

CDS Spreads and Default Risk

Interpreting the Signals

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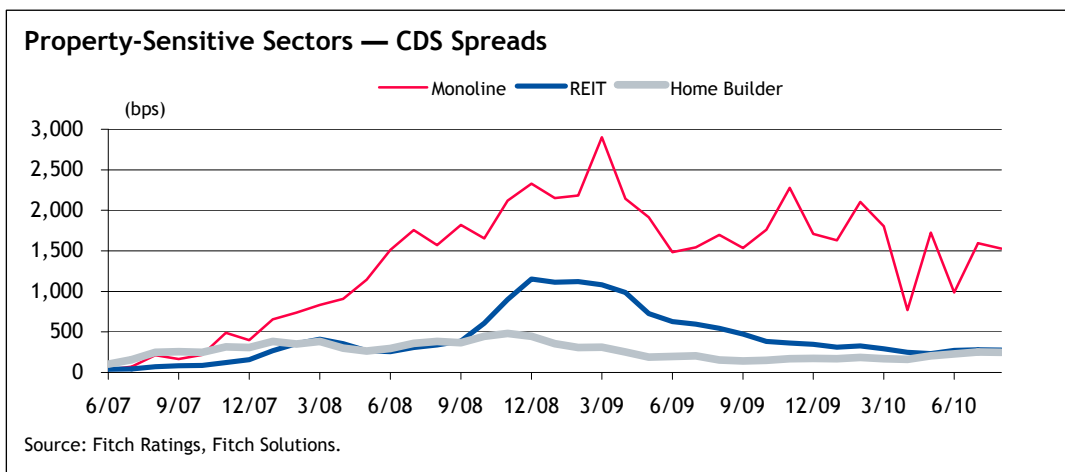
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Related Research

- *Credit Derivatives and Margin: Under the Radar?*, Aug. 11, 2010

Summary

- Credit default swap (CDS) spreads, along with other market-based indicators such as bond and equity price information, have become prevalent tools for risk analysis. CDS spreads are updated frequently (e.g., daily) and reflect a market view on a credit, attributes which are potentially useful to the valuation of trading exposures, active portfolio management, and the assessment of funding conditions.
- CDS spreads are also sometimes used in deriving estimates of a company's default risk and, in turn, the calculation of regulatory and economic capital. When used in this context, it is important to note that CDS pricing can be driven by a number of factors not directly related to an entity's fundamental creditworthiness, such as the leverage inherent in CDS trading, liquidity conditions, counterparty risk, and the risk aversion of market participants.
- This study analyzes how CDS market volatility and directional momentum in spreads can affect their performance as indicators of default risk during a stress period. The research sample includes five U.S. sectors that experienced pronounced spread volatility during the crisis and encompasses more than 100 actively referenced entities (see the Appendix for full list of companies). Although the focus is on these five sectors, the study's findings have broader applicability to the performance of spreads as default risk indicators in other sectors and regions (e.g., Europe).
- Fitch's research indicates that overall performance of CDS spreads during the crisis period has been mixed. For example, spreads on property-sensitive sectors started to widen rapidly during the latter part of 2007 (see graph below). Widening spreads proved to lead the severe distress that occurred among monolines, but generated false positives for homebuilders and real estate investment trusts (REITs), sectors that as a whole experienced relatively mild erosion in credit fundamentals.



- Similarly, although CDS spreads also widened markedly for financial services firms during the height of the crisis, only one credit event (Washington Mutual) occurred

Using CDS Spreads to Estimate PD

- Several assumptions underpin the conversion of CDS spreads to implied PDs, including fixed (rather than stochastic) recovery rates and risk neutrality (i.e. that CDS spreads do not embed a risk premium beyond compensation for expected or average credit losses).
- Since CDS pricing is dependent on trading activity, spread values are potentially sensitive to market liquidity, counterparty risk, the time value of money, and technical factors, such as the high leverage inherent in swaps, which could contribute to directional spread momentum.
- Additionally, since many market participants have a total return orientation based on changes in the mark-to-market value of CDS positions, CDS spreads do not necessarily reflect a longer term horizon (e.g., one year) of fundamental credit risk but rather a short-term trading view.
- An important caveat in using annualized spreads to imply annual PDs is that, if the market considers an entity's default to be imminent, then the resulting implied PD could exceed 100%. For example, a protection buyer might be willing to pay 1,000 bps (or 10% of the notional CDS amount) for effectively a month's horizon of protection, which if annualized would translate to a spread of 12,000 bps and imply an annual PD of 200% (assuming a 60% loss severity).

among the roughly 60 U.S. bank and insurance companies sampled. This discrepancy suggests that CDS markets might not have fully anticipated the significant role of external support (e.g. government assistance, acquisition by other financial institutions) in mitigating risks to debtholders.

- Understanding the limitations and volatility of spreads as an indicator of default risk continues to be a pertinent issue, particularly in light of recent market activity in sovereign CDS spreads and the potential use of market-implied default risk estimates in determining Basel III regulatory capital requirements.

