Keywords: credit risk, credit default swaps, credit ratings, equity analysts.

THE ROLE OF EQUITY ANALYSTS IN THE PRICING OF AUSTRALIAN CDS SPREADS
during the financial crisis

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Understanding the key drivers of risk premia in times of heightened risk enables credit traders to assess more accurately market-implied corporate credit risk. By analysing the determinants of Australian corporate credit default swap (CDS) spreads we examine whether equity analysts' price forecasts played a role in the pricing of Australian CDS spreads during the financial crisis. Equity analysts' one-year-ahead stock price targets provide a proxy of cash flow uncertainty that should be reflected in firms' CDS spreads. We find that an increase in the dispersion of analysts' forecasts increases CDS spreads and, during financial crisis, equity-based market variables are more relevant to the pricing of CDS spreads than commonly used leverage and credit ratings.

The recent financial crisis has thrown a spotlight on credit risk. Although credit risk is generally priced as a function of firm leverage and volatility, Alexander and Kaeck (2008) show that during volatile periods, credit spreads are driven by different factors from those in stable markets. Duffie and Lando (2001) argue that creditors also have incomplete information and will demand a premium if they are unable to assess valuation parameters with precision. Furthermore, Korteweg and Polson (2010) find that parameter uncertainty varies over time and increases significantly during periods of market stress. Guntay and Hackbarth (2010) use the dispersion in earnings forecasts of equity analysts as a proxy for this valuation uncertainty and find that higher dispersion leads to higher credit spreads in the US corporate bond market.

This study contributes to the existing literature by investigating the impact of value uncertainty on the pricing of Australian credit risk during the global financial crisis. We use equity analysts' one-year-ahead price target forecasts as a proxy for uncertainty and measure credit risk with corporate credit default swap (CDS) spreads. CDS spreads are less likely to be constrained by data availability issues usually associated with studies using Australian bonds (see for example, Creighton, Gower and Richards 2007). CDS spreads also do not require the selection of a benchmark risk-free interest (Blanco, Brennan, and Marsh 2005). With the exception of Callen, Livnat and Segal (2009), and Melgarejo (2010), who use US data and lower sampling frequency, there is scant literature on the impact of equity analysts' forecasts on CDS spreads and, to our knowledge, this is the first empirical study that extends the analysis to the financial crisis.

Analysis

Determinants of CDS spreads

To the extent that information contained in analysts' forecasts reduces information asymmetry between the market and the firm, we hypothesise that greater uncertainty among equity analysts will reduce transparency in the pricing of securities, with resulting uncertainty leading to higher CDS spreads. We control for common firm-level variables that have been previously documented in the literature. Due to the short and volatile time period covered by our data we have little guidance on the precise functional relationship between the variables. Furthermore, as Guntay and Hackbarth (2010) argue, relying purely on the cross-sectional relation between credit spread levels and analysts' forecast dispersion may provide a noisy indicator of the underlying relationship. Consequently, we construct two regression models to test our hypothesis both in differences and levels. The regression specification for CDS levels for firm i at week t is:[1]

$$CDS_{it} = \beta_0 + \beta_1 Target_{it} + \beta_2 StDTarget_{it} + \beta_3 Leverage_{it} + \beta_4 Leverage_{it} \times D_i + \beta_5 5ySwap_t + \beta_6 Vol_{it} + \beta_7 CreditRating\ [A]_{it} + \beta_8 CreditRating\ [BBB]_{it} + u_{it} \quad (1)$$

The regression of the weekly changes in CDS spreads takes first differences of the variables measured in percent terms, and percentage changes of variables that are measured in dollar values (e.g. share price). With a sufficiently similar investment rating across the issuers we specify raw changes in CDS spreads as our dependant variable.

$$\Delta CDS_{it} = \beta_0 + \beta_1 \Delta Target_{it} + \beta_2 \Delta StDTarget_{it} + \beta_3 StockReturn_{it} + \beta_4 \Delta 5ySwap_t + \beta_5 \Delta Vol_{it} + \beta_6 Credit[-]_{it} + \beta_6 Credit[+]_{it} + v_{it} \quad (2)$$

The regression variables are summarised below.

