66 bps for upgrades and 90 bps for downgrades), these changes around the immediate announcement period correspond to percentage changes in spreads of around 5 per cent for upgrades and 11 per cent for downgrades. It is noteworthy that the impact for downgrades is both larger and more protracted, with a widening of about 4 bps on the day of the announcement and a further 6 bps the following day. The size and pattern of this impact partly reflects the effect of one particularly influential observation, the downgrade of Southcorp from BBB to BB+, a non-investment grade. The measured spread of this bond widens by 90 bps on the day after the downgrade announcement and contributes about 4 bps to the average spread change on day 1.[16] While this delayed adjustment is puzzling, the average spread change on day 1 remains significant even when this bond is excluded. It is unclear whether this delayed adjustment indicates that markets do not absorb new

[16] The median two-day spread change of 8.4 bps is only modestly smaller than the average change of 10.3 bps, so our results do not appear to be excessively affected by any particular outlier.

information immediately, that some rating changes were made late in the trading day, or simply that it is difficult to obtain accurate daily data on bond spreads.

Comparing our results with earlier studies, it is perhaps noteworthy that we find little evidence of bond spreads moving in advance of the changes by rating agencies, as would be expected if the decisions of agencies are based at least partly on information that is already in the public domain and reflected in pricing. Data problems due to the illiquidity of the market would be one possibility, but this seems unlikely given that we do see a significant change in bond spreads in the immediate announcement window. Indeed, based on the analysis in Appendix B, it would seem that the estimate of the average change in spreads on days 0 and 1 represents around half of the total adjustment in spreads that would be expected. In particular, the median rating change in our sample is between A and A-, and the analysis in Appendix B would suggest that this difference in ratings is typically associated with an 'equilibrium' spread differential of around 9 bps. Given that the median two-day change in spreads in our analysis is around 4.5 bps, it seems that half of the total adjustment we would expect to see in yields is occurring in the immediate period around ratings announcements.

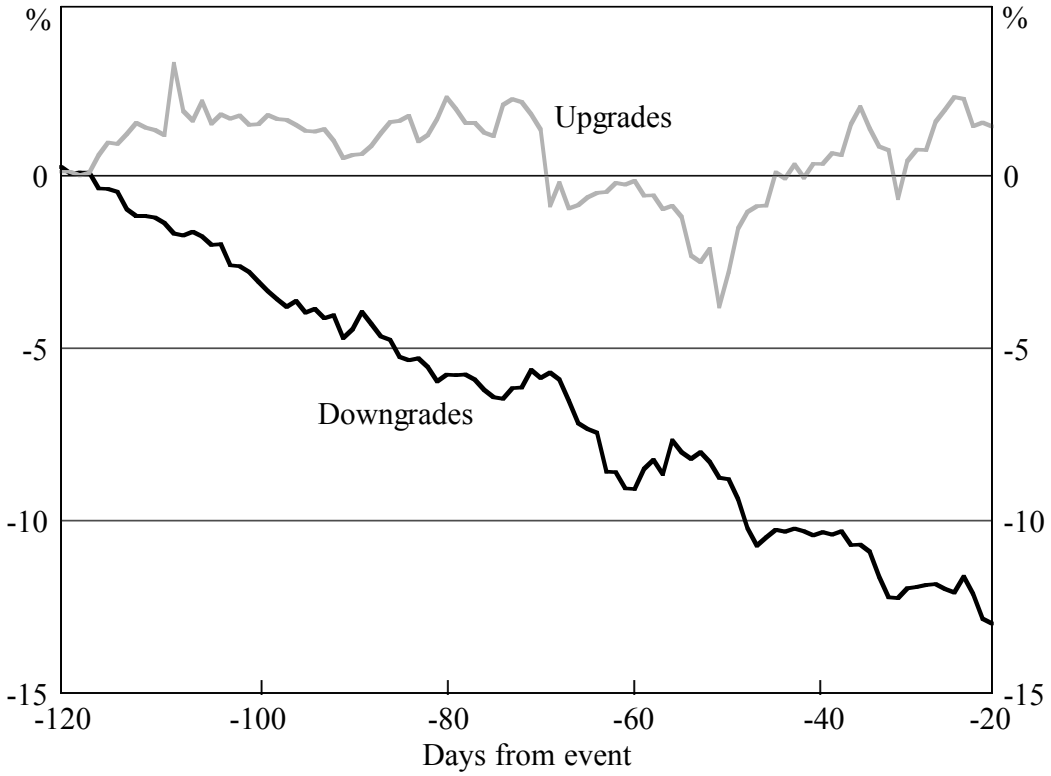
The analysis in Appendix B also gives an indication of the magnitude of change in bond *prices* that might be expected to result from a one-notch rating change. For the median bond in our sample, a 9 bps change in yields (assuming, for illustrative purposes, a coupon and yield of 7 per cent and maturity of 2½ years) will result in a price change of only about 0.21 per cent. Given the relatively small size of this implied change and the various data problems in the bond market, it is perhaps not surprising that other event studies have frequently failed to find significant impacts on bond prices or returns.

