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Rating Downgrades and the CDS-Bond Basis of European Banks

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Executive Summary

Problem

The rapid growth of the derivative market led to the origin of several financial products. The most dealt contract among credit derivatives is the credit default swap (CDS). Its basic purpose can be compared to an insurance as follows: The protection buyer transfers his credit risk of the reference asset to the protection seller in exchange for periodical payments called the CDS spread or premium. In case of a credit event, for example the default of the respective company, the protection seller has to reimburse the protection buyer. The payback amount is equal to the difference between the notional value and the post-default market value of the underlying asset in order to compensate the losses. Regarding bonds, the debt obligation's yield compensates the lender for his risk undergone with periodical coupon payments. Wit (2006) argues that in perfect markets the return on both the CDS and the bond yield over a risk-free rate should be equal to the expected loss of the investment. Assuming no arbitrage market conditions, Duffie (1999) shows that the CDS contract can be synthetically replicated, which means the n-year CDS spread s is equal to the credit spread of a par floating-rate note y over an n-year floating-rate risk-free note r. The CDS-bond basis b is calculated as follows:

$$b = s - (y - r)$$

Regarding the validity of the no arbitrage assumption, b has to be equal to 0 basis points (bp). However, discrepancies in both short- and long-term developments are reported, which climaxed during the global financial crisis in an extreme negative basis of 676 bp (see Bai and Collin-Dufresne (2013)). Theoretically, arbitrageurs should have been able to close the basis gap. However, this was not the case, which resulted in a persistent negative basis during volatile macroeconomic circumstances. This study tackles this puzzle by extracting the main drivers of the negative CDS-bond basis using existing literature and answers why investors were unable to benefit from arbitrage using basis trades. Furthermore, this research expands past findings of Norden and Weber (2004) and Hull, Predescu, and White (2004) regarding rating downgrades and the effects on the CDS-bond basis. Specific rating agency-, rating levels- and nationality effects are analysed.

Theoretical background

Past research shows that the parity relationship holds reasonably well in a stable macroeconomic environment. According to Blanco, Brennan, and Marsh (2005), slight deviations occur due to mismatches in contract specifications and the lead-lag relation between the CDS- and the bond market, whereas CDS prices tend to adapt faster to changing economic factors. The CDS' faster

price adjustment is caused by the liquidity of the CDS market as explained by Coudert and Gex (2013), which offers an unlimited supply compared to debt obligations.

Setting emphasis on deviations of the CDS-bond spread parity in the long run, limits to arbitrage prevented investors from closing the basis gap. Blanco, Brennan, and Marsh (2005) indicate that the cheapest-to-deliver option in CDS contracts, the difficulty in short-selling bonds and the liquidity premium caused major problems for arbitrageurs to benefit from basis trades. However, an extreme negative CDS-bond basis is observable during times of crisis. Bai and Collin-Dufresne (2013) report that arbitrage investors can not take advantage of the basis anomalies due to higher counterparty risk, higher funding cost, lower collateral quality, capital shortage held by major dealer banks and illiquidity of the bond market. Considering the variables included in the CDS-bond basis, CDS spreads and bond yields are available from market data. In contrast, the true benchmark risk-free rate is not observable in the market. Existing literature provides two widely used proxies, the sovereign bond rate and the swap rate. Using government bonds as the benchmark risk-free rate results in misfit due to the special tax status of sovereign securities and restricted market for government bonds compared to the unlimited supply of swaps (see Elton et al. (2001) and Houweling and Vorst (2005)). Therefore, the yield on a government security note is substantially smaller. Hull, Predescu, and White (2004) provide evidence in their work that the sovereign bond rate is approximately 63 bp below and the swap rate 6 bp over the true benchmark risk-free rate. Hence, this research uses the EUR-LIBOR swap rate as the proxy for r.