Control Variable	Variable description	Expected coeff. sign
Target ΔTarget	Mean price target for stock *i* across the analysts at week *t*. divided by the current stock price Weekly percentage change in *Target*	–
StDTarget ΔStDTarget	Weekly cross-sectional standard deviation of analyst price targets for stock i across the equity analysts covering the firm Weekly percentage change in *StDTarget*	+
Leverage	Semi-annually reported total liabilities expressed as a percentage of the firm's week *t* stock market capitalisation	+
Di	A dummy variable for financial firms	–
5ySwap	Five-year swap rate	–
Vol ΔVol	Firm *i* equity put option-implied volatility calculated from options with at least one week to maturity. First difference in *Vol*	+
CreditRating	Firm's credit rating. Due to the small number of credit events, we aggregate the credit ratings into three buckets: (AA+, AA, AA-), A, *and* BBB with dummy variables included for the last two categories based upon each firms' median rating across the three rating agencies in week *t*	+ Relative to AA rating
StockReturn	Return on the equity of firm i for week *t* As balance sheet information is only reported semi-annually, *StockReturn* is used indirectly as a proxy for changes in firm leverage	–

Data

The CDS dataset is provided by Markit Partners and consists of companies in the Australian CDS iTraxx Index (Series 16) with traded options on the Australian Securities Exchange (ASX). It includes end-of-day midpoint quotes in basis points (bps) for 22 corporations.[2] The reference entities reflect approximately two-thirds of the ASX 200 market capitalisation. We focus on spreads during the financial crisis period, which we identify as being between 1 January 2006 and 31 December 2010. To ensure sufficient liquidity, we use senior debt five-year CDS contracts, which represent the majority of single-name CDS traded volume.

The equity analyst target price forecasts are obtained from Institutional Brokers Estimates System (I/B/E/S). To eliminate stale data we remove individual analyst forecasts if they have not been updated for at least three months. Our filter eliminates approximately 1 per cent of the individual analyst forecasts. The median number of analysts covering a firm ranges from 5 to 11 with an average of 9. Put option-implied volatilities, and total liabilities per share for each firm are sourced from Bloomberg. Five-year swap rates are obtained from the Australian Financial Markets Association (AFMA). Credit rating announcements by Moody's, Standard & Poor's, and Fitch are obtained from Thomson Reuters. We consider all long-term rating events. We do not distinguish between rating agencies, or whether it is a credit watch, single-notch or multiple-notch rating change. If there are multiple announcements by different rating agencies for the same firm in any two-week window, we only consider the first announcement as conveying new information and exclude the subsequent announcements. The sample contains 33 positive and 38 negative credit events.

Results

We divide our sample into three periods — a pre-crisis period and the two separate crisis periods. The pre-crisis period is characterised by low and stable credit spreads. It coincides with increasing liquidity in the CDS market, historically low interest rates and corporate default rates, low equity market volatility and increasing equity values. We select 31 July 2007 as the start of the first crisis period (Crisis I) because of heavy losses reported by hedge funds stemming from sharp reductions in the value of collaterised debt obligations based on sub-prime mortgages. The start of the period corresponds to the peak in both equity markets and interest rates. The average level of CDS spreads increased from 29 bps to 92 bps between the pre-crisis period and Crisis I, while the average weekly change increased from 0.08 bps to 1.79 bps. The second crisis (Crisis II) period covers the banking crisis triggered by the failure of Lehman Brothers on 15 September 2008. During Crisis II the CDS spreads rose to an average of 160 bps. The summary statistics for the variables across the three sub-samples are provided in Table 1 with time series behaviour of the CDS spread mean, median and range depicted in Figure 1.