5.2 Equities

The behaviour of equity returns around rating announcements is quite different to the behaviour observed in bond markets. The greatest contrast is in terms of the significant market movements that take place over a long period prior to rating announcements. This is illustrated most starkly in Figure 3, which shows that companies subject to downgrades on average have underperformed the broader

market by around 12 per cent in the estimation window (days –120 to –21).[17] By contrast, there is little evidence of outperformance by companies that are subsequently upgraded by rating agencies.

Figure 3: Cumulative Market–adjusted Equity Returns Prior to Rating Changes



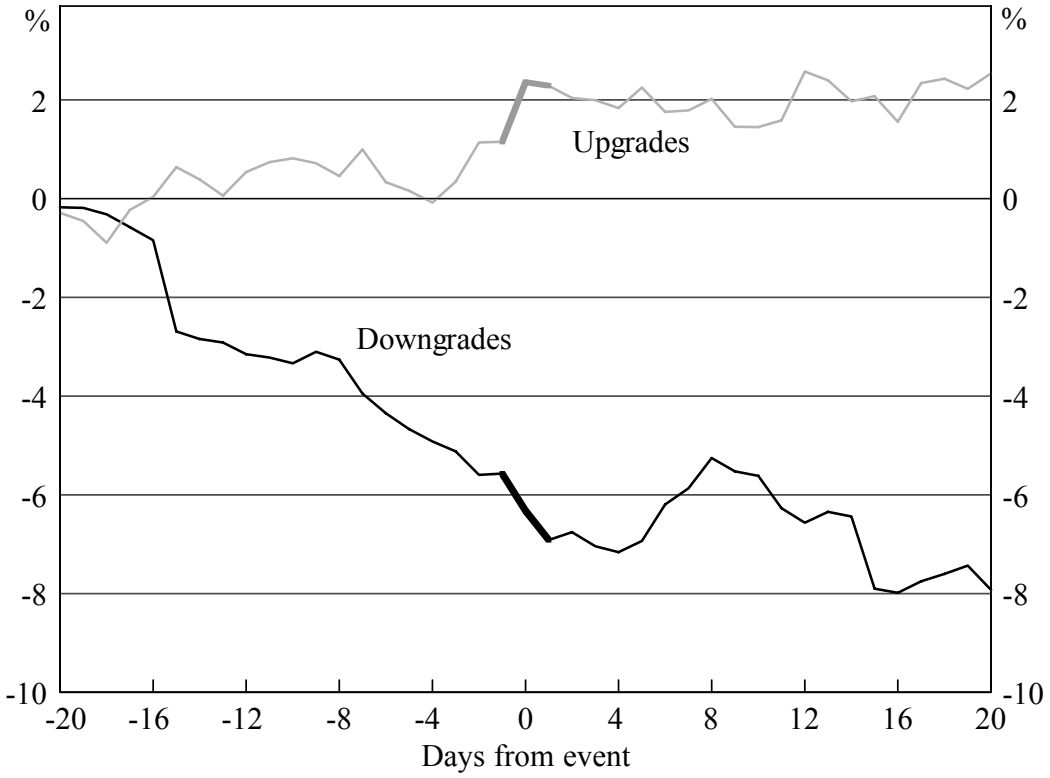
Note: Market-adjusted returns are defined as the raw equity price return minus the market index return.

