Empirical dynamics of emerging financial markets during the global mortgage crisis☆

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Abstract

Focusing on five major emerging markets, I investigate the interactions between credit default swap premiums, foreign exchange rates, local currency government bond spreads, and national stock market returns over the period 4/2/2007 to 8/27/2009. Empirical analysis indicates that bond markets, along with foreign exchange markets, were very dominant in the price discovery process during a common distressed period. Copyright © 2014, Borsa İstanbul Anonim Şirketi. Production and hosting by Elsevier B.V. All rights reserved.

1. Introduction

Which markets provide the most accurate and timely assessment of macroeconomic risks? Does the flow of information have a common path across emerging financial markets? There is a large body of literature examining the informational discoveries in the corporate world as well as in the sovereign context (Blanco, Brennan, & Marsh, 2005; Forte & Lovreta, 2013; Forte & Pena, 2009; Giannikos, Guirguis, & Suen, 2013; Narayan, Sharma, & Thuraisamy, 2014; Ngene, Hassan, & Alam, 2014; Nowak, Andritzky, Jobst, & Tamirisa, 2011). Even though there are many studies (Cakan, Doytch, & Upadhyaya, 2014) focusing on emerging markets (EM), very few (Ertugrul, & Ozturk, 2013) brought foreign exchange (FX) and local currency government bond (LCB) markets into spotlight. Especially, the interaction of Credit Default Swaps (CDS) and stock markets were rarely assessed together with the LCB and FX markets. This study aims to accomplish this task.

The reason behind bringing FX and LCB markets to light is simple; they are the building blocks in determining the overall risk level of a sovereign (Eichengreen, Hausmann, & Panizza, 2002). Using the novel ideas of Merton (1974) on the firms' capital structure and option pricing theory, Gray, Merton, & Bodie (2007) show that the local currency liabilities (domestic debt and monetary base) function as the "equity-like" portion of the sovereign balance sheet, whereas the foreign currency liabilities (external debt) function as a "distress barrier" on the road to default. Here one can easily see that local currency bonds and exchange rate parities are the starting points to such default probability calculations (Aktug, 2014).

Accordingly, local currency denominated government bonds are emphasized rather than US Dollar (USD) or Euro (EUR) denominated bonds in empirical analysis. Most of the corporate studies use USD or EUR denominated bonds (Blanco et al., 2005; Forte & Pena, 2009; Zhu, 2006). About

the EM studies, some authors use JP Morgan's EMBI+ or EMBIG spreads (Chan-Lau & Kim, 2004), and some use USD denominated bond yields provided by JP Morgan (Adler & Song, 2010) or extracted from Bloomberg (Ammer & Cai, 2007).[1]

The use of LCB markets is very new in the price discovery literature and the advantage is that these markets are larger and more liquid (Peiris, 2010) compared to foreign currency denominated bond (FCB) markets.[2] In addition, using JP Morgan's EMBI+ or EMBIG data has some shortcomings such as the variation in maturity structure over time, and unclear composition of instruments that go into index calculation (i.e. Brady Bonds, collateral enhancements, loans).[3]

Currency markets are the largest and the most active financial markets, and the easiest and cheapest to trade. Liquidity of these markets can also be attributed to the 24-h-trading day. Currency markets can also help international investors in diversifying their portfolios, thus achieving mean-variance efficiency (Campbell, Mederios, & Viceira, 2010).

In addition to the LCB and FX markets, I include the national stock markets and the newly developing sovereign CDS markets to provide a comprehensive analysis of emerging financial markets.[4] Sovereign risk, defined as the ability and willingness of a government to pay back its debt, has also a direct impact on macroeconomic risks via government's interaction with private sector. Therefore the performance of the private sector, or the performance of a country's stock market, is very sensitive to the finances of governments (Gray et al., 2007; Ngene, 2014) and should be included in such a study.