CDS spread levels

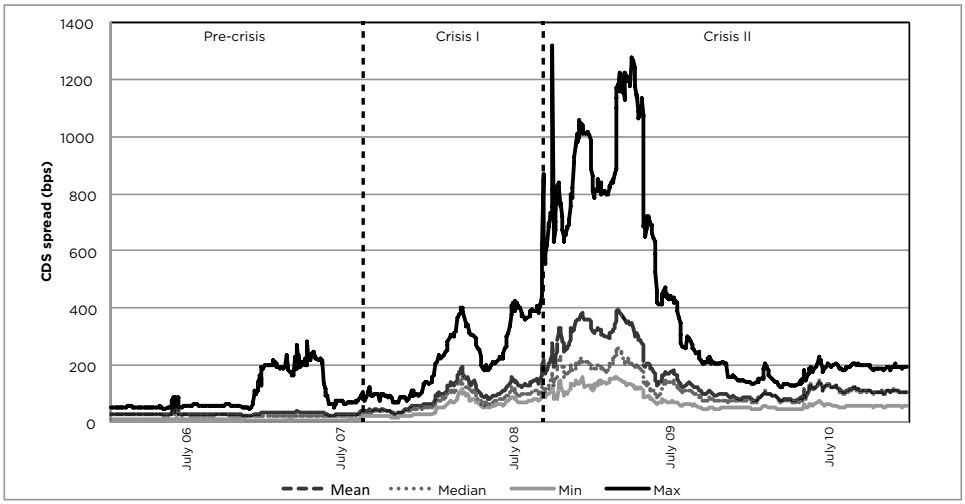
The CDS spread level regression results using Equation 1 are summarised in Table 2.[3] In the pre-crisis period, higher leverage and lower credit ratings have a significant effect on the differences in the level of CDS spreads across firms although leverage is not an important explanatory variable for financial firms.

TABLE 1: Descriptive statistics: crisis analysis

	Pre-Crisis		Crisis I		Crisis II	
	Mean	Std Dev	Mean	Std Dev	Mean	Std Dev
Panel A: Levels						
CDS	28.505	24.087	91.766	68.486	160.178	160.194
Target	0.915	10.178	10.699	15.085	7.087	16.102
StDTarget	8.911	5.144	10.171	4.637	12.549	7.108
Leverage	1.948	2.443	2.536	3.540	3.213	4.588
5ySwap	6.304	0.343	7.272	0.355	5.373	0.591
Stock Vol	20.993	5.977	33.202	10.793	33.534	16.985
Panel B: Changes						
ΔCDS	0.079	5.888	1.785	12.933	-0.343	34.555
ΔTarget	0.312	1.675	-0.332	2.075	-0.098	2.677
ΔStDTarget	0.002	1.255	0.046	1.724	-0.015	2.327
Stock Return	0.272	2.796	-0.365	4.735	0.047	5.451
Δ5ySwap	0.016	0.075	-0.009	0.132	-0.005	0.163
ΔStock Vol	0.025	2.527	0.326	4.845	-0.195	6.340

This table contains descriptive statistics for a sample of 22 single-name five-year Australian CDS contracts and their hypothesised determinants from 3 Jan 2006 to 31 Dec 2010, measured at a weekly frequency. CDS is the credit default swap spread, Target is the median equity analyst target price divided by its current stock price, StDTarget is the cross-sectional standard deviation of equity analyst price targets, Leverage is the value of firm liabilities as a percent market capitalisation, 5ySwap is the five-year swap rate, Stock Vol is the 30-day put option-implied volatility. ΔCDS is the change in the credit default swap spread, ΔTarget is the percentage change in the median equity analyst target price, ΔStDTarget is the change in the cross-sectional standard deviation of equity analyst price targets, Stock Return is return on each individual stock, Δ5ySwap is the change in the five-year swap rate and ΔStock Vol is the change in the 30-day put option-implied volatility.

FIGURE 1: Credit default swap spreads: 2006 to 2010



This figure presents the evolution of CDS spreads from 3 Jan 2006 to 31 Dec 2010. The summary statistics are based on the daily cross-section of CDS spreads over 22 single-name five-year Australian CDS contracts. Pre-crisis covers a periods from 3 Jan 2006 until 31 July 2007, Crisis I is from 1 August 2007 until 15 September 2008 and Crisis II is from 16 September 2008 until 31 December 2010.