For downgrades, we find continuing evidence of underperformance by companies in the pre-announcement period of the event window (days –20 to –1). The cumulative average abnormal return for companies that are subsequently downgraded is around –6 per cent; and 64 per cent of the events are associated with negative returns, which is statistically significantly different from 50 per cent (Figure 4 and Table 2). By contrast, there is only very weak evidence of positive abnormal returns in this period for companies that are subsequently upgraded. In

[17] It is, however, noteworthy that the downgrades in our sample have historically not occurred in times of falling equity markets. The data suggest that downgrades occur independently of movements in the broader markets, so that rating agencies have responded to idiosyncratic weakness of issuers, rather than weakness in conditions for the broader corporate sector.

particular, the cumulative average abnormal return of 1 per cent in this period is not significant, nor is the proportion of events with positive returns.

Figure 4: Cumulative Abnormal Returns around Rating Changes



Note: The cumulative two-day average abnormal returns to day 1 are shown in bold.

Around the announcement, we find that downgrades are associated with negative returns both on the day of the announcement and the day after the announcement, with cumulative average abnormal returns over this period (days 0 to 1) of –1.3 per cent. However, this underperformance is small compared with the underperformance that is seen over the previous 20 days, and indeed the 100 days prior to the event window. Thus, it appears that the information that prompts rating agencies to lower ratings (or place ratings on negative watch) is largely already reflected in equity prices, and that the decisions of the agencies convey little additional information to the market. In addition, there is no evidence of any protracted market reaction to rating changes, since the cumulative average abnormal return for days 2 to 20 is insignificant.

Table 2: Abnormal Equity Returns around Rating Announcements

Days relative to event	Average abnormal return – per cent		Proportion of negative returns	
	Upgrades	Downgrades	Upgrades	Downgrades
–2	0.8	–0.5*	0.52	0.56
–1	0.0	0.0	0.5	0.52
0	1.2**	–0.8***	0.26***	0.55
1	–0.1	–0.6**	0.57	0.58
2	–0.2	0.2	0.59	0.55
	Cumulative average abnormal return – per cent		**Proportion of negative returns**	
	Upgrades	Downgrades	Upgrades	Downgrades
–20 to –1	1.1	–5.8***	0.41	0.64***
0 to 1	1.1	–1.3***	0.30**	0.56
2 to 20	0.2	–1.0	0.56	0.53
Sample size	46	95		
Standard deviation of daily abnormal return – per cent	0.5	0.3		

Note: ***, **, * indicate significance at the 1, 5 and 10 per cent level; two-tailed t-test.

Turning to upgrades, we find some evidence that companies that are upgraded by rating agencies outperform the general market on the day of the announcement. The average abnormal return of 1.2 per cent on the event day is statistically significant, and the proportion of events showing positive abnormal returns is 74 per cent which is also statistically significant. There is no evidence for ongoing adjustment in market prices in either the average abnormal returns for day 1 or for days 2 to 20. Overall, the cumulative abnormal return in the entire event window (days –20 to +20) is around only 2 per cent for upgrades, versus around –8 per cent for downgrades.

Our results for the immediate market impact of upgrades and downgrades are slightly at odds with earlier research. In particular, earlier studies have mostly suggested that the impact of downgrades tends to be larger than the impact of upgrades. Notwithstanding firms' obligations to provide market-relevant information in a timely manner, one explanation for this earlier finding would be that firms have an incentive to release positive information as soon as possible, and

to hide negative information, which would make downgrades more newsworthy. Our point estimates for the two-day announcement window (days 0 and 1) suggest little difference between the magnitude of the effects for upgrades and downgrades (1.1 per cent and –1.3 per cent, respectively).[18] However, the two-day effect for upgrades is not strictly statistically significant, so perhaps the contrast with earlier work is not that large. It is also noteworthy that the results for bonds are consistent with the notion that downgrades have larger immediate impacts than upgrades.

While our results provide evidence that both bond and equity prices respond to ratings announcements, the statistical significance of the results is stronger for bond yields than for equity prices. This might reflect the fact that ratings refer specifically to probability of default on a company's bonds, and are not necessarily broader indicators of a company's health. Indeed, as was discussed in Section 2, the response of equity prices to changes in bond ratings is theoretically ambiguous. In theory, some rating changes may reflect an agency's view that a firm's management is acting in a way that benefits one class of claimants at the expense of the other. Hence, an upgrade (downgrade) to the firm's bond rating might be bad (good) news for equityholders. The results presented so far provide no evidence for the presence of such cases: on average, upgrades (downgrades) are associated with positive (negative) price effects for equities.