Overview

Over the past decade, CDS markets have benefited from broader coverage of names, deeper liquidity, and more transparent pricing. These developments have improved the availability and integrity of CDS spread data and, in turn, its usefulness as a market-based indicator of credit risk. When analyzed relative to Fitch's ratings, which are based on credit fundamentals, CDS spreads provide an alternative view on the credit risk of an issuer's senior debt. Indeed, CDS spreads, along with other analytical tools, are made available to Fitch's ratings analysts, and outliers may prompt further review of an individual credit.

When used in estimating an entity's probability of default (PD), CDS spreads are often cited as a leading risk indicator, particularly for investment-grade credit exposures that subsequently become distressed or suffer a default. This perception has historically been supported by specific examples of both individual names and sectors whose CDS spreads widened in advance of observable deterioration in fundamental credit quality.

While there are notable instances in which CDS spread widening preceded eventual defaults, there have also been numerous false positives where spreads ramped up dramatically even though few if any defaults ensued. For example, during the summer of 2002, CDS spreads for an index of the most actively traded investment-grade corporate issuers widened in the wake of economic recession in several developed countries and broader financial market volatility. By July 2002, average spreads reached 125 bps for 'A' rated issuers and exceeded 300 bps for 'BBB' rated issuers. However, a year after this peak, these spread levels had fallen to one-third of their respective peaks, and the realized default rate for all investment-grade obligors was only 0.11% for 2003 (see Fitch special report, "Credit Derivatives: A Case of Mixed Signals?," from December 2003).

Study: Background

The financial crisis provides an opportunity to backtest the performance of CDS spread information as a predictive indicator of default risk. In this study, Fitch analyzes sectors that experienced pronounced market duress during the crisis, manifested by sharply widening and volatile CDS spreads. Conducting this exercise on a sectoral basis enables more systematic analysis than focusing anecdotally on individual names. The study focuses on property-sensitive (i.e. monoline insurers, REITs, and homebuilders) and financial services (i.e. banks and insurance companies) sectors and is based on a sample of North American companies whose senior debt securities were rated in the investment-grade category as of June 30, 2007.

To estimate the default risk implied by CDS spreads at a given point in time, the average spread for the entities in each sector is calculated and then converted to a PD value through the following simple formula:

Probability of Default (1 yr) = CDS spread (annualized) / Loss Severity
 As an example, if assuming a 60% loss severity (or 40% recovery rate), then an annual CDS spread of 120 bps would imply a one-year probability of default of 2.0%.

Loss Severity — A Drill-Down

- A fixed 60% loss severity (or 40% recovery rate) is assumed in deriving PD from CDS spreads, consistent with common convention for this type of calculation and roughly in line with both the average outcome of CDS auctions following credit events over the past few years and with realized recovery rates on the Fitch U.S. High-Yield Default Index in 2008 and 2009.
- The exception is monolines, for which this study assumes an 80% loss severity, consistent with final settlement prices from three recent monoline CDS auctions.
- Loss severity assumptions can significantly impact the resulting estimate of implied PD. By definition, for a given spread level, a higher loss severity assumption results in a lower implied PD. Existing research generally suggests that loss severity tends to increase during stress periods (i.e. is positively correlated with PD).
- During the crisis, the pronounced increase in CDS spreads meant that, even under the most severe loss severity assumption (i.e., 100%), implied peak PDs would remain substantial.
- For example, if assuming loss severity of 100% (i.e., no recoveries), peak implied PDs would still be 29% (monoline), 11.5% (REIT), 4.9% (insurance), 4.8% (homebuilder), and 4.3% (bank).

There are a number of caveats and considerations in using this formula as the basis for estimating PD (see text box on page 2). However, this approach has the advantage of being tractable, intuitive, and directly relatable to the credit performance of the underlying reference entities. For example, a CDS protection seller (i.e. long credit exposure) with a one-year horizon anticipates that the premium received over that period will at least fully compensate for the position's expected loss.

A **credit event** is an occurrence marking severe deterioration in a reference entity's financial condition (e.g. bankruptcy or failure to pay) which triggers an insurance payment under a CDS contract. CDS credit events and bond defaults are generally aligned, but can differ (e.g. conservatorship of Fannie Mae and Freddie Mac triggered their CDS but did not result in bond impairments).

Results: Broad Brush, Not Fine Print

Looking across the five sectors, both the absolute levels and relative rank ordering of the default risk within each sector changed markedly at different points in time (see table below). In the early stages, spreads suggested that the default risk of homebuilders was twice that of the other four sectors, whose implied PDs were all below 1%.