The coefficients on the credit rating dummies indicate that firms rated A and BBB command a statistically significant credit risk premium of 13 bps and 26 bps, respectively, relative to the AA-rated firms. The results also suggest that analysts and equity volatility do not affect CDS spreads during this benign market environment. The model can explain 42 per cent of the variation in CDS spreads.

During Crisis I, CDS spreads become more sensitive to equity market fluctuations and option-implied equity volatility becomes highly statistically significant. Economically, one standard deviation increase in volatility translates to a 29 bps increase in spread. Leverage continues to be an important determinant of CDS spreads for non-financial firms in Crisis I. The *Target* variable (analysts' target price/current price), which can be interpreted as a one-year-ahead expected return is also significant, however, contrary to expectations it is positively related to spreads. This observed relationship is misleading and can be explained by the disparity between the speeds at which information is reflected in the target prices. Lags in revising analyst targets in a period of falling equity prices and increasing CDS prices due to the leverage create the illusion of a higher expected return. Interestingly, the credit rating coefficients are not significant and close to zero, indicating that ratings are unable to differentiate the credit risks implied by the CDS market. Overall, our model can explain 62 per cent of the variation of CDS spread levels during Crisis I.

In Crisis II, following the collapse of Lehman Brothers, analyst target price dispersion becomes a statistically significant determinant of spreads. Equity volatility remains a key driver and its effect actually trebles. One standard deviation increase in dispersion increases spreads by 28 bps while one standard deviation increase in volatility increases spreads by 85 bps. The swap rate, our proxy for the risk-free rate, also has a significant effect on CDS spreads, largely due to the declining short-term interest rates over this period. Leverage has the expected sign but it is no longer statistically significant. The *Target* variable is still positive but also not statistically significant. The explanatory power of the model remains high, with an adjusted R^2 of over 60 per cent.

Comparing the two crisis periods to the pre-crisis period, it is apparent that forward-looking market factors and proxies for valuation uncertainty have a stronger effect during times of heightened credit risk, with non-market related backward-looking variables, such as leverage, and credit ratings being more important in explaining spread variations in calm, orderly credit markets.

TABLE 2: Determinants of CDS spread levels: crisis analysis

	Pre-Crisis	Crisis I	Crisis I
Constant	11.631 (0.61)	-96.855 (1.25)	132.758* (1.70)
Target	-6.696 (0.28)	164.942*** (3.31)	75.128 (0.90)
StD Target	-0.596 (0.90)	1.406 (1.54)	3.942** (2.09)
Leverage	23.469*** (4.09)	44.822** (2.14)	41.288 (1.32)
Leverage x Fin dum	-23.858*** (4.32)	-46.327** (2.33)	-43.055 (1.42)
5-year Swap Rate	1.592 (0.40)	7.218 (0.66)	-39.357*** (3.22)
Stock Vol	-0.477 (1.48)	2.710*** (5.35)	4.991*** (4.25)
Dummy A	13.308*** (3.71)	-0.352 (0.02)	25.092 (0.94)
Dummy BBB	25.826*** (2.62)	-7.341 (0.47)	-22.690 (0.58)
Obs.	1804	1298	2640
Adj. R^2	0.423	0.624	0.607

*Equation 1 regression results across three sub-periods. Absolute value of t-statistics based on firm- and week-clustered standard errors are shown in parentheses. *, ** and *** indicate significance at 10%, 5% and 1%, respectively.*

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CDS spread changes

The results of the first difference regressions (Equation 2) are displayed in Table 3. In all periods the constant in the regression is not significantly different from zero. In the benign pre-crisis economic environment credit spreads are only significantly affected by positive credit announcements. The spreads are characterised by a lack of volatility, producing a low explanatory power with an adjusted R^2 of less than 5 per cent. Although a positive correlation between changes in CDS spreads and equity returns seems counterintuitive, increasing leverage can boost profitability and raise the return on equity during periods of low financial distress. Consistent with the preceding section, market-based variables become increasingly prominent in the pricing of CDS spreads from the onset of Crisis I. During both crisis periods, equity returns and equity volatility become statistically significant in explaining CDS spread changes. Once the volatility in the market rises, increases in analyst dispersion cause

