Research in International Business and Finance xxx (xxxx) xxx–xxx

Contents lists available at ScienceDirect

Research in International Business and Finance

journal homepage: www.elsevier.com/locate/ribaf

Full length Article

Is Thailand's credit default swap market linked to bond and stock markets? Evidence from the term structure of credit spreads

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ARTICLE INFO

JEL classification code:
G01
G12
G14
G18

Keywords:
Term structure
Credit spreads
Bond spreads
Credit default swap
Basis

ABSTRACT

When the term structure of credit spreads is used in a panel vector autoregression model, Granger causality tests provide strong evidence of bi-directional relationships among CDS, bond and stock markets. This study argues that extant research using only a 5-year credit spread tends to understate intermarket linkages since in practice investors are able to trade credit risk over the entire term structure of credit spreads. Interestingly, this study produces new empirical evidence that the term structure of CDS-bond basis displays a monotonically increasing trajectory. As the maturity lengthens, the arbitrage opportunity of companies with negative (positive) CDS-bond basis decreases (increases).

1. Introduction

A single-name credit default swap (CDS) is analogous to insurance contract that requires the buyer to make periodic payments during the contract's life or until the occurrence of a credit event in exchange for protection against credit risk of the reference entity. If a credit event occurs, the seller pays compensation equivalent to the difference between the par value of the bond and its market value after credit events. The CDS markets provide investors a convenient alternative way to trade credit risk especially when the secondary bond markets are illiquid and costly (Choudhry, 2006). In doing so, investors can take short (long) positions in credit risk of the reference company by purchasing (selling) credit protection using CDS. Duffie (1999) and Hull and White (2000) theoretically demonstrate that under the no-arbitrage conditions CDS spreads are approximately equal to bond spreads because both CDS and bond spreads measure the credit risk of the reference entity. However, many studies find that CDS and bond spreads often diverge due to several factors such as bond identity, delivery option, counter party risk, market's expectations of debt buyback and liquidity premium (e.g., Adler and Song, 2010; Bai and Collin-Dufresne, 2013; Mayordomo and Pena, 2014). The difference between CDS and bond spreads, the so-called CDS-bond basis, is therefore a key indicator of mispricing of credit-risky assets in CDS and bond markets.

For a given company, CDS spreads are not only correlated with bond spreads but also stock prices. The interrelation between CDS spreads and stock prices can be explained in the context of Merton (1974) model. Based on option pricing theory, Merton proves that equity is analogous to a call option when the company is also financed by debt. Unless the company's assets are worth more than its debt, equity is worthless and the call option is out-of-the-money. As a result, the negative movement in the corporate value is reflected in both declining stock prices and increasing bond yields (decreasing bond prices). With reference to Merton (1974), Duffie (1999) and Hull and White (2000), it can be inferred that CDS spreads and stock prices are negatively correlated. In this respect, buying (selling) CDS enables bearish (bullish) investors to take synthetic short (long) positions on stocks of the reference entity.

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https://doi.org/10.1016/j.ribaf.2018.04.006
Received 25 October 2017; Received in revised form 30 March 2018; Accepted 18 April 2018

Due to differences in market microstructures, the relative speed of incorporating new information about the credit risk across CDS, bond and stock markets has been the focus of recent research. While a large number of studies explore the price discovery and the lead-lag relationship between any possible pair of these markets (e.g., Blanco et al., 2005; Choi and Shachar, 2013; Coudert and Gex, 2013; Fontana and Scheicher, 2016; Forte and Pena, 2015; Hilscher et al., 2015; Coakley et al., 2017), a few studies analyze all of the three markets concurrently (Forte and Pena, 2009; Norden and Weber, 2009; Zhu, 2006). Incorporating both strands of literature, the current study aims to examine whether CDS and bond markets equally price credit risk and whether CDS, bond and stock markets exhibit causal interrelations. Nevertheless, this study differs from previous research which concentrates only on the 5-year credit spreads in that the credit term structure ranging from 6-month to 10-year maturities is simultaneously considered in a panel vector autoregression (PVAR) model with fixed-maturity effects. Using the entire term structure of credit risk enables investors and market regulators to understand the characteristics of CDS-bond basis and the lead-lag relationship among CDS, bond and stock markets over different maturities of the credit curve.