In order to examine the effects of rating downgrades, this study sets emphasis on negative rating changes performed by Moody's, Standard and Poor's (S&P), Fitch Ratings and Dominion Bond Rating Service (DBRS). The long-term credit rating signals the creditworthiness of the reference corporation to prospective investors. From 2007 to 2016, 546 downgrades are executed on the sample entities. In order to simplify the empirical analysis, the S&P rating scale is applied for all rating downgrades following the comparison of Cantor and Packer (1997).

Methodology

This work uses a sample of 25 European banks in 10 different states. Rating downgrades, CDS spreads, bond yields and risk-free rates are downloaded from Bloomberg and Thomson Reuters Datastream. To match maturities of all financial instruments, synthetic 5-year bonds are created for each day and each reference entity using linear regression. Afterwards, the following time intervals around a rating downgrade are established to examine pre- as well as post-downgrade effects: [-30,-1], [1,30], [31,60], [61,90], [1,90] and [-1,1]. The interval $[n_1, n_2]$ defines the time interval of n_1 business days after the downgrade to n_2 business days after the negative rating change. n_1 and n_2 can be either positive or negative depending on whether the respective period

is referring to the time span either before or after the rating event. Furthermore, to analyse effects of crisis, three different time periods are evaluated, which include the global financial crisis, the European debt crisis and the post-crisis situation.

First, the CDS-bond basis during the observation period is shown using mean values of all financial instruments. Second, the effects of all downgrades are tested using the one sample t-test. The null hypothesis follows the CDS-bond spread parity, which states that the basis is equal to 0. Therefore, mean changes in each interval should not be statistically significant from 0. At last, effects of different rating agencies, rating downgrades below a certain threshold and reactions among banks in different states are examined using the non-parametric bootstrap method of Efron and Tibshirani (1993) due to violations of the assumptions necessary to perform parametric tests. This is followed by determining if groups are significantly different from each other using the Kruskal-Wallis test and a subsequent post-hoc test.

Results

As described by Bai and Collin-Dufresne (2013), the negative CDS-bond basis is detected over the entire observation period. Negative peak levels during both the global financial crisis and the European debt crisis are followed by a basis recovery. The post-crisis situation shows far less volatility.

Setting emphasis on the effects of rating downgrades reveals a U-shaped pattern around the negative rating change. From 30 days before to 30 days after the downgrade, a negative basis trend is observable showing anticipation of the downgrade and resulting in short-term negative developments. Starting from 30 days after the downgrade, where the lowest mean value of the basis is found, the CDS-bond basis rehabilitates until 90 days after the rating event reaching its maximal value, which even exceeds the pre-downgrade level.

Rating agency effects recorded the most significant results. Moody's, S&P and Fitch produce similar outcomes concerning the CDS-bond basis, whereas DBRS downgrades show an overall negative basis reaction. The analysis in differences indicates discrepancies between DBRS and all other agencies in pre- as well as post-downgrade intervals. Examining effects of rating levels generates less promising results. Only downgrades below BBB- are to some extent significantly different from downgrades below AA- and below A-. Considering effects of nationality shows similarities between entities from France, Great Britain and the Netherlands. Scandinavia differs from both France and Great Britain. Furthermore, Great Britain indicates differences to Italy.

Evaluation

This study provides further evidence on the negative effects of economic crises on the CDS-bond

basis. Focusing on the effects of rating downgrades, the empirical results indicate the failure of the CDS-bond spread parity, especially during the global financial crisis and the European debt crisis. Encouraging outcomes are achieved suggesting the importance of which rating agency performs the rating change. Rating changes below a certain threshold barely produce any significant results. However, not including the speculative grade may have affected the analysis. Furthermore, it remains unclear which drivers pushed the CDS-bond basis into the negative area over most of the observation period. Setting emphasis on European banks, it was not possible to incorporate all major financial institutes due to limited data availability. These shortcomings should be considered in further research. The lack of studies on the CDS-bond basis, especially regarding the effects of credit rating, offers a broad spectrum of research possibilities in future examinations.