However, in principle it is possible that there might at least be some proportion of events where the rating announcement prompts some perverse response in equity prices. If so, the distribution of abnormal returns for upgrades or downgrades on the announcement day would consist of a mixture of two different distributions, one with a positive mean and the other with a negative mean. We can test for this by examining the cross-sectional standard deviation of announcement-day abnormal returns to see if this is substantially larger than the equivalent standard deviation in the estimation window. When we do so, we find that the standard deviation of abnormal returns on upgrade days is 1.8 per cent, which is actually less than the estimation-window average of 2.8 per cent. The standard deviation for downgrades of 2.9 per cent is higher than the estimation-window average of

[18] However, an explanation for the lack of evidence in our results for larger impacts from downgrades may be that, in our sample, downgrades are more likely to be anticipated than are upgrades: 41 per cent of downgrades are preceded by a watch, compared with only 20 per cent of upgrades. As we show in Section 5.3, the response of equity prices to rating changes is apparently smaller when the changes are (at least partly) anticipated.

2.6 per cent, but it is far from being statistically significantly different. Hence, these results provide no support for the existence of a subset of events for which equity prices respond perversely to the announcement of bond rating changes.

5.3 Firm Size and Type of Rating Change

In addition to differences in the response to upgrades and downgrades, it is possible that the effects of rating changes may vary in other ways across types of rating changes or firms. To explore this possibility, we split the sample in three ways to test hypotheses relating to different response patterns. Since the sample of bond events and equity upgrades is quite small, we limit this analysis to equity downgrades.

The first possibility is that the impact of a ratings announcement may depend on whether or not the rating change is 'anticipated'. More specifically, does the fact that a firm has earlier been placed on a rating watch reduce the market impact of the announcement of a subsequent downgrade, relative to the market impact of a watch announcement or a rating change that was not preceded by a watch? For this test, our data suggest that we can reject the hypothesis that the market impact of the two types of events is similar. In particular, the data suggest that only unanticipated downgrades have an impact in the immediate event window (Table 3). For the two-day announcement window (days 0 and 1), the impact of unanticipated events is –1.8 per cent versus an insignificant –0.7 per cent for anticipated events.

The second hypothesis is that the reaction of a security's price to a rating change might depend on the size of the particular firm. A difference might arise if large firms are subject to more market scrutiny, so that the opinions of the rating agencies would be less influential and have a smaller impact on prices. To test this, we divide the 62 firms into 2 equal-sized groups according to their relative market capitalisations. We find some evidence for differential market impact based on firm size. Announcement window returns are significantly negative for smaller firms but insignificant for larger firms (–2.0 per cent versus –0.6 per cent). In addition, there is also a large difference in abnormal returns in the 20-day period leading up to the rating announcement, when smaller firms have much larger

cumulative abnormal returns (–8.8 per cent versus –1.4 per cent). It is unclear what the explanation for the latter difference might be.

Table 3: Firm Size and Type of Rating Change
Downgrade event window

Days relative to event	Unanticipated events	Anticipated events	Smaller firms	Larger firms	Changes to sub-investment grade	Changes within investment grades
			Average abnormal returns – per cent			
–2	–0.2	–0.9**	–0.6	–0.3	–1.3	–0.4
–1	0.2	–0.3	0.4	–0.4	2.0	–0.2
0	–1.0**	–0.4	–1.1**	–0.2	–0.9	–0.7**
1	–0.8**	–0.3	–0.8*	–0.3	–2.2*	–0.5
2	0.5	–0.2	0.5	–0.2	2.0	0.1
			Cumulative average abnormal returns – per cent			
–20 to –1	–5.3***	–5.9***	–8.8***	–1.4	–15.1**	–4.9***
0 to 1	–1.8***	–0.7	–2.0***	–0.6	–3.2*	–1.2**
2 to 20	–1.0	–0.9	–0.9	–1.2	–1.0	–0.9
Sample size	56	39	53	42	7	88
Standard deviation of daily abnormal return	0.4	0.4	0.5	0.3	1.1	0.3

Note: ***, **, * indicate significance at the 1, 5 and 10 per cent level; two-tailed t-test.