Volatility in the Relative Risks of Sectors over the Crisis

Sector	June 2007		Sector	October 2008		Sector	March 2009		Sector	August 2010	
	CDS Spread (bps)	Implied PD (%)		CDS spread (bps)	Implied PD (%)		CDS spread (bps)	Implied PD (%)		CDS spread (bps)	Implied PD (%)
HB	101	1.7	Monoline	1,656	20.7	Monoline	2,902	36.3	Monoline	1,527	19.1
REIT	40	0.7	REIT	607	10.1	REIT	1,081	18.0	REIT	275	4.6
Monoline	37	0.5	HB	447	7.5	Insurance	460	7.7	HB	249	4.2
Insurance	30	0.5	Bank	310	5.2	HB	313	5.2	Bank	161	2.7
Bank	26	0.4	Insurance	267	4.5	Bank	243	4.1	Insurance	151	2.5

HB – Homebuilder. Notes: The October 2008 and March 2009 periods illustrated above are intended to represent different points in time during the financial crisis and do not necessarily reflect peak CDS spreads for each sector. Figures above are annualized.

Source: Fitch Ratings, Fitch Solutions.

As the crisis deepened in late 2008 and early 2009, monolines and REITs gapped out considerably, with implied annual PDs of roughly 36% and 18%, respectively, as of March 2009. Interestingly, the rank ordering of the other three sectors changed markedly between October 2008 and March 2009, with insurers moving from the least to the third riskiest sector.

As of August 2010, implied PDs for all sectors except monolines had narrowed considerably from their peaks during the crisis. Although implied PDs for monolines proved to lead the observable fundamental credit weakness in this sector, CDS spreads appeared to overstate the default risk for the REIT, homebuilder, bank, and insurance sectors. As a group, these four sectors experienced discernible credit erosion during the crisis but during the period of study have incurred only one credit event among the almost 100 entities comprising these cohorts (i.e. akin to a roughly 0.3% annual realized default rate over the three-year period studied).

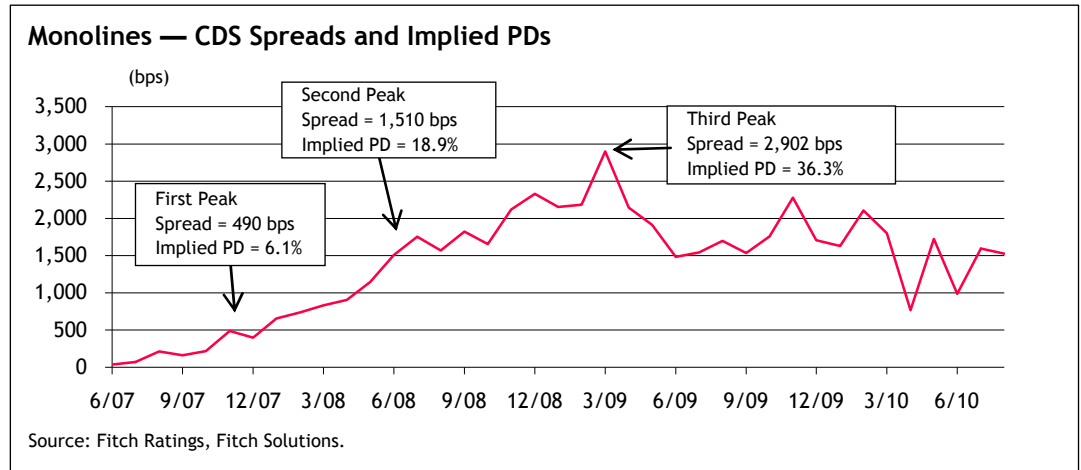
Thus, at the height of the crisis, credit markets appeared to paint these sectors with a relatively similar brush, even though monolines were the only sector to experience multiple credit events and severe deterioration in senior debt ratings. To drill down further into the performance within each of the five sectors, we backtest the CDS-implied PDs relative to the realized credit performance at various points in the crisis, with particular focus on troughs and peaks in CDS spreads. We also evaluate the variability in spreads, and thus in implied PDs, throughout the crisis.