Finally, sovereign Credit Default Swaps (CDS) have also become very popular tools to hedge country risk, or to bet against the health of a country's economy. A CDS is simply an insurance policy[5] which pays out when a government or a company defaults on its debt. The liquidity and ease of trading in CDS markets make them very attractive for financial institutions and investors (Augustin, 2014). Consequently, since sovereign risk is closely monitored in all the four markets mentioned above (Broner, 2010), it is important to provide a complete analysis to discover which markets deliver the news faster.

The Fundamental Theorem of Arbitrage-Free Pricing (Cornuejols & Tutuncu, 2007) suggests that all the derivatives of an underlying asset have an intertemporal (linear or non-linear) relationship among each other. From this point of view, the capacity and willingness of a sovereign to payback

its debt, can be thought as the underlying asset, and all the secondary markets; stock, bond, currency, and CDS, can be considered as the derivatives tied to this asset.

Accordingly, I examine how various emerging financial markets interact with each other in delivering the news over the 2007−2009 global mortgage crisis period. Specifically, I test the comparable speed of CDS, FX, LCB, and stock markets in delivering the news. My analysis fills some of the missing gaps in the literature, and provides a snapshot for the major emerging markets, namely Brazil, China, Indonesia, Mexico, and Turkey.[6] Understanding the empirical dynamics among these financial markets can be quite important for trading, investment, and risk management purposes (Campbell et al., 2010; Jorion, 2009).

Besides various noticeable findings, I have four novel contributions. First, I show that LCB markets are very active in the price discovery process, especially when the market fear is high. This finding departs from the corporate studies which favor the leading role of CDS and stock markets over bond markets (Forte & Pena, 2009; Narayan et al., 2014). Second, I find that FX markets also have an important presence in time-series analysis. FX and LCB markets have been rarely compared with other financial markets, especially in the context of price discovery and causality across EM. Third, I reveal that the markets are more integrated (or efficient) during a common distressed period, which shows that price discovery process can be state dependent. Fourth, I also address the issue of synchronicity, and perform a multiple cointegration analysis linking all the four markets together simultaneously. This analysis sheds some light on the departures from pairwise cointegration studies performed in literature (Chan-Lau & Kim, 2004; Norden et al., 2009).

The remainder of this paper is as follows. The second section provides a brief literature review. Section 3 describes the data. Section 4 lays out the econometric methodology and elaborates on the empirical findings. The last section concludes the discussion.

2. Literature review

Majority of the literature on price discovery in CDS and bond markets have focused on the corporate sector. Blanco et al. (2005) and Zhu (2006) confirm that the two markets are cointegrated and CDS markets lead bond markets. They also argue that the discrepancies between the two markets can occur due to contract specifications such as the presence of a Cheapest-to-Deliver (CTD) option, measurement errors (Adler, 2010), repo costs, the changing credit and liquidity conditions, and moral hazards.[7]

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[1] Adler and Song (2010) are not clear about whether their bond data is dollar denominated or not. I assume that JP Morgan provided the authors with USD denominated bond yields.

[2] Andritzky (2006) notes that sovereign local debt is about three times the external debt. As of December 2008, the size of LCB markets was around $6.2 Trillion, whereas the size of FCB was around $1.1 Trillion (Peiris, 2010).

[3] Ammer and Cai (2007).

[4] Due to lack of daily data and discontinuities, I did not include foreign currency bond (FCB) markets in my analysis.

[5] Blanco et al. (2005) and Longstaff, Mithal, and Neisl (2005) give very good introductions to CDS markets.

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[6] G-20 Countries that are classified as emerging markets by MSCI Barra (June, 2009) except Russia, India, and South Africa. The quality and availability of data for these three countries was not sufficient to be included in the analysis.

[7] There is no point of buying a CDS if you believe that the (underlying) bond issuer will always be bailed out. In bailout scenarios, CDS buyers lose the value of their insurance (Cochrane, 2010).