The third hypothesis is that rating changes might matter more when they carry an issuer from investment to speculative (or junk) grade. This is because some portfolio managers face restrictions on the type of credits that they can hold, and because movements below the investment grade threshold could have important psychological effects. However, the non-linear relationship between credit ratings and default probabilities might also explain why rating changes toward the lower end of the ratings spectrum, such as a downgrade into speculative grade, would be associated with larger price movements. The small number of rating changes (only 7) is a constraint in drawing strong conclusions in this regard, but there is some evidence that rating changes from investment to sub-investment grades do have larger market impacts than other rating changes (–3.2 per cent versus –1.2 per cent). This would be consistent with the notion that markets do pay more

attention to rating changes that lower credit ratings to sub-investment grade levels. There is also evidence that rating changes to sub-investment grades are preceded by substantially larger abnormal returns in the 20-day period prior to announcements (–15.1 per cent versus –4.9 per cent). This may reflect the particular 7 cases in our sample, or it may reflect a broader wariness on the part of agencies to downgrade companies through this important barrier, so that such downgrades only occur after a very substantial amount of adverse news about the firms in question.[19]

6. Conclusion

The results of our study provide reasonably clear evidence that announcements of rating changes (or that ratings are 'on watch' or 'under review' for change) do appear to be 'news', in that they affect prices in the Australian bond and equity markets. Bond spreads appear to widen in response to ratings downgrades and contract with upgrades. Equity prices tend to fall on days of downgrades and rise on days of upgrades. This finding is significant in light of the relatively limited role – in contrast to some other countries – that ratings play in the Australian regulatory framework. It is also noteworthy that we find significant effects for both upgrades and downgrades, and both bonds and equities. Many previous foreign studies have failed to find such consistent evidence for market impacts. We attribute our identification of such effects to the reasonable sample size that we have in the case of equity events, and in the case of bonds, to the quality of our data and our focus on spreads rather than prices.

However, our estimates of the price impacts associated with rating announcements are arguably fairly small, so they suggest that agencies are not generally viewed as consistently having access to important information that is not already in the public domain. Instead, the modest size of the price impacts perhaps suggests that markets at most perceive agencies as simply obtaining and processing information in a way that at the margin provides a summary measure of creditworthiness.

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[19] Johnson (2003) suggests that agencies may be aware of the importance of the investment grade barrier, and are mindful of the significance of downgrades through this barrier, so that the BBB-/Baa3 rating may in effect be 'wider' than other surrounding ratings.

Of course, looking ahead to a regime where ratings might have some role in regulatory bank capital requirements, it is possible that the decisions of agencies could affect market valuations because they impact directly on the cost of funds. In addition, if ratings become more widely used in debt contracts – for example, through ratings triggers which call for higher interest rates, provisions of more collateral, or even the repayment of the debt – then we might expect to see decisions of agencies have a greater impact on market prices. However, recent evidence suggests that in 2002 only around 15 per cent of large Australian firms had ratings triggers built into some of their borrowing agreements and also had ratings near enough to these triggers to warrant concern that they could be subject to potentially destabilising rating downgrades (see Standard & Poor's (2002)). Hence, we suspect our results are not significantly influenced by the use of such provisions.

In the case of equity returns and downgrades, we find very strong evidence that rating changes tend to follow long periods of underperformance. On average, companies that are downgraded have underperformed the market by around 20 per cent in the preceding period. This suggests that downgrades are typically based on information that is well-and-truly in the public domain, which would be consistent with the finding of Ederington and Goh (1998) that most bond downgrades in the United States are preceded by declines in actual corporate earnings and in stock analysts' forecasts of earnings.[20] This would help to explain why the announcement-window impacts of rating changes were quite small. Yet, like most other work on rating agencies and market prices, our study yields a few conflicting findings, and it is puzzling that we find no evidence of noticeable pre-announcement movements in prices in the bond market or before upgrades in the equity market. These results may partly reflect the smaller sample of events in these cases. However, the finding is also suggestive of some form of segmentation between the markets for corporate bonds and equities, whereby bond investors fail to respond to information that is already reflected in the more liquid equity markets. If there has indeed been such segmentation in the past, we suspect it will be less prevalent in the future given the growing use of market-based credit risk

[20] However, it should be noted that Ederington and Goh (1998) find that analysts do revise their earnings forecasts downwards after downgrades (with only small revisions following upgrades), which is consistent with the market viewing agencies' announcements as conveying some information.

models, which link bond valuations directly to equity price movements (see Lowe (2002)).