Key Methodological Assumptions

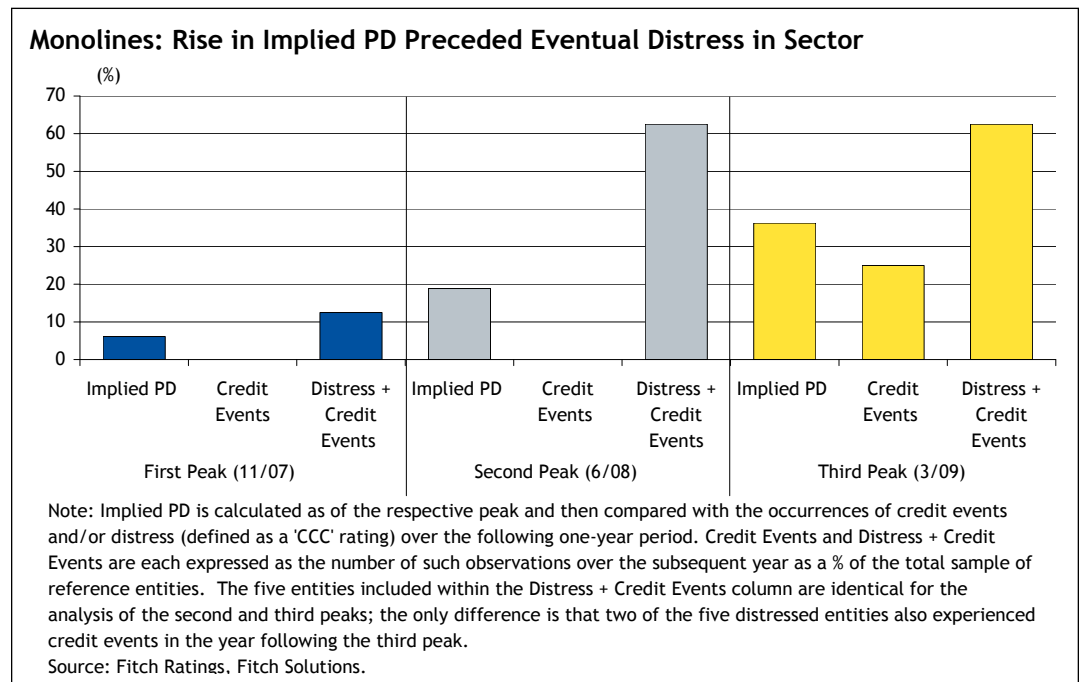
- Similar to the assumptions underlying investment-grade credit indices, each sector is constructed as a cohort populated by entities with at least two investment-grade ratings as of June 30, 2007, which this study uses as the approximate starting point for the crisis (see the Appendix for constituent entities within each sector).
- CDS spread data is based on five-year contracts. Spreads are tracked from June 30, 2007 through Aug. 31, 2010 and aggregated into monthly observations by an equally weighted average of the annualized spreads of the individual entities within each sector.
- Spread observations of individual entities are excluded if based on low liquidity, meaning that there is not necessarily a spread observation for each entity in every period.
- Observations are also excluded if occurring subsequent to a credit event or if exceeding levels that are no longer meaningful for estimating one-year default probabilities (e.g. annualized spread observations of 8,000 bps or above are excluded from the monoline sample, since this would imply an annual PD above 100%, based on an 80% loss severity assumption).

Property-Sensitive Sectors (Homebuilder, Monoline, REIT)

Among the property-sensitive sectors, implied PDs widened most dramatically for monolines, which include specialty insurance companies that underwrite a single line of business, such as bonds or mortgages. Monoline CDS spreads experienced several distinct peaks that preceded further deterioration within the sector (see graph below).



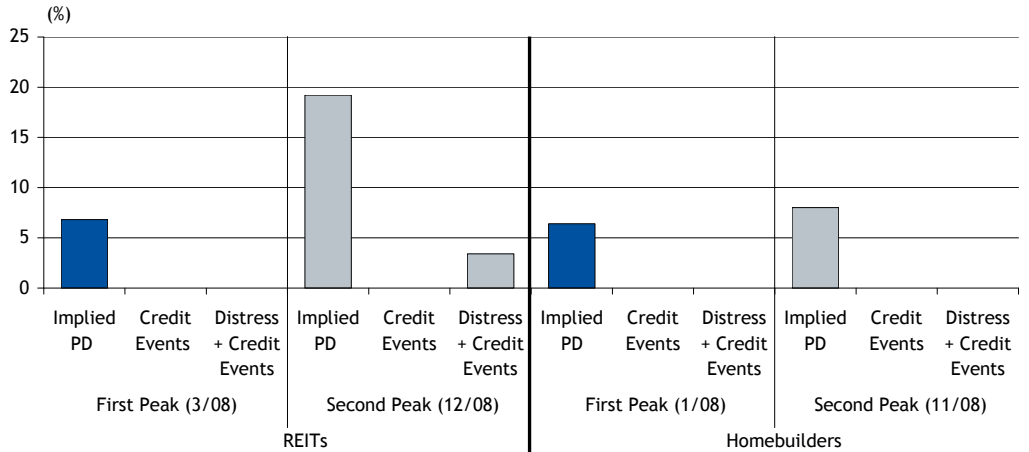
For example, the second distinct peak in monoline CDS spreads occurred in June 2008, with more than half of the sample suffering fundamental credit distress (defined as a ratings downgrade to 'CCC' or below) over the ensuing year. While no credit events materialized during this period, there were two credit events within the year following the third peak in monoline spreads in March 2009 (see chart below).



By comparison, REITs and homebuilders also experienced dramatic increases in perceived default risk, with CDS-implied PDs peaking at 19.2% and 8.0%, respectively (see chart page 5). However, among the REITs, none incurred a credit event and only one of the

29 entities suffered a downgrade to 'CCC' or below in the year following this peak (note that one REIT within the sample, Centro, had been downgraded to 'CCC' one year prior to this peak). Similarly, there were neither credit events nor severe downgrades within the homebuilder cohort.

