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# CDS-bond basis and bond return predictability☆

Gi H. Kim [a,*], Haitao Li [b], Weina Zhang [c]

[a] Finance Group, Warwick Business School, University of Warwick, United Kingdom
[b] Cheung Kong Graduate School of Business, Beijing 100738, China
[c] Department of Finance, NUS Business School, National University of Singapore, Singapore

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ABSTRACT

We examine the predictive power of the CDS-bond basis for future corporate bond returns. We find that *residual basis*, the part of the CDS-bond basis that cannot be explained by a wide range of market frictions such as counterparty risk, funding risk, and liquidity risk, strongly negatively predicts excess returns. Controlling for systematic risk factors, including credit risk and liquidity risk, we find that a bond portfolio formed on the residual basis generates a significant abnormal bond return of 1.79% at the 20-day horizon. The abnormal returns due to the residual basis reflect mispricing rather than missing systematic risk factors. These results are robust to different horizons and sample periods and to the various characteristics of bonds. Overall, our results imply a beneficial role of CDS in the bond market as the existence of mispricing between CDS and bonds results in a subsequent price convergence in bonds.



## 1. Introduction

The market for credit default swaps (CDS) has seen tremendous growth in recent years. According to the Bank for International Settlements (BIS, 2010), the notional value of outstanding credit derivatives at the end of 2007 was $58 trillion, more than six times that of the corporate bond market. As a result, CDS have fundamentally changed market practices in the investment, trading, and management of credit risks. As CDS are essentially an insurance contract against the default of a company's bonds, the CDS and corporate bond markets tend to move in tandem, closely interacting with each other.

The CDS basis ("the basis" hereafter), the deviation between CDS and bonds spreads, is one of the well-known no-arbitrage relations. In theory, the basis should be close to zero, ignoring some technical issues and market frictions. The violation of this relation, if any, may represent the relative mispricing between corporate bonds and CDS. Much interest has been shown, by both academics and practitioners, in understanding the basis, especially after the recent financial crisis, when an extremely negative basis was observed. Most of the existing studies on the analysis of the basis are centered on the causes of the non-zero basis

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* Corresponding author.
*E-mail addresses:* gi.kim@wbs.ac.uk (G.H. Kim), htli@ckgsb.edu.cn (H. Li), weina@nus.edu.sg (W. Zhang).

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(e.g., Bai and Collin-Dufresne, 2014; Fontana, 2011; Longstaff et al., 2005). No prior study, however, has addressed the implications of the basis for future price movements in related markets. Our study fills this void by investigating the predictive power of the basis for future returns in the corporate bond and CDS markets.

A non-zero basis could be due to many factors. For instance, CDS markets are informationally more efficient (e.g., Acharya and Johnson, 2007; Blanco, Brennan, and Marsh, 2005), and incorporate relevant information into prices more quickly than the bond market. Market frictions and risks encountered in a basis arbitrage may prevent price discrepancies from being corrected instantly (Duffie, 2010). A recent study by Bai and Collin-Dufresne (2014) documents that 34% of the CDS-bond basis can be explained by risks or market frictions (e.g., illiquidity). If a large portion of the basis cannot be explained by known factors, the remaining part of the non-explainable basis can potentially reflect temporary "mispricing," which may converge at zero in the future. Therefore, the non-zero basis may predict a price convergence in future periods of the corporate bond and CDS markets. Such predictability is expected to be stronger for the less efficient bond market than for the more efficient CDS market. Using a refined measure of the non-zero basis, we aim to quantify the predictive power of the mispricing between bonds and CDS for their future returns.