There has been very little research reported on the link between Thailand's CDS market and its related bond and stock markets. This makes Thailand an ideal laboratory for investigating the intermarket relationships. Due to a short history of Thailand's CDS market and limited CDS data availability, this study uses a sample of six companies from September 2008 to August 2017, a period when high-quality time series are available from Thomson Reuters Eikon. This study finds that the CDS-bond basis of five companies (one company) is consistently negative (positive) with a monotonically increasing trajectory over the whole range of credit term structure. This result suggests that the arbitrage opportunity of companies with negative (positive) CDS-bond basis decreases (increases), as the maturity lengthens. Furthermore, this study demonstrates that the VAR model using only the 5-year maturity of credit spreads underestimates the causal relationships between CDS, bond and stock markets. When the entire maturities of credit curve are used in the PVAR model, this study finds the bi-directional Granger causality between CDS, bond and stock markets. This implies that the credit term structure provides incremental information content regarding the causal directions between markets. These findings have important implications for arbitrageurs who search for arbitrage opportunities over the credit term structure and market regulators who aim to improve market efficiency and to coordinate cross-market regulatory policies.

2. Literature review

To frame the literature review, this section summarizes recent empirical studies on two key strands of literature: (1) the CDS-bond basis and (2) the price discovery and the lead-lag relationship among CDS, bond and stock markets.

2.1. The CDS-bond basis

A CDS enables two parties to exchange the credit risk of the reference entity. The premium paid by the credit protection buyer to the seller, the so-called "CDS spread", is normally quoted as basis points per annum of the contract's notional value. A CDS can be viewed as a put option written on a corporate bond because the buyer of CDS is protected from losses after the credit events. Similar to the CDS spread, the bond spread over the benchmarks (i.e., asset-swap spread, I-spread, and Z-spread) compensates bondholders for credit risk embedded in a corporate bond. Since both CDS and bond spreads measure the credit risk for a given reference entity, no-arbitrage conditions imply that the CDS spread should equal the bond spread (Duffie, 1999; Hull and White, 2000). In other words, the difference between CDS and bond spreads, namely the CDS-bond basis, should not statistically deviate from zero. The CDS-bond basis is usually computed by subtracting the bond spread from the matched maturity CDS spread. When the CDS-bond basis is negative (positive), the arbitragers can earn a near-riskless return by buying (selling) a bond and credit protection of the same maturity in equal notional amount.

In real world applications, although the long-term equilibrium between CDS and bond spreads broadly holds true, both spreads exhibit considerable short-term deviation (e.g., Blanco et al., 2005; Chan-Lau and Kim, 2004; Norden and Weber, 2009; Zhu, 2006). In addition, several empirical studies demonstrate that the CDS-bond basis is not exactly zero due to various reasons such as market liquidity, margin requirement, short-selling restriction, counterparty risk and limits to arbitrage (e.g., Adler and Song, 2010; Bai and Collin-Dufresne, 2013; Choudhry, 2006; De Wit, 2006; Mayordomo and Pena, 2014). For example, Duffie (1999) and Hull and White (2000) explain that no-arbitrage conditions between CDS and bond spreads only hold true for floating-rate notes. Longstaff et al. (2005) who decompose the CDS-bond basis into default and non-default components report that the non-default component is time-varying and associated with bond-specific illiquidity and bond market liquidity. Garleanu and Pedersen (2011) show that the CDS-bond basis persistently deviates from zero due to the differences in margin requirement of CDS and bond markets. Choi and Shachar (2013) argue that the CDS-bond basis during the 2008 financial crisis was not attributed to dealers shedding inventories when liquidity was scarce but dealers encountered regulatory capital constraints. Recently, Fontana and Scheicher (2016) who examine the linkage between euro area sovereign CDS and government bond spreads document that the positive CDS-bond basis is due to short-selling frictions and flight-to-liquidity whereas the negative CDS-bond basis is due to funding frictions and bond illiquidity.

2.2. The price discovery and the lead-lag relationship among CDS, bond and stock markets

Intermarket price discovery is the process by which asset prices of the same reference entity in different markets reflect new information and market expectations. As explained by van der Merwe (2015), most derivative markets have relatively higher liquidity but relatively lower transaction costs than their underlying cash markets. Consequently, derivative instruments tend to lead their underlying stocks and bonds in price discovery process. Comparing price discovery between CDS and bond markets, many