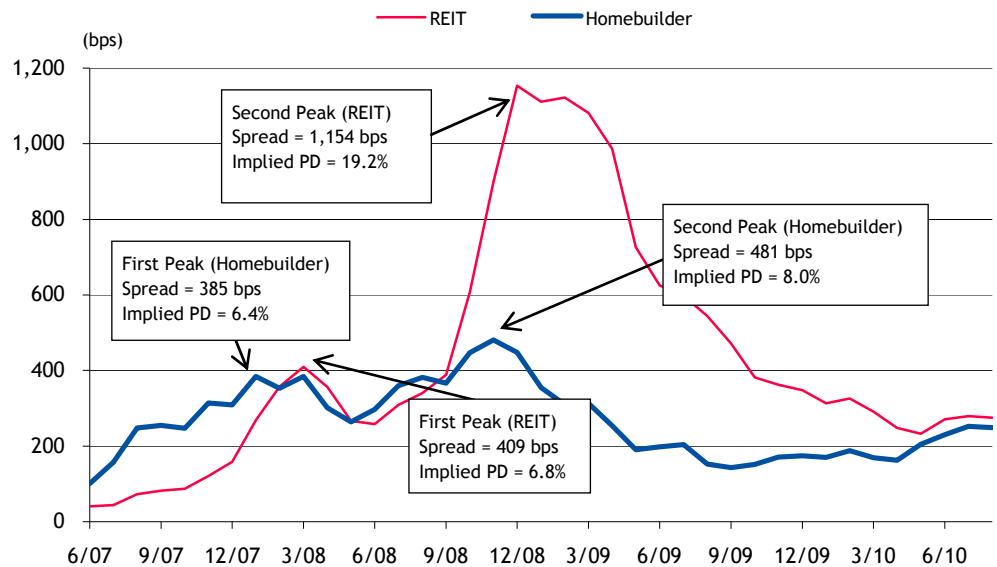
REIT and Homebuilders: Rise in Implied PD, but No Credit Events in Year Following the Peak



Note: Implied PD is calculated as of the respective peak and then compared with the occurrences of credit events and/or distress (defined as a 'CCC' rating) over the following one-year period. Credit Events and Distress + Credit Events are each expressed as the number of such observations over the subsequent year as a % of the total sample of reference entities.

Source: Fitch Ratings, Fitch Solutions.

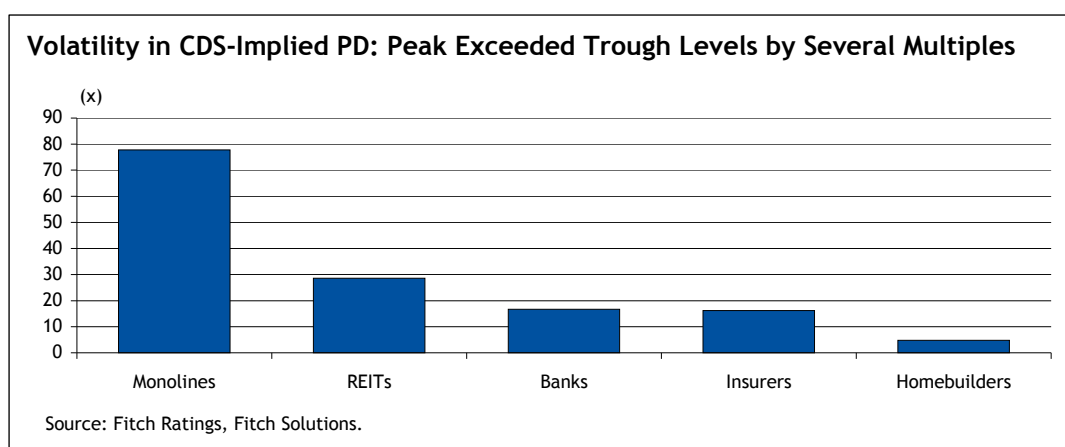
REIT and Homebuilders — CDS Spreads and Implied PDs



Source: Fitch Ratings, Fitch Solutions.

Taking a closer look at this apparent false positive, trends in CDS spreads for REITs and homebuilders were roughly correlated through October 2008. However, the implied default risk for these sectors subsequently diverged sharply, as REIT spreads increased exponentially while homebuilder spreads generally stabilized (see graph, bottom page 5).

A portfolio manager or risk officer who hedged or sold REIT-related exposure in response to this ramp-up in implied PDs would either have purchased expensive credit protection or suffered opportunity costs from not remaining invested in the sector, as manifested in the subsequent narrowing of CDS spreads. Additionally, while the fundamental credit performance of REITs and homebuilders has been roughly comparable over the crisis period, with moderate ratings deterioration on average and no post-peak credit events within the timeframe studied, CDS spreads indicated a marked divergence in default risk that ultimately was not borne out by the ensuing credit performance of each sector.



Indeed, volatility in CDS spreads over the cycle translated into dramatic shifts in implied PDs, reducing their usefulness as gauges of medium-term credit risk. For example, the implied annual PDs for monolines increased by a multiple of almost 80, from a trough of 0.5% to a peak of 36.3% (see chart above). Implied annual PDs for REITs shot up by a multiple of almost 30 from trough to peak, but are currently only one-fourth of their peak levels (see chart page 8). Even among homebuilders, the most stable sector among the property-sensitive group, the trough-to-peak implied PD increased almost five-fold.