More broadly, it might be asked how our results relate to the debate over the role of rating agencies in the financial system. Critics of the agencies often point to the belated reactions of agencies in cases such as Enron. In addition, they point to the lack of market impact as evidence that agencies do not provide new information to the market. In contrast, rating agencies would argue that their ratings are opinions of long-term creditworthiness, and their aim of providing ratings that 'look through the cycle' would suggest that they should not respond to all short-term price movements: indeed, this reluctance to change ratings may also contribute to the stability of the financial system. Accordingly, if a firm's prospects have altered to such an extent that a rating change is warranted, it would not be surprising if markets had already adjusted substantially. This points to the tensions that exist between the conflicting interests of different end-users, and the relative importance they place on timeliness and stability of ratings.

Appendix A: Further Description of Events

Both bond and equity events can be classified according to their type and their source (Tables A1 and A2). The bond events apply to 19 different firms compared to 62 firms for equity events. Of the latter group, the raw materials, banking, food, and insurance sectors account for the largest proportion of firms, providing 14, 12, 5 and 5 firms respectively. The telecommunications, energy, real estate, and media sectors provide 4 firms each.

Table A1: Bond Events

	Downgrades			Upgrades			Total
	Unanticipated	Anticipated	Watch	Unanticipated	Anticipated	Watch	
Moody's	1	3	1	3	1	3	12
S&P	3	10	3	1	2	2	21
Total	4	13	4	4	3	5	33

Table A2: Equity Events

	Downgrades			Upgrades			Total
	Unanticipated	Anticipated	Watch	Unanticipated	Anticipated	Watch	
Moody's	12	9	4	9	3	4	41
S&P	24	30	16	15	6	9	100
Total	36	39	20	24	9	13	141

The average and median initial and final ratings for both bonds and equities demonstrate that, apart from their sample size, the distributions of ratings in the two groups of events are quite similar (Table A3).

Table A3: Average (Median) Initial and Final Ratings

	Bond events		Equity events	
	Upgrades	Downgrades	Upgrades	Downgrades
Initial	A-/A3	A-/A3	BBB/Baa2	BBB+/Baa1
	(A-/A3)	(A/A2)	(BBB+/Baa1)	(A-/A3)
Final	A/A2	BBB+/Baa1	BBB+/Baa1	BBB/Baa2
	(A/A2)	(A-/A3)	(A-/A3)	(BBB+/Baa1)

Note: Medians (in parentheses) and averages have been rounded to the nearest rating notch; watches are counted as half a notch.

Appendix B: A Cross-sectional Analysis of Bond Spreads

The results presented in Section 5 estimate the short-run impact of rating changes on bond spreads. To compare these results with the expected long-run 'equilibrium' impact on spreads, we estimate a simple cross-sectional relationship between spreads, credit ratings, and modified duration in the Australian corporate bond market. Our sample comprises the 466 bonds that appeared in the Merrill Lynch Australian corporate bond index at the end of each of the years from 1999 to 2003, with the deletion of a small number of obvious outliers. Because we are using data for different years, we also include year dummies to account for the variation in average spreads over time. The results appear in Table B1.

Table B1: The Cross-sectional Relationship between Spreads, Ratings and Duration

Independent variables	Coefficient	*t*-statistic	P-value
Constant	16.8	4.2	0.00
Rating	1.6	1.4	0.17
Rating squared	0.7	4.2	0.00
Duration	18.3	10.9	0.00
Duration squared	–1.2	–6.6	0.00
Dummy 2002	–1.0	–0.4	0.70
Dummy 2001	–2.9	–1.2	0.20
Dummy 2000	8.6	3.3	0.00
Dummy 1999	7.4	2.7	0.01

For simplicity, the spread in basis points is used as the dependent variable, but the results are similar for more complex (and arguably more appropriate) transformations of the spread. Alphabetic ratings are converted to a cardinal scale from 0 (AAA/Aaa) to 9 (BBB-/Baa3). The OLS regression includes dummy variables to control for differences between spreads in particular years, and also squared terms to account for non-linear relationships among spreads and the main independent variables. The equation has an adjusted R^2 of 0.52.

The ratings coefficients (in particular the squared term) imply that bonds with poorer ratings have higher spreads, and the coefficients for duration show that spreads narrow as bonds near their maturity. The median rating change in our sample of bonds from Section 3 is between A and A-, which translates into a 9 bps change using the analysis above. Additionally, the passage of 100 days (or about 0.3 years of duration), as occurs during our estimation window, is associated with a fall in spreads of around 4 bps.

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