To filter out the impact of market frictions and risks involved in a typical basis arbitrage, we separate the observed basis into two parts based on the empirical explanatory model of basis by Bai and Collin-Dufresne (2014): (1) *predicted basis*, which captures the equilibrium non-zero level of the basis due to market frictions and risks (such as counterparty, funding, and liquidity risk); and (2) *residual basis*, which captures the unexplained part of the basis that may reflect mispricing between bonds and CDS. Although the residual basis may not be fully devoid of market frictions or risk factors that are not specified in the empirical model, it is expected to be less noisy in capturing mispricing after removing the well-known risks and measurable market frictions.[1]

We first document that the residual basis strongly predicts future returns for corporate bonds. We find that a one standard deviation increase in the residual basis predicts a negative future excess bond return of −4.8% on an annual basis at a minimum, suggesting that currently overpriced (underpriced) corporate bonds relative to CDS experience a subsequent price decline (increase). The price correction of corporate bonds occurs over various time horizons (e.g., 20 days, 40 days, and 60 days). The predictive power of the residual basis is still robust after controlling for bond illiquidity,[2] information spillover from the CDS market, and price momentum and reversals. However, the predicted basis has a much lower predictive power for future bond returns.

A typical basis arbitrage also involves CDS since arbitrageurs tend to hedge their bond positions with CDS. When the basis is negative (positive), one can long (short) the underlying corporate bond and buy (sell) CDS to bet on the narrowing of the basis. The arbitrage force may lead to an adjustment in subsequent CDS prices. Our empirical results confirm this intuition by showing that the residual basis has strong predictive power for the change in CDS spreads as well. A one standard deviation increase in the residual basis predicts a rate of change in CDS spreads of −11.9% on an annual basis at a minimum, suggesting that the corresponding CDS experience a subsequent spread decrease. However, the predicted basis does not predict CDS price movements at all.

Even though the residual basis has strong predictive power for both markets, the statistical significance of its predictability is much stronger for bond markets than for CDS markets. The t-statistics for the coefficients on the residual basis in our predictive regression models are about two times bigger for bond markets than for CDS markets, regardless of model specifications. This result is also consistent with the literature documenting that mispricing is observed more often in bond markets than in CDS markets because CDS markets are more efficient in pricing credit risk (e.g., Acharya and Johnson, 2007; Blanco, Brennan, and Marsh, 2005).

We perform several robustness tests to ensure that the strong predictability is consistent with the mispricing and subsequent price convergence interpretation. It is well known that investment-grade (IG) and high-yield (HY) bonds are different in many dimensions, such as investors' clientele and liquidity (e.g., Da and Gao, 2010; Acharya et al., 2013). Therefore we analyze each type of bond separately. Our results show that the price corrections occur for both types of bonds across different time horizons (20 days, 40 days, and 60 days), but the result is weaker for the speculative-grade CDS over longer horizons ( 40 days or 60 days). This result is consistent with the anecdotal evidence that the basis arbitrage is risky and that basis arbitrageurs opt for safer investment opportunities, such as investment-grade credit instruments and shorter horizons (e.g., Deutsche Bank, 2009).

Given the disruption of the corporate bond and CDS markets during the financial crisis,[3] we also investigate whether price corrections were disrupted during the crisis. Our results show that the predictability of the residual basis for bond price correction was still robust during the crisis. Interestingly, the predictability for CDS spread movement was not statistically significant during the crisis. These results indicate that basis arbitrage plays a reduced role in stabilizing the CDS market during a crisis, consistent with the literature that the limits of arbitrage have been hit by investors (e.g., Duffie, 2010; Mitchell and Pulvino, 2012).

Given the strong predictive power of the residual basis for future bond returns, it is natural to verify whether we could implement a profitable convergence trade in bond markets based on the residual basis as a trading signal. Indeed, we find that a

[1] Anecdotal evidence suggests that basis arbitrageurs will start trading only when the basis crosses a certain threshold (e.g., from 10 to 25 basis points for negative basis arbitrage, as indicated by JP Morgan, 2006, p. 55). A similar economic intuition is used in Lee et al. (1999) in the stock market to capture temporary market price deviation from fundamental value.

[2] See, for example, Longstaff et al. (2005), Chen et al. (2007), Goldstein et al. (2007), Lin et al. (2011), Bao et al. (2011), Dick-Nielsen et al. (2012), and Friewald et al. (2012).

[3] For example, see Fontana (2011), Trapp (2010), Dick-Nielsen et al. (2012), and Friewald et al. (2012). The basis was extremely negative for a prolonged period during the recent financial crisis: the basis of the investment-grade index in late 2008 dropped to −250 bps, whereas that of the speculative-grade index dropped to about −400 bps.