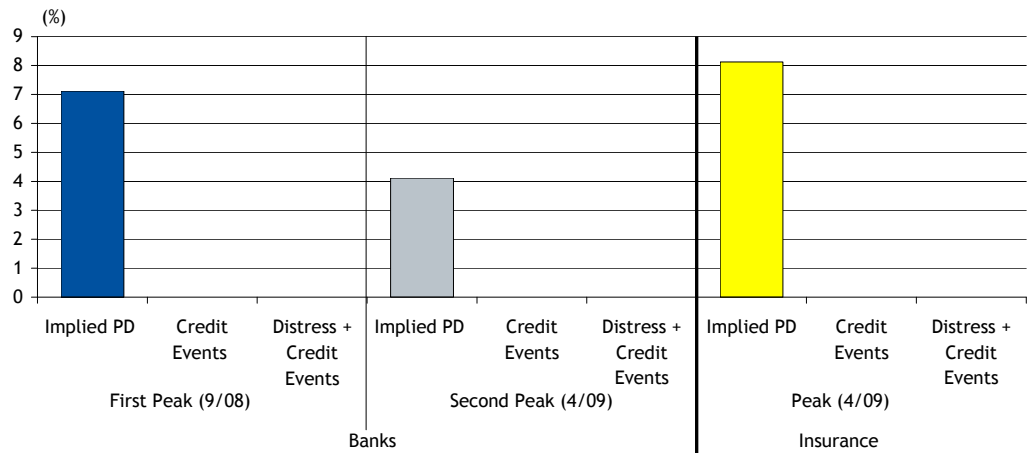
Financial Services (Bank, Insurance)

Among banks and insurance companies, CDS spreads began their rapid ascent in the latter half of 2008, with implied PDs for banks peaking in September 2008 and insurers peaking in April 2009 (see chart, top page 7). In each case, however, no credit events occurred over the ensuing year after the peak implied PD. The only credit event that occurred in either sector (Washington Mutual) was coincident with the first peak in bank implied PD, suggesting that spreads were reflecting current market distress rather than providing a forward-looking view of fundamental credit risk on the horizon. Although several banks and insurance companies received extraordinary external support (e.g. government assistance, acquisition by another financial institution) in response to financial market pressures during the crisis, the senior debt obligations of these entities continued to perform and thus did not trigger a CDS credit event despite their weakened financial condition.

After reaching their highest respective peaks, each sector’s CDS spreads tightened sharply (see graph, bottom page 7). Additionally, a comparison of the CDS spreads of banks and insurers reveals significant variability in the relative risks of each sector over the crisis period. While bank and insurance spreads appear highly correlated through the second

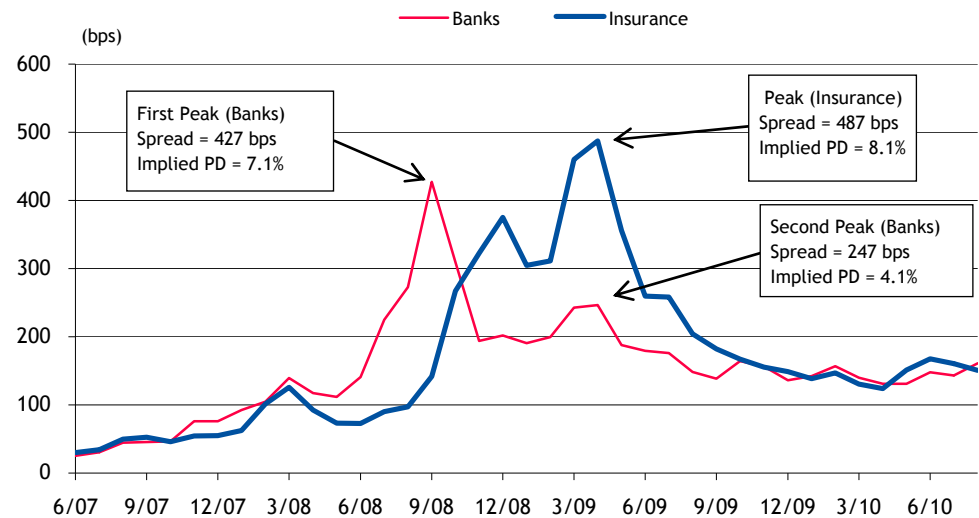
half of 2007 and early 2008, the implied default risk of the banking sector diverged in the second half of 2008.