CDS spreads to widen. This statistically significant result clearly supports our hypothesis that increases in uncertainty in equity analysts' forecasts are associated with higher credit risk. Negative credit rating news also becomes significant with negative news triggering an increase in CDS spread of 6 bps. We conclude that while CDS spreads respond to credit rating events, credit ratings are not as effective in classifying market-implied credit risk during market turmoil. During Crisis I our model explains almost 14 per cent of the variation in CDS spread changes.

During Crisis II the impact of most of the market-based determinants on the CDS spreads intensifies. Changes in stock volatility, the five-year swap rate, equity analyst uncertainty, target price changes and credit events all become significantly correlated with spread changes, with the hypothesised signs. Together, these factors can explain over 16 per cent of the variation in CDS spread changes of the 22 firms in the sample.

TABLE 3: Determinants of changes in CDS spreads: crisis analysis

	Pre-crisis	Crisis I	Crisis II
Constant	-0.123 (0.31)	1.438 (1.38)	-0.386 (0.33)
ΔTarget	0.470 (1.13)	-0.127 (0.45)	-0.744** (2.05)
ΔStD Target	-0.820 (1.27)	0.645** (2.52)	0.570* (1.83)
Stock Return	0.080 (0.85)	-0.747*** (4.01)	-1.290*** (3.88)
Δ5ySwap	1.321 (0.48)	3.413 (0.36)	-44.479*** (3.20)
ΔStock Vol	-0.177 (1.33)	0.344** (2.28)	0.671** (2.27)
Credit[–]	5.600 (1.46)	6.356** (2.03)	18.940*** (2.93)
Credit[+]	-1.517*** (3.44)	-2.302 (0.44)	-28.808* (1.92)
Obs.	1804	1298	2640

*Equation 2 regression results across three sub-periods. Absolute value of t-statistics based on firm- and week-clustered standard errors are shown in parentheses. *, ** and *** indicate significance at 10%, 5% and 1%, respectively.*

Conclusion

This study investigates the key drivers of Australian corporate CDS spreads during the financial crisis at a weekly frequency. In addition to examining credit ratings, firm-specific and market-level variables, we include equity analysts' consensus forecasts and their cross-sectional standard deviation as a proxy for uncertainty. We separate the sample into three sub-periods to assess the relative importance of these factors during the financial crisis. The results show that equity analyst price target forecasts offer increased explanatory power in pricing credit spread levels and changes, with higher uncertainty leading to higher spreads. We find that our variables explain up to 63 per cent of the variation in CDS spreads and 17 per cent of the variation in CDS spread changes. Leverage and credit ratings convey significantly more information about credit risk during benign market periods than market-based variables. Conversely, we find that the explanatory power of credit ratings decreases during the financial crisis.

During volatile periods, market-linked variables, such as equity returns, interest rates, volatility and analyst information are more prominent in explaining CDS spreads. The results indicate that traders of credit instruments should be aware that in times of heightened credit risk, equity market-based factors play a more pivotal role in determining CDS spreads. ■

Notes

1. Panel and individual firm unit root tests show that the CDS spread levels are stationary at the 1 per cent level.
2. The 22 companies included in our sample are Amcor, AMP, ANZ Bank, BHP Billiton, Coca-Cola Amatil, Commonwealth Bank of Australia, CSR, Fosters, General Property Trust, Lend Lease, Macquarie Bank, National Australia Bank, QBE Insurance, Qantas, Rio Tinto, Tabcorp, Telstra, Wesfarmers, Westfield, Westpac, Woodside and Woolworths.
3. Clustered standard errors are utilised to adjust for correlation across firms and time. We omit results using fixed effects as they do not alter the results.

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