Financial Services: Rise in Implied PD, but Neither Credit Events nor 'CCC' Downgrades in Year Following the Peak



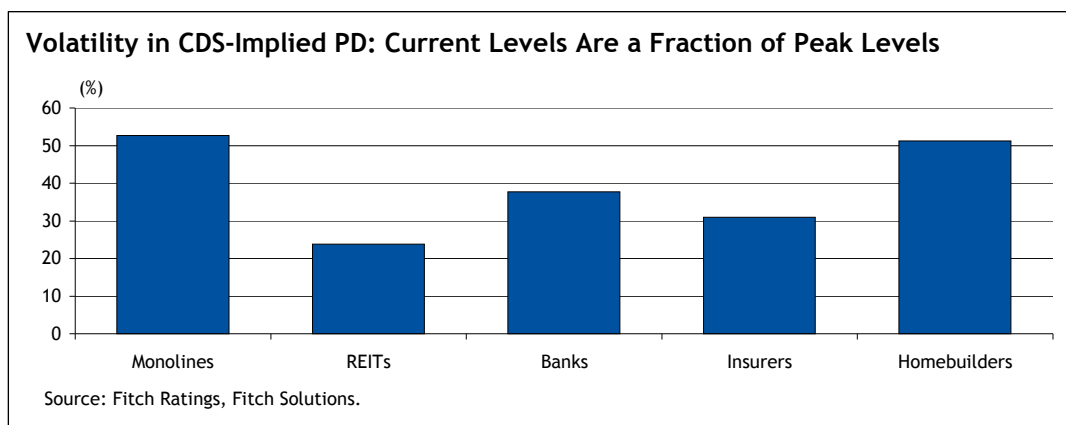
Note: Implied PD is calculated as of the respective peak and then compared with the occurrences of credit events and/or distress (defined as a 'CCC' rating) over the following one-year period. Credit Events and Distress + Credit Events are each expressed as the number of such observations over the subsequent year as a % of the total sample of reference entities. As noted, Washington Mutual experienced a credit event in September 2008, which contributed to the increase in spreads for the first peak. If excluding Washington Mutual from the September 2008 analysis, bank sector CDS spreads would have been 256 bps, or an annual implied default rate of 4.3%, for this observation. Alternatively, if including Washington Mutual as a credit event for the year following the first peak (even though it was coincident with this peak), the realized "default" rate (i.e. credit events per total entities in the sample) would have been 4.0%. Source: Fitch Ratings, Fitch Solutions.

Financial Services — CDS Spreads and Implied PDs



Source: Fitch Ratings, Fitch Solutions.

At their September 2008 peak, bank spreads (427 bps) were three times higher than insurance spreads (142 bps). However, this relationship flipped completely just a few months later, as the insurance peak of 487 bps in April 2009 was roughly twice bank spreads (247 bps) at that juncture. As the crisis waned, these spread levels converged and have since resumed a tighter correlation. Thus, although banks and insurers are exposed to many common risk factors, CDS spreads indicated markedly different patterns in the implied default risk of these sectors during the course of the crisis. The complete inversion in bank versus insurance spreads between September 2008 and April 2009 likely exaggerated any relative changes in the fundamental financial condition of these sectors over this period.



This volatility in the implied PDs of both banks and insurers is evident when comparing trough to peak levels. Entering the second half of 2007, the tight spreads for both banks and insurers translated into implied PDs of 0.4% and 0.5%, respectively. For banks, the peak implied PD, which occurred a little more than one year after its low of 0.4%, reached 7.1%, a roughly 18-fold increase. For insurers, the April 2009 peak PD of 8.1% was more than 16x times the June 2007 trough. For both sectors, their current implied PD has declined considerably and is now roughly 30%–40% of peak levels (see chart above).

Conclusions

Ultimately, CDS spreads can be a useful analytical tool. However, it is important to recognize the potential limitations caused by both their inherent volatility and incidence of false positives during stress periods, which can impose significant costs on market participants who rely on them as default risk indicators. For example, risk managers hedging credit exposure during market distress might overpay for credit protection, since spread levels could overstate eventual realized credit losses. Similarly, credit investors might not be appropriately compensated for risk exposure assumed during benign conditions and could incur opportunity costs if trimming exposure during market distress.

Additionally, for portfolio credit risk and economic capital models that rely on CDS-implied PDs as inputs, volatility and false positives could undermine both the stability and the robustness of the resulting risk capital estimates. For example, under the Basel III advanced internal ratings-based approaches, banks are able to estimate credit risk capital requirements using internal estimates of PD and loss severity. Based on the CDS-implied PDs generated in this study, the resulting Basel III capital charges, coupled with reserves to cover expected loss, would increase by a factor of approximately two (homebuilders), three (banks, insurance companies), four (REIT), or five (monolines) from trough to peak (see table page 9).

From a systemic perspective, this variability in risk capital might create another channel for procyclicality. That is, as spreads widen, PD estimates increase, in turn weakening capital ratios and compelling deleveraging and forced selling, potentially driving further spread widening.

“As the markets came under increasing strain on account of the financial turmoil, liquidity in the CDS markets also began to dry up, raising doubts as to their value as an indicator of risk and funding costs.”

European Central Bank, August 2009

Volatility in CDS-Implied PD Could Drive Cyclicity in Basel Capital Charges

(%)

Sector	Period	PD	LGD ^a	Reserves (Expected Loss)	Basel Capital Charge (Unexpected Loss) ^b	Expected Loss + Unexpected Loss
Monoline	Trough	0.5	80	0.4	13.0	13.3
	Peak	36.3	80	29.0	38.4	67.4
	Current	19.1	80	15.3	38.2	53.5
REIT	Trough	0.7	60	0.4	8.6	9.0
	Peak	19.2	60	11.5	25.2	36.7
	Current	4.6	60	2.7	15.6	18.3
Homebuilder	Trough	1.7	60	1.0	11.7	12.7
	Peak	8.0	60	4.8	18.9	23.7
	Current	4.2	60	2.5	15.0	17.5
Bank	Trough	0.4	60	0.3	8.8	9.1
	Peak	7.1	60	4.3	21.4	25.7
	Current	2.7	60	1.6	16.3	17.9
Insurance	Trough	0.5	60	0.3	9.7	10.0
	Peak	8.1	60	4.9	22.4	27.3
	Current	2.5	60	1.5	16.0	17.6

^aMonoline LGD is assumed to be higher than for the other sectors, consistent with the realized average final price from CDS auctions for monoline reference entities that have experienced a credit event. ^bThe Basel capital charges are based on the IRB formulae for each respective asset class and, for monolines, banks, and insurance companies incorporate the 25% upward adjustment in correlation values for financial institutions under the recent Basel III revisions. Capital charge calculations are based on an 8% total capital requirement, which is consistent with both the Basel II and Basel III calibrations (notes that Basel III capital calculations above do not reflect the capital conservation buffer of 2.5% that will be phased in over the next several years).

Source: Fitch Ratings, Basel Committee on Banking Supervision.

Finally, anticipated structural changes to the CDS market, such as reliance on central clearing counterparties and potential increases in margin requirements, are likely to dampen some of this volatility in the future.

Appendix: Reference Entities Included within Sample

Bank	Insurance	Monoline	REIT	Home Builder
Bank of America Corporation	Aetna Inc.	Ambac Financial Group, Inc.	AMB Property LP	Centex Corporation
Bank of New York Co Inc.	AFLAC Incorporated	Assured Guaranty Corp.	Archstone-Smith Operating Trust	D R Horton Inc.
Bank One Corporation	Allstate Corporation	FGIC Corporation	Avalon Bay Communities	Lennar Corporation
BB&T Corporation	American Financial Group, Inc.	Financial Security Assurance Inc.	BRE Properties, Inc.	M.D.C. Holdings, Inc.
Canadian Imperial Bank of Commerce	American International Group Inc.	MBIA, Inc.	Camden Property Trust	NVR Inc
Capital One Financial Corporation	Anthem Insurance Companies Inc.	MGIC Investment Corporation	Developers Diversified Realty Corporation	Pulte Homes, Inc.
Citigroup Inc.	Assurant Inc.	Radian Group Inc.	Duke Realty LP	Ryland Group, Inc.
Fifth Third Bancorp	AXA Financial Inc.	The PMI Group, Inc.	Equitable Resources, Inc.	Toll Brothers, Inc.
JPMorgan Chase & Co.	Berkshire Hathaway Inc.	—	Equity One Inc	—
KeyCorp	Chubb Corporation	—	Federal Realty Investment Trust	—
Marshall & Ilsley Corp	CIGNA Corporation	—	First Industrial LP	—
Mellon Financial Corporation	First American Corporation	—	Health Care Property Investors, Inc.	—
National Bank of Canada	Genworth Financial Inc.	—	Health Care REIT, Inc.	—
National City Corp	Hartford Life, Inc.	—	Healthcare Realty Trust Incorporated	—
PNC Financial Services Group, Inc	Horace Mann Educators Corp	—	Highwoods Realty LP	—
Popular, Inc.	John Hancock Financial Services Inc.	—	Hospitality Properties Trust	—
Royal Bank of Canada	Liberty Mutual Insurance Companies	—	HRPT Properties Trust	—
Sovereign Bancorp, Inc.	Lincoln National Corporation	—	iStar Financial Inc.	—
State Street Corporation	Manufacturers Life Insurance Company	—	Kimco Realty Corporation	—
SunTrust Banks	Markel Corporation	—	Liberty Property LP	—
Toronto Dominion Bank	Marsh & McLennan Companies, Inc.	—	Mack-Cali Realty Corporation	—
U.S. Bancorp	Massachusetts Mutual Life Insurance Company	—	National Retail Properties Inc	—
Wachovia Corporation	MetLife, Inc.	—	New Plan Excel Realty Trust, Inc. (acquired by Centro in 2007)	—
Washington Mutual Incorporated	Nationwide Financial Services, Inc.	—	ProLogis	—
Wells Fargo & Co	New York Life Insurance Company	—	Regency Centers, L.P.	—
—	Pacific Life Insurance Co	—	United Dominion Realty Trust, Inc.	—
—	Principal Financial Group	—	Vornado Realty Trust	—
—	Prudential Financial Inc.	—	Washington Real Estate Investment Trust	—
—	Safeco Corporation	—	Weingarten Realty Investors	—
—	The Progressive Corporation	—	—	—
—	The St. Paul Travelers Group of Companies, Inc.	—	—	—
—	Torchmark Corporation	—	—	—
—	Unitrin, Inc	—	—	—

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